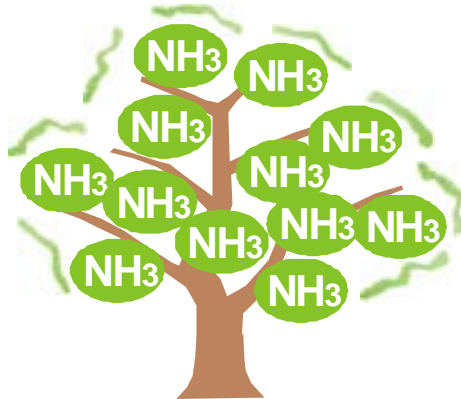




**INTERNATIONAL INSTITUTE OF REFRIGERATION**

**INVITATION AND PRELIMINARY PROGRAMME**

**INTERNATIONAL CONFERENCE**



## **Ammonia Refrigerating Systems, Renewal and Improvement**

**IIR Commissions: B2 with B1 and D1**

**May 6-8, 2005, Ohrid, Republic of Macedonia**



Organized by  
Faculty of Mechanical Engineering,  
University "Sv. Kiril and Metodij" - Skopje  
[www.mf.ukim.edu.mk](http://www.mf.ukim.edu.mk)  
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and



**IIR**

The International Institute of Refrigeration (IIR) is a scientific and technical intergovernmental organization enabling pooling of scientific and industrial know-how in all refrigeration fields on a worldwide scale.

The IIR's mission is to promote knowledge of refrigeration technology and all its applications in order to address today's major issues. The IIR has 61 member countries representing 80% of the global population, and corporate and individual members in all refrigeration spheres; it is rigorously neutral and aims to express balanced, constructive viewpoints.

## ABOUT THE CONFERENCE

Two of the global environment threats which are of the greatest concern are ozone depletion caused by (H)CFC refrigerants, and the global warming where the synthetic refrigerants HFCs participate too.

Depending on the applications, many refrigeration experts prefer the use of natural refrigerants such as ammonia, carbon dioxide and hydrocarbons. Ammonia has already well-proven in practice: it has been used for over 130 years.

According to the type of application, the size of the system, the cooling temperature, the environment, safety and other considerations, there is no single criterion governing the choice of a refrigerant. What is the right direction? It is difficult to decide because there are many groups with varying interests.

Therefore, academics and experts from the industry are kindly invited to take part which will contribute to knowledge on new technologies and to exchange experiences in ammonia refrigeration and related themes.

## MAIN TOPICS

### Design of modern ammonia systems and technological innovation

Current and future use of natural refrigerants

Low charge NH<sub>3</sub> technology, factory-made units, quality improvement

Plate type heat exchangers; direct expansion of ammonia systems

Compatibility of ammonia and metals, and ammonia and (miscible) oils

### Energy efficiency of ammonia refrigeration

Comparison: ammonia and fluorocarbon-based systems

Ammonia - indirect cooling compared with direct evaporation of HCFCs and HFCs

NH<sub>3</sub>/CO<sub>2</sub> and other cascade systems

### Applications of ammonia refrigeration

Cold stores, Food industries, Supermarkets, Air-Conditioning systems,

Heat pumps. Expansion in applications with lower size capacity

### Ammonia systems in developing countries

Renewal and improvements, technical assistance. Renewal in the context of substantial energy savings

### Technical and safety standards

Regulations on the construction and safe operation

### Guidelines, instructions and training materials

## ROUND TABLE WITHIN THE CONFERENCE

Latest News in Techniques, Codes and Standards in Industrial and Commercial Ammonia Refrigeration, including several reports and panel discussion

## KEYNOTE SPEAKERS



**Dr Forbes Pearson, UK**  
Star Refrigeration, President  
Winner of the 2003  
Gustav Lorentzen Medal  
"Ammonia Refrigeration –  
Yesterday, Today and For Ever"



**Mr. Anders Linborg, Sweden**  
Ammonia Partnership AB  
Honorary member of IIR Commission D1  
"Large Ammonia Refrigeration  
Systems - The necessity, Risks  
and 130 Years of Operation"



**Dr Predrag Hrnjak, USA**  
University of Illinois  
at Urbana-Champaign  
Secretary of IIR Commission E2  
"Charge Minimization in  
Ammonia Refrigeration Systems"



**Dr Herman Halozan, Austria**  
Technical University - Graz  
President of IIR Commission E2  
"Heat Pump Systems with  
Ammonia as Refrigerant"

## SPECIAL GUESTS



**Mr. Ron Vallort, USA**  
President of ASHRAE  
Vice President of IIR Commission D1  
"The Future of Refrigeration"



**Mr. Rajendra Shende,**  
Head of OzonAction, UNEP  
"Importance of natural  
refrigerants in safe-guarding  
the climate system and ensuring  
the sustainable development"

## REGISTRATION AND FEES

Full conference fee includes: participation at the conference, supply of the separate printed papers, Proceedings distributed at the conference, coffee breaks, conference dinner and sightseeing in the old town of Ohrid.

### Registration fee

Full registration  
by March 31 April 22, 2005            350 EUR  
after April 22, 2005                    400 EUR  
Accompanying persons                 120 EUR

### Instructions for payment, by bank transfer:

Beneficiary: CIRKO (at Faculty of Mechanical Engineering)  
Bank:            Komercijalna Banka AD Skopje, 1000 Skopje, Republic of Macedonia  
Account No: 0270100056779  
Code:            47964  
SWIFT:          KOBS MK 2X

## ACCOMMODATION

Accommodation is not included in the conference fee. Accommodation is available at the conference facility, in a five-star hotel, and in four- and three-star hotels. More information are available on the web site [www.ohrid.com.mk](http://www.ohrid.com.mk).

### Venue:

Hotel Metropol \*\*\*\*\*  
[www.metropol-ohrid.com](http://www.metropol-ohrid.com)  
[metropol@mt.net.mk](mailto:metropol@mt.net.mk)

Hotel Metropol is situated in the most beautiful part of the Ohrid Lake and the mountain Galicica on the other side.  
Capacity: 200 rooms, five suites and one residence apartment.  
Facilities: restaurant, snack bar, dancing bar, casino, salon with satellite TV, spacious sun terraces, bowling alley, tennis, billiards, hire of windsurfers, rowing boats.

Discount prices for Conference participants

	Bed&Breakfast	Full board
Single room	60 EUR	70 EUR
Double room	40 EUR	50 EUR (per person)



## OTHER INFORMATION

Ohrid: [www.ohrid.com.mk](http://www.ohrid.com.mk)  
Flights: [www.airports.com.mk](http://www.airports.com.mk)  
Visa information: [www.mnr.gov.mk/consular/vizaEN.htm](http://www.mnr.gov.mk/consular/vizaEN.htm)  
(Visa is not necessary for most of the countries.)

## OHRID

Ohrid is a city-museum with numerous archaeological treasures, a great number of churches and an antique theatre, which confirm that Ohrid was a cultural centre of the ancient era. Lake Ohrid is one of the oldest and best-preserved lakes in the world with crystal-clear water. It lies at an altitude of 695 m, has an area of 358 km<sup>2</sup> and maximum depth of 289 m. Ohrid and Lake Ohrid as a world cultural and natural heritage is under the protection of UNESCO since 1980. The colourful heritage of beautiful architecture, crafts and traditions combined with lake and mountainscape, interesting town and village architecture, local hospitality, climate and delicious fresh food, a visit to the Ohrid area will be deeply rewarding.



## ARRIVAL IN OHRID

### By plane

The flights to Ohrid are rare. However, there are many direct flights from many European cities to Skopje, the capital of Macedonia, which is 180 km far from Ohrid. For those arriving in Skopje, transportation to Ohrid will be organized with a special (mini)bus. Please inform us for the date and time of arrival till April 15.

### By car, bus

Skopje-Ohrid (180 km): one part is a freeway.

### By railway

The international trains from Vienna, Budapest, Belgrade or Athens arrive at the Central Railway Station in Skopje. There is no railway connection to Ohrid. The Central Railway Station and Intercity Bus Station are on the same location.

### Taxi

Start 50 Denars, + 20 Denars/km. Taxi Skopje-Ohrid about 65 Euro.

### National currency: "Denar"

1 Euro = 62 Denars

### Credit cards

Most of the credit cards are available in banks, hotels and bigger shops.

## PRELIMINARY PROGRAMME

### May 5, 2005 (Thursday)

17:00-21:00 Registration  
20:00 Welcome drink

### May 6, 2005 (Friday)

Authors	Paper
Opening ceremony: Didier Coulomb (Director of IIR), Roland Handschuh (Eurammon)	
<b>Plenary lectures</b>	
Ronald Vallort ASHRAE President (USA)	The Future of Refrigeration
Rajendra Shende Head of OzonAction, UNEP (Paris)	Importance of natural refrigerants in safeguarding the climate system and ensuring the sustainable development
Forbes Pearson Star Refrigeration Ltd (UK)	Ammonia Refrigeration – Yesterday, Today and For Ever
Lunch break	
<b>Expansion in the use of ammonia refrigerating systems</b>	
Björn Palm Royal Institute of Technology (Sweden)	Ammonia in small heat pump and refrigeration systems
Andy Pearson Star Refrigeration Ltd (UK)	Ammonia water chillers in building services applications
I. Eiermann, YORK, A. Hilligweg, Nuremberg University of Applied Sciences (Germany)	Remarks on the Use of Ammonia in Air-Conditioning Systems
Assaad Zoughaib, Denis Clodic Ecole des Mines de Paris (France)	Energy Performances Using Ammonia as Refrigerant in a Large Supermarket
Coffee break	
<b>Improvement of ammonia heat exchangers</b>	
Zahid Ayub, Isotherm Inc., M. C. Chyu, Adnan Ayub (USA)	Limited Charge Shell & Tube Ammonia Spray Evaporator with Enhanced Tubes for a Thermal Storage System
Wolfgang Dietrich "thermowave" GmbH (Germany)	Module welded Plate Heat Exchanger within the NH <sub>3</sub> Refrigeration circuit – effective technique for using at flooded and dry expansion applications
Hans Haukås Hans Haukås AS (Norway)	On the design of vertical risers from large ammonia recirculation type evaporators
Dermot Cotter, Star Refrigeration Ltd, J. Missenden, M. Nasralla, G. Maidment	The Design of Ammonia Test Rig to Measure the Internal Heat transfer Coefficient of Ammonia at Low Heat Fluxes
Coffee break	
<b>Ammonia and CO<sub>2</sub></b>	
Gert Koster Grasso International B.V. (The Netherlands)	CO <sub>2</sub> as Refrigerant: Why, and When Beneficial
Niels Vestergaard Danfoss (Denmark)	CO <sub>2</sub> Used as Low Temperature Refrigerant in Ammonia-CO <sub>2</sub> Cascade Systems
M. Ono, K. Kawamura, N. Mugabi Mayekawa Mfg Co Ltd (Japan)	Ammonia Refrigeration System with CO <sub>2</sub> as a Secondary Refrigerant

**May 7, 2005 (Saturday)**

Plenary lectures	
Anders Lindborg Ammonia Partnership (Sweden)	Large Ammonia Refrigeration Systems - the Necessity, Risks and 130 Years of Operation
Predrag Hrnjak University of Illinois at Urbana-Ch. (USA)	Charge Minimization in Ammonia Refrigeration Systems
Herman Halozan Graz University of Technology (Austria)	Heat Pump Systems with Ammonia as Refrigerant
Coffee break	
Renewal and improvement of ammonia refrigerating systems	
Ray Clarke Iseco Consulting Services Pty Ltd (Australia)	Cold Storage Warehouse, Using Direct Expansion Ammonia Refrigerant
S. Dichev, N. Angelov, H. Nikolov University of Food Technologies (Bulgaria)	Past and Present of Ammonia Refrigeration Systems in Bulgaria
Onur Devres, Istanbul Technical University; Cemal Yilmaz, Frigo Soğutma San. (Turkey)	Ammonia Refrigeration Industry in Turkey
Dragos Hera, Liviu Drughean, Technical University of Civil Engineering (Romania)	Efficient and Ecological System for an Artificial Ice-Rink
M. Poirier, G. Pajani, D. Giguère - CANMET W. Dilk - CIMCO Refrigeration (Canada)	Development and Demonstration of an Innovative Integrated Refrigeration and HVAC System in a Recreational Complex Ice Rink
Lunch break	
Various applications	
G. Panno, S. Auggano, A. Messineo, D. Panno University of Palermo (Italy)	Ammonia Heat Pump for Energy Saving in Food Industrial Processes: The Case of a Cheese Factory
M. Sharevski, I. Cherepnalkovski, Faculty of Mech. Eng. (Macedonia)	Characteristics of the Ammonia Turbocompressor and Possibilities for Application in the Refrigerating Systems
Vasile Minea, Inst. Hydro-Québec (Canada), F. Chiriac, Technical University (Romania)	Dual-Energy Heat Recovery Systems Using Ammonia/Water Mixtures
B. Cerkvencik, D. Žihor, A. Poredoš University of Ljubljana (Slovenia)	Ammonia Absorption Chillers in District Cooling Systems
(Poster session)	
Dieter Krauss, Schick + Co., Juergen Schenk, ILK (Germany)	Ammonia/Dimethyl Ether (R723) as a New Refrigerant Blend
T. S. Lee, C. H. Liu, T. W. Chen, National Taipei University of Technology (Taiwan)	Thermodynamic Analysis of Opt. Condensing Temperature of Cascade Condenser for Cascade Refrigeration Systems Applying Natural Refrigerants CO <sub>2</sub> /NH <sub>3</sub>
M. Sharevski, V. Sharevski, V. Sharevska, Faculty of Mech. Eng. (Macedonia)	Performances of the Compressor Refrigerating Machines with Two-phase Ejectors

16:00            **Sightseeing in the old town of Ohrid**  
 20:00            **Gala dinner**

**May 8, 2005 (Sunday)****9:00-11:00      Round Table**

Latest News in Techniques; Codes and Standards in Industrial and Commercial Ammonia Refrigeration (Reports from representatives of several countries and panel discussion)  
 Chaired by Mr Anders Lindborg (Sweden), Mr Brian Marriott (USA) and Bernhard Schrempf (Germany)

11:00-11:30      Coffee break

11:30            **Closing ceremony - Resume**

**Accompanying Persons Programme**

Presence at all social events of the conference: welcome drink, conference gala dinner, sightseeing in the old town of Ohrid  
 Excursion in "Sv. Naum" (18 km far from Hotel Metropol along the lake)  
 Visit at the Ohrid old bazaar with special jewels, filigree and Ohrid pearls

## MAJOR SPONSORS



## SPONSORS



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Predrag Hrnjak (Secretary of IIR Commission E2), USA  
Holger Koenig (Axima Refrigeration, and Eurammon), Germany  
Horst Kruse (Honorary member of IIR Commission B2), Germany  
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Brian Marriott (IIR Board of Directors), USA  
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## Organizing Committee

President: Risto Ciconkov, (Skopje University)  
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Didier Coulomb, Director of the IIR  
Karin Jahn, (Eurammon)  
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