Editorial

Worldwide need for refrigeration equipment is ever growing. The IIR is continuing actions with other international organizations, especially United Nations programs and agencies, to set up safer, cheaper and more efficient cold chains for food and health products, and also to mitigate their impact on the environment. Despite the fact that international discussions on CO₂ or hydrofluorocarbon emissions are progressing slowly, the trend is clear: we must develop new equipment around the world while limiting energy consumption and fluorinated gas emissions.

The IIR wishes you all the best for 2014, destined to be a year of transition. International agreements on climate change, particularly limitations on fluorinated gases, have little chance of being reached before 2015. Nonetheless, regional and national initiatives, principally in Europe, will take place in 2014, so everyone needs to get ready for sustainable development! During the coming year, the IIR will lead numerous actions: joint FAO-IIR and CIHEAM-IIR publications, Informatory Notes as well as the publication of IIR books, conferences, international statements, participation in new projects and working parties.

We hope you’ll join us in these endeavors making 2014 a year of achievement for us all!

Didier Coulomb
Director of the IIR

Activities of the IIR’s Commission A2 on Liquefaction & Separation of Gases

In spite of the fact that the last of the so called permanent gases – helium – was liquefied by Heike Kamerlingh Onnes in 1908, the problems related to thermodynamic optimization and new technologies in liquefaction and separation of gases are actual and critical for many branches of modern industry, power generation and medicine. The motivations for vast activities in the field are in particular the shortages of noble gases (3He, Kr, Xe), potential demand of increase in oxygen production capacity resulting from oxy-combustion technology implementation in thermal power plants, and emerging market applications of Liquefied Natural Gas LNG.

Due to nuclear disarmament and a drastic drop in tritium availability resulting in a significant decrease of 3He production from tritium decay, alternative sources of this rare helium isotope, now vastly used in neutron detectors, are being investigated. To extract 3He from 4He rich mixture, with a typical 3He content below 1 ppm, a thermomechanical filtering of superfluid helium on “entropy filter” combined with rectification column is being considered. The method is now being developed at Odolanow, Poland, the only plant of liquid helium extraction from natural gas in Europe. The method, if feasible technically and economically may fulfill a need for superfluid helium loops in helium separation plants.

Carbon Capture and Storage policy may result in oxygen demand exceeding the present production capacity by at least two orders of magnitude. To provide sufficient oxygen quantities for oxy-combustion in thermal power plants, cryogenics is the only option. Other technologies, especially sorption and membrane are under fast development, but without prospects for required production rates in the near future.

In particular. Et tout le monde doit se préparer à ce développement durzur. L’IIR, mène en 2014 de nombreuses actions : publication de documents conjoints FAO-IIR, CIHEAM-IIR, de Notes d’information et ouvrages de l’IIR, conférences, communiqués internationaux, participation à de nouveaux projets de recherche et groupes de travail.

Nous espérons que vous vous joindrez à nous pour participer à tous ces travaux et que cette année 2014 sera une année de réussite pour vous tous.

Didier Coulomb
Directeur de l’IIR

The LNG turnover is increasing by about 20% per year. Natural gas liquefaction, transport, storage, vehicle fuelling and ship bunkering may be considered the most progressing branch within the scope of the A2 Commission. LNG may even restructure the whole energy economy worldwide combining environmental issues with fossil fuels and new technologies. LNG will probably be a driving force of cryogenics transmission to new markets and applications like transport, power generation and energy storage.

Other exemplary applications requiring robust and economical technologies of gas mixtures separation and liquefaction are cryotherapy (in particular whole-body cryo-therapy requiring liquid nitrogen), waste and flue gas separation and cleaning, protective atmospheres in semiconductor and high-tech industry.

The work of the A2 IIR Commission reflects world-wide activities in the domain of separation of gases and liquefaction. Apart from the personal involvement of Commission members in various projects, we are present at conferences, workshops, and seminars: LNG International Exhibition and Conference, Gastech, Cryogenics, Cryogen Expos, European Cryogenic Course and others. The Commission is close to academia, industry and end users of the separated and liquefied gases. IIR input to the field is globally visible and appreciated. The European Cryogenic Course being a common initiative of Wrocław University of Technology, Dresden Technische Hochschule and Trondheim Technical University offers unique training in cryogenics provided to the students by lecturers from academia, industry (e.g. CHART FEROX) and international laboratories (like CERN).

A2 Commission members work closely with the A1 Commission on Cryophysics, Cryoengineering and the G1 Commission on Cryobiology and Cryomedicine.

Maciej Chorowski
President of the IIR’s Commission A2

(1) Food and Agricultural Organization / Organisation des Nations Unies pour l’alimentation et l’agriculture
(2) International Centre for Advanced Mediterranean Studies / Centre International de Hautes Etudes Agronomiques Méditerranéennes

International Institute of Refrigeration
Institut International du Froid

January 2014

Newsletter

No. 57
news

Past events

- United Nations Conferences on the ozone layer and climate change
  The annual United Nations (UN) Conference on the ozone layer took place in Bangkok, Thailand, from October 21-25, 2013. Almost all the discussions focused on proposals to phase down HFCs, without any conclusion, only requests for new studies and new meetings. India and Gulf countries are strongly opposed to any commitment in a framework different than the framework on climate change negotiations. The next steps are UN Conferences in mid and end 2014 on that topic.
  The annual United Nations Conference on climate change took place in Warsaw, Poland, from November 11-23, 2013. Some progress was made on the agenda and the basis of negotiations, without any practical decision. The next steps will be a meeting of the heads of States in September 2014 and two UN Conferences on climate change in Lima, Peru in December 2014 and in Paris, France at the end of 2015. The aim is to obtain an international agreement in Paris in 2015.

- Conference in Saint Petersburg
  The Saint Petersburg National Research University of Information Technologies, Mechanics and Optics organized its 6th International scientific and technical conference on “Low temperature and food technologies in the 21st century” in Saint Petersburg, Russia from November 13-15, 2013. Attendees came from Russia and neighboring countries. The Director of the IIR was invited for a lecture on the refrigerators phase down: the future phase down of HFCs and its consequences.

- Conference in Belgrade
  The 44th International Congress and Exhibition on heating, refrigeration and air conditioning took place in Belgrade, Serbia from December 4-6, 2013. It was, as usual, a really important conference with attendees from all over the world, and particularly from Eastern Europe. Media TV, newspapers covered the event, interviewing the Director of the IIR.

- The IIR at the Interci-clima-elec home&building
  Last year, from November 4-8, 2013 at Paris Nord Villepinte, the Interci-clima-elec home&building took place. An event like no other in the world offering a robust range of exhibits for professionals in the building trade, from construction to management. Many refrigeration manufacturers displayed innovative and efficient products at this event. The IIR was also present, sharing a stand with the AFF (Association Française du Froid), IIR representatives welcomed their members and the general public, sharing information on activities, services and publications. www.interclimatelec.com

Conference update

- Check out the list of over 200 abstracts contributions for the 13th IIR CRYOGENICS 2014 now available online. Full papers must be submitted before January 25, 2014. The conference, with a programme covering equipment and technology problems found at temperatures below 120 K (-153°C) as well as topics related to devices and technologies, takes place from April 7-11, 2013 in Prague, Czech Republic. www.cryogenics2014.cz

- The second announcement for the IIR co-sponsored 7th Ibero-American Congress of Refrigeration Science and Technology (CYTEF2014) is now available online. The conference, to be held in Tarragon, Spain from May 20-23, 2014, is a well-established biennial event focusing on overall topics related to refrigeration. It also offers networking and knowledge exchange opportunities in the Ibero America refrigeration sector. www.cytef2014.com

Booksings are now open for the 3rd IIR sponsored International Conference on Sustainability and the Cold Chain (ICCC2014). Early bird rates end March 31, 2014. Further discounts are available for conference speakers, IIR, IOR, and IRC members, and sponsors.

- On January 31, 2014 abstract acceptance notification and instructions to authors for manuscript preparation will be announced for the 22nd International Compressor Engineering Congress, the 15th International Refrigeration and Air Conditioning and the 3rd International High-Performance & Green Buildings Conferences at Purdue from July 14-17, 2014 in West Lafayette, Indiana, USA.

- GL2014: Abstract submission deadline is April 1, 2014 for the 11th IIR-Gustav Lorentzen Conference on Natural Refrigerants from 6-8 September 2014 in Hangzhou, China. gl2014.org

- The 6th IIR International Conference on Magnetic Refrigeration: THERMAG VI is on in Victoria - BC, Canada from September 7-10, 2014! This year THERMAG VI enhances its scope to include materials and applications covering all temperature ranges thus allowing for new refrigeration systems such as gas liquefaction systems as well as thermally driven magnetic heat engines. Abstract submission deadline is February 15, 2014. www.lesvic.ucvic.ca/events/ThermagVI

- Abstract submission starts April 1, 2014 for the 24th International Congress on Refrigeration (ICR2014) to take place in Yokohama, Japan from August 16 – 22, 2015. For more information visit the congress web site: www.icr2015.org/

Briefs

- ELICIT
  The IIR is partner of a new 2.1 million € funded project by the European Commission (FP7) so-called “ELICIT” standing for “Environmentally Low Impact Cooling Technologies”. ELICIT focuses on the application of magnetic cooling technology to the domestic refrigeration appliances. This proposal aims to enhance the collaboration between SMEs (such as Cambridge, TCS Micropump, Polyfrost, Cemafroid and RegenT), global appliance manufacturers (such as Whirlpool), draw on the expertise found in universities and research centres (Politecnico di Milano, S.C.I.R.E.). The IIR is principally responsible of the communication and dissemination. The ELICIT has officially started in January 2014 for a period of 36 months.

- COOL-SAVE at the Cold Chain Forum
  As project partner, the IIR has facilitated the organization of a COOL-SAVE workshop at the Cold Chain Forum held from October 23-25, 2013 at the Grande Écurie, Ville d’Avray in Paris. COOL-SAVE, an IEE co-funded EU project of 9 partners, aims to reduce industrial energy consumption in cooling installations by vapor compression mechanical systems in the food and drink sector through the dissemination of cost effective energy efficient strategies implementation. The workshop topic “How to Improve Energy Efficiency for a More Efficient Cooling in the Food Industry” was presented by COOL-SAVE project partners with almost 30 people in attendance. Additionally, COOL-SAVE partners took this opportunity to organize a project progress meeting at IIR head offices. For more details visit: www.cool-save.eu/

- “Containment of Refrigerants within Refrigeration, Air Conditioning and Heat Pump Systems”, a new IIR Informatory Note, is the result of collaboration between David Cowan, Issa Chaer, P. Lundqvist and D. Coulomb. IIR members can consult this new note at www.iirfr.org in the section “Publications/Informatory Notes”

- IIR partner, the International Centre for Advanced Mediterranean Agronomic Studies (CIGEA) will hold its 10th meeting in the Algerian capital of Algiers on February 6, 2014. Discussions will focus on sustainable food security in the Mediterranean Basin. Specific issues to be addressed are those of agricultural production, on-farm resources, and food quality. Also to be covered is the fight against food waste, green growth, and inclusive growth for rural remote areas along with cooperations to be established in the multilateral Mediterranean framework in terms of agricultural, food and rural development.

- A New Master’s for food security
  In September 2013, the Polytechnic Institute of LaSalle in Beauvais, France launched a Master degree in the “Management of Food Safety in Cities”, certified by the French Ministry of Higher Education and Research, and partnered with the IIR. This course endeavors to train local architects in the development of food security. Upon graduation, students will hold leadership positions in the food security sector where their practical and operative skills can advance growth.
  From September to April, the 8 unit programme (120 credits) is taught in French. In addition to the cursus, there are two internships: four months from May to August in France followed by a second in the graduate’s country of origin or an international organization. Learn more: www.last-beauvais.fr/formation-maitrise-management-de-securite-alimentaire-des-villes

IIR member news

- Nestlé freezers to only use natural refrigerants
  Nestlé plans to phase out its HFC refrigerants by 2016 replacing them with natural refrigerant alternatives. The company has pledged that from now on all new commercial horizontal ice cream chest freezers bought by Nestlé across Europe will use only natural refrigerants. The new horizontal ice cream chest freezers should reduce energy consumption by more than a third, in comparison with existing systems.
In the news

Markets

World air-conditioning market

Recently released figures by BSRIA concerning the 2013 global air-conditioning market showed total market value reached USD 89.9 billion for 117.2 million units. Unducted standard split systems constitute an overwhelming majority of units sold, representing 71.3% of the market in terms of volume, followed by window systems at only 11%, US ducted splits (5.4%), fan coils (4.7%) and ducted standard splits (2.2%). China represents 39.5% of the market in terms of volume, the USA 13.9%, Japan 7.6% and Brazil 4.6%. Other significant markets include India (2.9%), Indonesia (2.2%), Russia (2%), Thailand, Saudi Arabia and South Korea, each with figures around 1.5%.

The global refrigerant market is expected to grow at a CAGR of 5.2% over the next five years to reach 1.6 million metric tons by 2018. Asia-Pacific region, with its thriving economies and rapidly expanding middle class, is expected to experience highest consumption during the next five years.


BRIC frozen food market

Brazil, Russia, India and China (BRIC) frozen food market totaled a value of USD 18,826.2 million in 2012. India was the fastest growing country with a compound annual growth rate (CAGR) of 15.1% over the 2008-12 period. China, the leading country among the BRIC nations, is expected to grow at a CAGR of 5.2% over the next five years.
This study illustrates chilled beam technology is also performance led. Furthermore, with few moving parts, such as motorized fans, on-chiller maintenance requirements of chilled beams are reduced. www.feds.co.uk/uploaded_images/files/CBCA/Chilled%20Beams%20Brochure_Final%207%2020(web).pdf www.racplus.com/features/chill-out-and-save/8652667/article

Health care patient rooms have rigid environmental and safety requirements limiting the range of possible HVAC solutions. Chilled beams have been used successfully in Europe for over 20 years and are gaining wide acceptance in North America as an alternative to variable-air-volume (VAV) systems. Their prime advantage for health-care is that they maintain good indoor-air quality as use of airflow from a central air-handling unit (AHU) is reduced.

The cooling capacity of active chilled beams is much greater than that of passive chilled beams which rely on natural convection for cooling. Active chilled beams have a duct connected to the supply air to primary air from 1/1 to 4/1 and related cooling capacity. Therefore outdoor air provided and supply air delivered can be modified to meet the air-change and sensible-cooling heating needs of the building.

The benefits of implementing active chilled beams include downsized ductwork/equipment, energy reductions of up to 50% in some cases, decreased maintenance, optimal comfort and indoor air quality (IAQ) as both temperature and humidity are controlled, with a constant supply of air for minimum outdoor-air ventilation requirements. Furthermore, introducing 100% outdoor air into a patient room does not increase the risk of airborne infections and when chilled beams are designed properly, there is no condensation on the coil to collect dust and dirt. Their operation is quiet and in such mixed-air systems, reducing the fraction of primary air enables a decrease in terminal reheat of air, possibly resulting in significant operational-cost savings.

HPAC Engineering, November 2013

Cold stores

Dynamic controlled atmosphere for better quality apples

Apples are the most consumed fruit in the world, with a production 65-75 million tons worldwide, 9-11 million of which in the EU. Controlling O₂ and CO₂ levels during storage using CA has made it possible to double storage life of apples. More recently, chemical use criticized by consumers incited system designers to find alternative solutions, such as further lowering O₂ levels down to around 1% (ultra low oxygen, ULO) or initial low oxygen stress ILOS, in which the fruit is momentarily placed in an atmosphere containing less than 0.5% O₂ before being placed under ULO. Dynamic Controlled Atmosphere (DCA) appeared in this context in Canada ten years ago where O₂ rates are lowered to 0.5% thanks to a sophisticated system used to monitor fruit quality during the process. Dynamic DCA systems can limit fruit respiration and oxidation phenomena without provoking asphyxia. However, in DCA, fruit stress levels are monitored by checking the fluorescence of it chlorophyll, thanks to a fluorescence interactive response monitor (FIRM). Apples convert part of the light they receive into heat or fluorescence at a 690–730 nm wavelength. FIRM requires plumbing the apples in darkness, before stimulating their photosystem thanks to LED lighting and then analyzing the fluorescent light emitted. This operation is renewed every two hours in order to find out if the fruit is reaching stress limits. Around 1,000 cold stores, with over half in Italy, are currently equipped with this technology providing an overall storage capacity of 300,000 tons. It requires good-quality controlled atmosphere systems, Dynamic DCA systems, another similar technique, also relatively widespread in Italy involves directly analyzing ethanol levels in the fruit, while additional techniques are still under development.

Cryosurgery

The use of cold temperatures to freeze cancer cells dates back to James Arnott's first experiments in England using ice and sodium chloride to freeze breast and uterine cancers around 1845. However it wasn’t before 1961, with Dr. Irving Cooper’s invention of liquid nitrogen cryoprobes that modern cryotherapy came into being. Since the 80’s, device miniaturization makes it possible to introduce endoscopic cryoprobes through natural channels (bronchia, urethra...) without requiring traumatization. The parallel development of ultrasound echography allowed for the improvement of monitoring techniques and cryosurgery is now used in dermatology, ophthalmology, and cancer treatment. In some countries, the use of device is directly powered, sprayed or dabbed on the lesion. This simple treatment is only possible on small lesions and may lack efficiency. The other technique consists in using the cryofluid to cool a probe that will come into contact with the tissue to be treated. A cryo probe tip is made of thermally conduc tive metal, generally copper covered with gold to facilitate clearing. The probe should also be able to heat up quickly so that it can be detached from the treated surface and applied elsewhere. There are various shape and size configurations, but the two main technologies used are liquid nitrogen probes and Joule-Thomson expansion probes.

In liquid nitrogen probes, liquid nitrogen is brought to the tip where it evaporates in contact with the metal, thus extracting heat from the chosen tissue. Nitrogen evaporation allows for constant temperatures at -196°C. Its main advantage is its capacity to reach very low temperatures which enable rapid and extended freezing of the tissues. However due to thermal inertia while the device is being switched on, the duration of the intervention can be relatively imprecise. The device also offers limited maneuverability.

In Joule-Thomson expansion cryoprobes, gas at high pressure is released through a tight orifice into a lower-pressure chamber and undergoes an expansion and cooling process that is harnessed by heat exchangers near the probe’s tip. Nitrous oxide (N2O) at ambient temperatures is often used for this purpose, as its expansion allows for temperatures down to -90°C. The device requires a storage bottle and a transfer tube to the probe. Its capacity to be cooled immediately allows for higher precision and control over the duration than the nitrogen system but it requires higher operation temperatures. Nitrous oxide can also act as a hydrocarbon solvent and traces of hydrocarbons can cause irreversible blockage to the system if special care isn’t taken in cleanliness and fluid pureness. Froid et chirurgie, P. Haberschil et al. Revue Générale du Froid, November 2013

Find out more on cryosurgery by consulting the IIR Informatory Note “Applications of Cryosurgery”: www.iirf.org

Briefs

First zero carbon building in Hong Kong
Hong Kong buildings account for 80% of total electricity consumption, mostly generated by fossil fuels. All generated electricity accounts for 68% of total greenhouse gas (GHG) emissions. In order to set an example, Hong-Kong’s Construction Industry Council commissioned its first Zero Carbon Building (ZCB). A ZCB goes beyond the common definition of green buildings (ZEB) producing on-site renewable energy and export part of it to the grid. In this case, energy is produced by biodiesel trigeneration. The building constructed following a careful study of the local microclimate and at a distance from potentially overshadowing buildings also integrates 1015 m² of crystalline PV panels with high output.

ZCB gives priority to energy conservation by passive design, thus reducing its reliance on mechanical systems. A greenery coverage of about 3,700 trees occupies half the site, providing shade and acting as a carbon and heat sink. The building placement was carefully planned to receive the south easterly prevailing wind and daylight is harvested from the double-height north windows, while interior brightness is amplified thanks to a sloped reflective ceiling.

A large open-plan and cross-ventilated layout allows for a minimized AC cooling load in peak summer periods. The AC system consists in under-floor air-supplied combined with radiant heating and cooling. The building was designed for the south easterly prevailing wind and daylight is har vested from the double-height north windows, while interior brightness is amplified thanks to a sloped reflective ceiling. Over Arup & Partners HK limited, the engi neers who worked on the project, stress the importance of occupant behavior in contrib uting to more sustainable buildings. Hong Kong ZCB itself is open for public visits or tours. The building owners hope that this offers an opportunity to educate people on a green lifestyle through real experience.

First Zero Carbon Building in Hong Kong, A. Lai et al., CLIMA 2013

Horizontal geothermal heat-pump under supermarket car park
Walmart’s new 12,540 m² prototype store in Burlington, ON, Canada is equipped with a geo-heat exchange heating and cooling system using 15 km of pipes under the store’s parking lot. The piping was installed in only six days thanks to a type of plowing tecnology often used for oil and gas applications. Plowing also reduces ground disturbance, achieves depths over 2m and enables the creation of a horizontal field on two levels at 2.3m and 1.7m. Auxiliary equipment includes a boiler, two fluid coolers to meet summer and winter peak load conditions and a low-cost roll out radiant mat system in the con crete. CO2-based frigo fluid and 1,3-Propanediol (25 mixture) is used for heat transfer while any heat from refrigeration is reclaimed and used to heat the store.

Humidification became the first priority where it was critical for the floor slab not to create moisture at its surface and to avoid condensation at refrigerated display-cabinet level. Temperature was the second priority in conjunction with the radiant slab operation. Third and fourth priorities were CO2 control for ventilation and pressurization in order to minimize infiltration through the main sliding doors.

The store also features other energy-saving features such as LED lighting, daylighting, energy recovery, dehumidification using compressor reject heat and a white reflective roof.

An extensive energy model using TRNSYS software, a transient thermal hydronic model, was developed for the store. It predicted a reduction in energy of 57%, close to an actual overall reduction of 60%, 40% being electricity use.

ASHRAE Journal, November 2013

Leak detection thanks to thermal imaging cameras
Thermal imaging cameras can be specially designed for the detection of refrigerant gases. In order to achieve this, FLIR GF304 thermal imaging cameras contain a cooled quantum well infrared photodetector and a cold band filter which allows them to visualize gases in the 8-8.6 µm wavelength and temperatures ranging from -20°C to 500°C. After the cameras capture images of a suspected leak, a report including a visual representation is sent out. The technology reportedly facilitates efficient and reliable leak detection where traditional detection systems proved to be difficult.

www.vision-systems.com

Fish packaging with built-in nose
PhD candidate Jërneke Heising’s research into three ways of measuring the freshness of packaged fish has been published in the Journal of Food Engineering. The three methods all involve measurements using a sensor in the packaging. As the fish decays, various substances are released into the air inside the packaging and subsequently dissolve in water in the sensor. Heising investigated the practicality of using sensors that measure ammonia, acetic acid and conductivity but water temperature at the nose does not appear to be very useful because the substance is only released once the fish is almost ‘off’. Acidity is unreliable because temperature appears to have too much influence on readings. However, conductivity looks promising, Heising says. Ultimately this research should lead to a tiny chip being packed with in fish. The chip will indicate how long the product can be expected to last.

“I’m thinking of a small piece of gel containing a chip that can be read with RFID”, says the PhD candidate. This will enable supermarkets and other retailers to judge the freshness of fish without opening the packaging. “And the sensor could also be read by the packaging information with their smartphones.”


Lighting systems for cold stores
Various types of lighting exist for below 0°C temperature cold stores including mercury vapor (MV) lamps, high pressure sodium (HPS) and light-emitting diodes (LED). MV lamps are the least efficient (50 lumens/watt) but have a white and blue light. HPS lamps are the most efficient in the commonly used HID family (60-120 lumens/watt) but their orange light and limited color rendering can make them unsuitable or even dangerous in certain applications when the identification of the colors of electric wires, liquids, smoke or objects is necessary. LEDS, on the other hand, have better efficiency (160 lumens/watt); their light covers the full color spectrum and radiates spherically. As they are illuminated solely by the movement of electrons in a semiconductor material and don’t rely on a filament, they have high energy efficiency and a longer lifespan.

La lumière sur l’éclairage des chambres froides, RPF March 2013
Thermoelectric bracelet for body-part cooling

Increasing thermal comfort by cooling body parts currently raises a lot of interest. A team from the Massachusetts Institute of Technology recently developed a thermoelectric bracelet that monitors air and skin temperature sending tailored pulses of hot or cold waveforms to the wrist. The team earned the USD 10,000 1st prize at this year’s MADMEC competition and estimates that if such a device could stop a building from adjusting its temperature by as little as 1°C, it could save around 100kWh per month. They found they needed to heat or cool any body part at a rate of at least 0.1°C per second to make the entire body, overall, feel several degrees warmer or colder. The prototype, resembling a wristwatch, can be powered for up to eight hours by a lithium polymer battery and demonstrates a rate of change of up to 0.4°C per second. It consists of a custom copper-alloy-based heat sink attached to an automated control system with integrated thermometers, that manage the intensity and duration of the thermal pulses.

Zimbabwe: wireless phone base stations to power vaccine refrigerators

Keeping cold in African temperatures, which often soar above 30°C, can often be a challenge given lacking or unreliable power supplies. Econet Wireless, a cellphone company realized their Base station infrastructure Zimbabwe, a network of cellphone tower sites where generated excess power is an opportunity to power vaccine-storage refrigeration units. Econet Wireless donated such units, which have a 10 day holdover period during which they can maintain low temperatures even in the event of power shortages, as the base station’s backup generator produces excess power. The units can also be monitored via the internet and formal training is provided to hospital staff enabling them to use the equipment.

Regulations—Standardisation

Informal agreement on the future EU F-gas Regulation

On December 16, 2013, EU institutions reached an informal agreement on the future F-gas (fluorinated gases) Regulation which could enter into force in January 2015. The deal came after 4 rounds of informal negotiations and will subsequently be formally adopted by the European Commission – in a plenary vote tentatively scheduled in March 2014 – and then negotiated by the Council (European Member States). It reflects a compromise between the positions of the Parliament on one hand and the Council on the other. A key part is the introduction of an HFC phase-down – a gradually declining “cap” on bulk HFCs placed on the EU market expressed in CO₂ equivalent – with a reduction target of 70% by 2030, as originally proposed by the European Commission one year ago. In addition to the phase-down, the deal also includes a range of HFC bans in certain applications.

The first ban is the much-touted service and maintenance ban on refrigerants with a GWP over 2500 which is now planned for 2020. The ban is expected to apply to all equipment with a charge over 400 CO₂ equivalent. The agreement also includes some HFC bans in new equipment, preventing equipment to be ‘placed on the market’ in the EC if they contain HFCs. These bans comprise: hermetically sealed new commercial refrigeration equipment containing HFCs with a GWP over 150 banned by 2020; centralised refrigeration systems for commercial use with a capacity above 40 kW and containing HFCs with a GWP over 150 banned by 2022 - except cascade systems where primary refrigerant only can use HFCs under 1500 GWP; hermetically sealed room air-conditioning systems containing HFCs banned by 2020, small split air-conditioning systems containing HFCs banned by 2022 (does not apply where GWP is lower than 750). This may be brought forward to 2020, depending on the outcome of a review process. In addition, a traceability system will be introduced to better track equipment containing F-gases imported into the EU. This replaces the proposed ban on precharged systems which proved unpalatable to air conditioning manufacturers.

Parliament has also announced several elements will undergo further review before a decision is made. Among these are the fee payable by refrigerator producers which appears to have been deferred until 2017. The new Regulation is expected to be published in the Official Journal of the EU in the summer of 2014, and enter into force in January 2015.


IIR-co-sponsored conferences

2014

- Rome - Italy - February 26-28
- 49th AiCARR International Conference info@aicarr.org - www.aicarr.org
- Commissions B1, B2, E1, E2
- College Park, Maryland - USA - March 31-April 3
- 2014 International Sorption Heat Pump Conference (ISHPC2014)
- Mary Baugher: mbaugher@umd.edu
- www.cee.umd.edu/events/ISHPC2014
- Commissions E1, E2
- Montreal - Canada - May 12 - 16
- 11th IEA Heat Pump Conference
- Sophie Hosatte: Sophie.Hosatte-Duczasy@NRCan-NC.gc.ca - www.iea-21hp-2014.org/
- Commission E2
- Ohrid - Macedonia - May 21 - 24
- Central European Conference on Food (CEFood2014) contact@key.com.mk - www.keyevent.com
- Commissions C2, D1, D2
- Tarragon - Spain - June 18-20
- CYTEF2014 (7th Ibero-American Congress of Refrigeration Science and Technology)
- All commissions

- West Lafayette - Indiana - USA - July 14-17
- 22nd International Compressor Engineering Conference at Purdue
- 15th International Refrigeration and Air Conditioning Conference at Purdue
- 3rd International High Performance & Green Buildings Conference at Purdue
- www.engineering.purdue.edu/Herrick/Events
- Commissions B1, B2, E1

2016

- Perth - Australia - April 16-22
- LNG18 - 18th International Conference & Exhibition on Liquefied Natural Gas
- Robby Clark: rclark@etf.com.au
- Commission A2

- EPA permits R1234yf to be sold to US consumers
- The US Environmental Protection Agency (EPA) issued a final rule permitting R1234yf to be sold to consumers so that they can recharge their vehicle air conditioning systems.
- The EPA had originally issued a rule requiring anyone to notify EPA at least 90 days prior to the manufacture or processing of 1234ytfe for consumer use, based on toxicity concerns. However, following a review of the data submitted by AAJA and ARPI that indicated that there was no adverse impact on consumers from recharging their air conditioner using 1234yf, the EPA decided to reverse its decision.

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