VATIS Update Ozone Layer Protection . May-Jun 2005

THE SCIENCE OF OZONE LAYER

Ozone decline stupefies researchers

Solar flares and frigid temperatures are believed to be working with human-made chemicals to eat away at the protective ozone layer above the North Pole. This revelation has benumbed scientists who have been looking for signs that the planets protective shield is healing. According to a report in the journal Geophysical Research Letters, in the previous winter Arctic ozone levels declined more precipitously than ever in the upper atmosphere. More recently, a lower layer of ozone has undergone an extraordinary thinning because of a level of bitter cold (about -79C) rarely seen in the Arctic and human-made chemicals. These two unusual findings have experts worried that they as yet do not fully understand the dynamics of ozone depletion.

Website: www.denverpost.com

Large-scale ozone loss

Researchers from the EU SCOUT-03 Integrated Project, coordinated by the Chemistry Department of University of Cambridge, the United Kingdom, have been studying the links between stratospheric ozone and climate change in the Arctic since May 2004. It was found that overall temperatures in the ozone layer were the lowest for 50 years and were consistently low for over three months. From late November to late February, large areas of polar stratospheric clouds were present over the Arctic region at altitudes between 14 and 26 km. As such, chemical balance in the stratosphere is altered significantly, changing the breakdown products from human-made CFCs so that rapid chemical ozone destruction could occur in the presence of sunlight. Cold conditions affected the distribution of nitrogen oxides, allowing ozone loss to continue longer than usual.

European scientists reported the first signs of ozone loss in January 2005. As sunlight returned to northern latitudes the rate of ozone depletion increased and rapid destruction of ozone occurred throughout February and March. In the altitude range where the ozone layer usually reaches its maximum concentration, over half of the ozone was lost. Dr. Markus Rex at the Alfred Wegener Institute, Germany, states that overall about 30 per cent of the ozone layer was destroyed. This largely prevented the normal seasonal increase in the thickness of the ozone layer during winter and led to a thinner ozone layer in Arctic spring compared with warmer years. The overall degree of ozone loss this year was similar in magnitude to the record loss observed during the 1999-2000 Arctic winter.

Website: www.physorg.com

Latest on Antarctic ozone

As of 20 April 2005, ozone circulation over the Antarctic continent was in its autumn state. Ozone levels over much of the Southern Hemisphere south of 50 remains around 10-15 per cent below the long-term normal. The ozone hole (where ozone values are below 220 DU) grew rapidly from mid-August to early September to reach around 19 million km2. It slowly decreased in area from a maximum of 20 million km2 in mid-September to 15 million km2 in early October. The ozone hole area rapidly dropped to zero after mid-November.

Temperatures in the Arctic stratosphere were cold enough for stratospheric clouds to form until mid-March. A rapid warming then took place and it is now too warm for such clouds to exist in the Arctic stratosphere.

Website: www.antarctica.ac.uk

Improving the accuracy of ozone depletion models

Data available in the United States indicate that inorganic bromine levels throughout the lowermost stratosphere could be as high as 4-8 parts per trillion, rather than the negligible amounts assumed in existing ozone assessment models. Traditional models underestimate the amount of ozone that has been lost during the past 25 years over the Northern Hemisphere mid-latitudes due to human activities. Researchers suggest that the additional bromine could resolve the discrepancy between actual and calculated ozone loss, since bromine reacts with other human-made chemicals. The additional bromine is likely to come from natural oceanic emissions and may relate to circulation and temperature changes.

Website: www.agu.org

ODS PHASE-OUT IN INDIA

Achievements and experiences under HIDECOR project

The Human and Institutional Development in Ecological Refrigeration (HIDECOR) project was launched to enable India achieve its national CFC phase-out targets. The main phase of this Indo-Swiss project came into existence in 2001 and ended operations in 2004. HIDECOR achieved its goal of training 10,000 servicing technicians and created a physical training infrastructure as well as a methodological approach for training the informal service sector. Salient features of HIDECOR project are the following.

Development of a dissemination strategy based on a combination of the industry access route as well as the training cell access route to technician training. An institutional set-up was conceptualized and developed to offer quality training to technicians in a cost-effective manner.

The dissemination and outreach strategy of HIDECOR was based on the principle of technology neutrality. Equal weight was given to good practices in HFC-134a, hydrocarbons and CFC-12 based technologies.

HIDECOR established a close cooperation with the Industrial Training Institute (ITI) system under the Directorate General of Employment and Training, supported revision of the syllabus as well as development of teaching aids for ITI instructors, and trained a large number of ITI instructors in cooperation with the Advance Training Institutes Howrah and Hyderabad.

Completed an unfinished job taken over from the ECOFRIG project, to make available hydrocarbon refrigerant on a nationwide basis; and

Methodologies and infrastructure created under HIDECOR significantly supported the development of a national strategy for the service sector by partners cooperating under the multilateral framework MoEFs Ozone Cell, GTZ, UNDP, UNEP and INFRAS.

Executive Summary of the HIDECOR Achievements and Experiences, March 2005

Developments under HIDECOR programme

The R&D component of the Human Institutional Development in Ecological Refrigeration project (HIDECOR) has developed indigenous and affordable equipment for the refrigeration industry. For instance, air-LPG torches or paraffin oil blow lamps are used by mechanics for brazing. However, paraffin blow lamps do not provide the necessary temperatures for brazing while air-LPG torches produce a flame of inadequate temperature, and is too thick and wide for quality brazing. Experts studied imported propane-air torches, which indicated that a swirl imparted to the flame narrowed and directed the flame to the targeted area and did not heat up adjoining areas unnecessarily. This refinement was incorporated in the air-LPG torches with satisfactory results.

Evacuation and charging (E&C) stations, which evacuate and charge a refrigeration system in one sitting, have been designed. Considerable efforts were put in by HIDECOR to locate and evaluate manufacturers of light and economical two-stage, oil-sealed, vane rotary vacuum pumps close-coupled to two-pole electric motors, and develop E&C stations incorporating these vacuum pumps. The stations include isolation valves, manifolds, compound, pressure and vacuum gauges, charging stills or an electronic weigh scale, and the vacuum pump. A station could use HFC-134a or hydrocarbons. The entire station is contained in a steel frame, weighing about 18 kg. Three such designs were developed and the E&C units successfully used in HIDECOR workshops. Apart from developing these units, HIDECOR organized special workshops for trainers to impart effective system inspection and maintenance procedures.

Contact: Mr. R.S. Iyer. E-mail: iyerus@vsnl.com

Eco-Cool, December 2004

IAF takes halon management to new heights

Halon-1211, -1301 and -2402 are the three halon compounds used by the Indian Air Force (IAF). As part of its provision for direct assistance to nations to support Montreal Protocol compliance targets, UNEP DTIEs Ozonaction Programme, along with the Ministry of Environment and Forests and the Technology and Economic Assessment Panel, convened an experts forum with high-level representatives from the IAF on the issue of halon management. This meeting raised awareness about the links between military readiness and the ODS phase-out under the Montreal Protocol, the need to phase out halons in a systematic manner and the importance of establishing an ODS management programme by the military.
Three key issues for follow up were also identified:

Conduct an inventory of halons and other ODS in military aviation;

Identify the location and quantity of halons that have adequate purity and resolve the issue related to measurement of purity; and

Set up a task force and focal point in IAF to coordinate the halon issue within the defence sector.

Contact: Mr. Rajendra Shende, UNEP DTIE Ozonaction Branch, Tour Mirabeau, 39-43, quai Andre Citroen, 75739 Paris Cedex 15, France. Tel: +33 (1) 4437 1459; Fax: +33 (1) 4437 1474

E-mail: rmshende@unep.fr

Website: www.uneptie.org

Training under NCCoPP

HIDECOR and NCCoPP programmes share the common objective of strengthening the national RAC service sectors capabilities to cope with CFC phase-out. However, while training under HIDECOR was aimed primarily at the skill development of smaller CFC consumers of MSEs and focused on non-CFC technologies in the domestic and commercial refrigeration service sector, training under NCCoPP will focus on:

Good servicing practices for CFC-based appliances;

High CFC-consuming firms (exceeding 50 kg/y of CFC);

Sub-sectors other than commercial and domestic refrigeration; and

Extending the geographical coverage for training to maintain equity between states and regions.

Existing training cells under HIDECOR are being transferred to NCCoPP, and additional training cells have been identified in new states. A notable difference from HIDECOR is that priority will be given to large CFC-consuming firms. A majority of programmes in each state under NCCoPP will be outreach programmes. Two dedicated training cells will be set up for the mobile air-conditioning sub-sector, not covered by HIDECOR.

The training will also cover best practices in retrofitting appliances using non-CFC refrigerants and servicing of the retrofitted equipment, and retrofitting of domestic and small commercial appliances with alternative refrigerants. Recovery & recycling will be relevant for sub-sectors in which the charge quantity of CFC refrigerants is quite substantial and/or where large quantities are handled at a single location.

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Eco-Cool, December 2004

CTC phase-out in India

The German Technical Cooperation (GTZ) assists the Government of India in the implementation of the

Montreal Protocol and the phase-out of CTC. With financial support from the Multilateral Fund, GTZ conducts in-depth industry surveys currently focused on the textile industry. GTZ has developed instruments that specifically aid the industry in effecting a change-over from CTC. A thorough understanding of the textile sector forms the basis of the activities undertaken. These are:

Creation of awareness of the problems resulting from the use of CTC.

Providing information on implications of CTC-related regulations;

Coordination of identification and testing of potential alternatives to CTC;

Conducting of industry seminars to assist the industry in managing the change-over; and

Imparting training on destaining processes using alternatives to CTC.

GTZ's Proklima International Programme activities in India are conducted in close consultation with the Ozone Cell, Ministry of Environment and Forest. For technical assistance, GTZ joined hands with selected local private and government institutions that provide scientific backstopping and enhance the outreach of its activities. It is also collaborating with the Textiles Committee (Ministry of Textiles) for technical consultancy services for the phase-out of CTC in the textiles industry.

Contact: CTC Phase-out India. Tel: +91 (413) 520 1241

E-mail: ctc-phaseout@touchtelindia.net

Website: www.ctc-phaseout.org

IN THE NEWS

ODS alternatives also contribute to climate change

A new report from the United Nations Environment Programme (UNEP) reveals that since 1997, when the Montreal Protocol came into force, ODS alternatives have accounted for approximately 5 per cent of human-made greenhouse gas emissions. According to Mr. Klaus Toepfer, UNEPs Executive Director, There can be no trade-offs between saving the ozone layer and minimizing climate change.

While CFCs contribute more per unit to global warming, the rapid increase in the use of replacement chemicals makes them now the greater threat to climate stability, according to Mr. Bert Metz, a climate change expert who has contributed to UNEPs 31-page report. The report outlines measures that governments could implement to curtail the use of such chemicals. UNEP is of the view that action on its proposals could halve the effect of these chemicals by 2015.

Website: www.climateark.org

Award for UNEP

The Stratospheric Ozone Protection Award is conferred by the United States Environmental Protection Agency (USEPA) in recognition of exceptional leadership, personal dedication and technical achievements in eliminating ODS. The OzonAction branch of UNEPs Division of Technology, Industry and Economics won this years award. USEPA heaped praises on the leadership and innovation of the OzonAction Programme, which has benefited over 140 countries through its unique regional networks or National Ozone Units (NOUs) and global information clearinghouse.

Contact: Mr. Robert Bisset, UNEP, Paris, France. Tel: +33 (1) 4437 7613

E-mail: robert.bisset@unep.fr

UNEP News Release 2005

Asia-Pacific region lowers CFC consumption

Twenty-three countries from the Asia-Pacific region congregated in Beijing, China, to agree on further actions that will bring them closer to full phase-out of ODS. Recent statistics have unveiled that CFC consumption in these countries were halved. Despite a marked decrease in CFC consumption, these nations are yet to commit themselves to further reductions, especially on halon and methyl bromide phase-out. Specific benchmarks are required to allow countries to meet these targets without any difficulties.

The region continues to face problems of illegal ODS trade among border countries and a system of regional cooperation and coordination has been established to help the concerned nations cope with the situation. The three-day meeting of the Regional Networks of ODS Officers from South Asia and Southeast Asia and the Pacific will plan:

Comprehensive policies and actions, such as solid control and monitoring ODS imports;

Conversion to alternatives as well as emissions reduction;

Public awareness and involvement at least for the next year; and

Identify potential difficulties that countries might face in 2007 and suggest specific actions to move these commitments forward.

The meeting is part of the work programme of the UNEP Compliance Assistance Programme in the regional office for Asia and the Pacific.

Contact: Mr. Atul Bagai, Regional Coordinator (Networking), South Asia Network, Compliance Assistance Programme, OzonAction Programme, UNEP Regional Office of Asia and Pacific, UN Building, Rajadamnern Nok Ave., Bangkok 10200, Thailand. Tel/Fax: +66 (2) 2881 662/2803 829

E-mail: bagai@un.org

Website: www.vanuatu.net.vu

China to cooperate on ODS smuggling crack-down

Mr. Zhu Guangyao, Vice-director of Chinas State Environmental Protection Administration (SEPA), has stated that China will cooperate more closely with Asian and Pacific countries to crack down on the illegal trade in ODS. Mr. Guangyao said that to deal with the illegal trade, the Ministry of Commerce and the General Administration of Customs have established an office and adopted measures, including import and export quotas and licensing system. Significant progress has also been achieved in training customs officers as well as capacity building to manage ODS imports and exports. Additionally, China will speed up the establishment of a national electronic information network to monitor the trade in ODS.

Website: www.news.xinhuanet.com

CFC phase-out in China

China will soon implement stringent measures to achieve zero ODS production and consumption by 2010, in accordance with its commitment to the Montreal Protocol. By the end of 2004, production and consumption of CFCs was lowered by 40 per cent and 55 per cent, respectively, compared with 1997 levels. Production and consumption of halons decreased by 85 per cent. China is also committed to stop production and consumption of CFCs, such as CFC-11 used as blowing agent in the PU foam sector, by 1 July 2007, except for essential purposes. The 2006-08 period will be crucial for China to implement the convention and protocol, as the country will shift its focus from investment activities in phasing out ODS production and consumption to non-investment activities in strengthening and supervision of ODS production and consumption.

Website: www.en.ce.cn

ODS phase-out in Viet Nam

UNDP has worked extensively in Viet Nam to help the government and industrial sector acquire and develop human capital and technology to manage plans to recover, recycle or eliminate ODS. UNDP supported the government in the implementation of a CFC-12 Recovery and Recycling Plan. New projects focus on recovery, recycling and conversion in the mobile air-conditioning and perfume industries and would enable the government to build up the capacity to monitor progress in all these areas.

Website: www.undp.org.vn

Bhutan bans ODS-containing equipment

The Kingdom of Bhutan has banned imports of equipment/appliances containing ODS with effect from February 2005. According to the National Environment Commission (NEC), trade officials and environmentalists will be strictly monitoring imports of commercial equipment containing ODS. Bhutan became a signatory to the Montreal Protocol only last year. On average, Bhutan imports about 170 kg/y of ODS. NEC is trying to initially halve ODS imports while existing ODS-based equipment will not be affected.

Website: www.bbs.com.bt

Philippines to cut ODS consumption by half

The Philippine government will cut the consumption of CFCs by one-half for 2005, compared with 1997 level, for the country to comply with the provisions of the Montreal Protocol. The Department of Environment and Natural Resources (DENR) said it would only allow manufacturers to import a total of 1,509 metric tons (MT) of ozone depleting substances, including CFCs, this year. This is a 50 per cent reduction from 1997 consumption level of 3,018 MT a year. In 2007, this will be further reduced to 452.7 MT, an 85 per cent reduction, according to Ms. Elvira Pausing, the OIC programme manager of the Philippine Ozone Desk of DENR.

The service sector accounts for 75 per cent CFC consumption, half of which is used to service car air-conditioners and 26 per cent intended for household air-conditioners, refrigerators and other such appliances. To assist the service sector in the phase-out, DENR developed a scheme to distribute equipment to service enterprises through the use of voucher system. The scheme is being be funded by a US$30 million grant from the Multilateral Fund of the Montreal Protocol. The voucher system now being carried out in selected service shops within Metro Manila will be expanded nationwide in the last quarter of this year.

Website: www.abs-cbnnews.com

Training of customs officers on ODS monitoring and control

A two-day training programme for customs officers on import monitoring and control of ozone depleting substances (ODS) was held at Maldives Customs Service on 8-9 May 2005. The training, which was organized by Environmental Research Centre and The Customs Academy and assisted by United Nations Environment Programme, was attended by 40 customs officers and 4 officers from NSS. The objective of the training workshop was to familiarize customs officers to identify and handle ODS that are imported into Maldives. Training was conducted by the trainers from the Environmental Research Centre and The Customs Academy. A total of 100 customs officers have completed this training so far.

Website: www.customs.gov.mv

Philippines to insist on non-CFC car aircon units

The Philippine Department of Environment and Natural Resources has announced that the Land Transportation Office (LTO) is set to reject the registration of all vehicles, covering 1999 models and older, which do not use non-CFC agents in their cars air-conditioning unit starting 1 January 2006. The regulation is part of the governments scheme to phase out the use of ODS in the country in fulfillment with the Montreal Protocol. Vehicles with air-conditioning must shift to the use of the ultimate alternative for CFC, such as HFC before that time. Otherwise, they will not be allowed to ply our roads by the LTO, said Mr. Fernandino Concepcion, Assistant Director of Environmental Management Bureau. He has warned that the use of CFCs in air-conditioning systems of vehicles is akin with violations to the provisions of the Clean Air Act.

Website: www.philstar.com

REFRIGRATION/AIR-CONDITIONING

New cooling device

In the United States, Purdue University researchers have developed new technology with the potential to modify household refrigeration technology, as well as find use in cooling future weapons systems and computer chips. Known as micro-channel heat sinks, the devices circulate a coolant through numerous channels about three times the width of a human hair. These devices could be attached directly to electronic components in military lasers, microwave radar and weapons systems, and even in future computers that will produce more heat than current computers.

The micro-channel heat sink is a copper plate containing numerous grooves 231 m wide and 713 m deep. The team is adapting refrigeration systems by employing such micro-channel heat sinks to replace conventional evaporators. In work funded by the Office of Naval Research, a team led by Mr. Issam Mudawar successfully integrated the micro-channel heat sink into a refrigerator. The device, attached to a heating element that stimulates a hot electronic component, has been tested using R-134a refrigerant. Doctoral student Mr. Jaeseon Lee states that this system successfully combines the cooling attributes of a two-phase micro-channel heat sink with the low-temperature capability of a fairly standard refrigeration system. This results in a high-performance cooling system capable of removing large amounts of heat while maintaining low chip temperatures unattainable by any competing cooling technology.

Website: www.sciencedaily.com

Synthetic lubricating oil

ChevronTexaco Corp., the United States, offers Capella HFC-55, a premium grade, fully synthetic oil for the lubrication of compressors used in air-conditioning and refrigeration systems. Developed specifically for use in compressors based on the new generation of HFC refrigerants like R-134a, Capella HFC is blended exclusively with specially selected polyol esters. It features a high viscosity index (145; viscosity at 40C - 55 cSt; viscosity at 100C - 9.06 cSt), ensuring good lubricity over a wide range of temperatures. It has a density of 1.01 (at 15C) and flash point of 275C. Other notable features of Capella HFC include:

Resistance to oxidation at high temperatures, guaranteeing a long service life;

Numerous compressor tests have exhibited excellent compressor cleanliness as well as total absence of copper transfer;

Excellent thermal and chemical stability in the presence of new eco-friendly HFC refrigerants, especially R-134a; and

Excellent oil-refrigerant miscibility properties with HFC refrigerants over a range of operating temperatures.

Contact: ChevronTexaco Corp., Fuel and Marine Marketing, 1500 Louisiana, 4th Floor, Houston, Texas 77002 2543, United States of America. Tel: +1 (832) 8546 000; Fax: +1 (832) 8544 876

E-mail: gulfcbm@chevrontexaco.com

Website: www.fammllc.com

Residential air-conditioner

Lennox Industries Inc., the United States, has launched the worlds first residential air-conditioner rated at over 20 Seasonal Energy Efficiency Rating (SEER). Rated at up to 20.5 SEER, XC21 is the most quiet and efficient central air-conditioner presently available. This model is the latest addition to Lennoxs Dave Lennox Signature collection, a product line that includes the most exciting and innovative products.

XC21 features a distinctive new cabinet design, including SmartHinge louvered panels that are attractive to homeowners and service-friendly for contractors. XC21 incorporates a two-stage scroll compressor with two levels of operation high for summer days and low for cooler days. This allows for more energy-efficient operation since the low setting is sufficient to fulfil household cooling demands up to 80 per cent of the time. A high-efficiency outdoor coil provides exceptional heat transfer and low air resistance, thus facilitating efficient operation.
The Energy Star product fulfils EPA standards by using less energy. Based on chlorine-free R-410a refrigerant, XC21 is engineered with the exclusive SilentComfort technology and includes the latest innovations to lower noise a new fan design, compressor with new vibration insulators, sound-dampening fan grill and Hushtone cabinet. It is approximately 13 times quieter than a standard air-conditioner, and includes the Lennox System Operations Monitor that reviews system performance.

Contact: Lennox Industries Inc., 2100, Lake Park Blvd., Richardson, TX 75080, United States of America. Tel: +1 (972) 4975 000; Fax: +1 (972) 4975 292.

Website: www.news.thomasnet.com

Heat exchanger for water-fuelled air-conditioner

In the United States, Delphi Corp. has entered into an agreement with Idalex Technologies to be the worlds exclusive manufacturer of heat and mass exchangers (HMX) for cooling air using a recently discovered thermodynamic cycle called the Maisotsenko Cycle, or M-Cycle. Coolerado Cooler, marketed by Idalex subsidiary Coolerado Corp., is the first product introducing the HMX.

HMX is the key component in the air-conditioner, which uses water as the medium for cooling. The system works by saturating a working air stream with water that incrementally pulls heat away from both the product and working air streams through unique flow path geometries. This results in unprecedented economical and energy-efficient cooling. No compressor or chemical refrigerant is used. Electricity is used only to power a fan to move air.

Contact: Ms. Barb Barkley, Delphi Corp., United States of America. Tel: +1 (716) 4392 594

E-mail: barbara.a.barkley@delphi.com

Website: www.delphi.com

Industrial water chiller

In the United States, Carrier Corp. has reintroduced the 17DA large capacity industrial water chiller after a six-year absence. This product has been the mainstay of central chilled water plant design since its original introduction in the mid-1960s. With a performance capacity in the nominal 3,000, 4,000 and 5,000 t range, the 17DA uses eco-friendly HFC-134a refrigerant. A steam turbine, electric motor or gas engine drive can be selected to match the most economical fuel available.
The 17DAs flexibility provides for a diverse range of applications, including industrial, municipalities and large commercial complexes, airports, etc. It also has a proven track record in university central plants as well.

Contact: Carrier World Headquarters, One Carrier Place, Farmington, CT 06034 4015, United States of America. Fax: +1 (315) 4326 620.

Website: www.global.carrier.com

Vehicle climate control

The United States-based Visteon and its affiliate Halla Climate Control Canada have jointly found a way to cool passengers faster by modifying a climate system component known as accumulator, a device that prevents too much liquid refrigerant from going to the compressor. The new Liner Air-conditioning accumulator raises time-to-comfort for passengers, enhances overall air-conditioning performance, simplifies production and assembly, and helps lower noise, vibration and harshness. The patented Liner A/C accumulator is a precision-moulded, all-plastic liner that replaces the all-metal internal component in traditional accumulators.

The new technology is suitable for use in current R-134a as well as future CO2 climate control systems. The improved time-to-comfort is the result of higher purity refrigerant gas-to-liquid mix directed to the compressor. By creating a higher purity gas mix, the refrigerant is able to achieve an optimum pressure and temperature, resulting in enhanced cooling of the passenger compartment. This technology also eliminates a NVH quality issue known as A/C thump or knock, which stems from the rapid boiling of refrigerant in the accumulator that creates a pressure wave through the system.

Website: www.biz.yahoo.com

SOLVENTS

Low-emission degreaser

Branson Precision Processing, the United States, offers LED Series Ultrasonic Vapour Degreasers that integrates all of the latest advances in emission controls and high-efficiency ultrasonics. Each model in this series incorporates a boiling tank for vapour generation and gross cleaning, an ultrasonic tank for critical cleaning and an internal water separator. This series includes, as standard, a patented conductive superheat plate to assure that minimal solvent leaves the unit with processed parts. The systems are designed for use with traditional solvents such as trichloroethylene and methylene chloride, as well as new materials, including HCFC, HFC, HFE, n-propyl bromide, AK-225, etc. Notable features of this series include:

120 per cent freeboard, a bi-parting power sliding cover and standard sub-zero secondary cooling coils;

Patented conductive superheat plate and welded plumbing connections to eliminate undetected leaks;

Low-voltage controls for safety;

PLC controls for process consistency;

Sensor for high vapour leveld to prevent solvent boil-off;

Sensor for low solvent levels to prevent heater damage and solvent decomposition; and

Optionals such as desiccant kit for azeotropes, open-mesh stainless steel parts baskets and a TDR-automated hoist system to control system operating methods.

Contact: Branson Precision Processing, 41, Eagle Road, Danbury, CT 06813 1961, United States of America. Tel: +1 (203) 7960 400.

Website: www.bransoncleaning.com

Cleaner for use on energized equipment

A.W. Chesterton Co., the United States, offers a cleaner specifically engineered to restore and improve electrical continuity on energized equipment. 279 PCS is a state-of-the-art precision cleaning solvent designed to replace CFC-113. This highly effective non-corrosive and non-inflammable solvent cleaner for electrical/electronic contacts and assemblies utilizes new HFE technology to quickly remove fluorolubricants like Krytox grease, fluoropolymers, light oils, particulates and other contaminants from metal contacts.

Contact: A.W. Chesterton Co., 225, Fallon Road, Stoneham, MA 02180, United States of America. Tel: +1 (781) 4387 000.

Website: www.chesterton.com

CFC alternative

Academy TV, Australia, has developed an effective alternative to CFC-based cleaners. The chemically inert and non-inflammable CRC Contact 2000 features thermal stability with rapid and complete evaporation. It does not contain lubricants, CFCs or methyl chloroform. This new aerosol removes light contaminants, atmospheric oils, dust and lint from precision electronic equipment without leaving behind any residue. Applications include cleaning video heads/drums, audio heads, potentiometers, fax machines, plug-in contacts, tuning mechanisms, etc.
CO Contact Cleaner is a precision electronic cleaning solvent. This technically proven, stable, inert, high-purity cleaning solvent is non-corrosive and non-staining. It evaporates rapidly and is free of lubricants. The cleaners composition does not contain CFC-113 or methyl chloroform.

Contact: Academy TV, 66-72, Charles Street, Newcomb 3219, Victoria, Australia. Tel: +61 (3) 5248 1621; Fax: +61 (3) 5248 3977

E-mail: info@academytv.com.au

Website: www.academytv.com.au

Ultrasonic vapour degreaser

Soniclean Pty. Ltd., Australia, offers an ultrasonic vapour degreasing system that provides precision cleaning of oxygen, nitrogen, hydraulic, gyrosystems, airframe and aircraft engine components. Intended for use with solvents that have been designed for minimal impact on the environment, prevent pollution and conserve resources, the new vapour degreaser utilizes pulse swept power to clean with superior penetration, precision and reliability. Pulse swept ultrasonics ensure powerful, reliable and uniform cleaning without the risk of damage to delicate items. Salient features of the system include:

Safe and eco-friendly;

Easy to use; and

Easy access to maintenance areas like boil tanks.

Optional accessories like in-line turbidity sensing and control to monitor solvent cleanliness, internal solvent distillation, I/O ports for external PC control and data acquisition, remote terminal monitoring facilities for control and process optimization are available.

Contact: Soniclean Pty Ltd., 38, Anderson St., Thebarton, South Australia 5031, Australia. Tel: +61 (8) 8234 8398; Fax: +61 (8) 8234 8391

E-mail: sales@soniclean.com.au

Website: www.soniclean.com.au

High-purity solvents

Cobehn Systems, the United States, offers ultra-pure solvents for different cleaning applications, including removal of ionic (polar), non-ionic (non-polar) and particulate soils. These clean room processed solvents are filtered to 2 microns to eliminate particulate matter. This exclusive processing stage eliminates the contamination inherent in bulk-packaged electronic grade solvents supplied in pails and drums. Cobehns product range comprises the following solvents.

Cobehn Vertrel series Vertrel SMT and Vertrel MCA (+): Vertrel SMT is a non-inflammable hydrofluorocarbon (HFC) intended for use in the removal of flux, grease, oils, waxes and ionic residues. Vertrel MCA, a non-inflammable HFC with cyclopentane, is for precision cleaning applications such as precision cleaning of metals, removal of heavy oil, grease, wax, vacuum oil and difficult soil situations.

Spray clean solvent: The non-inflammable spray clean trichloromethane is intended for use in difficult flux removal scenarios as well as in the removal of grease, oils and particulates where no other material can tackle

the job.

AKA-AK225 series: These non-inflammable eco-friendly HCFCs are designed to replace CFCs and PFCs.

Contact: Cobehn Systems, 640, Airport Road, Winchester, Virginia, VA 22602, United States of America. Tel: +1 (540) 6650 707; Fax: +1 (540) 6650 768

E-mail: cobehn@cobehn.com

Website: www.cobehn.com

FOAMS

Low-viscosity reactive polyether polyol

Synair Corp., the United States, offers low-viscosity reactive polyether polyols for use in the production of rigid polyurethane foams and elastomers. While Syncur 45325 is more compatible in water-blown foam formulations, Syncur 45365 is compatible in systems formulated with HFC-134a, -141b, -245, -365 and different hydrocarbon-based blowing agents. These polyols feature low friability, uniform cell structure, low K-factor and notably superior burn properties compared with standard amine polyols. Potential applications include spray foams, insulation, coatings and rigid casting applications.

Contact: Synair Corp., P.O. Box 5269, 2003 Amnicola Highway, Chattanooga, Tennessee, TN37406, United States of America. Tel: +1 (423) 6970 400; Fax: +1 (423) 6970 474

E-mail: sales@synair.com

Website: www.polyols.synair.com

PU foam with reduced discolouration

Researchers at E.R. Carpenter Co. Inc., the United States, have developed and patented a method to produce flexible polyurethane (PU) foam having reduced discolouration. Low density, soft, resilient, flexible PU foam is manufactured by reacting a polyol and a polyisocyanate, with water as the primary blowing agent. The improvement relates to lowering discolouration or scorch during the manufacture of the PU foam, characterized in using an auxiliary blowing agent selected from a group of linear or branched alkanes (pentane, isopentane or butane), or their mixtures, that have boiling points above -50C and below 100C at atmospheric pressure.

Website: www.freepatentsonline.com

Rigid PU foam production

Tosoh Corp., Japan, has developed a process to manufacture rigid polyurethane (PU) foam by using a blowing agent with less amount of CFC and an increased amount of water. Rigid PU is obtained by reacting a polyol

with a polyisocyanate in the presence of a catalyst, a blowing agent and a foam stabilizer. Reduction in CFC in the blowing agent was not considered feasible as it causes deterioration in friability of the foam. Decreased friability gives rise to undesirable effects such as reduced foam strength and decreased adhesiveness between the foam material and, for instance, a surface material. The new method is claimed to check friability deterioration, while allowing the foam to maintain a high degree of heat insulation. The blowing agent has minimum 2 parts by weight water and maximum 35 parts by weight of halogenated hydrocarbon (CFC). The catalyst used is an imdidazole. The process yields a rigid PU with a foam density of 10-60 kg/m3.

Website: www.freepatentsonline.com

New blowing agent

Sun Colour Industries Co. Ltd., China, offers two azodicarbonamide blowing agents AC600 and AC3000. The yellowish crystal powders can act as blowing agents in the production of PVC, polyethylene, polypropylene, ABS resins, polystyrene, nylon 6, ethylene-vinyl acetate copolymer, chlorobutaethylene, acrylonitrile-butadiene rubber, natural rubber and silicon rubber, etc.

AC600 has a gas yield of 215 ml/g and an average particle size of 10-12 m, while AC3000 has a gas yield of 220 ml/g and a particle size of 5-6 m. Both blowing agents decompose at 200-210C, have an ash content of 0.1 per cent and 0.1 per cent loss on drying.

Contact: Sun Colour Industries Co. Ltd., Building A, World Trade Centre, #6, Hongkong Zhong Road, Qingdao City, China. Tel: +86 (532) 3890 760; Fax: +86 (532) 3899 602

Website: www.suncolour.com

Website: www.ebigchina.com

Rigid thermal insulation

Xtratherm UK Ltd., the United Kingdom, offers Xtratherm Polyiso, a foil-faced polyisocyanurate (PIR) insulation board suitable for use in floors, walls and roofs. Polyiso is formed by a blowing process that generates a rigid foam composed of fine, gas-filled bubbles, which impart Polyiso its good insulating capability. Manufactured under ISO 9001 quality system, Polyiso is produced using pentane as the blowing agent. The zero-ODP blowing agent improves the dimensional stability of the boards and yields a stronger bond between the foam and facing. It also does not condense within the board at working temperatures, and breaks down rapidly in the atmosphere.

Virtually all building elements can be insulated with Polyiso concrete slab, beam and block or timber floors, masonry or timber framed walls, flat and pitched roofs. Contact: Xtratherm UK Ltd., Unit 5, Jensen Court, Astmoor Industrial Estate, Runcorn, Cheshire WA7 1SQ, United Kingdom. Tel: +44 (871) 2221 033; Fax: +44 (871) 2221 044

E-mail: info@xtratherm.com

Website: www.xtratherm.com

CO2-based foam technology

Carpenter Co., the United States, has developed Natural Foam Technology (NFT) process that utilizes carbon dioxide (CO2) as a natural blowing agent to make the foam expand. Richfoam and Comfort Cure are two products manufactured using the NFT foam conditioning system.

Comfort Cure foams are conditioned by pulling air through recently poured foams to rapidly cool them. This eliminates the effects of heat and humidity that may cause inconsistencies within the product. Richfoam products are used in almost every aspect of furniture production.

Contact: Carpenter Co., 5016, Monument Ave., Richmond, VA 23230, United States of America. Tel: +1 (804) 3590 800

Website: www.carpenter.com

HFC-245fa for rigid urethane foam

Central Glass Co. Ltd., Japan, has commercialized HFC-245fa, a replacement for HCFC-141b as a blowing agent in the production of rigid urethane foam. The company developed a unique process for producing HFC-245fa and commercialized the technology following successful results achieved during pilot plant production. HFC-245fa is a non-ozone depleting and non-inflammable substance. Its use as a blowing agent adds high heat insulating property to urethane foam. Furthermore, ease of handling has been improved by the companys recent development of methods to lower the vapour pressure of HFC-245fa.

Contact: Central Glass Co. Ltd., Chemicals Sales Dept., Kowa-Hitotsubashi Bldg., 7-1 kanda-Nishikicho 3-Chome, Chiyodaku, Tokyo 101 0054, Japan

E-mail: csd@cgco.co.jp

Website: www.cgco.co.jp

HALONS

Fire and gas system solutions

Siemens AG, Germany, offers complete fire and gas system solutions, mostly in conjunction with ESDs, for hydrocarbon production and processing plants. Active protection mechanisms are available in the form of protective extinguishing systems and a final instrumented protection layer for shutdown should a hydrocarbon leak occur. Safety of the plant is further enhanced by deploying fire and gas detection systems, comprising multiple types of hydrocarbon sensors, to reliably detect fire and explosion hazards.

The three types of eco-friendly halon-substitute extinguishing systems provided for active fire and gas protection are:

Wet extinguishing, such as with sprinklers, deluge installation or water fog or mist, to restrict or extinguish an emerging fire or for cooling the seat of a fire, e.g. storage facilities, production plants, etc.;

Foam extinguishing for cooling and smothering a fire, e.g. in tank farms, production facilities or solvent stores. The foam is easily and naturally degradable; and

Dry extinguishing systems for extinguishing a fire using inert gases like nitrogen, argon or carbon dioxide. These systems could be installed in computer centres, switching stations, chemical stores, telecommunication systems or generators.

Contact: Siemens AG, Oil and Gas Technologies, Schuhstrasse 60, P.O. Box 3240, Erlangen D-91050, Germany. Tel: +49 (9131) 723 090; Fax: +49 (9131) 721 059

E-mail: oil-gas@siemens.com

Website: www.industry.siemens.com

Automatic fire extinguisher

Nanjing Fire Protection Technology Co. Ltd., China, offers hexafluoropropane-based fire extinguishing system. The extinguishant is colourless, odourless, low toxicity, electrically non-conductive and does not cause secondary pollution. Hexafluoropropane, which has zero ODP, is an ideal substitute for halon products. Benefits include low cost, high efficiency, excellent insulation, non-contamination to equipment and speedy fire-fighting performance. The extinguishing system comprises an automatic fire alarm control system, agent cylinder, head valve, safety valve, solenoid valve, selector valve, check valve, pressure switch, rack, piping system and nozzle, etc. It can be used in telecommunication centres, electrical apparatus rooms, oil stations, laboratories, computer rooms, libraries, underground projects, offshore platforms, etc.

Contact: Nanjing Fire Protection Technology Co. Ltd., China.

E-mail: njxf@public1.ptt.js.cn

Website: www.tuna.com.cn

CF3I fire extinguishant

F-Tech Inc., Japan, has developed a technique for the industrial production of trifluoromethyl iodide (CF3I), an alternative for halon-1301. The new method involves, for the first time in the world, direct reaction HFC-23 and iodine in the presence of a hybrid catalyst. CF3I is ozone friendly and has characteristics similar to that of halon-1301.

Conventional method of manufacturing CF3I is by a complicated process of reacting a metal salt comprising a highly toxic and expensive trifluoroacetic acid or a silver salt thereof with iodine. This technology is available only with a select group of manufacturers in the United States. F-Techs process directly reacts HFC-23 and

iodine using an immobilized bed flowing type continuous system through the use of a special catalyst in which a metal catalyst is carried on activated carbon. CF3I is reported to cause cardiac sensitization when inhaled at a high concentration, but practical realization of a fire extinguishing agent offering high performance in unoccupied places like engine rooms of aircrafts and reaction apparatus in plants has been strongly desired.

Contact: Tosoh F-Tech Inc., Shiba-koen First Building, 3-8-2, Shiba, Minato-ku, Tokyo 105 0014, Japan. Tel: +81 (3) 5427 5490; Fax: +81 (3) 5427 5493

E-mail: kato@f-techinc.co.jp

Website: www.f-techinc.co.jp

CO2-based extinguisher

In China, Nanjing Fire Protection Technology Co. Ltd., Tianjin Fire Protection Science and Research Institute of the Ministry of Public Security have jointly investigated a carbon dioxide (CO2) automatic fire extinguishing system. A fire extinguishing test for 3,150 kVA oil transformer was successfully carried out. The set of design parameters obtained after the test is more complete, systematic and accurate than those from advanced countries. These data, which provide a complete set of essential design data for engineering, can also be used in total flooding extinguishing system.

Contact: Nanjing Fire Protection Technology Co. Ltd., China.

E-mail: njxf@public1.ptt.js.cn

Website: www.tuna.com.cn

HFC-227ea and CO2 fire extinguishing systems

Guangdong Ping An Fire-Fighting Equipment Co. Ltd., China, is offering HFC-227ea automatic fire extinguishing system. Available in cylinder volumes ranging from 40 l to 180 l, the eco-friendly extinguishing system is very effective and suitable for long-term leakproof storage. The system, with a working pressure of 2.5 MPa or 4.2 MPa, can be operated manually, electrically or mechanically.

The CO2 fire extinguishing system features low toxicity, excellent insulation and is operated either manually, electrically or solenoid valve actuated. This model is available with cylinder volumes of 45 l and 70 l (high pressure). Application areas include libraries, power stations, oil pipelines, painting production rooms, generating plants, data rooms, computer rooms, etc.

Contact: Mr. Liang Zemian, Guangdong Ping An Fire-Fighting Equipment Co. Ltd., Pingzhou Industrial Garden, Nanhai, Foshan, Guangdong Province, China 528251. Tel: +86 (757) 8676 6007, 8670 9999, ext. 8119/8116; Fax: +86 (757) 8676 6380

Website: www.ga.com.cn

Website: www.pafire-fighting.en.alibaba.com

Extinguishers for racing cars

SPA Technique Inc., the United States, offers eco-friendly fire extinguishers that have been specifically designed for use in competition vehicles. The latest on-board fire suppression technology used is termed SPA Lite Aqueous Film Forming Foam (AFFF). The 4 litres Multi-Flo units are designed especially for use in closed cockpit cars. They give an even 2 litres split between engine and cockpit compartments from a single chamber bottle. The FIA approved steel bottle MFM 400 S and MFC 75 S mechanical systems offer a cost-effective alternative while providing performance on pat with the more expensive alloy and carbon fibre bottle systems.

The newly homologated 3.375 litres Multi-Flo fire extinguisher systems (the mechanical MFM series and the electrical MFE series) are primarily for use in single seater cars and offer an alternative to the widely used dual chamber system. Other products from the company include the 3.375 litres Multi-Flo gas generator fire extinguisher system, the 2.25 litres single-chamber fire extinguisher system and the 2.25 litres Clubmans fire extinguisher system.

Contact: SPA Technique Inc., 1209 Indy Way, Indianapolis, IN 46214, United States of America. Tel: +1 (317) 2717 941; Fax: +1 (317) 2717 951

E-mail: info@spatechnique.com

Website: www.spatechnique.com

Halon replacement agent for use in ship compartments

In the United States, researchers at the Naval Research Laboratory (NRL) have evaluated a heptafluoropropane (HFP, HFC-227ea, C3F7H) system with a water spray cooling system as a halon alternative for application in ship compartments. HFP has been shown to readily extinguish fires in a small-sized inflammable liquid storage room. In the presence of fire, HFP degrades into the extremely hazardous acid gas hydrogen fluoride (HF) in quantities significantly greater than those generated from halon-1301 fire extinguishers.

To counter the HF threat, the team investigated fire suppression using HFP with the NRL-invented water spray cooling system (WSCS). Results have shown that this combined fire suppression system readily suppresses a fire while significantly decreasing HF concentrations and cooling the compartment. The quantified benefits of WSCS include reduced temperatures, improved reignition protection and lowered HF levels, all allowing for enhanced safe compartment re-entry and recovery.

Website: www.stormingmedia.us

FUMIGANTS

MB alternatives against tobamovirus group

In Japan, researchers have studied alternatives to the use of methyl bromide (MB) in controlling pepper mild mottle virus (PMMoV) and cucumber green mottle mosaic virus (CGMMV), which belong to the tobamovirus group. Fumigation efficacy to PMMoV and CGMMV was tested using five paper disks containing purified PMMoV and cucumber leaf sap infected with CGMMV, respectively, placed in petri dishes. The paper disks were fumigated by each fumigant for 24 h in a glass chamber with reduced air pressure. To assess fumigation efficacy, the treated paper disks were ground in phosphate buffer and inoculated for checking infectivity by counting the number of local lesions on tobacco plants for PMMoV and the number of infected cucumber plants for CGMMV. Moreover, fumigant gas diffusion in the soil was surveyed with several fumigants to determine gas behaviour in soil.

Results unveil that for PMMoV, chloropicrin is effective at the dose of 10,000-25,000 ppm and 1,3-dichloropropene is effective at the dose rate of 25,000 ppm. However, application in these dosages which are several times higher than the dose rate of the ordinary pest control practice would be costly as well as detrimental to the ecology. In the case of CGMMV, chloropicrin was found effective at dosages of 5,000-25,000 ppm. Methyl iodide was found to be far less effective even at doses of 10,000 ppm. Metam sodium at 5,000 ppm and 1.3-dichloropropene at 10,000 ppm were not found effective at all. The team concluded that as yet there are no technically and economically feasible alternatives to control soil transmission of PMMoV and CGMMV.

Website: www.mbao.org

Scrubbing out methyl bromide

Value Recovery Inc. (VRI), the United States, has developed technology for scrubbing out methyl bromide (MB). Removal and destruction of MB from a fumigation air stream requires acceptance of several constraining issues and specifications that must be addressed in an economically viable manner. An ideal system for scrubbing MB should have the following attributes:

Ambient temperature (5-15C) operation;

Simple straightforward operation requiring no incremental labour;

Off-the-shelf components, no special or costly equipment;

One-pass operation, straight through removal without air recycling;

Reliable instrumentation sampling method to verify MB destruction;

Speedy set-up, shutdown and mobility; and

Easy (non-hazardous) and cheap disposal.
VRIs technology is based on phase transfer catalysis (PTC), the salient feature of which is to bring the reactant from different phases together to react. PTC can facilitate the reaction of MB with the appropriately chosen water soluble anion, thus destroying MBs toxicity.

Contact: Value Recovery Inc., 510, Heron Drive, Suite 301, Bridgeport, New Jersey 08014, United States of America.

Website: www.mbao.org

Non-chemical post-harvest pest control

Dr. Juming Tang at Washington State University, the United States, has developed a non-chemical post-harvest pest control strategy for fumigation of agricultural commodities. The method can be used as an alternative to methyl bromide for fumigating, for example, dried fruits and nuts. The new method integrates conventional heating with a short radio frequency heating period with fruits moving and rotating in a water flume. A heat block system developed by Dr. Tang is now being used as a unified method in four stations of the United States Department of Agriculture and in Israel for studying insect thermal mortality.

Contact: Dr. Juming Tang, Washington State University, United States of America.

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Website: www.impact.typepad.com

Plastic mulch technology

Researchers in Florida, the United States, have been investigating ways to lower methyl bromide (MB) field application rates using plastic mulch technology. The commonly used plastic mulches are black and white, low-density polyethylene (LDPE) mulches. In general, their benefits include: thermal regulation of soil temperature; weed suppression; increased effectiveness of soil-applied pesticides; barrier protection from soil pathogens; reduced evaporative loss of water from soil; minimized leaching of fertilizers from the root zone of plants; etc.

However, it has been found that 20-90 per cent of MB applied can ultimately out-gas through the LDPE plastic mulch cover and into the air after soil fumigation. For enhanced containment of MB, virtually impermeable plastic mulches (VIF) has proved to be a simple and effective strategy to lower soil emissions of not only MB but of other fumigant gases as well. Studies have shown that with VIF the fumigant use rates can be substantially lowered without serious consequence to pest control efficacy or crop yield response. A key drawback of using VIF mulches is their high costs and other problems involving tensile strength. They are typically slow to properly install and are subject to tearing during machine application in the field.

Website: www.edis.ifas.ufl.edu

Quadura food irradiation system

MDS Nordion, Ontario, Canada, has introduced the QuaduraTM system, a new pallet food irradiator that is designed for importers and exporters of exotic fruits and vegetables. The system provides an economical and environment-friendly disinfestation treatment to satisfy the quarantine security requirements of international markets.

Irradiation is an alternative to methyl bromide, the universal chemical fumigant now under international regulatory scrutiny. The Quadura irradiator is one of the most advanced system available for the purpose. The Quadura system features four stations that can independently process pallets of food, allowing multiple pallet-

specific treatment doses to be simultaneously administered to different products while maintaining product quality and continuous processing operations. The fully automated Quaduras full pallet processing will reduce downtime and maximize operational flexibility and efficiency.

Contact: MDS Nordion, 447 March Road, Ottawa, ON K2K 1X8, Canada. Tel: +1 (613) 592 2790; Fax: +1 (613) 592 6937

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