VATIS Update Ozone Layer Protection . Nov-Dec 2006

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THE SCIENCE OF OZONE LAYER

Ozone hole is a double record breaker

Scientists at the National Aeronautics and Space Administration (NASA) and National Oceanic and Atmospheric Administration (NOAA) report that this years ozone hole in the polar region of the Southern Hemisphere has broken records for area and depth. From 21 to 30 September, the average area of the ozone hole was the largest ever observed, at 27.5 million square kilometres (10.6 million square miles), said Mr. Paul Newman, atmospheric scientist at NASAs Goddard Space Flight Centre. Had the stratospheric weather conditions been normal, the ozone hole would have reached a size of about 23-24 million square kilometres, about the surface area of North America.

The Ozone Monitoring Instrument on NASAs Aura satellite measures the total amount of ozone from the ground to the upper atmosphere over the entire Antarctic continent. This instrument observed a low value of 85 Dobson Units (DU) on 8 October, in a region over the East Antarctic ice sheet. According to data from NOAAs Earth System Research Laboratory in Boulder, Colorado, the total column ozone had plunged to 93 DU by 9 October from approximately 300 DU in mid-July.

More importantly, nearly all of the ozone in the 13-21 km layer above the Earths surface had been destroyed. In this critical layer, the instrument measured a record low of just 1.2 DU, having rapidly plunged from an average non-hole reading of 125 DU in July and August.

These numbers mean the ozone is virtually gone in this layer of the atmosphere, said Mr. David Hofmann, Director, Global Monitoring Division at the NOAA Earth System Research Laboratory. The depleted layer has an unusual vertical extent this year, so it appears that the 2006 ozone hole will go down as a record-setter, he added.

Observations by Auras Microwave Limb Sounder showed extremely high levels of ozone destroying chlorine chemicals in the lower stratosphere (approximately 20 km high). These high chlorine values covered the entire Antarctic region in mid to late September. The high chlorine levels were accompanied by extremely low values of ozone.

The temperature of the Antarctic stratosphere causes the severity of the ozone hole to vary from year to year. Colder than average temperatures result in larger and deeper ozone holes, while warmer temperatures lead to smaller ones. The temperature readings from NOAA satellites and balloons during late-September 2006 showed the lower stratosphere at the rim of Antarctica was approximately -13 C colder than average, increasing the size of this years ozone hole by 3.1 to 3.9 million square kilometres.

The Antarctic stratosphere warms by the return of sunlight at the end of the polar winter and by large-scale weather systems (planetary-scale waves) that form in the troposphere and move upward into the stratosphere. During the 2006 Antarctic winter and spring, these planetary-scale wave systems were relatively weak, causing the stratosphere to be colder than average.

The ozone hole is estimated to annually very slowly decrease in area by about 0.1 to 0.2 per cent for the next 5-10 years. This slow decrease is masked by large year-to-year variations caused by Antarctic stratosphere weather fluctuations. The 2006 World Meteorological Organization/United Nations Environment Programme

Scientific Assessment of Ozone Depletion completed recently concluded that the ozone hole recovery would be masked by annual variability for the near future and the ozone hole would fully recover in approximately 2065.

Website: www.nasa.gov

Hole in ozone layer will shrink within 70 years

Scientists have predicted that the hole in the ozone layer above Antarctica could be healed within 70 years. The prediction comes days after the hole reached its maximum size for this year, breaking previous records for late September.

This year it has been very cold in the Antarctic ozone layer and, as a consequence, [the hole] has had a chance to expand to quite a large size, said Mr. Jonathan Shanklin, head of the meteorology and ozone monitoring unit at the British Antarctic Survey. At its peak, the hole reached 26.9 million square kilometres, just shy of the overall record of 28 million square kilometres in the year\0.

Mr. Paul Newman of NASAs Goddard Space Flight Centre in Maryland said that the Antarctic ozone hole will reach sizes on the order of 20.7 to 25.9 million square kilometres nearly every year until about 2018 or so. Around 2018, things should slowly start improving, and somewhere between 2020 and 2025 we will be able to detect that the ozone hole is actually beginning to decrease in size, he said.

Website: www.environment.guardian.co.uk

Canadian satellite explains 2006 ozone layer depletion

High-speed winds above the Northern Hemisphere have a much greater impact on ozone levels than was previously thought, says a new study that used data collected in 2006 by the Canadian Space Agencys SCISAT satellite. The study showed that record amounts of ozone-destroying nitrogen oxide (NOx) gases descended some 48 km to the top of Earths stratosphere because of strong atmospheric winds. It was a process that contributed to the depletion of the ozone layer.

In February 2006, winds in the polar vortex sped up significantly and brought increased levels of NOx to the upper stratosphere over the Arctic and the northern areas of North America and Europe. The only time more NOx has been observed in the upper stratosphere was during winter 2003-04, when huge solar storms bombarded the region with energy particles, and triggered a decrease of up to 60 per cent in ozone molecules.

Dr. Peter Bernath, the lead scientist, said that more NOx enters the stratosphere when strong winds combine with solar storms. The sheer quantity of nitrogen oxide making its way from the upper stratosphere down to the ozone layer last February was remarkable, and there were no solar storms at the time, he said. Besides Dr. Bernath, Mr. Chris Boone of the University of Waterloo, Ontario, Mr. Lynn Harvey and Ms. Cynthia Singleton of the University of Colorado at Boulder, and Ms. Janet Kozyra of the University of Michigan co-authored the paper, Enhanced NOx in 2006 linked to strong upper stratospheric Arctic vortex.

Website: www.newswire.ca

ODS PHASE-OUT IN INDIA

India reports reduction of CFC

India produces CFC-11, CFC-12, CFC-113, Halon-1211, Halon-1301, carbon tetrachloride (CTC), methyl chloroform and methyl bromide. These ozone depleting substances (ODS) are used in refrigeration and air-conditioning, electronics, fire-fighting, foams and aerosol industries. In 1993, India prepared a detailed Country Programme for Phase-out of ODS, to ensure that ODS phase-out occurs according to the national industrial development strategy, without undue burden on the consumers or the industry, and for accessing the Montreal Protocols financial mechanism. Since then, the Programme is being implemented.

The Ozone Cell in the Ministry of Environment and Forests (MoEF) has been set up as a national unit to look after the Montreal Protocol and to render necessary services to implement the Protocol and its ODS phase-out programme in India. The MoEF has also established an Empowered Steering Committee, chaired by the Secretary (E&F) and supported by three Standing Committees. These Committees are responsible for the implementation of the Montreal Protocol provisions, review of various policy and implementation options, project approvals and project monitoring.

India has taken a series of fiscal and regulatory measures to facilitate ODS phase-out. The gov-ernment has accorded customs and excise duty exemptions on goods required for ODS phase-out projects and new investment with non-ODS technology. The Reserve Bank of India has directed all financial institutions and commercial banks not to finance any new establishment with ODS technology. Trade in ODS with non-Parties to the Montreal Protocol is been banned. All ODS need licence for both import and export. Export of CFCs to non-Article 5 Countries has also been banned.

The Ozone Depleting Substances (Regulation and Control) Rules, 2000 under the Environment (Protection) Act, 1986 has been notified in the Gazette of India on 19 July 2000. These Rules set the deadlines for phasing out of various ODS, besides regulating production, trade import and export of ODS and the products containing ODS. These Rules prohibit the use of CFCs in manufacturing various products beyond 1 January 2003, except in metered dose inhaler (MDI) and for other medical purposes. Similarly, use of halons is banned after 1 January 2001, except for essential use. ODSs such as CTC and methyl chloroform and CFCs for metered dose inhalers can be used up to 1 January 2010. Further, the use of methyl bromide has been allowed up to 1 January 2015. HCFCs, used as interim substitute to replace CFCs, are allowed up to 1 January 2010.

The Executive Committee of the Montreal Protocol approved 357 projects involving funding of Rs 10 billion to phase out 12,405 ozone depletion potential (ODP) tonnes in consumption and 33,683 ODP tonnes in the production sector. In the consumption sector, 269 projects covering 750 enterprises in refrigeration and air-conditioning, aerosol, foam, halon and solvent sectors have been assisted in the change-over to non-ODS technology. Among these, 90 projects have been completed and others are at various stages of completion. Some of the other ODS phase-out projects are:

Gradual Phase-out of CFC Production project US$90 million disbursed to the four producer plants in India and will reduce 11,243 MT of CFC.

National Halon Production Closure project US$2.3 million provided to the two halon producers.

National Halon Banking Management Programme, with bilateral assistance from Australian and Canadian governments, at a total cost of US$491 million completed and inaugurated.

National Phase-out Plan of CTC in Production and Consumption Sector US$52 million approved for reducing the production and consumption of CTC by 85 per cent by 2005 and 100 per cent by 2010.

A national training programme for customs and enforcement officials and national awareness programme under implementation.

Preparation of CFC phase-out in MDI sub-sector and HCFC strategy for India funding approved by the Executive Committee.

Data on production, export, import and feedstock use of ODSs are reported on time to the Ozone Secretariat. Sector-wise consumption data along with the progress report on the implementation of the Country Programme are reported to the Multi-lateral Fund (MLF) Secretariat.

The Ozone Cell officers participate in MLF missionson ODS phase-out project implementation. India has so far met the following compliance dates as per the control schedule:

Freeze of CFC production and consumption in July 1999 at 22,588 ODP tonnes and 6,681 ODP tonnes, respectively;

Freeze of halon production and consumption on 1 January 2002;

Total phase-out of halon production and consumption;

50 per cent reduction of CFC production and consumption in 2005 (production from 22,588 MT to 11,240 MT and consumption from 68,812 MT to 1,640 MT); and

85 per cent reduction of CTC production and consumption (production from 11,525 MT to 1,508 MT and consumption from 11,537 MT to 1,493 MT.
Website: www.pib.nic.in

Preparatory segment of 18th Meeting of Parties to the Montreal Protocol

The Minister of Environment and Forests, Mr. A. Raja, expressed the need to accord importance to the health of people while giving high priority to protect the ozone layer. He was speaking at the opening ceremony of the High-level Segment of the 18th meeting of the Parties to the Montreal Protocol in New Delhi. The Minister said that some developing countries, including India, face difficulties in manufacturing metered dose inhalers (MDI) that use chlorofluorocarbons (CFC). He expressed concern that till date neither economically viable and well adaptable technology has been evolved nor suitable guidelines for financial support for developing countries been developed to meet the incremental cost of CFC phase-out in MDI sector.

The five-day meeting hosted by the Ministry of Environment and Forests has been organized by United Nations Environment Programme. It will address issues relating to monitoring the trans-boundary movement of ODS to prevent illegal trade, treatment of stockpile of ODS for both developed and developing countries, the challenges to be faced by the parties in preparing the ozone layer in future, review of nominations for essential use exemptions, discrepancies between emissions determined from bottom-up methods and atmospheric measures, etc.

Website: www.pib.nic.in

CTC phase-out in Steel Authority of India Limited

Carbon tetrachloride (CTC), which depletes the ozone layer, was being used at the integrated steel plants of the Steel Authority of India (SAIL) mainly for three types of cleaning applications: cleaning of electrical machines; cleaning of oxygen storage tanks and accessories (cylinders, rotors, stators, piping, valves, compressors, heat exchangers, etc.) in the oxygen plant; and cleaning of circuit breakers and electrical installations. An umbrella project, funded by the United Nations Development Programme, for the change-over from CTCto trichloroethylene, under the coordination of the Ministry of Environment and Forest Ozone Cell, is currently phasing out the use of 268 MT of CTC.

Website: www.sail.co.in

Indian HFC plant secures 20 per cent of worlds carbon credit

Gujarat Fluorochemicals, India, has cornered one-fifth of the worlds total supply so far of carbon credits under a Kyoto Protocol trading scheme. The website of the United Nations Framework Convention on Climate Change (UNFCCC) says that the judging panel formally approved 780,000 tonnes of pollution cuts, which the company can now deliver to rich countries lagging in their Kyoto emissions targets.

The plant produces pollution cuts measured in tonnes of carbon dioxide equivalent by destroying the super-greenhouse gas HFC 23, a by-product in the refrigerant industry. The new approvals swell its total issued carbon credits to 2.9 million tonnes versus a global total of 16.5 million. Carbon cuts for 2008 delivery in the European Unions trading scheme trade at about 16.5 euros per tonne. Kyoto carbon credits typically trade at some 85 per cent of the EU price, which would value Gujarat Fluorochemicals total haul so far at some 41 million euros.

Website: www.in.news.yahoo.com

IN THE NEWS

Beijing 2008 sponsors want games ozone-friendly

Sponsors of the Beijing 2008 Summer Olympic Games have told the Beijing 2008 Organizing Committee (BOCOG) that they will do their best to make the 2008 Games ozone-friendly. The 2008 Games has Green Olympics as one of its concepts and BOCOG has worked with the UNEP OzonAction Programme and the State Environmental Protection Administration (SEPA) to bring out a number of guidebooks compiled to assist in the ozone-friendly construction of the venues, marketing, catering and other areas.

BOCOG has advised Coca Cola and McDonalds, its Worldwide Olympic Partners, and the Beijing 2008 Olympic partner Volkswagen (China) and sponsor Haier to carry out this effort in their own companies. Volkswagen (China) has promised that R134a or a better refrigerant will be used for air-conditioning the vehicles it provides for the Games. Coca Cola is partially adopting natural refrigerants as carbon dioxide instead of ozone depleting substances (ODS) for the 4,000 freezers, which it will provide during the Games. McDonalds has pledged not to use any ODS during the Games and has a team dedicated to dealing with the use of any ODS. Haier, Chinas top home appliance manufacturer, is planning to develop a new generation of refrigerators that use natural refrigerants and solar energy.

Website: www.gamesbids.com

Drastic reduction in use of CTC urged in Pakistan

Pakistans Federal Minister for Environment Mr. Syed Faisal Saleh Hayat has called for a drastic reduction in the use of the ozone depleting chemical carbon tetrachloride (CTC). This poses a great challenge and we need to control the use of the chemical by cutting down its consumption to 15 per cent, said the Minister while speaking at a function organized to mark the International Ozone Day on 16 september.

Pakistan will continue to make efforts to control CTCs usage in partnership with national stakeholders and through governmental controls, the Minister said, stressing that no government could accomplish much without the participation of the general public and all stakeholders. In order to check the problem, Pakistans Directorate General of Customs and Research and United Nations Industrial Development Organization (UNIDO) have trained 199 customs officers to increase their capacity in identifying ozone depleting substances.

Website: www.dailytimes.com.pk

Indian Prime Minister lauds the countrys timely compliance

The Indian Prime Minister Dr. Manmohan Singh said that country has fulfilled all its obligations under the Montreal Protocol within the time table laid down, in some aspects even before schedule. Giving three main reasons for Indias success in this area, he said the contributions are generally in line with the principle of common but differentiated responsibility and respective capabilities and contributions from developed

countries are voluntary.

Inaugurating the High-level Segment of 18th Meeting of Parties to the Montreal Protocol in New Delhi, he explained that the first reason is the strong scientific consensus preceding the treaty about the cause of problem, clarity about responsibility for the problem, the availability of mitigation technologies at reasonable cost and fairly accurate knowledge about the resources needed to address the problem. The second reason, he said, is that the eventual entitlements of ODS on a per capita basis between developed and developing countries are identical. The third reason is meeting of incremental costs of change in technology in and transfer of technology to developing countries.

The Minister of Environment and Forests, Thiru A. Raja said India has taken a series of fiscal and regulatory measures to facilitate ODS phase-out in the country. He further said that all financial institutions and commercial Banks have been directed not to finance new establishments with ODS technology. A massive public awareness campaign has been launched for publicising the ODS phase-out programme. He said this is the first environmental agreement where developed and developing countries have taken pro-active steps to address a significant global environmental issue, in a framework of legally binding commitments on the basis of common but differentiated responsibilities and respective capabilities. For this a dedicated financial mechanism has been established. The implementation of the Montreal Protocol provides several reasons on how we may move forward on other global environmental issues with greater scientific complexity, he added.

Website: www.pib.nic.in

China amends CFC import quota

China has announced the gross volume of import quotas of chlorofluorocarbons (CFC) and the detergent TCA in 2006 and related matters in accordance with the regulations under Administrative Measures on Import & Export of Ozone Depleting Substances (ODS) jointly released by State Environmental Protection Administration, the former Ministry of Foreign Trade and Economic Cooperation and General Administration of Customs. According to the announcement:

In line with the principle of gradually phasing out the production and consumption of ODSs, the gross volume of import quotas of CFC-11, used as dispersant in metered dose inhalers, and the detergent TCA in 2006 are reduce to 380 and 2,200 tonnes, respectively.

For the time being, 70 per cent of the gross volume of import quotas of the dispersant CFC-11 and the detergent TCA will be distributed, and the remaining 30 per cent will be distributed in accordance with actual demands of both domestic and overseas markets in September 2006.

As part of strengthening the administration of quota licensing of CFCs and controlling the gross volume of exports of CFC-11, CFC-12 and Halon-1301, enterprises shall submit export declaration forms in duplicate to the National Office of Import and Export Administration of Ozone Depleting Substances for registration immediately after finishing the contracts.

In accordance with Administrative Measures on Import and Export of Ozone Depleting Substances and Regulations on Strengthening Administration on Import and Export of Ozone Depleting Substances, enterprises applying for import quotas of CFCs and the detergent TCA shall put forward applications to the National Office of Import and Export Administration of Ozone Depleting Substances before applying for import and export licence to licensing agencies authorized by the Commerce Ministry.

Website: www.english.mofcom.gov.cn

Korea sharply cut ODS production last year

According to the government of the Republic of Korea, the country has fulfilled its obligation to cut the production and use of ozone-depleting substances by 50 per cent last year in accordance with United Nations regulations. Republic of Korea joined the Montreal Protocol in 1992. The governments basic plan called for halving production and consumption of Annex A substances by the end of 2005 from the 1995-97 baseline. To allow a smooth transition, the plan was for reductions of just under 10 per cent a year over 1998-2004. The country cut its output and use of these substances by 69 per cent between 1992 and 2001. Domestic production of Annex A substances fell by 63 per cent during the same period, while imports fell by nearly 80 per cent between 1995 and 2001, from 1,645 tonnes to 353 tonnes.

Websites: www.english.yna.co.kr
& www.oecd.org

More eco-friendly shops in the Philippines

In the Philippines, 132 shop owners in Quezon City have received vouchers worth US$2,000 each that they can use to buy environment-friendly tools and equipment. Mayor Feliciano Belmonte Jr. and officials of the Department of Environment and Natural Resources (DENR) issued the vouchers to help beef up Quezon Citys campaign against the use of ozone depleting substances like Freon in air-conditioning and refrigeration.

The programme, part of the World Bank-assisted Voucher System Grants, benefits owners and operators of air-conditioning and refrigeration service shops. Beneficiaries will use the vouchers to buy equipment like a portable leak detector, a recovery and recycling machine, a recovery cylinder, a vacuum pump and meter, and a nitrogen regulator. DENR describes Voucher System as an effective strategy in changing the behaviour and practice of operators, owners and technicians in the air-conditioning and refrigeration industry.

Website: www.newsinfo.inq7.net

Sri Lanka to freeze import of CFC-operated equipment

The National Ozone Unit (NOU) of Sri Lanka has urged people to not purchase refrigerators, air-conditioners and other equipment that use chlorofluorocarbons (CFC). The Unit head Dr. W.L. Sumathipala said Sri Lanka would freeze imports of CFC-operated equipment from the end of next year to protect the ozone layer under the guidance of the Montreal Protocol. Speaking to media in Colombo, Dr. Sumathipala said that after the launching of the NOU in Sri Lanka the ozone depleting substances have reduced by a considerable amount. During 1995, Sri Lanka imported over 450 tonnes of CFC. This was reduced by 65 per cent during 2005.

NOU assists local industrialists and individuals to convert their equipment into CFC-free system. According to NOU, several CFC-operated industries have changed their CFC-operated sections. It has trained CFC investigators, air-conditioner and refrigerator technicians, customs officials and other government officials to carryout investigations on CFC operated equipment.

Website: www.lankaeverything.com

Advice on natural refrigerants

Eurammon based in Frankfurt, Germany originally established to promote the use of ammonia in refrigeration systems has expanded its coverage to include the other mainstream natural refrigerants hydrocarbons and carbon dioxide.

In Germany, Eurammons members include compressor manufacturers and academic centres. It is associated with similar organizations worldwide.

As a centre of competence, Eurammon offers advice on plant design and conformity with international standards. The development of R723 a binary fluid composed of ammonia and dimethylether in the ratio 3:2 and gives improved oil mobility and lower gas pressures than ammonia alone was the result of one of its cooperative ventures with the ILK research institute in Dresden. R723 creates more opportunities for ammonia in smaller systems (below 100 kW). More information about Eurammon is available at the websitewww.eurammon.com or by sending e-mail to karin.jahn@eurammon.com

Website: www.jarn.co.jp

REFRIGRATION/AIR-CONDITIONING

Mobile air-cooling unit with numerous benefits

A mobile air-cooling unit engineered for use in remote underground locations offers significant benefits to mining operations, especially where additional cooling capacity is needed, or where existing cooling capacity is not available or inadequate. Available from Mine Support Products (MSP), a company within the DCD-Dorbyl group in South Africa, the unit was developed by M-Tech Industrial to provide a more comfortable working environment.

The Ener-flow modular underground air-cooling unit (ACU) is ideal for providing localized cooling where heat is a problem. The unit uses a vapour compression cycle that comprises a compressor, an air evaporator and a water condenser. All components are housed within a single, mobile, modular unit. It can be mounted on a tracked unit, have its own tracked under-carriage or, if needed, could be wheel-mounted. The unit was designed to allow easy connection of all services including water, electricity and fan. The dimensions of the unit are such that it will fit very easily into a mine cage, and the unit can easily be moved as needed.

Hot air is drawn into the unit and cycled through the air evaporator using a standard mine ventilation fan, resulting in the cooling down of the hot air and the feeding of this cooled air back into the surrounding area. According to Mr. Van Eldik of M-Tech, the unit is suitable for all remote underground locations with air wet bulb temperatures in the region of 32.5C and water inlet temperatures of up to 35C. The temperature change on the air side through the unit is between 5C and 10C wet bulb, depending on the air volume flow rate through the unit, Mr. Van Eldik says.

The energy extracted from the air is transferred to the water in the condenser by means of the compressor and

this water is then discharged into the mines waste water reticulation system. The system design ensures that this volume of water is minimal, depending on the specific application circumstances as well as the temperature of the supply water; the flow is typically in the region of one litre a second.

Currently, a 406 mm mine ventilation fan with 4 kW capacity or a 572 mm, 7.5 kW fan is used. The unit has a nominal cooling capacity of 80 kW, yet needs only 18 kW electrical input, making it energy-efficient. The air-cooling unit is 2.3 m long, 1.25 m wide, 1.8 m high and has a weight of 2 tonnes. It uses the environment-friendly R134a refrigerant.

Website: www.engineeringnews.co.za

CO2 refrigeration device with heat reclaim

Carrier Corporation, the United States, offers a refrigeration device that employs carbon dioxide (CO2) as refrigerant. The unit consists of a compressor, a heat exchanger, an expansion device, and an evaporator. The refrigeration device comprises a first portion and a second portion, which has a higher temperature relative to the first portion when the refrigeration device is in operation. The heat-reclaim heat exchanger is provided at a given location in the second portion, for transferring heat to a fluid for further use as a source of heated fluid.

Contact: Carrier Corporation, One Carrier Place, Farmington, Connecticut, CT 06034-4015, United States of America. Tel: +1 (860) 674 3000.

Website: www.wipo.int

Composition that can be used as a refrigerant

Atofina, Puteaux, France, has been granted a United States patent for a composition consisting essentially of 55 to 94 per cent R-125, 2.5 to 35 per cent of R-134a and 3.5 to 25 per cent by weight of DME for use as a refrigerant in a heat transfer system designed for R-22 and comprising, as lubricant, a mineral oil or an alkylbenzene oil.

This composition can be substituted for R-22 in its various applications and particularly for air-conditioning. Its thermodynamic properties allows it to be substituted, without any disadvantage, for R-22 in a heat transfer installation designed to run on that fluid, particularly allowing a return of oil far better than that of R-407C when the oil used is a mineral oil or an alkylbenzene oil. Therefore, while switching over to the new composition from R-22, an oil change is not necessary.

The three following specific compositions (all percentages by weight) are claimed as ideal, the last one being the most preferable:

63.5 per cent R-125, 31.5 per cent R-134 and 5.0 per cent DME

73.5 per cent R-125, 21.0 per cent R-134 and 5.5 per cent DME

82.0 per cent R-125, 12.0 per cent R-134 and 6.0 per cent DME

Another advantage of the composition is its chemical compatibility with the polymers such as EPDM, Hypalon, Neoprene, Viton, polyethylene terephthalate and polytetrafluoroethylene commonly used to make the seals or connecting pipes in refrigerating circuits operating on R-22.

Website: www.freepatentsonline.com

New refrigerant for automotive air-conditioning

INEOS Fluor, part of the multi-national INEOS Group, has announced that it has developed and is currently testing a new proprietary refrigerant designed to meet the long-term needs of automobile manufacturers in Europe. The new refrigerant has a direct global warming potential (GWP) well below the 150 threshold for automotive refrigerants set by the European Union F-Gas Directive. With many of the benefits associated with the current fluorinated refrigerants, it is expected that this new refrigerant will be a viable alternative to HFC134a in vehicle air-conditioning beyond the phase out in new vehicle types after 2011.

Initial assessments of the new refrigerant are said to be promising, suggesting it will be an effective, non-inflammable refrigerant with zero ozone depletion potential (ODP) and very low direct GWP. Our aim is to provide a safe and effective refrigerant for automotive air-conditioning that can be used with the same degree of confidence as HFC134a, stated Mr. David Price, CEO of INEOS Fluor.

Contact: Mr. Richard Longden, INEOS Fluor Limited, P.O. Box 13, The Heath, Runcorn, Cheshire WA7 4QF, United Kingdom. Tel: +44 (1928) 513064; Fax +44 (1928) 567607.

Website: www.ineosfluor.com

First test car cooled with next generation refrigerant

DuPont Refrigerants, a unit of the chemicals giant DuPont, recently launched the first demonstration of DP-1, its leading next generation, low global warming potential (GWP) refrigerant, in a current production car equipped with a R-134a mobile air-conditioning (MAC) system. No changes were made to the demonstration vehicles existing MAC system in order to run on DP-1. This and other tests indicate that the conversion to the more sustainable refrigerant DP-1 might not need extensive redesign of automotive air-conditioning systems or a major overhaul of the current MAC supply chain. Since it is compatible with existing 134a MAC system technology, DP-1 has the potential to enable a cost-effective global transition to low GWP refrigerants across the entire global MAC industry.

According to the latest safety, environmental and performance test data released by DuPont Refrigerants, based on a comparison between DP-1 and CO2, emissions reduction would be equivalent to 230 million gallons of fuel savings per year with DP-1. DuPont expects DP-1 to be the preferred alternative refrigerant candidate globally for automotive air-conditioning owing to its similarities with R-134a, very low GWP and zero ozone depletion potential refrigerant. It is non-inflammable and has also performed well in tests to date

involving thermal stability, materials compatibility, lubricant miscibility and toxicity. DP-1 is expected to be suitable for use in all climates and in all vehicles.

Website: www.refrigerants.dupont.com

Marine DC air-conditioners

Dometic Environmental Corporation, the United States, has introduced a marine air-conditioning package with a dedicated power module that operates on 12 VDC power from the boats batteries. The 3,500 BTU Cuddy air-conditioning unit is about the size of a battery box and can be set up at any out-of-the-way location in the smallest boat cabin. It uses environment-friendly R417A refrigerant gas and weighs just 13.2 kg.

The built-in dedicated power module converts the 12 V output from the batteries to alternating current for the air-conditioning unit. It can also run on 115/230 V, 50/Hz AC power. The system draws just 29 amperes from the boats batteries when running, and can provide more than 8 hours of continuous run time from a bank of three deep-cycle Group 27 marine batteries.

The basic package includes the air-conditioning unit with dedicated power module, seawater pump and thermostat controls. Dometic offers an optional air distribution kit that includes grills and ducts. The systems pre-wired polarized plugs provide fast, error-free hook-up. The unit is built for long-lasting performance in the salt-air environment, with a corrosion-resistant stainless-steel chassis and reliable rugged components. It has a high-velocity split-capacitor motor for optimal airflow.

Website: www.bymnews.com

Environment-friendly system replaces refrigerants

Gas producer and supplier Afrox Limited of South Africa has introduced Zugibeast, a machine that places ailing systems on the refrigeration equivalent of dialysis. Just as human dialysis patients have their blood cleaned, this new equipment separates contaminants from the refrigerants off line or on line.

Zugibeast is capable of processing up to 2 t/h of refrigerant, depending on the refrigerant type, properties and contaminants. It can decontaminate and replace refrigerant around 10 times faster than any comparable equipment, according to Afrox, and uses the plants own refrigerant charge to carry out a deep clean. Zugibeast extracts, and then separates the deposits and water from the clean refrigerant through a filter, while another dry filter takes out any remaining moisture at the end of the cycle.

Cleaned refrigerant is flushed through the system to take out any deposits and sludge that reduce heat transfer efficiency by building up in the evaporator and condenser and causing increased electrical and maintenance costs. Theoretically, oil should not make up more than about 2 per cent of the total volume of the refrigerant in a system. However, according to Afrox, some of its samples have shown levels in excess of 20 per cent. Zugibeast separates and drains off the full charge and restores the right balance.

The reclamation and rectification process cleans the entire system on the internal gas side of the system. This also means that there is less power consumed owing to improved coefficients of performance and the refrigerant is reused being back to ARI Spec for moisture, acid and oil, says Mr. Christell le Roux, Afroxs

Business Manager.

Website: www.miningweekly.co.za

Air-cooled chiller range

Carrier Corporation, the United States, has introduced its latest air-cooled chiller range, the 30XA AquaforceTM, in the Middle East. The chiller with screw compressors uses non-ozone depleting refrigerant HFC 134a and new micro-channel heat exchanger coil technology. In tests, Aquaforce achieved record part load seasonal energy efficiencies IPLV of 0.76 kW/t (4.6 kW/kW) on average.

According to Mr. Pierre Crevat, Carriers Marketing Manager for Europe, Middle East & Africa, The micro-channel coil technology has been widely used in the automotive industry for some years, but this is the first time it has been applied in large chillers. It has been shown to increase heat transfer efficiency.

Carriers patented Flying BirdTM fans have also been incorporated to contribute to new standards in sound emission. Pro-DialogTM controls with a touch screen interface and field serviceable compressors are further innovations. The 30XA Aquaforce range of chillers with screw compressors is available in 20 sizes with capacities from 75 to 475 tonnes (270 kW to 1.7 MW).

Contact: Carrier Corporation, One Carrier Place, Farmington, CT 06034-4015, United States of America. Tel: +1 (860) 674 3000.

Website: www.ameinfo.com

SOLVENTS

Vapour degreasing machines

The Ardelve Vapor-Therm from Avanti Chemicals, Australia, provides simple, straightforward, single-step vapour degreasing. Ardelve Vapor-Therm machines are primarily used in production line vapour degreasing of newly manufactured components such as those that have been pressed, machined, stamped or milled for removing cutting oil and turnings. The machines are also used for vapour degreasing precision components, for removing residue of fluids used in non-destructive crack testing process, for cleaning bearings and valves, etc.

Ardelve Vapor Therm machines have no moving parts, provide rapid production and have reduced impact on the environment. Their operation is simple. The solvent is boiled in the tank, creating a vapour, which rises within the machine creating a vapour zone. Parts are lowered into this vapour zone. The solvent vapour condenses on the cold work and immediately washes any grease and oil away, down into the tank. When no further condensation occurs as the part reaches the boiling temperature of the solvent, the cleaning action ceases, the parts are removed clean, dry and ready. A large capacity coalescer separates all water picked up during the vapour degreasing operation. The distilled dry solvent is automatically returned to the tank to complete the cycle.

Vapour degreasing action can be enhanced by fitting the optional spray wand and holding pot to provide filtered solvent rinsing of components. The machines can also be configured as a dual tank unit, where one tank is used for immersion cleaning. The tank can be fitted with ultrasonic transducers to further enhance the operational efficiency of the vapour degreasing process. The machines use as solvent trichloroethylene, which is non-inflammable and has negligible ozone depletion potential and global warming potential.

Vapor Therm vapour degreasing machines features include, 304 stainless steel construction, maximum safety controls, triple thermostat control, cooling water flow switch, air flow switch, low level alarm, push button controls, full system indication, 24 V control circuit for added safety, fully insulated to conserve heat and energy, Incoloy-sheathed elements, which are easily removable without tank draining, and recirculating cooling system. The machines are available in several configurations.

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Solvent composition for engine cleaning

General Electric Company, New York, the United States, has patented a solvent composition for cleaning gas turbine engines to remove fuel or lubricant residues. The composition comprises a fluorine-containing first constituent and a flourine-containing second constituent (such as a mixture of hydrofluorocarbon and hydrofluoroether). According to the patent, the first constituent of the solvent can comprise one or more hydrofluoroethers and the second constituent one or more hydrofluorocarbons, with each of these constituents not exceeding 75 per cent by volume and the hydrofluorocarbon content being less than that of the hydrofluoroether.

The patented invention also provides a method of cleaning gas turbine engines having a residue, such as fuel or lubricant residue. The method involves applying the cleaning composition directed in a pressurized stream to remove residue from the gas turbine engine. The cleaning solution can be applied to the gas turbine engine prior to running the gas turbine engine, and/or can be applied to a hot surface of a gas turbine engine during operation. For instance, the cleaning solution can be used to clean fluid conduit components, such as tubing, tubing connections and tubing fittings, and accessories such as gearboxes, valves and pumps.

Website: www.freepatentsonline.com

Dry cleaning using a highly fluorinated organic liquid

The United States Patent and Trademarks Office has granted a patent to Entropic Systems Inc. of Massachusetts for a dry cleaning liquid formulations and methods for their use based on a highly fluorinated organic solvent, in particular, highly fluorinated hydrocarbons or ethers. In the patent, the phrase highly

fluorinated refers generally to a compound in which fluorine atoms constitute at least one-half of the non-carbon substituents on the carbon atoms in the molecule or, alternatively, a compound in which the total atomic weight of the fluorine in the molecule contributes greater than 50 per cent of the molecular weight of the compound.

In a preferred embodiment, the cleaning liquid contains a hydrofluorocarbon (HFC) or hydrofluoroether (HFE) combined with dichloroethylene. The addition of a surfactant enhances the ability of the liquid to remove water-soluble soils. Because none of the principal components of this dry cleaning liquid HFC, HFE and dichloroethylene is listed in Section 261.31 of the Resource Conservation and Recovery Act of the United States Environment Protection Agency, such liquids can be applied to radioactive fabric without creating a mixed waste. Thus, the handling of the effluent produced by the cleaning method of the invention is much simple compared with what would be required for conventional laundering or dry-cleaning techniques.

A surfactant or combination of surfactants can be added to the basic HFC- or HFE-based cleaning liquid formulation. The resulting solution may form a very stable water emulsion, that is, one capable of containing greater than 5 per cent water by volume or having water/surfactant ratio greater than 1.5. In complement to the inherent ability of the cleaning liquid to remove hydrophobic stains (such as motor oil), the emulsification of water made possible by an appropriate surfactant addition enhances the ability of the cleaning liquid to remove hydrophilic soils (such as mustard or ketchup) from textiles.

Website: www.freepatentsonline.com

Quick-drying flux remover

Flux Remover C, from Micro Care Corporation of the United States, is a versatile, general-purpose defluxer engineered for the electronics industry. Based on HFC technologies from DuPont, and enhanced with VersaTrans from PPG, it is a ternary azeotropic solvent. This makes it ideal for two different types of cleaning: the manual cleaning of PCBs found during rework and repair, and the automated cleaning of modern vapour degreasers. Flux Remover C is claimed to be the most affordable, non-inflammable, ozone-safe cleaner on the market today.

Suitable for all types of electronics, Flux Remover C can be used on through-hole boards, BGA chips, SMT designs, hybrid circuits, cables and connectors. With its high cleaning power, this defluxer is suitable for those applications in which high-temperature soldering is common. The solvent is generally safe on components, insulators, elastomers and connectors and will not normally degrade plastics. The defluxer works well on most fluxes and pastes, light oils and grease. It is effective on acrylic conformal coatings and some inks. Tests have shown it to even be effective on some water-based fluxes. It is safe for cured epoxies, flex laminates, solder masks, metals and metal alloys. It will, however, attack urethanes, natural rubber, silicones, acrylics and polystyrene.

Flux Remover C has a very low boiling point and evaporates quickly. This makes it ideal for difficult cleaning situations where solvent entrapment is a concern. Powerful enough to clean without scrubbing, it is safe for fragile circuits such as read/write heads on disk drives. The fast evaporation also helps in repair environments or when cleaning optics. The product is a true drop in replacement for old-style solvents. Flux Remover C is safe for the stratospheric ozone, low in global warming potential and has a reduced VOC content.

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Stabilized solvent system for cleaning and drying

The production of many mechanical and electrical parts generally requires a final step of cleaning the part with a solvent prior to final assembly. Solvents such as 1,1,1-trichloroethane and 1,1,2-trichloro, 1,2,2-trifluoroethane are not in favour today because of the environmental harm they cause. The chemical n-propyl bromide is an environment-friendly alternative to these solvents. Polysystems USA Inc. in New Jersey has been assigned a United States patent for an invention relating to improved stabilizing compositions for n-propyl bromide. The patented composition is 0.1-5 per cent butylene oxide, 0.1-5.0 per cent t-butanol, 0.1-5 per cent acetonitrile, 0.1-5 per cent nitromethane, and n-propyl bromide forming the rest. The mixture is useful as cleaning solvent for the electronic, aerospace and general manufacturing industries, especially for vapour degreasing.

The cleaning composition is claimed to be superior to those currently used by manufacturers of stabilized n-propyl bromide compositions. The blend is effectively stabilized when used on common metals such as aluminium, iron, zinc and copper. The most preferred composition is 1 per cent butylene oxide, 1.5 per cent t-butanol, 1.5 per cent acetonitrile, 0.5 per cent nitromethane and 95.5 per cent n-propyl bromide.

Website: www.freepatentsonline.com

Alternative to TCE for aerospace cleaning

Enviro Tech Europe, based in the United Kingdom, has announced the outcome of a long and stringent test programme of its EnSolv 5408 to meet the requirements of critical cleaning in the aerospace industry. EnSolv 5408 is an alternative to trichloroethylene (TCE), and listed by Boeing as approved for use under the requirements of BAC 5408 requirements. EnSolv 5408 is the only n-propyl bromide-based vapour-degreasing solvent approved by Boeing.

EnSolv 5408 can be used on all the usual metals and virtually all plastics and elastomers common to aerospace. As there is no chlorine in EnSolv 5408, unlike TCE, the risk of metal embrittlement is greatly reduced. The solvent has proved safe for cleaning titanium, a widely used metal in the aerospace industry. Another important application of EnSolv 5408 is in cleaning aluminium honeycomb sections where epoxy resin adhesive is used to bond the formed aluminium skin to produce lightweight high-tensile structures. This is a very demanding application as any chemical residue prevents adhesion of adhesives to the substrate, leading to delamination.

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AEROSOLS

Blowing agent blends

Chlorofluorocarbons (CFC) had been used as blowing agents for rigid, closed cell insulation foams for many years because they offer outstanding fire resistance besides good thermal insulation. However, CFCs have been phased out because of their detrimental effect on ozone layer. Zero ozone depletion alternatives such as pentanes have been identified, but pentanes are highly inflammable and their resulting foams have undesirable fire performance properties.

Arkema Inc., Philadelphia, the United States, has received a United States patent for foam blowing agent blends of trans-1,2-dichloroethylene (Trans 12) and pentanes, and polyol premixes and foam compositions containing such blends. The resulting foams are reported to exhibit dramatic improvement in fire resistance. This invention relates to blends of Trans 12 with one or more of n-pentane (n-C5), i-pentane (i-C5) and cyclopentane (c-C5). The foam blowing agent blends are particularly useful for making closed cell polymer (insulation) foams having improved fire resistance, such as polystyrene, phenolic and polyurethane foams.

Website: www.freepatentsonline.com

Cyclopentane blowing agent

Exxsol HP-95 blowing agent, from ExxonMobil Chemical Singapore Pte. Ltd., is a clear colourless liquid, consisting of high-purity cyclopentane. Its vapour pressure is 509 mm Hg at 37.7C. The boiling point for Exxsol HP-95 blowing agent at atmospheric pressure is approximately 49.4C, confirming that it is a liquid at room temperature. Under the NFPA 30 inflammable liquid definitions Exxsol HP-95 would be considered a Class 1B liquid, given the characteristics of having a flash point below 22.7C and a boiling point at or above 33.7C.

Although Exxsol HP-95 blowing agent could theoretically be stored in an atmospheric vessel, it is highly recommended, and may be required in most areas, that it be stored in a pressure vessel for environmental reasons to minimize hydrocarbon emissions. This is especially true in hot climates where 1-2 psig pressure can build up in the storage vessel at 51.6C. A minimum15 psig pressure rating is required for the vessel (30 psig recommended) for normal storage requirements.

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CFC-free blowing agents

Solvay S.A., Belgium, offers CFC-free blowing agents for the foam sector. Solkane 134a and Solkane 152a are high-purity gases liquified under pressure. Solkane 134a is non-inflammable, while Solkane 152a is an

inflammable gas.

The non-flammable mixture of Solkane 134a and Solkane 152a in ratio 87:13 per cent by weight is designed for applications where such a blowing agent with a better solubility is required.

Solkane 365 and 227 are liquid hydrofluorocarbon blends of the third generation without ozone depletion potential. Solkane 365mfc is currently under notification procedure within the European Authorities. A SNAP approval has been received.

Website: www.solvay-fluor.com

Research on non-HCFC closed-cell foam insulation

Polyisocyanurate board insulation and polyurethane refrigerator insulation, both closed-cell foam insulations, owe their high thermal resistance (R-value) primarily to the low thermal conductivity of the gas used as a blowing agent to produce the foam. Chlorofluorocarbons (CFC) were formerly used as blowing agents, but were banned from use by the Montreal Protocol. Currently, foam insulation is blown with hydrochlorofluorocarbons (HCFC), such as HCFC-141b. This chemical is less damaging to the earths upper atmosphere, but still has ozone depletion potential and hence its production for use as a blowing agent is curtailed. Therefore, Oak Ridge National Laboratory in the United States is on a quest for a new, non-ozone-depleting chemical replacement for CFC and HCFC products. The research aims to:

Evaluate the long-term thermal performance of foams blown with non-HCFC blowing agents; and

Develop experimental methods and models that properly account for the aging characteristics of complete foam insulation systems.

Studies are under way to measure the aging characteristics (the decrease in thermal performance as air components diffuse into the cells of the foam and as the blowing agent gas diffuses out) of foam insulations blown with several alternative blowing agents. These are looking at the thermal conductivity and aging characteristics of simulated refrigerator panels containing polyurethane foam blown with third-generation blowing agents, the development of a computational model for the aging of foam insulation with semi-permeable surface skins, the development of a fundamental understanding of the aging processes, etc. Studies will continue to focus on thermal performance data for foams blown with various alternative blowing agents so that the best choice of a new blowing agent can be made.

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New liquid blowing agent

Ecomate from Foam Supplies Inc., the United States, is claimed to be a revolutionary ecological and highly competitive blowing agent. It can be used not only in rigid foams, but also in self-skinning elastomerics and flexible foams. It has zero ozone depleting potential, zero global warming potential, and is free of any volatile organic compounds. It is cost-competitive and requires minimal or no equipment or production changes.

Ecomate is a true liquid blowing agent designed to replace HCFC, HFC and HC. Many of its properties such as boiling point, solubility and gas lambda value are similar to HCFC-141b. The fact that Ecomate has a molecular weight about half that of 141b means that it is nearly twice as effective at blowing the same density foam. It has excellent solubility in most polyols and in both sides of A+B systems. It is also soluble with most other blowing agents including HCFC, HFC and HC.

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FUMIGANTS

Emission control technology for methyl bromide

Value Recovery Inc., an environmental technology company in the United States, has announced the results of its most recent emissions control demonstration for instantaneous destruction of methyl bromide (MBr). It proved the destruction of 91 per cent of MBr emissions from fumigation operations using its new breakthrough technology that employs a non-hazardous, water-based scrubbing system. The commercial-scale demonstration involved attaching the scrubbing system directly to a commercial shipping container that had been fumigated with MBr. The company is aiming at the destruction of more than 98 per cent of MBr for both small container and large-scale commodity import fumigations.

Current practice allows MBr gas that has been in contact with fumigated goods to be ventilated directly into the open air, creating havoc in the environment that can now be avoided with the new technology. The patent pending technology is an environmental triple play because it reduces volatile organic carbon (VOC) emissions, protects the ozone layer and improves the safety of workers and by-standers. By using Value Recoverys technology, VOC emissions from MBr are reduced by over 90 per cent, far greater than the 20 per cent goal set for pesticide emissions reduction.

Value Recoverys proprietary process chemically destroys MBr by forcing it through a water-based solution that converts MBr into non-hazardous water-soluble products. The waste products could then be routinely disposed of by licensed waste disposal companies. A blower fan captures the fumigation air stream and pumps it into a scrubber tank where MBr-laden air is converted into a column of fine bubbles and substantially destroyed. Value Recovery sells scrubber systems and also licenses its technology.

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Allicin for soil fumigation

The treatment of soil with agents that kill microorganisms prior to the seeding or planting of high value plants is a well-established procedure in modern and intensive agriculture. The most commonly used agent to treat soil in greenhouses and limited open air areas is methyl bromide (MBr). Although MBr is a successful broad-spectrum pesticide, its use is being phased out due to its toxicity to humans as well as to other non-target organisms, besides its hazardous effect on the environment.

Researchers at the Weizmann Institute, Israel, have developed an alternative method for sterilization of soil prior to seeding and planting based on Allicin, a natural ingredient. Allicin is one of the biologically active molecules that are generated upon crushing of garlic cloves. Allicin accounts for much of the beneficial anti-microbial properties attributed to garlic. Since Allicin has poor chemical stability, most methods of production are unsatisfactory. However, these researchers have succeeded in developing an extremely effective procedure for the production and storage of pure Allicin in large quantities.

The researchers have demonstrated the effectiveness of Allicin against soil fungal pathogens such as Sclerotinia scleroiorum, Fusarium oxysporum and Rhizoctonia solani. This method is particularly useful in greenhouses for protecting plants against contamination by plant pathogens such as fungi, bacteria and protozoa.

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