

26th IIR International Congress of Refrigeration (ICR 2023)

Paris, France
21 – 25 August 2023

Volume 1

ISBN: 978-1-7138-8578-8

Printed from e-media with permission by:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571



Some format issues inherent in the e-media version may also appear in this print version.

Copyright© (2023) by International Institute of Refrigeration
All rights reserved.

Printed with permission by Curran Associates, Inc. (2024)

For permission requests, please contact International Institute of Refrigeration
at the address below.

International Institute of Refrigeration
177 Boulevard Maiesherbes
75017 Paris
France

Phone: +33 1 42 27 32 35

Fax: +33 1 47 63 17 98

iifiir@iifiir.org

Additional copies of this publication are available from:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: 845-758-0400
Fax: 845-758-2633
Email: curran@proceedings.com
Web: www.proceedings.com

Table of contents

PLENARY PAPER

| | |
|--|----|
| 1160 | 10 |
| From past to present: a net-zero framework with various hurdles and opportunities for RACHP | |
| <i>Lambert Kuijpers</i> | |

KEYNOTE PAPERS

| | |
|--|-----|
| 1148 | 46 |
| Magnetic refrigerators for hydrogen liquefaction | |
| <i>Koji Kamiya, Kyohei Natsume, Takenori Numazawa, Koichi Matsumoto, Akiko Saito, Tsuyoshi Shirai, Akira Shirai</i> | |
| 1149 | 61 |
| Knowing properties of fluids to understand their potentialities in RACHP sector | |
| <i>Laura Fedele</i> | |
| 1150 | 72 |
| Electrochemical Mass Transfer for Dehumidification and Gas Compression | |
| <i>Yunho Hwang, Longsheng Cao, Joseph Baker, Chunsheng Wang, Reinhard Radermacher</i> | |
| 1151 | 80 |
| Sustainability with prospective refrigerants: a thermodynamic perspective for systems design | |
| <i>Claudio Zilio</i> | |
| 1153 | 95 |
| Cryopreservation innovations in reproductive biotechnologies: meeting biobanking challenges in human and veterinary application | |
| <i>Lucie Gavin-Plagne, Eric Schmitt</i> | |
| 1155 | 106 |
| Latest refrigeration equipment technology using natural refrigerants | |
| <i>Kazuhiro Hattori</i> | |
| 1156 | 116 |
| Towards sustainability of road refrigerated transport in the food chain | |
| <i>Silvia Minetto, Francesco Fabris, Sergio Marinetti, Antonio Rossetti</i> | |
| 1157 | 131 |
| Can we further improve the energy efficiency of air conditioning system significantly? | |
| <i>Xianting Li, Chenjiyu Liang</i> | |
| 1158 | 144 |
| The role of heat pumps in the future energy system | |
| <i>Björn Palm</i> | |
| 1159 | 148 |
| Heat pump assists in energy transition: Challenges and approaches | |
| <i>Ruzhu Wang, Xiaoxue Kou, Hongzhi Yan</i> | |
| 1161 | 161 |
| Frost and ice fog formation in industrial freezers operating in supersaturated air | |
| <i>S.A. Sherif, Pedro J. Mago</i> | |

| | |
|---|-----|
| 1162 | 177 |
| Non-conventional cold storage regime for food at subzero temperature; challenges and recent developments | |
| <i>Soojin Jun, Dongyoung Lee, Taiyoung Kang</i> | |
| 1172 | 201 |
| The sustainability of the food cold chain. Part 1- the carbon emission savings related to food losses reduction | |
| <i>Jacques Guilpart, Jean Sarr, Cyril Toublanc, Jean-Luc Dupont</i> | |
| 1173 | 214 |
| The sustainability of the food cold chain. Part 2- the carbon emission due to the use of refrigeration equipment | |
| <i>Jacques Guilpart, Jean Sarr, Cyril Toublanc, Jean-Luc Dupont</i> | |

CONFERENCE PAPERS

COMMISSION A1 - CRYOPHYSICS & CRYOENGINEERING

| | |
|---|-----|
| 0290 | 231 |
| Design of a High-Current Cryogenic Test Stand for Compact Accelerator Systems <i>Jonas Arnsberg, Michael Stamm, Steffen Grohmann</i> | |
| 0563 | 240 |
| Optimization of precooling stage performance for MR JT cryocooler <i>Zbigniew Rogala</i> | |
| 0870 | 252 |
| Development of non-flammable mixed refrigerant Joule-Thomson refrigerator for semiconductor etching process <i>Cheonkyu Lee, Jung-Gil Lee, Jin Man Kim, Dong An Cha, Seon-Chang Kim, Wook Jin Yoo, Hyun Joong Kim, Seong Soo Kim, Jin Gi Hong</i> | |
| 0956 | 258 |
| Parametric Analysis on Magnetoresistive Heat Switch – Numerical Study <i>Yash Desale, Gautam Ranjan, Shivendra Rathore, Bukke Kiran Naik, V. K. Singh</i> | |
| 0958 | 268 |
| Design And Optimization of Niobium-Titanium Based Superconductive Magnet for The Magneto Resistive Heat Switch <i>Bukke Kiran Naik, Shivendra Rathore, Yash Desale, Kishore Singh Patel, Suryanarayan Dash, V. K. Singh</i> | |

COMMISSION A2 - LIQUEFACTION & SEPARATION OF GASES

| | |
|---|-----|
| 0015 | 279 |
| R4F-GAS reclamation of ultimate waste of fluorinated greenhouse gases <i>Valérie Lucas, Laurent Guégan</i> | |
| 0068 | 286 |
| Further research in helium and hydrogen liquefaction <i>Mihail-Dan Staicovici</i> | |
| 0296 | 297 |
| Performance of liquid hydrogen vaporizer <i>Hiroaki Murata, Hajime Yabase, Naoyuki Inoue, Yonezo Ikumi, Minoru Takeda, Kiyoshi Saito, Kenji Tojo</i> | |
| 0304 | 304 |
| Liquid Hydrogen Trailers: State of the Art, Latest Developments and Related Performance <i>Jean-Pierre Bernard</i> | |
| 0335 | 314 |
| Experimental investigation of Propylene during flow condensation in structured tubes <i>Christos Tsitsiloudis, Andrea Luke</i> | |
| 0357 | 323 |
| Spray Ejector Condenser for Negative-CO₂-emission gas power plant: dimensioning and initial test results <i>Krzysztof Banasiak, Paweł Madejski, Tomasz Kuś, Michał Karch</i> | |
| 0358 | 335 |
| Gas breakthrough across a porous array structure wetted by cryogenic fluid <i>Tianhao Yi, Guang Yang, Chunyu Li, Jingyi Wu</i> | |
| 0616 | 347 |
| The First Extractive Distillation Column for the Separation of Azeotropic Refrigerant Mixtures Using Ionic Liquid Entrainers <i>Kalin Baca, Mark Shiflett</i> | |

| | |
|--|-----|
| 0618 | 353 |
| Fundamentals to Commercialization: Using Membranes, Porous Media, and Ionic Liquids for the Separation of Azeotropic Refrigerant Mixtures | |
| <i>Mark Shiflett, Kalin Baca, Abby Harders, Andrew Yancey, Ethan Finberg, Karim Al-Barghouti, Aaron Scurto</i> | |
| 0707 | 358 |
| Technoeconomic optimisation of systems for liquefaction and purification of captured CO2 | |
| <i>Rikke Cilius Pedersen, Erasmus Rothuizen, Torben Ommen, Jonas Jensen</i> | |
| 0848 | 370 |
| Refrigerant composition regulating method in small-tonnage LNG plants | |
| <i>Sofia Maslikova, Yaroslav Samokhvalov, Alexander Krotov, Margarita Krikunova, Maxim Mazyakin</i> | |
| 0868 | 378 |
| Comparison of conventional and emerging technologies for Hydrogen Liquefaction | |
| <i>Guilherme Fidelis Peixer, Jhonatta Bordignon, Tamayo Dias, Yogan Sganzerla, Jaime Lozano, Jader Barbosa Jr.</i> | |
| 0888 | 388 |
| Pre-cooling systems in modern hydrogen liquefaction | |
| <i>Margarita Krikunova, Sofia Maslikova, Alexander Krotov, Yaroslav Samokhvalov, Nikolai Polyansky</i> | |
| 0889 | 395 |
| Low capacity nitrogen liquefier | |
| <i>Yaroslav Samokhvalov, Alexander Krotov, Evgeny Bychkov, Sofia Maslikova, Margarita Krikunova</i> | |
| 0890 | 401 |
| Efficiency of a Natural Gas Liquefier Using Natural Refrigerant Pre-cooling driven by Organic Rankine Cycle | |
| <i>Alexander Krotov, Margarita Krikunova, Yaroslav Samokhvalov, Tatiana Ustiugova</i> | |

26th IIR International Congress of Refrigeration (ICR 2023)

Paris, France
21 – 25 August 2023

Volume 2, Part 1

ISBN: 978-1-7138-8578-8

Table of contents

CONFERENCE PAPERS

COMMISSION B1 - THERMODYNAMICS & TRANSFER PROCESSES

| | |
|---|-----|
| 0046 | 21 |
| Investigations on optimal spray parameters of pressure swirl nozzle-based spray cooling in the non-boiling regime <i>Rajeev Kukreja, Sukhdeep Singh</i> | |
| 0051 | 33 |
| Phase Changing Materials for temperature control in an industrial electronic room <i>Benedicte Ballot-Miguet, Pascal Borel, Maxime Houvin</i> | |
| 0063 | 45 |
| Effect of miscibility on flow boiling heat transfer characteristic of refrigerant-oil mixture inside small diameter tube <i>Guang Li, Dawei Zhuang, Liyi Xie, Guoliang Ding, Yifeng Gao, Ji Song</i> | |
| 0080 | 58 |
| Evaluation of condensation-induced invalidation of various materials in high humidity environment <i>Xiaoqing Zhou, Chunyu Li, Cai Aifeng, Guang Yang, Jingyi Wu</i> | |
| 0112 | 68 |
| Local heat transfer coefficients of hydrocarbon refrigerant condensation inside a brazed plate heat exchanger (BPHE) <i>Giovanni A. Longo, Simone Mancin, Giulia Righetti, Claudio Zilio</i> | |
| 0113 | 80 |
| Local heat transfer coefficients of hydrocarbon refrigerant boiling inside a brazed plate heat exchanger (BPHE) <i>Giovanni A. Longo, Simone Mancin, Giulia Righetti, Claudio Zilio</i> | |
| 0148 | 91 |
| Innovative System Using Thermodynamics Algorithm to Predict the Autonomy of Cold Chain Applications <i>Daniel Pires, Simone Antonio Bruno, Mario Lentz, Florian Waserman</i> | |
| 0152 | 103 |
| Evaluation of the Performance of a Thermal Switch Capacitor in a Magnetocaloric Device <i>Nada Petelin, Katja Vozel, Katja Klinar, Urban Tomc, Andrej Kitanovski</i> | |
| 0153 | 113 |
| Experimental assessment and correlation of the liquid density and saturation pressure of trans-1,2-Dichloroethene (R1130(E)) <i>Giulia Lombardo, Davide Menegazzo, Laura Fedele, Sergio Bobbo, Mauro Scattolini</i> | |
| 0158 | 123 |
| Heat transfer characteristics within a multiscale packaging: application on a pallet of strawberries <i>Ahmad Nasser Eddine, Steven Duret, Denis Flick, Jean Moureh</i> | |
| 0163 | 130 |
| A transient numerical analysis of two-stage refrigeration systems for battery electric vehicles comprehending low-GWP refrigerant fluids <i>Leonardo Monteiro de Carvalho, Guilherme Ribeiro</i> | |
| 0169 | 140 |
| New experimental data on organic Phase Change Materials (PCM) for refrigeration applications <i>Giulia Righetti, Dario Guarda, Giovanni A. Longo, Claudio Zilio, Simone Mancin</i> | |
| 0170 | 148 |
| Comparison of different architectures for two-phase cooling of polymer electrolyte fuel cells in aircraft <i>Patrick Koschel, Benedikt G. Bederna, Markus Schönheit, Mario Raddatz, Riley B. Barta, Christiane Thomas</i> | |

| | |
|---|-----|
| 0173 | 160 |
| Compressed liquid density and speed of sound measurements and correlation of the binary mixture {Carbon dioxide (CO₂) + 1,1-difluoroethene (HFO-1132a)} at temperatures from 240 K to 350 K | |
| <i>Davide Menegazzo, Aaron Rowane, Laura Fedele, Sergio Bobbo, Giulia Lombardo, Mark O. McLinden</i> | |
| 0210 | 173 |
| Experimental study of the vaporization of water drops impacting a heated wall under conditions of low pressure | |
| <i>Antoine Courouble, Romuald Rullière, Jocelyn Bonjour</i> | |
| 0218 | 185 |
| Evolutionary optimization of heat exchanger circuitries for the advancement of next-generation refrigerants | |
| <i>Niccolo Giannetti, Adriano Milazzo, John Carlo Garcia, Richard Jayson Varela, Yuichi Sei, Koji Enoki, Kiyoshi Saito</i> | |
| 0231 | 197 |
| Development and Performance Enhancement of a Compact Elastocaloric Refrigerator | |
| <i>Shijie Xu, Yanliang Chen, Sijia Yao, Yao Wang, Suxin Qian</i> | |
| 0252 | 206 |
| Gas-Liquid Distributions of Refrigerant Flows in Multi-pass Channels with Vertical Headers -Influence of Heating of Branch Tubes on Liquid Distribution Characteristics- | |
| <i>Ayumi Onodera, Takafumi Hatada, Fuuka Sawahara, Kohei Mori, Masafumi Hirota, Akira Nishimura, Naoki Maruyama</i> | |
| 0255 | 216 |
| Thermal conductivity measurement of HFO/HFC mixture refrigerant by transient hot-wire method | |
| <i>Shotaro Mizuno, Atiqur R. Tuhin, Keishi Kariya, Akio Miyara</i> | |
| 0263 | 226 |
| Influence of porous media on carbon dioxide hydrate formation and dissociation processes by calorimetry for secondary refrigeration applications. | |
| <i>Pascal Clain, Fatima Benmesbah, Anthony Delahaye, Laurence Fournaison, Olivia Fandino, Livio Ruffine, Véronique Osswald, Christophe Dicharry</i> | |
| 0272 | 237 |
| Prediction Model of Two-Phase Flow Distribution in a Vertical Header | |
| <i>Yoji Onaka, Rihito Adachi, Nanami Kishida, Takashi Matsumoto</i> | |
| 0278 | 249 |
| Heat transfer measurement and modeling in a jacketed batch stirred reactor applied to CO₂ hydrate formation kinetic study | |
| <i>Véronique Osswald, Pascal Clain, Seydina Ndoeye, Anthony Delahaye, Laurence Fournaison</i> | |
| 0281 | 259 |
| Two-phase flow distribution characteristics of a vertical header with protruded branch pipes | |
| <i>Rihito Adachi, Yoji Onaka, Nanami Kishida, Shogo Kikuchi, Hiroyuki Okano, Takashi Matsumoto</i> | |
| 0311 | 271 |
| Experimental study of ammonia falling film evaporation heat transfer on horizontal smooth and finned tubes | |
| <i>Ikuro Akada, Kosaku Nishida, Norihiro Inoue</i> | |
| 0338 | 280 |
| Fluidic EWOD thermal switch for magnetocaloric device | |
| <i>Katja Klinar, Katja Vozel, Nada Petelin, Urban Tomc, Andrej Kitanovski</i> | |
| 0348 | 290 |
| Performance investigation and structural improvement of the finned tube surface cooler under extreme conditions | |
| <i>Jing Yu</i> | |
| 0393 | 302 |
| Modelling and experiments of dry ice sublimation in an insulation box | |
| <i>Abhishek Purandare, Srinivas Vanapalli</i> | |

| | |
|--|-----|
| 0395 | 309 |
| Experimental investigation on water vaporization at subatmospheric pressure in different liquid geometrical configuration <i>Wiktoria Lada, Karolina Wojtasik, Tomasz Halon, Romuald Rullière, Bartosz Zajaczkowski, Jocelyn Bonjour</i> | |
| 0399 | 323 |
| Analysis of the frost formation pattern in heat exchangers for proper placement of frost measuring sensors <i>Martim Lima Aguiar, Pedro Dinis Gaspar, Pedro Silva</i> | |
| 0407 | 334 |
| Dynamic modelling and optimization of energy storage density of sorption thermal battery <i>Hyung Won Choi, Jinhee Jeong, Yong Tae Kang</i> | |
| 0412 | 343 |
| Experimental investigations and modeling of Propylene and DME solubility in PAG oil <i>Matteo Caramaschi, Jonathan Notturmo, Guglielmo Vaccaro, Wiebke Meesenburg, Jonas Kjaer Jensen, Lorenzo Talluri, Brian Elmegaard, Pascal Tobaly</i> | |
| 0415 | 352 |
| Heat transfer coefficients during laminar flow of microencapsulated PCM fluid <i>Boguslaw Bialko, Bartlomiej Nalepa, Tomasz Halon, Bartosz Zajaczkowski</i> | |
| 0418 | 362 |
| Development of the correlation condensation heat transfer for non-azeotropic refrigerant mixtures inside 4mm OD small-diameter microfin tubes <i>Masataka Hirose, Daisuke Jige, Norihiro Inoue</i> | |
| 0427 | 372 |
| Rheological and thermal study of mixed cyclopentane + CO₂ Hydrate slurries for refrigeration applications <i>Nada Chami, Yasmine Salehy, Pascal Clain, Anthony Delahaye, Laurence Fournaison, Didier Dalmazzone</i> | |
| 0430 | 384 |
| Numerical simulation of density wave oscillation in two parallel mini-channels under constant wall temperature condition <i>Kizuku Kurose, Kazushi Miyata</i> | |
| 0440 | 390 |
| Characterization of ice melting kinetics on a heat exchanger <i>Laurence Fournaison, Anthony Delahaye, Hong Minh Hoang, Romuald Hunlede, Maria Aurely Yedmel</i> | |
| 0442 | 398 |
| The environmental impact of HFOs from TEWI to PFAS. A review. <i>Laura Fedele, Silvia Trini Castelli, Piera Ielpo, Claudio Zilio, Sergio Bobbo</i> | |
| 0444 | 409 |
| Modeling and experimental analysis of direct contact heat exchangers for R718 refrigeration system <i>Raed Fayad, Egoi Ortego Sampedro, Assaad Zoughaib, Karino Kang, Alan Chauvin</i> | |
| 0447 | 421 |
| SophiA: Sustainable off-grid solutions for Pharmacies and Hospitals in Africa – Self-sufficient cascade system in combination with a thermal energy storage charged by a two-phase thermosiphon <i>Oliver Schmid, Elena Melito, Michael Kauffeld</i> | |
| 0451 | 431 |
| The void fraction measurement of R454C refrigerant using the capacitance sensor <i>Moojoong Kim, Yuya Uemura, Jongsoo Jeong, Kiyoshi Saito</i> | |
| 0452 | 439 |
| Experimental investigation of flow boiling instabilities in parallel microchannels <i>Stanislawa Halon, Zbigniew Krolicki, Rémi Revellin, Bartosz Zajaczkowski</i> | |

| | |
|--|-----|
| 0456 | 450 |
| High frequency and high-power density magnetocaloric cooling | |
| <i>Urban Tomc, Katja Klinar, Nada Petelin, Katja Vozel, Simon Nosan, Jakob Perne, Andrej Kitanovski</i> | |
| 0460 | 462 |
| Experimental and numerical analyses of propane leakage into a closed environment | |
| <i>Giulia Righetti, Michele Calati, Simone Mancin, Claudio Zilio</i> | |
| 0486 | 470 |
| Influence of finned and porous structures in nucleate boiling of the hydrocarbon n-pentane | |
| <i>Andrea Luke, Mohammad Deeb, Hendrik Margraf</i> | |
| 0492 | 481 |
| Multi-performance assessment of hydrate slurries for secondary refrigeration in a modelled industrial case study | |
| <i>Yasmine Salehy, Nada Chami, Pascal Clain, Hong Minh Hoang, Didier Dalmazzone, Laurence Fournaison, Anthony Delahaye</i> | |
| 0495 | 493 |
| Experimental Investigation of a New Ultra-Low Temperature Refrigerant to Replace R-23 in an Environmental Test Chamber | |
| <i>Melanie Cop, Diandra Küçükkaya, Riley B. Barta, Christiane Thomas</i> | |
| 0497 | 501 |
| On the deviation from equilibrium state and the heat and mass transfer capabilities of ionic liquids in absorption chillers | |
| <i>Roland Kühn</i> | |
| 0500 | 514 |
| Experimental characterization of a water/LiBr horizontal tubes falling film absorber using an ionic liquid as additive | |
| <i>Hussain Ahmed Tariq, Mahmoud Bourouis, Juan Prieto, Alberto Coronas</i> | |
| 0504 | 525 |
| Experimental investigation on heat transfer and pressure drops during CO₂ boiling in a cylindrical microchannel | |
| <i>Ahmadou Tidiane Diaby, Marie-Christine Duluc, Brice Tremeac, Pascal Tobaly</i> | |
| 0516 | 535 |
| A residual entropy scaling approach for viscosity of refrigerants, other fluids and their mixtures | |
| <i>Xiaoxian Yang, Xiong Xiao, Monika Thol, Markus Richter, Ian Bell</i> | |
| 0517 | 546 |
| Development of Equations of State for Low Global Warming Potential Refrigerants Based on Supercritical Flow Calorimetry Measurements | |
| <i>Jera Van Nieuwenhuysse, Willem Faes, Caro Sallet, Michel De Paepe, Steven Lecompte</i> | |
| 0521 | 558 |
| Assessment of pool boiling correlations using experimental data with refrigerant FK-649 | |
| <i>Ilya T'Jollyn, Jasper Nonneman, Wim Beyne, Michel De Paepe</i> | |
| 0532 | 567 |
| Thermodynamic study of working fluid pairs for an absorption refrigeration process | |
| <i>Alaa Hajlaoui, Laurène Salat, Laurence Rodier, Jean-Michel Andanson, Yohann Coulier</i> | |
| 0544 | 579 |
| Numerical assessment of CO₂-based mixtures for refrigeration systems: focus on the evaporation process | |
| <i>Guglielmo Vaccaro, Nicola Andreini, Matteo Caramaschi, Lorenzo Talluri, Brian Elmegaard, Adriano Milazzo</i> | |
| 0570 | 591 |
| Determination of the isobaric mass heat capacity of a powder at low temperatures (-100°C to 10°C) by differential scanning calorimetry with temperature modulation (TMDSC): influence of mass and mechanical compaction | |
| <i>Mireille Bader, Benoit Duponchel, Fabrice Goutier, Stephane Longuemart, Abdelaziz Ellass, Gabriela Blanita, Mihaela Streza</i> | |
| 0576 | 603 |
| Condensation heat transfer of R513A and R516A in a small diameter channel: heat transfer coefficient and flow pattern | |
| <i>Nicolò Mattiuzzo, Marco Azzolin, Arianna Berto, Stefano Bortolin, Davide Del Col</i> | |

| | |
|--|-----|
| 0588 | 613 |
| Thermodynamic Concept of a Novel Recuperative Two-Phase Heat Pump Cycle | |
| <i>Benedikt G. Bederna, Riley B. Barta, Christiane Thomas</i> | |
| 0602 | 625 |
| Numerical finite-element study and performance evaluation of an isothermal compression in a hydro-CO₂ liquid piston | |
| <i>François Faraldo, Paul Byrne, Philippe Loiseau, Pascal Lalanne</i> | |
| 0603 | 638 |
| Assessment of Non-Ideal Chemical Looping Heat Pump Cycle | |
| <i>Junyoung Kim, James E. Braun, Eckhard A. Groll, Davide Ziviani</i> | |
| 0609 | 650 |
| Direct grain-scale observation of chloride salts contained in the absorber of solid sorption heat pumps to characterize their reaction kinetics | |
| <i>Aleix Pubill, Xavier Lulka</i> | |
| 0614 | 657 |
| Characterization methodology of mass transfer within porous absorbers of solid-gas sorption heat pump | |
| <i>Aleix Pubill, Driss Stitou</i> | |
| 0617 | 665 |
| Preliminary study of the splashing effect due to the bursting of giant water bubbles near the triple point: application to water evaporator | |
| <i>Florine Giraud, Patric Mantaropoulos, Brice Tremeac, Pascal Tobaly</i> | |
| 0621 | 675 |
| Preliminary study of saturated water (R-718) film boiling in a grooved plate evaporator | |
| <i>Florine Giraud, Romain Collignon, Joris Marek, Benoit Stutz</i> | |
| 0623 | 684 |
| Heat transfer analysis of R134a, R1234ze(E) and R513A inside falling film and flooded evaporators with enhanced surface tubes: experimental data and comparison with empirical correlations | |
| <i>Giuseppe Censi, Andrea Padovan</i> | |
| 0662 | 696 |
| A Thermodynamic Property Model for R1234yf and Propane Mixtures | |
| <i>Ryo Akasaka</i> | |
| 0680 | 705 |
| PVT Properties, Saturated Densities, and Critical Parameters of trans-1,2-Difluoroethene (R1132(E)) + 2,3,3,3-Tetrafluoroprop-1-ene (R1234yf) | |
| <i>Naoya Sakoda, Yukihiro Higashi</i> | |
| 0683 | 712 |
| Evaluation of a New Low-GWP Dielectric Fluid for Two-Phase Immersion Cooling of Data Centers | |
| <i>Gustavo Pottker, Drew Brandt, Abigail Van Wassen</i> | |
| 0692 | 722 |
| Effect of porous bodies thickness on evaporation heat transfer by falling film on horizontal tube | |
| <i>Sho Fukuda, Kazushi Miyata, Shuichi Umezawa</i> | |
| 0705 | 729 |
| Experimental study and modeling of the characterization of mixtures of PAG and POE with propane (R-290) and POE and AKB oil with Tetrafluoroethane (R-134a) | |
| <i>Jonathan Notturmo, Brice Tremeac, Pascal Tobaly</i> | |
| 0708 | 741 |
| Condensation heat transfer of hydrocarbons inside a compact horizontal microfin tube | |
| <i>Giovanni A. Longo, Giulia Righetti, Simone Mancin, Claudio Zilio</i> | |

| | |
|---|-----|
| 0717 | 751 |
| Experimental investigation on nucleate boiling heat transfer of low GWP refrigerants over metal-foam enhanced tube bundles | |
| <i>Cheng-Min Yang, M. Muneeshwaran, Kashif Nawaz</i> | |
| 0722 | 760 |
| Vapor-Liquid Equilibrium of Binary Refrigerant Blends of R1132(E) + R1234yf and R1132(E) + R32 | |
| <i>Hiroaki Ishimaru, Kentaro Kitabatake, Yukihiro Higashi, Naoya Sakoda</i> | |
| 0733 | 769 |
| Influence of the mass diffusivity versus solubility on the performance of ammonia-ionic liquid absorption refrigeration systems | |
| <i>Amín Altamirano, Ronny Rives, Dereje S. Ayou, Alberto Coronas</i> | |
| 0745 | 779 |
| Energy storage systems – energy based versus entropy forces. | |
| <i>Tomasz Banaszekiewicz, Maciej Chorowski</i> | |
| 0747 | 788 |
| Investigation on Condensation Heat Transfer of R454C inside Small Diameter Microfin Tube | |
| <i>Afdhal Kurniawan Mainil, Hakimatul Ubudiyah, I. Wayan Sugita, Keishi Kariya, Akio Miyara</i> | |
| 0754 | 798 |
| Experimental results of ejector refrigeration system with R1233zde operating under real industrial conditions | |
| <i>Jerzy Gagan, Andrzej Pawluczuk, Michał Łukaszuk, Kamil Śmierciew, Dariusz Butrymowicz, Marek Madej, Mikołaj Mastrowski</i> | |
| 0759 | 807 |
| Numerical and experimental evaluation of OD model of gas ejector | |
| <i>Kamil Śmierciew, Dariusz Butrymowicz, Jerzy Gagan</i> | |
| 0762 | 817 |
| Experimental determination of flammability of low GWP mixtures based on alternative refrigerants | |
| <i>Dominik Mazur, Bartosz Gil, Sabina Rosiek</i> | |
| 0778 | 828 |
| Modelling of CO₂ transonic flashing flow through a convergent-divergent nozzle using novel closure equations in the Delayed Equilibrium Model | |
| <i>Wojciech Angielczyk, Dariusz Butrymowicz, Jerzy Gagan, Kamil Śmierciew</i> | |
| 0786 | 839 |
| Investigations of a prototype two-phase injector operating as passive heat driven pump with R1234ze | |
| <i>Andrzej Pawluczuk, Dariusz Butrymowicz, Kamil Śmierciew, Jerzy Gagan</i> | |
| 0788 | 849 |
| Investigations of supersonic micro-ejector for cooling system of electronic components | |
| <i>Kamil Śmierciew, Dariusz Butrymowicz, Wojciech Angielczyk, Mark J. Bergander, Jerzy Gagan</i> | |
| 0807 | 859 |
| Effect of confinement on the heat load of built-in refrigerators | |
| <i>Fernando Knabben, Hans Ihle, Adolf Feinauer, Christian Hermes</i> | |
| 0823 | 870 |
| Modelling and Experimental Investigation of Solute Inclusion During a Progressive Freeze Concentration Process | |
| <i>Zhuo Zhang, Midhun Joy, Srinivas Vanapalli</i> | |
| 0851 / English version..... | 882 |
| Measurements of Isobaric Heat Capacity of R1336mzz(Z) | |
| <i>Noboru Kagawa, Atsushi Matsuguchi</i> | |
| 0851 / French version..... | 893 |
| Mesures de la capacité thermique isobare du R1336mzz(Z) | |
| <i>Noboru Kagawa, Atsushi Matsuguchi</i> | |

| | |
|---|------|
| 0854 | 905 |
| Experiment on Condensation Performance and Flow Visualization in Layered Microchannel Heat Exchangers | |
| <i>Norihiro Inoue, Tatsuki Goto, Daisuke Jige, Kentaro Sagawa</i> | |
| 0855 | 912 |
| Solid-liquid equilibrium property measurements for R23 alternative candidates | |
| <i>Sebastiano Tomassetti, Kohei Miyoshi, Giovanni Di Nicola, Ryuji Kawamura, Chieko Kondou</i> | |
| 0856 | 922 |
| pvTz properties of R1132a + R1234yf binary system measured in the two-phase and superheated vapor regions | |
| <i>Sebastiano Tomassetti, Giovanni Di Nicola</i> | |
| 0862 | 933 |
| Development of An Electrochemical Membrane Dehumidifier | |
| <i>Longsheng Cao, Joe Baker, Yunho Hwang, Chunsheng Wang, Reinhard Radermacher</i> | |
| 0869 | 939 |
| Simulation and Exergy Analysis of Transcritical CO2 Ejector Flows Using the Real Gas Implicit SU2 Solver | |
| <i>Antoine Metsue, Hakim Nesreddine, Dominique Monney, Yann Bartosiewicz, Sébastien Poncet</i> | |
| 0873 | 951 |
| Condensation heat transfer of refrigerant mixtures of R1234yf and R32 in multiport minichannels | |
| <i>Daisuke Jige, Maika Nobunaga, Taiga Nogami, Norihiro Inoue</i> | |
| 0877 | 959 |
| Molecular simulation for property prediction of low GWP refrigerant mixtures | |
| <i>Tomoaki Imai, Takehiro Miura, Masato Hashimoto, Tetsuya Okumura, Chieko Kondou</i> | |
| 0878 | 969 |
| Boiling enhancement of R1234ze(E) on microstructure aluminum surfaces processed by a laser ablation | |
| <i>Hironobu Hirahara, Shota Hamasaki, Daichi Suzuki, Yufei Liu, Chieko Kondou</i> | |
| 0880 | 979 |
| Surface tension measurement with assistance of a molecular simulation for low GWP refrigerant mixtures | |
| <i>Takemasa Kawahara, Ryutaro Nonaka, Tetsuya Okumura, Chieko Kondou</i> | |
| 0882 | 988 |
| Heat transfer and flow characteristics of evaporating flow in a triangular mini-channel | |
| <i>Hitoshi Asano, Masaaki Ishibashi, Akito Eda</i> | |
| 0883 | 994 |
| Experimental development of alternative mixtures to isobutane. Energy optimization. | |
| <i>Daniel Calleja-Anta, Giovanni Napoli, Laura Nebot-Andres, Daniel Sánchez García, Ramon Cabello López, Luca Viscito, William Alfonso Mauro, Rodrigo Llopis Doménech</i> | |
| 0884 | 1006 |
| Condensation and evaporation heat transfer of R32 and R410A in reversible shell-and-tube and brazed plate heat exchangers | |
| <i>Giuseppe Censi, Andrea Padovan</i> | |
| 0926 | 1016 |
| Investigation of a Heat Pump Dishwasher with Natural Refrigerant Mixture | |
| <i>Katharina Stöckel, Erik Mickoleit, Frieda Busching, Riley B. Barta, Christiane Thomas</i> | |
| 0931 | 1027 |
| Condensation of R450A and R454B inside a compact microfin tube | |
| <i>Yuce Liu, Luisa Rossetto, Andrea Diani</i> | |

COMMISSION B2 - REFRIGERATING EQUIPMENT

| | |
|--|------|
| 0013 | 1037 |
| Improvements on efficiency and reliability of CO2 TC systems | |
| <i>Paul Rivet</i> | |
| 0020 | 1043 |
| Condensation Heat transfer of R134a and R410A in multiport rectangular microchannels with different aspect ratio | |
| <i>Rajeev Kukreja, Varinder Singh</i> | |
| 0049 | 1055 |
| Investigation methodology for a better knowledge of the French retail sector | |
| <i>Benedicte Ballot-Miguet, Fabrice Decellas, Jacques Guilpart, Clement Gachot, Pierre Boulin</i> | |
| 0050 | 1064 |
| Analysis of Refrigerant R452B in Use-phase versus Pristine Conditions using Gas Chromatography | |
| <i>Saman Nimali Gunasekara, Björn Palm, Monika Ignatowicz, Peter Hill</i> | |
| 0054 | 1076 |
| Development of NH3/H2O absorption chillers for negative cooling in industrial solar systems | |
| <i>Helène Demasles, Anouk Muller, Hai Trieu Phan</i> | |
| 0055 | 1086 |
| Experimental characteristics analysis of the closed-cycle Joule–Thomson refrigerator operating with a nitrogen-hydrocarbon refrigerant mixture in transient modes | |
| <i>Evgeny Bychkov</i> | |
| 0064 | 1098 |
| Numerical Model of Water Drainage Performance of Microchannel Heat Exchangers Applied in Heat Pump Type Air Conditioner | |
| <i>Dawei Zhuang, Guang Li, Guoliang Ding</i> | |
| 0065 | 1111 |
| Dynamic model of mixing and separation of refrigerant with lubricant in compressor oil sumps | |
| <i>Liyi Xie, Dawei Zhuang, Guang Li, Guoliang Ding, Hongjun Cao, Zhipeng Yang, Siqing Liao, Wang Kan</i> | |
| 0084 | 1124 |
| Evaluation of global optimization algorithms for capillary tube suction line heat exchanger sizing | |
| <i>Luka Lorbek, Andrej Kitanovski</i> | |
| 0118 | 1135 |
| Analysis and comparison of four configurations using flooded evaporator in an experimental transcritical CO2 refrigeration machine | |
| <i>Ana Paez, Pascal Tobaly, Benedicte Ballot-Miguet, Benoit Michel, Rémi Revellin</i> | |
| 0145 | 1147 |
| How to optimize the floating high pressure | |
| <i>Jacques Guilpart, Jonathan Notturmo, Amín Altamirano</i> | |
| 0150 | 1157 |
| Vapour compression and caloric refrigeration in combination for a new hybrid refrigeration system | |
| <i>Laura Nebot-Andres, Ciro Aprea, Jaka Tušek, Andrej Žerovnik, Angelo Maiorino, Rodrigo Llopis Doménech</i> | |
| 0151 | 1169 |
| Projecting the carbon emissions from refrigeration used in the UK food industry to 2050 | |
| <i>Alan Foster, Judith A. Evans</i> | |
| 0166 | 1180 |
| Evaluation of various subcooling techniques for hot climate operation of an ejector based CO2 transcritical refrigeration system | |
| <i>Vaishak S, Prosenjit Singha, Mani Sankar Dasgupta, Souvik Bhattacharyya, Simarpreet Singh, Armin Hafner</i> | |

| | |
|---|------|
| 0172 | 1191 |
| Caloric cooling modelling with a novel tool for simulating thermal control circuits | |
| <i>Katja Vozel, Katja Klinar, Andrej Kitanovski</i> | |
| 0174 | 1198 |
| Method for evaluating the energy efficiency of free cooling and refrigerating systems in hydraulically linked circuits | |
| <i>Simon Wagner, Sebastian Hausser, Martin Becker</i> | |
| 0179 | 1209 |
| Performance analysis of a CO₂ based milk chiller with evaporative cooling arrangement operating in hot climate | |
| <i>Prosenjit Singha, Vaishak S, Mani Sankar Dasgupta, Souvik Bhattacharyya, Armin Hafner, Hagar Elarga</i> | |
| 0182 | 1221 |
| Long-life elastocaloric regenerative cooler/heat pump with a breakthrough performance | |
| <i>Stefano Dall'Olio, Žiga Ahčin, Andrej Žerovnik, Parham Kabirifar, Luka Porenta, Jan Cerar, Jaka Tušek</i> | |
| 0198 | 1231 |
| Design of a Refrigeration Machine with Accurate Inline Refrigerant-Oil Property Measurements for Operation Optimization | |
| <i>Caner Cikmaz, Xiaoxian Yang, Thore Oltersdorf, Thorsten Urbaneck, Markus Richter</i> | |
| 0211 | 1239 |
| Experimental characterization of the icephobic surfaces properties for optimization of ice slurry production | |
| <i>Walid Samah, Pascal Clain, Francois Rioual, Laurence Fournaison, Anthony Delahaye</i> | |
| 0213 | 1251 |
| Application of a systematic approach to evaluate measures for increasing the energy efficiency of an industrial refrigerating system | |
| <i>Sebastian Hausser, Stefan Hudjetz, Martin Becker</i> | |
| 0214 | 1261 |
| Experimental demonstration of a ground-source reversible air conditioning unit for residential application using a PCM storage | |
| <i>Giulia Righetti, Simone Mancin, Giovanni A. Longo, Claudio Zilio</i> | |
| 0221 | 1271 |
| Experimental study on a multi-mode hybrid adsorption refrigeration and dehumidification system for low grade heat utilization | |
| <i>Jing Xu, Quanwen Pan, Tianshu Ge, Ruzhu Wang</i> | |
| 0226 | 1277 |
| Cooling capacity demand-induced cooperative control strategy of variable evaporating temperature and superheat in a VRF system | |
| <i>Haomin Cao, Dawei Zhuang, Junjie Lei, Guoliang Ding, Zhigang Huang, Shunquan Li, Jianfeng Li, Hao Zhang</i> | |
| 0228 | 1291 |
| Investigation of a novel CO₂ ultrahigh-lift ejector cycle with an additional subcooling heat exchanger | |
| <i>Dominik Herden, Christian Doerffel, Riley B. Barta, Christiane Thomas</i> | |
| 0232 | 1302 |
| Single-Phase Parallel Ejector: An Experimental Study | |
| <i>Charles Rand, Michel Poirier, Sébastien Poncet</i> | |
| 0246 | 1312 |
| A Novel Performance Model Based on Capacity Utilization Rate of Variable Refrigerant Flow Air Conditioning System | |
| <i>Hansong Xiao, Shurong Liu, Yunxiao Ding, Chunyuan Zheng, Niu Heng, Baolong Wang, Zixu Yang, Wenxing Shi</i> | |
| 0247 | 1324 |
| Measurement and Investigation of Adhesion Force of Cationic Surfactant Mixture on Copper Plate with Voltage Applied | |
| <i>Kenta Ando, Ryojaburo Nanba, Ryuji Okada, Koji Matsumoto</i> | |

| | |
|--|------|
| 0251 | 1330 |
| Experimental study on an adsorption desalination prototype with performance enhanced by heat and mass recovery scheme | |
| <i>Quanwen Pan, Jing Xu, Zhenyuan Xu, Tianshu Ge, Ruzhu Wang</i> | |
| 0273 | 1338 |
| Methodology for frost growth estimation in fin and tube evaporators and their potential use in the optimization of defrost time | |
| <i>David Alarcon-Gallen, Emilio Navarro Peris, Javier Marchante Avellaneda, Abdelrahman Hassan, Jose Gonzalvez</i> | |
| 0292 | 1348 |
| Improved indirect measuring methods for assessing the energy efficiency of a low temperature refrigerating system | |
| <i>Stefan Hudjetz, Daniel Pfeiffer, Martin Becker</i> | |
| 0297 | 1360 |
| Numerical study on three CO₂ transcritical two-stage refrigeration systems used in cold storage | |
| <i>Heng Niu, Wuyan Li, Hansong Xiao, Xianting Li, Baolong Wang, Wenxing Shi</i> | |
| 0298 | 1373 |
| Simulation study on atomization characteristics of swirl nozzle for artificial snowmaking | |
| <i>Peiwen Dong, Gaoqiang Liu, Gang Yan</i> | |
| 0303 | 1383 |
| Suitability of models of different complexity for deployment in a model predictive controller of a refrigerating system with thermal energy storage | |
| <i>Daniel Pfeiffer, Sebastian Hausser, Stefan Hudjetz, Martin Becker, Alessia Arteconi</i> | |
| 0321 | 1395 |
| Experimental Assessment on the Performance Difference between R245fa and R1224yd(Z) as the Working Fluid of an Ejector Refrigeration Cycle | |
| <i>Tamaki Ito, Nao Kuniyoshi, Mitsuo Kojima, Kohei Terashima, Haruki Sato</i> | |
| 0325 | 1403 |
| Thermodynamic Analysis of a Conical Screw Spindle Compressor for R718 | |
| <i>Thomas Moesch, Heiko Pleskun, Konrad Klotsche, Christiane Thomas, Ullrich Hesse</i> | |
| 0332 | 1415 |
| Experimental investigation on a Joule-Thomson refrigeration cycle with a ternary mixture of hydrocarbons for low-temperature freezer | |
| <i>Jiarui Liu, Ye Liu, Gang Yan, Jianlin Yu</i> | |
| 0339 | 1422 |
| Solar assisted CO₂ gas cooler integrated system, theoretical and experimental analysis | |
| <i>Stefano Filippini, Luca Molinaroli, Federico Volonte</i> | |
| 0343 | 1434 |
| The influence of evaporation pressure dynamics on energy consumption | |
| <i>Andreas Schulte, Sven Fösterling, Lars Larsen, Christian Heerup, Peder Bacher, Rasmus Gøttsch, Wilhelm Tegethoff, Benjamin Zühlsdorf, Jürgen Köhler</i> | |
| 0347 | 1446 |
| A prototype refrigeration unit with Xenon to simulate the future advance for cooling of silicon detector trackers | |
| <i>Luca Contiero, Krzysztof Banasiak, Armin Hafner, Bart Verlaat, Paolo Petagna, Yosr Allouche</i> | |
| 0356 | 1458 |
| Chemical Stability of HFO and HCFO Olefin Refrigerants and Their Potential Mechanistic Breakdown Pathways | |
| <i>Morgan Leehey, Stephen Kujak</i> | |
| 0360 | 1468 |
| Modelling energy consumption in supermarkets to reduce energy use and greenhouse gas emissions using EnergyPlus | |
| <i>Elias Eid, Alan Foster, Judith A. Evans, Denis Leducq, Fatou-Toutie Ndaye, Graciela Alvarez</i> | |

| | |
|--|------|
| 0366 | 1480 |
| Determination of suitable exposure limits for quantitative risk assessments of ammonia refrigeration installations | |
| <i>Kent Anderson, Alexander Pachai, Andy Pearson</i> | |
| 0370 | 1489 |
| Lessons drawn from safety database and press reports of ammonia refrigeration incidents | |
| <i>Andy Pearson, Alexander Pachai, Kent Anderson</i> | |
| 0372 | 1496 |
| The use of toxicological data in refrigeration hazard analysis | |
| <i>Alexander Pachai, Andy Pearson, Kent Anderson</i> | |
| 0373 | 1505 |
| The effect of fractionation inside the storage vessel and the impact of cycle architecture on the performance of ejector system with low-GWP zeotropic mixture of R1234yf/R32 | |
| <i>Muhammad Haider, Stefan Elbel</i> | |
| 0385 | 1515 |
| Numerical Simulation of Heat Transfer for a Refrigerator Freezer Cabinet Gasket based on the Static Analysis of the Assembly | |
| <i>Guoqiang Liu, Qi Chen, Siyuan Wang, Peiwen Dong, Tong Xiong, Gang Yan</i> | |
| 0422 | 1526 |
| Integration of Cold Thermal Energy Storage at a Pelagic Fish Processing Plant: A modelling approach | |
| <i>Eirik Starheim Svendsen, Jan Bengsch, Kristina Norne Widell, Håkon Selvnes, Alexis Sevault, Armin Hafner, Tom Ståle Nordtvedt</i> | |
| 0429 | 1538 |
| Performance and operation limits of a Remote Ultra-Low Temperature R744 transcritical chiller | |
| <i>Pierre Barroca, Armin Hafner, Kacper Kuczynski, Pierre Hanf, Bart Verlaat</i> | |
| 0435 | 1546 |
| Integrated CO2 refrigeration and heat pump system for a dairy plant: Energy analysis and potential for cold thermal energy storage | |
| <i>Håkon Selvnes, Sigmund Jenssen, Alexis Sevault, Jan Bengsch, Kristina Norne Widell, Marcel Ulrich Ahrens, Shuai Ren, Armin Hafner</i> | |
| 0448 | 1556 |
| Gas cooler heat driven sub-cooling system for CO2 chillers | |
| <i>Egoi Ortego Sampedro, Yassir Fakri, Maroun Nemer</i> | |
| 0450 | 1566 |
| Energy efficient and climate friendly refrigeration systems onboard fishing vessels | |
| <i>Kristina Norne Widell, Cecilia Gabriell, Engin Söylemez, Mihir Mouchum Hazarika, Armin Hafner, Muhammad Umar Khan, Eirik Starheim Svendsen, Tom Ståle Nordtvedt, Ignat Tolstorebrov, Alexander Pachai</i> | |
| 0467 | 1576 |
| A novel approach to integrate cold energy storage in a vapour compression cycle | |
| <i>Maria Aurely Yedmel, Romuald Hunlede, Stéphanie Lacour, Graciela Alvarez, Anthony Delahaye, Denis Leducq</i> | |
| 0480 | 1583 |
| Computational fluid dynamics simulations of a two-phase R-744 ejector geometry in expansion processes of vapor-compression refrigeration systems | |
| <i>Baris Burak Kanbur, Wiebke Brix Markussen, Alexander Busch, Ekaterini Kriezi, Martin Ryhl Kærn, Jóhannes Kristófersson, Jens Honore Walther</i> | |
| 0488 | 1593 |
| An experimental investigation of Refrigerant Mixtures evaporative heat transfer coefficient inside multiport minichannel tube | |
| <i>Hieu Hoang Ngoc, Nurlaily Agustiarini, Jong-Taek Oh, JongKyu Kim</i> | |
| 0512 | 1602 |
| Improvement of drinking water coolers using phase change materials (PCMs) | |
| <i>Lea Di Donato, Matteo Pediconi, Fabio Polonara, Alessia Arteconi</i> | |

| | |
|---|------|
| 0518 | 1614 |
| An integration of the thermoelectric sub-cooler with the ejector-based vapour compression unit using natural refrigerants for performance improvement and system control | |
| <i>Michal Haida, Tufan Özyıldız, Jakub Bodys, Rafal Fingas, Michal Pendzialek, Jacek Smolka, Daniel Sanchez, Patricia Aranguren Garacochea</i> | |
| 0520 | 1625 |
| R744 cooling technology at ultra-low temperature | |
| <i>Stefanie Blust, Pierre Barroca, Pierre Hanf, Paolo Petagna, Bart Verlaat, Armin Hafner</i> | |
| 0524 | 1634 |
| A digital twin for fault detection in commercial refrigeration systems: application to refrigerant leakage detection | |
| <i>Assaad Zoughaib, Etienne Haddad</i> | |
| 0542 | 1643 |
| Sustainable production of fish protein hydrolysates: overall system architecture and footprint | |
| <i>Prem Kumar Sherman, Ignat Tolstorebrov, Kristina Norne Widell, Armin Hafner</i> | |
| 0550 | 1653 |
| Computationally Efficient Numerical Modelling of LiBr-H₂O and H₂O-NH₃ in Single Effect, Double Effect and Double Lift Absorption Refrigeration Configurations Using Open Source Tools | |
| <i>Ludwig Irrgang, Christopher Schiffler, Steffen Kestler, Christoph Wieland, Hartmut Spliethoff</i> | |
| 0558 | 1665 |
| Transport, Industrial and Commercial Refrigeration – A research project | |
| <i>Catarina Marques, Henrique Lagoeiro, Melanie Jans-Singh, Graeme Maidment</i> | |
| 0564 | 1678 |
| Parallel deep neural network for scalable coupling fault diagnosis in HVAC systems | |
| <i>Siliang Chen, Zexu Liu, Kang Chen, Xu Zhu, Xinqiao Jin, Zhimin Du</i> | |
| 0572 | 1690 |
| Barocaloric cooling and heating | |
| <i>Richard Rose, Richard Lawton, Xavier Moya</i> | |
| 0582 | 1694 |
| Field measurement analysis of centralized refrigeration systems' evaporators under overfeed conditions | |
| <i>Sotirios Thanasoulas, Simon Fehling, Jaime Arias, Samer Sawalha</i> | |
| 0584 | 1704 |
| Women working in Refrigeration, Air-Conditioning and Heat Pumps: a Worldwide Survey | |
| <i>Catarina Marques, Ina Colombo, Monique Baha, Ayman Eltalouny, Sonja Wagner, Judith A. Evans, Graeme Maidment</i> | |
| 0601 | 1712 |
| Supermarket case study: analysis of refrigeration system with heating, air conditioning and ground storage integration | |
| <i>Sotirios Thanasoulas, Jaime Arias, Samer Sawalha</i> | |
| 0640 | 1722 |
| Experimental study of low-GWP refrigerants in a vapor compression system: performance and compressor efficiencies | |
| <i>Riccardo Conte, Marco Azzolin, Stefano Bernardinello, Davide Del Col</i> | |
| 0647 | 1733 |
| Theoretical assessment of CO₂-based blends as refrigerants. Evaluation in different refrigeration architectures. | |
| <i>Manel Martínez, Emanuele Sicco, Gabriele Toffoletti, Laura Nebot-Andres, Ramon Cabello López, Paola D'Agaro, Rodrigo Llopis Doménech</i> | |
| 0648 | 1746 |
| Experimental evaluation of different refrigeration system configurations using CO₂-based blends as refrigerants | |
| <i>Emanuele Sicco, Manel Martínez-Angeles, Gabriele Toffoletti, Laura Nebot-Andres, Daniel Sánchez García, Giovanni Cortella, Rodrigo Llopis Doménech</i> | |

| | |
|--|------|
| 0655 | 1757 |
| SCOP experimental comparison of refrigerants R454B and R410A in a domestic heat pump | |
| <i>Ignacio Ortega, Jaime Sieres, Fernando Cerdeira, Estrella Álvarez, José Manuel Santos Navarro</i> | |
| 0668 | 1768 |
| Cooling cycles of multi-effect hybrid compression vector type | |
| <i>Mihail-Dan Staicovici</i> | |
| 0669 | 1779 |
| Further TTRC vs. TWRC methods research applied to mechanical vapor compression refrigeration cycle for effectiveness improvement | |
| <i>Mihail-Dan Staicovici</i> | |
| 0675 | 1788 |
| Analysis of the refrigerant-side temperature profiles in the coil of an air-to-water heat pump | |
| <i>Jaime Sieres, Ignacio Ortega, José Manuel Santos Navarro, Fernando Cerdeira, Estrella Álvarez</i> | |
| 0679 | 1800 |
| The use of an R718 subcooler in an R744 supermarket refrigeration system | |
| <i>Florian Hanslik, Andreas Schulte, Jana Friese, Sascha Hellmann, Wilhelm Tegethoff, Jürgen Köhler</i> | |
| 0715 | 1812 |
| Dynamic Modeling of Water-Cooled Commercial Centrifugal Chillers | |
| <i>Ford Loskill, Matthew Hughes, Srinivas Garimella</i> | |
| 0720 | 1832 |
| Modelling and Performance Evaluation of Compressors and Air Conditioning / Refrigeration Systems using Low GWP Refrigerants | |
| <i>Hana Sano, Eriko Urasaki, Daichi Sugimoto, Kenji Tojo, Yonezo Ikumi, Hiroo Nakamura, Seiichi Yamaguchi, Kiyoshi Saito</i> | |
| 0721 | 1842 |
| Investigation on a Novel Ejector – based Regenerative Refrigeration Cycle Utilizing Low Ejector Entrainment Ratio | |
| <i>Junyan Ren, David Ladd, Davide Ziviani, Eckhard A. Groll</i> | |
| 0728 | 1852 |
| Simulation and optimization of scroll compressor with intermediate discharge valve for VRF system performance improvement | |
| <i>Minghong Yang, Xiuwei Yin, Shuangquan Shao, Yuanxin Lin</i> | |
| 0742 | 1864 |
| Experimental evaluation of the novel R744/R1270 blend in a transcritical refrigeration plant | |
| <i>Rafael Larrondo, Francisco Vidan-Falomir, Michal Haida, Daniel Sánchez García, Jacek Smolka, Ramon Cabello López</i> | |
| 0749 | 1874 |
| Investigation of a novel ejector based integrated CO₂ vapour compression system for supermarkets applications in hot climates | |
| <i>Ayan Sengupta, Mani Sankar Dasgupta</i> | |
| 0750 | 1885 |
| Assessment of Cold Chain Options, Critical Needs, and Emerging Solutions in Developing Countries with Warm Climates | |
| <i>Allannah Duffy, Kristian Lockyear, Roland Crystal, Anurag Agarwal, Srinivas Garimella</i> | |
| 0755 | 1898 |
| Oil Sensible Semi-Empirical Two-Stage Rotary CO₂ Compressor Model: Calibration Using Experimental Data and Reconciliation Algorithms | |
| <i>Javier Vega, Daniel Sacasas, Nicolas Leclercq, Cristian Cuevas, Vincent Lemort</i> | |
| 0761 | 1910 |
| Experimental and simulation-aided analysis of an absorption chiller operating in heating mode | |
| <i>Michael Wernhart, René Rieberer, Sandra Staudt, Viktor Unterberger, Markus Goelles</i> | |

| | |
|---|------|
| 0763 | 1920 |
| Analysis of a PID control for thermoelectric cooling | |
| <i>Ítalo Silva, Marcelo Santana, Yuri Fischer, José Carlos Charamba Dutra</i> | |
| 0764 | 1932 |
| Development of a Novel Biomass-Driven Adsorption Chiller for Off-Grid Food Storage | |
| <i>Kristian Lockyear, Roland Crystal, Anurag Agarwal, Srinivas Garimella</i> | |
| 0767 | 1945 |
| Optimizing Airflow in Spiral Blast Freezers | |
| <i>Eric Alar, Douglas T Reindl, Gregory Nellis, Tyler Young</i> | |
| 0774 | 1955 |
| Elastocaloric elastomer material and device as an alternative route for refrigeration | |
| <i>Marianne Sion, Gaël Sebald, Jacques Jay, Atsuki Komiya, Giulia Lombardi, Jean-Marc chenai, Laurent Chazeau, Bertrand Garnier, Gildas Coativy, Laurent Lebrun</i> | |
| 0775 | 1963 |
| Assessment of maximum allowable discharge pressure of two-phase ejector | |
| <i>Paweł Jakończuk, Kamil Śmierciew, Dariusz Butrymowicz, Jerzy Gagan, Tomasz Mania</i> | |
| 0792 | 1973 |
| Experimental evaluation of alternative CO₂-based blends for transcritical refrigeration systems. | |
| <i>Francisco Vidan-Falomir, Rafael Larrondo, Daniel Sánchez García, Manel Martínez-Angeles, Daniel Calleja-Anta, Laura Nebot-Andres, Rodrigo Llopis Doménech, Ramon Cabello López</i> | |
| 0795 | 1983 |
| Scenarios for Engineering Headered Safety Relief Vent Systems | |
| <i>Douglas T Reindl, Todd Jekel</i> | |
| 0796 | 1991 |
| Lessons Learned from 30 years of Process Safety Management | |
| <i>Douglas T Reindl</i> | |
| 0800 | 1999 |
| Compact ejector optimised compressor pack for carbon dioxide | |
| <i>Christian Heerup, Lars Larsen, Kenneth B. Madsen</i> | |
| 0811 | 2010 |
| Near-optimal control of variable speed drives on evaporative condenser fans | |
| <i>Todd Jekel, Marc Claas</i> | |
| 0820 | 2020 |
| Experimental assessment of n-butane and isobutane flows in adiabatic capillary tubes | |
| <i>Marian Moosbrugger, Diego Marchi, Pedro Augusto Brüggemann, Alexander Krimmel, Christian Hermes</i> | |
| 0829 | 2028 |
| Flammability classification and advantages of CO₂/propane over pure CO₂ in cooling systems | |
| <i>Ana Paez, Benedicte Ballot-Miguet, Pascal Tobaly</i> | |
| 0830 | 2040 |
| Design guidance for underfloor heating systems for low temperature refrigerated spaces | |
| <i>Marc Claas, Douglas T Reindl, Doran Mackowski, Tyler Young, Todd Jekel</i> | |
| 0837 | 2052 |
| HFO-1234yf as Alternative to HFC-134a in a Compact Refrigeration System with Spray Heat Sink for Electronics Cooling | |
| <i>Marcus Vinícius Pedron Carneiro, Jader Barbosa Jr.</i> | |

| | |
|--|------|
| 0840 | 2062 |
| PoloMag Project: Designing a Compact Magnetocaloric Wine Cooler | |
| <i>Natalia de Sa, Alan Nakashima, Elias Pagnan, Anderson Lorenzoni, Glenda Luz, Gislaine Hoffmann, Guilherme Fidelis Peixer, Jaime Lozano, Jader Barbosa Jr.</i> | |
| 0892 | 2072 |
| Performance of Linde-Hampson Refrigerator operating with a zeotropic refrigerant for ultralow temperature applications | |
| <i>Sanket Barbade, Venkatarathnam G</i> | |
| 0895 | 2080 |
| Thermodynamic Performance Evaluation of a Magnetocaloric Air Conditioner Prototype | |
| <i>Guilherme Fidelis Peixer, Anderson Lorenzoni, Yan Azeredo, Pedro Miola da Silva, Maria Claudia Régio e Silva, Gislaine Hoffmann, Diego dos Santos, Sergio Dutra, Gabriel Martins do Rosário, Hígor Feltrin Teza, Elias Pagnan, Rogério Sucaria, Allan Doring, Marcelo Augusto Anzolin Rosa, Paulo Faria, Bernardo Peressoni Vieira, Alan Nakashima, Cristiano Teixeira, Paulo Antônio Pereira Wendhausen, Jaime Lozano, Jader Barbosa Jr.</i> | |
| 0920 | 2091 |
| Why and how to test water refrigerated display cabinets | |
| <i>Vincent Araujo, Thomas Suquet</i> | |
| 0923 | 2100 |
| Heat recovery impact on eco-efficiency of retail refrigerating units | |
| <i>Jean De Bernardi, Wissam Rached, Pawel Wisnik</i> | |
| 0936 | 2111 |
| A variable refrigerant flow air-conditioning system refrigerant charge detection method using stacking ensemble learning | |
| <i>Hengda Cheng, Weixian Mu, Yahao Cheng, Huanxin Chen, Lu Xing</i> | |
| 0939 | 2125 |
| CO₂-refrigeration systems and heat pumps with ejectors | |
| <i>Jonas Schönenberger, Marcel Bärtsch</i> | |
| 0940 | 2136 |
| Risk assessment and application of environmental friendly refrigerants | |
| <i>Hongxia He, Zhao Yang, Yubo Chen, Yong Zhang, Jie Li, Jian Li, Changzhen Guo</i> | |

26th IIR International Congress of Refrigeration (ICR 2023)

Paris, France
21 – 25 August 2023

Volume 3

ISBN: 978-1-7138-8578-8

Table of contents

CONFERENCE PAPERS

COMMISSION C1 - CRYOBIOLOGY, CRYOMEDICINE & HEALTH PRODUCTS

| | |
|--|----|
| 0160 | 12 |
| Popularity and achievements in using whole body cryotherapy (WBC) as a therapy supporting the treatment of multiple sclerosis in Poland | |
| <i>Elzbieta Miller</i> | |
| 0195 | 16 |
| Breaking the limits of electric-powered whole-body cryotherapy | |
| <i>Zbigniew Rogala, Adrian Kwiatkowski, Dawid Laskowski, Piotr Pawłowicz</i> | |
| 0237 | 26 |
| Impact of regular cold exposure on electrodermal activity in older patients with joint degenerative diseases | |
| <i>Marcin Machnia, Wafa Douzi, Hela Jdidi, Elzbieta Miller, Benoit Dugué</i> | |
| 0333 | 38 |
| Difference in skin temp response during a whole-body cryotherapy exposure in males and females | |
| <i>Romain Bouzigon, Maxence Politoff, H el ene Petit, Olivier Dupuy, Benoit Dugu e</i> | |
| 0522 | 43 |
| Is Whole-Body Cryostimulation useful in Post-Covid19 Condition? Preliminary results from an italian experience | |
| <i>Paolo Piter , Federica Verme, Stefania Cattaldo, Amelia Brunani, Jacopo Maria Fontana, Paolo Capodaglio</i> | |
| 0594 | 55 |
| Metabolic and Autonomic Effects of Whole-Body Cryostimulation at Two Different Temperatures in Patients with Obesity | |
| <i>Jacopo Maria Fontana, Paolo Piter , Federica Verme, Riccardo Cremascoli, Stefania Cattaldo, Stefania Mai, Laura Bianchi, Veronica Cimolin, Amelia Brunani, Paolo Capodaglio</i> | |
| 0646 | 66 |
| The effects of high intensity interval training combined with the whole body cryostimulation on brain-derived neurotrophic factor and tryptophan metabolism | |
| <i>Ewa Ziemann, Ewa Rodziewicz-Flis, Joanna Jaworska, Marta Flis, Jędrzej Antosiewicz, Jakub Kortas, Giovanni Lombardi</i> | |

COMMISSION C2 - FOOD SCIENCE & ENGINEERING

| | |
|--|-----|
| 0029 | 77 |
| Retaining quality of fresh Chinese kale (Brassica oleracea) during retailing at Thai wet markets by using an ice-cooled display cabinet | |
| <i>Nattawut Chaomuang, Kanphot Kosanlawat, Nuttasit Chitsuphap, Pakkaraphon Srithammasak, Satakamolwan Krutharaj</i> | |
| 0091 | 87 |
| Study on retaining natural refrigerant in seafood processing industries in India | |
| <i>BS Arun, Sumit Kumar, Murali S, George Ninan, Manoj Samuel, Kristina Norne Widell, Simarpreet Singh, Hagar Elarga, Armin Hafner</i> | |
| 0109 | 97 |
| Modelling and prediction of thermal diffusivity of foods | |
| <i>James Carson, Duy K Hoang</i> | |
| 0159 | 107 |
| Towards the implementation of a sustainable cold chain for the livestock value chain in Bangladesh | |
| <i>Judith A. Evans, Kazi Bayzid Kabir, Farzana Munshi, Yosr Allouche, Ina Colombo</i> | |

| | |
|---|-----|
| 0248 | 118 |
| Effect of thermal property model selection on the accuracy of a one-dimensional numerical solution for the forced air chilling and freezing of food products | |
| <i>Duy Hoang, James K Carson</i> | |
| 0350 | 130 |
| Understanding the impact of freezing and storage on the microstructure of a porous food using synchrotron X-rays microtomography | |
| <i>Hayat Benkhelifa, Amira Zennoune, Pierre Latil, Frederic Flin, Christian Geindreau, Fatou-Toutie Ndoye</i> | |
| 0364 | 143 |
| Investigating the evolution of the microstructure of stored chicken breast at different superchilling conditions using X-Ray micro-computed tomography | |
| <i>Nariman EL Abdi, Graciela Alvarez, Fatou-Toutie Ndoye</i> | |
| 0428 | 152 |
| Experimental study on starch/tetradecane phase change material for cold energy storage | |
| <i>Laurence Fournaison, Hong Minh Hoang, Anthony Delahaye, Joelle Rassy, Isabelle Capron, Denis Lourdin</i> | |
| 0432 | 161 |
| Energy and environmental assessment of strawberry cold chain - comparison of the use of different materials for packaging | |
| <i>Hong Minh Hoang, Amina Merouani, Evelyne Derens-Bertheau, Yasmine Salehy, Steven Duret, Sophie Annibal, Malou Mireur, Valerie Merendet, Anthony Delahaye</i> | |
| 0434 | 169 |
| Wild caught cod (<i>Gadus morhua</i>) and haddock (<i>Melanogrammus aeglefinus</i>) chilled in flake ice or slurry and its effects on product quality | |
| <i>Guro Møen Tveit, Tom Ståle Nordtvedt, Ida Grong Aursand, Hanne Digre</i> | |
| 0470 | 179 |
| Reducing cold chain GHG emissions in Norwegian fish and meat industry sectors | |
| <i>Hanne Dalsvåg, Andrea Strand, Kristina Norne Widell</i> | |
| 0496 | 188 |
| Effect of freezing on the physicochemical, bioelectrochemical, and mechanical properties and microstructure of different apple cultivars | |
| <i>Younju Lee, Takashi Watanabe</i> | |
| 0511 | 199 |
| Development of a new thermometer for the measurement of carcass surface temperature in slaughterhouse | |
| <i>Steven Duret, Jérôme Gahartian, Farah Binti-Zacharia, Alain Thomas, Evelyne Derens-Bertheau</i> | |
| 0515 | 208 |
| Experimental and modelling study of water condensation and evaporation at the surface of fruits during cold chain breaks | |
| <i>Gurvan Le Quentrec, Nattawut Chaomuang, Patrick Sambou, Graciela Alvarez, Denis Flick, Steven Duret</i> | |
| 0525 | 217 |
| Mapping Greenhouse Gas emissions from the food supply chains in France | |
| <i>Anna Traore, Onrawee Laguerre, Yosr Allouche, Anthony Delahaye</i> | |
| 0526 | 228 |
| The interrelation between ice crystal size and the texture of commercial ice cream: a quantitative analysis | |
| <i>Misaki Shiba, Hidemasa Hoshiba, Younju Lee, Toru Suzuki</i> | |
| 0527 | 236 |
| Effect of magnetic field application during freezing on ice crystal formation inside food products | |
| <i>Hayato Baba, Mark Anthony Redo, Manabu Watanabe</i> | |
| 0539 | 243 |
| Sustainability within food cold chain sectors in Norway | |
| <i>Kristina Norne Widell, Erling Vingelsgård, Hanne Dalsvåg, Shraddha Mehta, Tom Ståle Nordtvedt</i> | |

| | |
|--|-----|
| 0541 | 253 |
| The vacuum freezing of food products in a novel food storage container equipped with a thermal energy storage system <i>Michal Palacz, Jakub Chrobak, Dominik Hulak, Jacek Smolka, Ignat Tolstorebrov</i> | |
| 0581 | 262 |
| Experiments and CFD simulations of thermal performance and air flow distribution in freezer with product loading effect <i>Zheng Xu, Mark Anthony Redo, Manabu Watanabe</i> | |
| 0585 | 271 |
| Investigation on the relationship between freezing temperature and soy protein denaturation <i>Risa Fukada, Mark Anthony Redo, Manabu Watanabe</i> | |
| 0605 | 281 |
| Thermal and hydraulic behaviors of a finned coil heat exchanger coupled with fixed-speed fans during frost formation in an industrial food freezer: numerical modelling and field experimental validation <i>Deyae Badri, Cyril Toublanc, Olivier Rouaud, Michel Havet</i> | |
| 0651 | 294 |
| Prototype of domestic-scale freeze-dryer with natural working fluid-based refrigeration system and microwave heating system <i>Edyta Piechnik, Jacek Smolka, Michal Palacz, Ignat Tolstorebrov, Trygve Eikevik, Michal Haida, Michal Stebel, Jakub Bodys, Andrzej J. Nowak, Bartłomiej Melka</i> | |
| 0730 | 305 |
| A tool to evaluate and optimize GHG emissions in food supply <i>Denis Leducq, Judith A. Evans, Pieter Verboven, Graciela Alvarez</i> | |
| 0809 | 313 |
| A study of ice clearness and production rate trade-offs in icemaking <i>Fabio Melo, Paulo Palomino, Rodrigo Cardoso, Christian Hermes</i> | |
| 0875 | 321 |
| The effect of fine bubbles on fish freshness retention <i>Uema Tomotaka, Mark Anthony Redo, Manabu Watanabe</i> | |
| 0952 | 328 |
| Building blocks for a digital twin of large cool store complexes <i>Hoang Minh Phan, Hans Van Caueren, Maarten Hertog, Bert Verlinden, Bart Nicolai, Pieter Verboven</i> | |
| COMMISSION D1 - REFRIGERATED STORAGE | |
| 0062 | 340 |
| Performance optimization of a transcritical CO₂ supermarket refrigeration system equipped with an ice tank <i>Mehran Khanloghi, Roozbeh Izadi-Zamanabadi, Hossein Ramezani, Paride Gullo</i> | |
| 0082 | 352 |
| CFD study of airflow and temperature heterogeneity within a pallet of heat generating products: application to cheese. <i>Dihia Aguenihanai, Steven Duret, Jean Moureh</i> | |
| 0104 | 359 |
| Assessment of Cold Storage Demand and Renewable Energy Implementation Potential of Fishery Industry in Indonesia <i>Ardiyansyah Yatim, Muhammad Kautsar, Bugie Pudjotomo, Hasanuddin Yasni, Fathurrahman Yudhi Nugraha</i> | |
| 0119 | 367 |
| A2L and A3 Refrigerants Testing for Commercial Refrigerated Display Cases under Whole Room Scale <i>Xudong Wang</i> | |
| 0147 | 377 |
| Air infiltration through a door separating two refrigerated spaces of finite volumes <i>Jacques Guilpart, Jonathan Notturmo, Amin Altamirano</i> | |

| | |
|--|-----|
| 0184 | 386 |
| Energy Analysis of Door Openings in Vertical Refrigerated Display Cabinets with Glass Doors <i>Christophe Vallée, Ahmad M. Mahmoud, Sanjay Adhikari</i> | |
| 0204 | 396 |
| Refrigeration and thermal control during industrial storage of potatoes to prevent acrylamide <i>Erlend Indergaard, Pia Heltoft</i> | |
| 0243 | 408 |
| A Novel Frost Detection: Applying Image Recognition with Wide-Angle Lens <i>Yung-Ming Li, Yu-Ming Chang, Chia-Hsing Hsieh, Guan-Wen Chen, Chao-Ching Ku, Pei-Yu Yu</i> | |
| 0244 | 418 |
| The Effect of Humidity on Food Refrigeration <i>Donald J Cleland</i> | |
| 0280 | 430 |
| Numerical analysis of a frost prevention system for refrigerated warehouses and planning of a test bench for validation <i>Felix Hochwallner, Christoph Reichl, Johann Emhofer</i> | |
| 0351 | 441 |
| Test results of solar thermal refrigerators for cooling vaccines in hot climates with a double-lift adsorption cycle. <i>Roland Kühn, Charlotte Fischer, Kilian Mähne, Paresh Chauhan, Christoph Göller, Ufuk Nezir, Julia Römer, Benjamin Witt</i> | |
| 0494 | 452 |
| Thermodynamic analysis of a multi-evaporator refrigeration cycle using a two-phase ejector as an expansion device <i>Vinod Laguri, Kundan Kumar, Pradeep Gupta, Pramod Kumar, Srisha Rao, Hagar Elarga, Armin Hafner</i> | |
| 0661 | 464 |
| Modelling and simulation of heat sink cascade CO₂ systems in low-income countries with high ambient temperature <i>Ina Colombo, Kokouvi Edem N'Tsoukpoe, Michael Kauffeld, Oliver Schmid, Yosr Allouche, Nicholas Kiggundu, Alex Paurine, Graeme Maidment</i> | |
| 0686 | 475 |
| Cold storage technology for Freshness extension of Kimchi cabbage using Hybrid environment control <i>Byeong Sam Kim, Jiyoung Kim, Andri Jaya Laksana</i> | |
| 0694 | 482 |
| Effect of temperature and relative humidity on the carvacrol release kinetics from active packaging for fresh horticultural products <i>Alejandra Navarro-Martínez, Antonio Lopez Gomez, Ginés Benito Martínez-Hernández</i> | |
| 0757 | 488 |
| Thermo-economic design and optimization of a waste heat driven system for medium temperature refrigeration <i>Rita Mastrullo, William Alfonso Mauro, Giovanni Napoli, Luca Viscito</i> | |
| 0814 | 499 |
| Numerical simulation of solid/liquid transition of carbon dioxide in pillow plate heat exchangers <i>Mahmood Mastani Joybari, Håkon Selvnes, Alexis Sevault, Armin Hafner</i> | |
| 0853 | 509 |
| Numerical Investigation of Air Curtain Velocity Ratio in an Open Refrigerated Display Cabinet with Dual Air Curtain <i>Po-Shen Cheng, Chia-Hsing Hsieh, Pei-Yu Yu</i> | |
| 0924 | 519 |
| Cost effective storage and distribution of temperature sensitive vaccine <i>Howard Pedolsky, Gerald Cavalier, Camille Fertel</i> | |
| 0954 | 527 |
| Saving energy using RQ-based dynamic controlled atmosphere storage of blueberry fruit <i>Bert Verlinden, Niels Bessemans, Pieter Verboven, Bart Nicolai</i> | |

COMMISSION D2 - REFRIGERATED TRANSPORT

| | |
|--|-----|
| 0037 | 536 |
| Is carbon neutrality for logistics flows of food products possible? | |
| <i>Bernard Commere, Eric Devin</i> | |
| 0089 | 544 |
| Adaptation de l'ATP aux climats chauds | |
| <i>Paolo Bison, Stefano Rossi, Girolamo Panozzo, Abdramane Ba</i> | |
| 0097 | 556 |
| Numerical Performance Assessment of a Reefer Unit Equipped with R1234yf as Drop-In Replacement for R134a | |
| <i>Santiago Martinez Ballester, Vipin Viswas</i> | |
| 0105 | 568 |
| System Modelling with Low Global Warming Potential Refrigerants for Transport Refrigeration Application | |
| <i>Gurudath Nayak, Michael Petersen</i> | |
| 0106 | 576 |
| Evaluation of lower GWP alternative R473A for R23 in ultra-low temperature refrigeration applications | |
| <i>Gurudath Nayak, Michael Petersen, Stephen Kujak, Michal Kolda, Tomas Kohoutek</i> | |
| 0199 | 584 |
| Assessment of the cold storage performance of a device used in deep frozen cold chain | |
| <i>Rick Spijkers, Alain Damas, Srinivas Vanapalli</i> | |
| 0202 | 593 |
| The development of night deliveries in urban areas of temperature-controlled foodstuff | |
| <i>Eric Devin, Ibrahim Zaid</i> | |
| 0299 | 603 |
| Ageing of Insulated Marine Containers with Polyurethane Foam Expanded with Cyclopentane | |
| <i>Richard Lawton, Tobias Mynott, Chris Rhodes, Paul Clarke</i> | |
| 0319 | 610 |
| Investigation of Adhesive Force of Ice by Addition of Surfactant to Catechin Solution Used to Obtain Bactericidal Effect | |
| <i>Mitsuki Chiwata, Kenta Ando, Ryuji Okada, Koji Matsumoto</i> | |
| 0371 | 617 |
| Refrigerated Transportation and Cold-chain Logistics in India – Current Status and Future Prospect | |
| <i>Pradeep Gupta, Pramod Kumar, Armin Hafner, Hagar Elarga</i> | |
| 0378 | 626 |
| Preparation of eutectic plates for temperature-controlled boxes | |
| <i>François Gimbert, Abbas Kacimi, Aurore Guyen-Bomba, Vincent Bugnicourt, Gilles Labranque, Pierre Guigon</i> | |
| 0400 | 634 |
| Phase change materials in packaging for buffering temperature fluctuation during short-range distribution of perishable food products | |
| <i>Martim Lima Aguiar, Pedro Dinis Gaspar, Pedro Silva</i> | |
| 0445 | 645 |
| Logistique urbaine et proposition d'un standard de livraisons multi températures | |
| <i>Georges Ferreira, Rémi Paing, Gérard Divaret, Thierry Allegre</i> | |
| 0519 | 654 |
| Modeling and Calibration of a Multi-Temperature Cargo for Trailer | |
| <i>Rohit Dhumane, Michael Greene</i> | |

| | |
|--|-----|
| 0545 | 666 |
| Estimating cargo temperatures in refrigerated containers | |
| <i>Leo Lukasse, Joost Snels</i> | |
| 0551 | 678 |
| A method to measure the K-value of local elements of insulated transport equipment | |
| <i>Leo Lukasse, Marcel Staal, Edo Bart Wissink</i> | |
| 0556 | 690 |
| CFD modelling of heat transfer and airflow in an insulated box equipped with Phase Change Material | |
| <i>Tanathep Leungtongkum, Onrawee Laguerre, Nattawut Chaomuang, Alain Denis, Denis Flick</i> | |
| 0566 | 704 |
| Review of the NF S 99-700 Standard for the qualification of standalone isothermal solutions | |
| <i>Abbes Kacimi, Gilles Labranque, David Stienne, Rodolphe Civet</i> | |
| 0590 | 713 |
| Methodology and Investigation into Quantity of Residual Blowing Agent in Insulation Foams | |
| <i>Tobias Mynott, Richard Lawton, Chris Rhodes</i> | |
| 0810 | 722 |
| Dynamic numerical modelling of a single stage dual temperature R744 ejector-supported refrigeration unit for last mile delivery | |
| <i>Francesco Fabris, Jakub Bodys, Sergio Marinetti, Silvia Minetto, Jacek Smolka, Antonio Rossetti</i> | |
| 0827 | 733 |
| Efficient, controlled, and smart refrigeration for cold chain, and refrigeration transport | |
| <i>Viktor Yalama, Mykhailo Khmelniuk, Olga Yakovleva, Volodymyr Trandafilov</i> | |
| 0906 | 744 |
| The ways to implement refrigeration and air conditioning in transport using heat utilizing refrigerators | |
| <i>Alexander Krotov, Andrey Kolesnikov, Dmitry Pronin, Anna Egorova</i> | |
| 0918 | 751 |
| The use of aerogel-based materials to improve refrigerated transport | |
| <i>Mathieu Bendouma, Camille Fertel, Gerald Cavalier, Claudiane Ouellet-Plamondon</i> | |
| 0919 | 760 |
| Situation and perspectives of evolution of refrigerated transport fleet | |
| <i>Gerald Cavalier, Camille Fertel, Paul Engelmann</i> | |
| 0921 | 771 |
| Replacement of refrigerants in refrigerated transportation: risks and opportunities | |
| <i>Manon Bossuat, Olivier Valet, Gerald Cavalier</i> | |
| 0922 | 784 |
| Study of European F-gas regulation on refrigerated transport equipment | |
| <i>Gerald Cavalier, Camille Fertel, Olivier Valet, Matthieu Hardy, Delphine Bourez</i> | |
| 0925 | 792 |
| Assessment of quality and conformity of new refrigerated transport equipment | |
| <i>Gerald Cavalier, Frantz Latchan, Olivier Valet, Camille Fertel, Matthieu Hardy</i> | |

26th IIR International Congress of Refrigeration (ICR 2023)

Paris, France
21 – 25 August 2023

Volume 4, Part 1

ISBN: 978-1-7138-8578-8

Table of contents

CONFERENCE PAPERS

COMMISSION E1 - AIR CONDITIONING

| | |
|---|-----|
| 0014 | 18 |
| Eco-gestures for a reasonable use of air conditioning: an important lever for energy savings <i>Eric Devin, Brice Tremeac</i> | |
| 0073 | 28 |
| High efficient desiccant coated heat exchanger based heat pump for rail transport decarbonization <i>Zhao Shao, Zhenggen Wang, Tianshu Ge, Ruzhu Wang</i> | |
| 0079 | 40 |
| Experimental study on whistling noise behavior in electronic expansion valve of multi-split air conditioning system <i>Shaohua Zhou, Feilong Zhan, Guoliang Ding, Tianjie Zhu, Jianjun Meng, Qingjie Wang</i> | |
| 0103 | 52 |
| Evaluation of R-744 and R-454C in Bus Air Conditioning and Heat Pump Applications <i>Michael Petersen, Stephen Kujak, Gurudath Nayak, Pavel Houdek, Michal Kolda</i> | |
| 0120 | 62 |
| Active and Passive Cooling Techniques for Buildings –Applicability and Preliminary Study for Evaporative Cooling Technique <i>Khaled Alghamdi, Christian K. Bach, Omer Sarfraz, Ardiyansyah Yatim</i> | |
| 0121 | 72 |
| Simulation analysis of Variable Refrigerant Flow Systems with multi-indoor units <i>Kuniyasu Matsumoto, Kiyoshi Saito, Seiichi Yamaguchi</i> | |
| 0168 | 84 |
| Development of a Continuous Heating Technology for Air Source Heat Pumps <i>Naofumi Takenaka, Shohei Ishimura, Kazuya Watanabe, Shinichi Wakamoto</i> | |
| 0171 | 97 |
| Numerical analyses of building thermal systems containing Phase Change Materials <i>Francesca Martelletto, Luca Doretti, Marco Noro, Simone Mancin</i> | |
| 0215 | 108 |
| Commercial sorption chillers for the valorization of low-temperature renewable heat sources: technical review <i>Amin Altamirano, Charles Maragna, Brice Tremeac</i> | |
| 0227 | 120 |
| Utilization of hybrid air conditioner and ultra-efficient air conditioner in (sub) tropic climate <i>Zixu Yang, Wenxing Shi, Baolong Wang, Hansong Xiao, Borong Lin</i> | |
| 0257 | 132 |
| A novel temperature and humidity independent system based on dual cooling sources <i>Lurong Ge, Yanjun Dai, Ruzhu Wang, Tianshu Ge</i> | |
| 0265 | 144 |
| Development of Zone Air-Conditioning System for Factories using Air Curtains <i>Yuudai Mori, Shigeyuki Nagasaka, Naoya Shinada, Jiang Zhang, Masazumi Gohdo, Hiroshi Nakayama, Tsuyoshi Ao, Kotohiko Murase, Mizuki Satoh, Kohki Komada, Masafumi Hirota, Akira Nishimura, Naoki Maruyama</i> | |
| 0277 | 156 |
| Control characteristics of residential air-conditioning system <i>Tatsuhito Todate, Shintaro Ariga, Tsubasa Nishiguchi, Seiichi Yamaguchi</i> | |

| | |
|--|-----|
| 0288 | 164 |
| Energy-saving effect of grading treatment for fan coil unit and dedicated outdoor air system | |
| <i>Wentao Wang, Chenjiyu Liang, Xianting Li</i> | |
| 0289 | 174 |
| A method to improve the partial heating load performance of air conditioner with multi-connected three-fluid heat exchangers | |
| <i>Fuhai Zha, Yuan Wang, Defang Guo, Chao Gu, Xianting Li</i> | |
| 0305 | 305 |
| On-site Room Air Conditioners Replacement Test with Limited Data during COVID-19 Regulation Periods | |
| <i>Hanlong Wan, Yunho Hwang, Stephen Andersen</i> | |
| 0318 | 194 |
| Performance analysis of dense membrane for air dehumidification: An experimental study | |
| <i>Soojin Bae, Donik Ku, Soyeon Kim, Minkyu Jung, Jaeseon Lee, Seong Hyuk Lee, Minsung Kim</i> | |
| 0401 | 202 |
| Investigation on the use of subcooling control in reversible residential air-conditioning systems | |
| <i>Bruno Yuji Kimura de Carvalho, Predrag Stojan Hrnjak</i> | |
| 0403 | 212 |
| Experiment study of refrigerant migration characteristics for a room air conditioner during defrosting | |
| <i>Tong Xiong, Guoqiang Liu, Gang Yan</i> | |
| 0404 | 222 |
| Performance analysis of a thermal management system for electric vehicles | |
| <i>Li Zhang, Tomohiro Higashi, Michiyuki Saikawa</i> | |
| 0405 | 234 |
| Predictions of Oil Retention in Horizontal and Vertical Refrigerant Vapor Lines of Unitary Split Systems using a Physics-Based Machine Learning | |
| <i>Ammar Bahman, Mohammad Erfanimatin, Pejman Nourani, Haotian Liu, Vatsal Shah, James E. Braun, Eckhard A. Groll</i> | |
| 0441 | 244 |
| Experimental Consideration of a Transpiration Cooling System using Porous Ceramics for a Measure against Urban Heat Island Phenomena | |
| <i>Miho Saitoh, Mitsuo Kojima, Nao Kuniyoshi, Kohei Terashima, Haruki Sato</i> | |
| 0468 | 253 |
| Capacity configuration of multiple-chiller system based on robustness evaluation | |
| <i>Zhiyang Jia, Qi Xue, Yuan Lyu, Xinqiao Jin, Zhimin Du</i> | |
| 0469 | 262 |
| Dynamic characteristics of liquid desiccant air-conditioning system | |
| <i>Tsubasa Nishiguchi, Hiroki Toyama, Seiichi Yamaguchi, Tatsuhito Todate</i> | |
| 0471 | 270 |
| Performance evaluation of a desiccant cooling system coupled with indirect evaporative cooling technologies under various climates | |
| <i>Alanis Zeoli, Samuel Gendebien, Vincent Lemort</i> | |
| 0475 | 281 |
| An Optimal Design Method of Multi-Chillers System Based on Map Concordance Analysis | |
| <i>Yuan Lyu, Xuejun Zhang, Qi Xue, Zhiyang Jia, Xinqiao Jin</i> | |
| 0485 | 290 |
| Possibility of Cooling Using PV/T Solar Panels with an Ejector Refrigeration Cycle | |
| <i>Kohei Terashima, Tamaki Ito, Nao Kuniyoshi, Mitsuo Kojima, Tatsuo Nagai, Haruki Sato</i> | |

| | |
|--|-----|
| 0490 | 301 |
| Demand response control for the installed inverter air conditioners based on Hierarchical model predictive control | |
| <i>Cuiling Wang, Baolong Wang, Zihao Zhao</i> | |
| 0501 | 310 |
| An interpretable machine learning method for fault diagnosis of heating, ventilation and air conditioning systems | |
| <i>Kang Chen, Xu Zhu, Siliang Chen, Xinqiao Jin, Zhimin Du</i> | |
| 0533 | 319 |
| A robust fault diagnosis method for HVAC systems with domain knowledge augmented machine learning | |
| <i>Xu Zhu, Siliang Chen, Kang Chen, Xinbin Liang, Tao Ren, Xinqiao Jin, Zhimin Du</i> | |
| 0535 | 327 |
| Performance Simulation of an Inverter Operated Split Air Conditioner using HFC-161 as an Alternative Refrigerant to HC-290 and HFC-32 | |
| <i>Ashish Utage, Heramb Phadake, Kundlik Mali</i> | |
| 0543 | 340 |
| Experimental investigation on single fault impacts of the residential heat pump in cooling mode | |
| <i>Minkyu Jung, Sanghun Jeong, Soyeon Kim, Donik Ku, Jae Dong Chung, Minsung Kim</i> | |
| 0595 | 349 |
| Investigation of a diffusion absorption chiller using a plate heat exchanger as generator | |
| <i>Johannes Brunder, Konstantinos Stergiaropoulos</i> | |
| 0596 | 360 |
| Theoretical study on performance of cyclic membrane-based vacuum dehumidification system | |
| <i>Donik Ku, Soojin Bae, Soyeon Kim, Minkyu Jung, Jungho Lee, Taesung Kim, Minsung Kim</i> | |
| 0598 | 370 |
| Effect of Falling film condenser on Refrigerant Charge for domestic split air conditioner | |
| <i>Heramb Phadake, Ashish Utage, Kundlik Mali</i> | |
| 0610 | 383 |
| Performance evaluation of CO₂ heat pump-driven liquid desiccant air conditioning system in hot and humid climates | |
| <i>Y. Siva Kumar Reddy, Guruchethan A M, M.P. Maiya, Armin Hafner</i> | |
| 0615 | 392 |
| Numerical and experimental analysis of desiccant coated heat exchanger for hot and humid climate | |
| <i>V.R. Abishraj, Gurubalan A, M.P. Maiya, Carey Simonson</i> | |
| 0660 | 404 |
| The Potential of Photovoltaic Green Cooling with Natural Refrigerants | |
| <i>Paul Kohlenbach, Uli Jakob, Philipp Munzinger, Anja Werntges</i> | |
| 0666 | 414 |
| Challenges of air conditioning decarbonization | |
| <i>Anna Pacak, Maciej Chorowski</i> | |
| 0697 | 422 |
| R474A - New working fluid for BEV thermal management | |
| <i>Felix Flohr, Alvaro De León, Christian Macrì, Tsubasa Nakae, Daisuke Karube, Kenji Gobo, Shohei Ajioka, Yasutaka Negishi, Ivan Rydkin</i> | |
| 0709 | 431 |
| Experimental assessment of a 18 kWh Latent Thermal Energy Storage for air conditioning and space cooling | |
| <i>Giulia Righetti, Claudio Zilio, Domenico Feo, Marco Auerbach, Martin Butters, Simone Mancin</i> | |

| | |
|---|-----|
| 0725 | 442 |
| Experimental Evaluation of Dynamic Compositions of Refrigerant Mixture in Heat Pump System by NIR Absorption Spectroscopy | |
| <i>Kosuke Miyawaki, Naoki Shikazono</i> | |
| 0765 | 453 |
| Digital Twins for Vapor Compression Cycles: Challenges & Opportunities | |
| <i>Christopher Laughman, Vedang Deshpande, Hongtao Qiao, Scott A. Bortoff, Ankush Chakrabarty</i> | |
| 0766 | 463 |
| Analysis of the performance characteristics of a refrigeration system operating on contaminated R404A refrigerant | |
| <i>Bartosz Gil</i> | |
| 0772 | 473 |
| Numerical investigations on channel type desiccant coated evaporative coolers for marine conditions | |
| <i>Pranav Iyer, M.P. Maiya, V.R. Abishraj, A. Ganguly</i> | |
| 0777 | 485 |
| Optimized approach for CFD simulations of HVAC systems with grill air diffusers | |
| <i>Jordi Vera, Eugenio Schillaci, Joaquim Rigola, Carles Oliet Casasayas</i> | |
| 0790 | 496 |
| Vapor Compression Cycle Modelling for Use within Large Thermal Systems | |
| <i>Nicolas Ablanque, Santiago Torras, Carles Oliet Casasayas, Joaquim Rigola, Carlos-David Pérez-Segarra</i> | |
| 0808 | 508 |
| Experimental mapping of heat pump and water-cooled condensing household tumble dryers | |
| <i>Diego Marchi, Vitor Alves, Adriano Ronzoni, Alexandro Silveira, Christian Hermes</i> | |
| 0822 | 517 |
| Performance of Compressor Lubrication and Refrigeration System Reliability When Using Lower GWP Refrigerants | |
| <i>Joe Karnaz</i> | |
| 0839 | 526 |
| Low GWP Refrigerants for Residential Heat Pump Applications: Evaporator Optimization and Cycle Improvements | |
| <i>Bruno Yuji Kimura de Carvalho, Ankit Sethi, Ryan Hulse</i> | |
| 0857 | 534 |
| Leaked refrigerant distribution around rail vehicle | |
| <i>Ajaya Kumar, Hari Krishnan Nayanar Kozhukkilidathil, Martin Soukup, Jan Andrýs, Radim Cermak</i> | |
| 0859 | 545 |
| Reduction of the electricity consumption of a compression refrigeration system for air conditioning by a preceding thermally driven absorptive air dehumidification system | |
| <i>Thomas Meyer, Cristina Ricart, Stefan Elbel</i> | |
| 0912 | 557 |
| Investigation on diverse loop cooling system composed of maglev compressor and liquid pump for data center | |
| <i>Bo Wang, Fei Wang, Shuangquan Shao, Yuanxin Lin</i> | |
| 0943 | 566 |
| Lower-GWP Non-Flammable Refrigerant Blends to replace HFC-134a | |
| <i>Harrison Skye, Piotr A. Domanski, Mark O. McLinden, Valeri Babushok, Ian Bell, Tara Fortin, Michael Hegetschweiler, Marcia Huber, Mark Kedzierski, Dennis Kim, Lingnan Lin, Greg Linteris, Stephanie Outcalt, Vance Payne, Richard Perkins, Aaron Rowane</i> | |
| 0950 | 578 |
| Physics-Informed Neural Network and Experimental Investigations for Analyzing Adsorption Kinetics of Desiccant Coated Energy Exchanger Under Tropical Climatic Conditions | |
| <i>Gaurav Priyadarshi, P. K. S. Tejes, Bukke Kiran Naik</i> | |

COMMISSION E2 - HEAT PUMPS & ENERGY RECOVERY

| | |
|--|-----|
| 0023 | 591 |
| Mechanical Vapour Recompression (MVR): a review of applications and a comparison with Thermal Vapour Recompression (TVR) | |
| <i>Renato Lazzarin</i> | |
| 0045 | 603 |
| Evaluation of correlations for mass flow rate of refrigerant through electronic expansion valve in air-water heat pump system using R32 | |
| <i>Min Kyu Kim, Hyoin Lee, Ji Hwan Jeong</i> | |
| 0066 | 610 |
| Experimental study on the performance of R290 air -water heat pump with vapor injection for cold regions | |
| <i>Bowen Lei, Hongyan Shi, Che Wang, Jianhua Wu, Li Zhang</i> | |
| 0069 | 621 |
| Mother & Father hybrid compression plants for refrigeration and work supplied by ambient heat source | |
| <i>Mihail-Dan Staicovici</i> | |
| 0077 | 630 |
| Experimental results of a high temperature heat pump prototype with R1336mzz(Z) for various production temperatures | |
| <i>Adrián Mota-Babiloni, Angel Barragan Cervera, Cosmin Mihai Udriou, Pau Giménez Prades, Joaquín Navarro-Esbrí</i> | |
| 0093 | 639 |
| Decarbonisation pathways for fossil fuel-based district heating networks using heat pumps | |
| <i>Aya H. Heggy, Henrique Lagoeiro, Catarina Marques, Graeme Maidment, Joel Hamilton</i> | |
| 0096 | 653 |
| System Analysis on a Thermal Transistor for Heat Recovery | |
| <i>Hiroshi Suzuki, Ruri Hidema, Yoshinori Itaya, Koichi Nakaso, Kimito Kawamura</i> | |
| 0098 | 662 |
| Comparison between different refrigerant charge level predictive methods in a water-to-water heat pump | |
| <i>Chiara D'Ignazi, Carla Bongiorno, Luca Molinaroli</i> | |
| 0100 | 674 |
| Low GWP Refrigerants for Commercial or Industrial Heat Pumps | |
| <i>Stephen Kujak, Michael Petersen</i> | |
| 0102 | 683 |
| Evaluation of R-410A alternatives with lower Global Warming Potential in Air Conditioning and Heat Pump applications | |
| <i>Michael Petersen, Stephen Kujak, Gurudath Nayak</i> | |
| 0115 | 692 |
| Comparison of air-source cascading heat pump systems with large temperature lift for industrial uses | |
| <i>Xi Zhang, Zhenyuan Xu</i> | |
| 0149 | 703 |
| Evaluation of the Effect of Pressure Pulsation on Injection Flow Rate in the Vapor Injection Cycle | |
| <i>Sachio Sekiya, Atsushi Kubota, Masayuki Nonaka, Hisashi Daisaka, Hirofumi Daiguji</i> | |
| 0157 | 715 |
| Evaluation of existing refrigerant charge determination methods for residential heat pumps using a virtual test bench | |
| <i>Maëlle Jounay, Odile Cauret, Cedric Teuillieres, Cong Toan Tran</i> | |
| 0178 | 726 |
| Performance evaluation a hybrid refrigeration cycle by combining an absorption process with a compression process using Low-GWP refrigerant | |
| <i>Tsutomu Wakabayashi, Saori Sakurai, Ryosuke Takioka, Hajime Yabase, Naoyuki Inoue, Yonezo Ikumi, Kiyoshi Saito</i> | |

| | |
|--|-----|
| 0190 | 738 |
| Selection maps based on multi-objective optimization of design and control for residential Heat Pumps systems | |
| <i>Alice Mugnini, Fabio Polonara, Alessia Arteconi</i> | |
| 0191 | 749 |
| Principles of Evaporator Coil Design for Air Source Cold Climate Heat Pumps Using Smaller Diameter Copper Tubes and Low GWP Refrigerants | |
| <i>Yoram Shabtay, Peter Mostovoy, Ji Song, Yifeng Gao</i> | |
| 0193 | 759 |
| Transient heating performance analysis of R290 and R410A heat pumps during startup process | |
| <i>Che Wang, Bowen Lei, Yanjun Du, Jinbo Li, Jianhua Wu</i> | |
| 0201 | 769 |
| High Temperature Heat Pumps for Space and Process Heating Utilising Geothermal Energy | |
| <i>Neil J. Hewitt, Simon Todd</i> | |
| 0205 | 781 |
| Energy flexible heat pumps - Reference cycle requirements and the effects of the on-board energy flexibility interfaces | |
| <i>Maarten Evens, Alessia Arteconi</i> | |
| 0216 | 787 |
| Evaluation of System-Level Performance of Closed Strontium Bromide Thermochemical Energy Storage Systems for Space Heating | |
| <i>Kate Rivera, Adewale Odukamaiya, Jason Woods, Brian Fronk</i> | |
| 0219 | 798 |
| New characteristics and temperature limitations of surfactant-induced Marangoni convection | |
| <i>Niccolo Giannetti, Ryohei Okamoto, Thomas Meyer, Christian Fleßner, Kiyoshi Saito</i> | |
| 0233 | 810 |
| Achieving high-performance absorption thermal energy storage via working fluid screening and cycle improvement | |
| <i>Jintong Gao, Zhenyuan Xu</i> | |
| 0264 | 821 |
| Numerical investigation of an ammonia-water absorption-compression high-temperature heat pump for hot water and steam production in food processing | |
| <i>Shuai Ren, Armin Hafner, Marcel Ulrich Ahrens, Khalid Hamid, Trygve Eikevik, Ignat Tolstorebrov, Kristina Norne Widell</i> | |
| 0287 | 831 |
| Experimental assessment of the use of R515B as R1234ze(E) alternative in a small water-to-water heat pump | |
| <i>Luigi Pietro Maria Colombo, Davide Frigerio, Andrea Lucchini, Luca Molinaroli</i> | |
| 0300 | 841 |
| A geothermal district heating system supplying two kinds of hot water temperature for radiators and radiant floor heating | |
| <i>Tiancheng Li, Wei Chen, Tianchan Yu, Xianting Li, Baolong Wang, Wenxing Shi</i> | |
| 0301 | 853 |
| Numerical Simulation of a Two-Phase Transcritical Carbon Dioxide Ranque-Hilsch Vortex Tube | |
| <i>Raphaël Oberti, Antoine Metsue, Yu Fang, Junior Lagrandeur, Sébastien Poncet, Dominique Monney</i> | |
| 0307 | 863 |
| Ultra heat pump: concept, design, experiment and application | |
| <i>Jiatong Jiang, Bin Hu, Ruzhu Wang, Di Wu, Hua Liu, Zhiping Zhang, Yu Zhou</i> | |
| 0310 | 871 |
| Sensible and latent heat recovery system for drying process using heat-pump and desiccant | |
| <i>Tomohiro Higashi, Takenobu Kaida, Li Zhang</i> | |

| | |
|--|------|
| 0316 | 879 |
| Comparison of different waste heat utilization methods in heat pump air conditioning system for electric vehicles | |
| <i>Tianchan Yu, Xianting Li, Wenxing Shi</i> | |
| 0324 | 888 |
| Theoretical assessment of industrial heating technologies up to 250°C | |
| <i>Elias Vieren, Wim Beyne, Toon Demeester, Michel De Paepe, Steven Lecompte</i> | |
| 0326 | 900 |
| Renewable energy calculation from heat pumps based on reporting and data processing | |
| <i>Peter Tomlein, Michal Tomlein, Matus Tomlein</i> | |
| 0337 | 908 |
| A heat recovery unit with adjustable heat exchange areas for fresh air handling | |
| <i>Chenjiyu Liang, Huan Wang, Lin Fang, Takema Nakazawa, Toshio Tanaka, Xianting Li</i> | |
| 0340 | 918 |
| Geometry miniaturization in fin-and-tube heat exchangers for heat pump charge reduction | |
| <i>Stefano Filippini, Luca Molinaroli</i> | |
| 0349 | 927 |
| Low GWP HFO Refrigerants for extended temperature range Heat Pumps, enabling an energy efficient, safe and sustainable building renovation in Europe. | |
| <i>Jean-Marc Christmann, Fabrizio Codella, Hans-Dieter Küpper, Samer Saab</i> | |
| 0352 | 938 |
| Investigation and analysis of a CO₂ heat pump chiller with novel two-stage evaporator | |
| <i>Jan Bengsch, Mihir Mouchum Hazarika, Armin Hafner, Kristina Norne Widell</i> | |
| 0363 | 950 |
| Simulating an evaporator field for large-scale air-source heat pumps subjected to frosting and defrosting | |
| <i>Jonas Kjaer Jensen, Svenn Ole Kjøller Hansen, Wiebke Brix Markussen</i> | |
| 0367 | 962 |
| Integration of High-Temperature Heat Pumps in Swiss Food Processes | |
| <i>Cordin Arpagaus, Frédéric Bless, Sidharth Paranjape, Stefan Bertsch</i> | |
| 0375 | 974 |
| Experimental study of heat pump water heater system operating on a new storage heat pump cycle to achieve higher operating range | |
| <i>Purav Patel, Stefan Elbel</i> | |
| 0376 | 986 |
| Experimental investigation of high-glide refrigerant mixture R1233zd(E)/R1234yf in a high-temperature heat pump | |
| <i>Leon Brendel, Cordin Arpagaus, Philip Widmaier, Dennis Roskosch, André Bardow, Stefan Bertsch</i> | |
| 0379 | 998 |
| Design and validation of a two-phase injection compressor test bench | |
| <i>Xander van Heule, Laurent Denys, Jana Rogiers, Wim Beyne, Bernd Ameel, Michel De Paepe, Steven Lecompte</i> | |
| 0380 | 1006 |
| Numerical simulation of an integrated CO₂/chiller and thermal storage system for a hotel in tropical weather conditions | |
| <i>Leon Henke, Hagar Elarga, Armin Hafner</i> | |
| 0388 | 1017 |
| Coupling effects in fault detection and diagnosis for variable speed air-to-water propane heat pump with subcooling control | |
| <i>Emilio Navarro Peris, Belén Llopis Mengual</i> | |

| | |
|--|------|
| 0390 | 1029 |
| Heat Exchanger Soft-Optimization for Low-GWP R454C Working as a Replacement for R410A in a Residential Heat Pump System | |
| <i>Weigang Hou, Hafez Raeisi Fard, Larry Burns, Eckhard A. Groll, Davide Ziviani, James E. Braun</i> | |
| 0408 | 1043 |
| Study on the configuration of multi-layered active magnetic regenerator with lanthanum compound materials for magnetic heat pump devices | |
| <i>Daito Matsubayashi, Tsuyoshi Kawanami, Junya Fukuda, Tetsuya Kume</i> | |
| 0416 | 1052 |
| Annual energy and economic performance assessment of transcritical R744 supermarket refrigeration systems powered by an organic Rankine cycle | |
| <i>Ayan Sengupta, Paride Gullo, Mani Sankar Dasgupta, Vahid Khorshidi</i> | |
| 0421 | 1064 |
| A novel graphic representation of the work losses on T-s diagram for refrigeration and heat pump cycles | |
| <i>Hikaru Yamada, Michiyuki Saikawa</i> | |
| 0426 | 1076 |
| Investigation on the Performance Change of a Heat Pump System with Refrigerant Mixtures during Leakage Process | |
| <i>Yeonwoo Jeong, Sangwook Lee, Min Soo Kim</i> | |
| 0433 | 1084 |
| Experimental Investigation of Operating Point Dependent Optimal Vapor Injection in Compressors with Flammable Refrigerants | |
| <i>Tim Klebig, Marius Frikel, Christian Vering, Dirk Müller</i> | |
| 0443 | 1096 |
| Performance evaluation of a magnetocaloric cooling system for boil-off gas re-liquefaction | |
| <i>Ryota Shima, Shinichiro Nakai, Tsuyoshi Kawanami, Tomoro Nakasu, Yukio Fujiwara, Yoshihiro Muro</i> | |
| 0457 | 1105 |
| Innovative reheat approach of the TES system during the hotel's standstill operation utilizing a CO2 heat pump/chiller unit | |
| <i>Hagar Elarga, Ángel Á. Pardiñas, Silvia Minetto, Armin Hafner</i> | |
| 0483 | 1117 |
| Investigation of the R744 Heat Pump System for an Electric Vehicle to Cool Down the Battery Subsystem | |
| <i>Seungyeon Lee, Jongmin Choi, Min Soo Kim</i> | |
| 0502 | 1127 |
| Analysis of different control strategies for improved performance at off design operation in CO2 heat pump water heater | |
| <i>Gabriele Toffoletti, Emanuele Sicco, Paola D'Agaro, Giovanni Cortella</i> | |
| 0505 | 1136 |
| Performance analysis of add-on large-temperature-lift heat pumps for pasteurization in the juice and dairy processing industries | |
| <i>Dereje S. Ayou, Cordin Arpagaus, Stefan Bertsch, Alberto Coronas</i> | |
| 0507 | 1147 |
| Theoretical study on isothermal compression technology in refrigeration cycle | |
| <i>Soyeon Kim, Minkyu Jung, Donik Ku, Gijeong Seo, Dong Kyu Kim, Minsung Kim</i> | |
| 0523 | 1153 |
| Flexible heat pumps in Clusters of Buildings: energy flexibility quantification of space cooling loads | |
| <i>Patricia Ercoli, Alice Mugnini, Flavio Caresana, Alessia Arteconi</i> | |
| 0528 | 1163 |
| Optimal design of the fin tube heat exchanger for an indoor unit of mini VRF heat pump system | |
| <i>Amal Vasu, Hyunjin Lee, Young-Soo Chang</i> | |

| | |
|--|------|
| 0531 | 1170 |
| Brine-to-water heat pump test system for small-scale oil-free turbocompressors | |
| <i>Andreas Peter, Cordin Arpagaus, Raffaella Menet, Jürg Schiffmann, Stefan Bertsch</i> | |
| 0549 | 1180 |
| Techno-economic analysis of heat export from supermarket refrigeration systems: field measurements analysis of three case studies | |
| <i>Daniel Steuer, Rebecka Magnus, Julia Almebäck, Jaime Arias, Samer Sawalha</i> | |
| 0553 | 1192 |
| Concept of a novel hybrid compression–adsorption heat pump cycle | |
| <i>Jubair Shamim, Gunjan Auti, Hibiki Kimura, Fabio Boccamazzo, Ming-Hsuan Hu, Wei-Lun Hsu, Hirofumi Daiguji, Arun Majumdar</i> | |
| 0561 | 1202 |
| Optimising a supermarket refrigeration system with heat recovery to minimise operational costs | |
| <i>Daniel Steuer, Filip Josefsson, Jaime Arias, Samer Sawalha</i> | |
| 0565 | 1214 |
| Adaptive model-based monitoring of large-scale heat pump prone to evaporator fouling | |
| <i>Jose Joaquin Aguilera, Wiebke Meesenburg, Wiebke Brix Markussen, Jonas Lundsted Poulsen, Benjamin Zühlsdorf, Brian Elmegaard</i> | |
| 0574 | 1226 |
| Systematic analysis of the stability of Sodium Acetate Trihydrate as Phase Change Material during thermal cycling | |
| <i>Dario Guarda, Giulia Righetti, Simone Mancin, Benjamin Fenk, Poppy O'Neill, Jörg Worlitschek, Jorge Martinez Garcia, Anastasia Stamatiou, Philipp Schuetz</i> | |
| 0580 | 1235 |
| A flexible heat pump for combined domestic hot water and space heating supply | |
| <i>Zahra Hajabdollahi Ouderji, Andrew McKeown, Miryam Essadik, Narges H. Mokarram, Zhibin Yu</i> | |
| 0591 | 1244 |
| Study of the defrosting operation of the Flexible Heat Pump Cycle | |
| <i>Miryam Essadik, Andrew McKeown, Zahra Hajabdollahi Ouderji, Narges H. Mokarram, Zhibin Yu</i> | |
| 0593 | 1254 |
| Analytical Investigation of Transcritical CO₂ Heat Pump Systems Combining a Vortex Tube | |
| <i>Ahmed Mansour, Sébastien Poncet, Hakim Nesreddine, Dominique Monney</i> | |
| 0600 | 1266 |
| Performance Comparison of HFC blend with CO₂ in Heat Pump Water Heater | |
| <i>Richard Lawton, Chris Rhodes</i> | |
| 0607 | 1274 |
| Advantage of CO₂ heat pump chiller for the application in Indian hotels | |
| <i>Y. Siva Kumar Reddy, Hagar Elarga, Guruchethan A M, M.P. Maiya, Armin Hafner</i> | |
| 0611 | 1282 |
| Techno-economic optimisation of a multi-stage steam compression heat pump using a centrifugal compressor for high-temperature applications | |
| <i>Martin Pihl Andersen, Simone Parisi, Benjamin Zühlsdorf, Wiebke Brix Markussen, Jonas Kjaer Jensen, Fredrik Haglind, Brian Elmegaard</i> | |
| 0612 | 1292 |
| A 0-D dynamic model of solid-gas sorption heat pump for waste heat recovery | |
| <i>Alex Pubill, Driss Stitou</i> | |
| 0620 | 1302 |
| Comparison of refrigerants working in an air conditioning system with heat recovery for desalination | |
| <i>Paul Byrne, Brice Dubreil, Wissam Morjane, Mostafa Dahbani, Thierry Maré</i> | |

| | |
|--|------|
| 0622 | 1311 |
| Review of Variable Geometry Air-to-Refrigerant Heat Exchangers | |
| <i>Brian O'Malley, Vikrant Aute, Daniel Bacellar, Reinhard Radermacher</i> | |
| 0624 | 1323 |
| Use of mechanical subcooling to increase CO2 heat pump performance. | |
| <i>Pierre-Jean Delètre, Johannes Kristofersson, Lars Overvad Rasmussen, Kim Gardø Christensen</i> | |
| 0625 | 1335 |
| Development of a high-temperature heat pump up to 140°C | |
| <i>Markus Müller, Ralf Noack, Karl Steinjan</i> | |
| 0626 | 1344 |
| Evaluation of low GWP refrigerants for Unitary Air-Conditioning and Heat Pump Applications | |
| <i>Sarah Kim, Bob Low, Christopher Seeton</i> | |
| 0635 | 1352 |
| Flexible operation of magnetocaloric heat pumps in natural gas decompression stations | |
| <i>Jierong Liang, Maxime Boulet, Kurt Engelbrecht, Anton Nymark Seeger, Tim Sittig, Dimitri Benke, Maximilian Fries, Christian Bahl, Brian Elmegaard</i> | |
| 0636 | 1363 |
| Study of CO2 heat pump cycle layout for full electrification of milk powder spray dryer | |
| <i>Jierong Liang, Riccardo Bergamini, Jonas Lundsted Poulsen, Jens Ulrik Nielsen, Benjamin Zühlendorf, Dhivakaran Jayakumar, Jonas Kjaer Jensen, Brian Elmegaard</i> | |
| 0641 | 1374 |
| CO2 dual source solar assisted heat pump with PV-T evaporators: performance and control of low pressure | |
| <i>Emanuele Zanetti, Marco Azzolin, Riccardo Conte, Sergio Giroto, Davide Del Col</i> | |
| 0645 | 1385 |
| Integrated R744 Heat Pump/chiller for Hotel: State-of-the-Art Implementation | |
| <i>Simarpreet Singh, Armin Hafner, Hagar Elarga, Kumodak Sharma</i> | |
| 0653 | 1394 |
| Technical and economic performance of air-source heat pump for building heat supply with advanced PCM thermal storage for underfloor | |
| <i>Ming Jun Huang, Gerard Obasi, Khoa Le, Donal Cotter, Christopher Wilson, Marcio Fernandes Novaes, Neil J. Hewitt</i> | |
| 0663 | 1405 |
| Heat to cold: Relevance and application of thermally driven cooling for the transformation of the energy system | |
| <i>Gerrit Földner, Rahel Volmer, Adrian da Silva Moreira, Lena Schnabel</i> | |
| 0664 | 1415 |
| Seasonal performance of a CO2 dual source heat pump for residential applications | |
| <i>Riccardo Conte, Emanuele Zanetti, Marco Azzolin, Corrado De Gioia Carabellese, Livio Calabrese, Davide Del Col</i> | |
| 0673 | 1426 |
| Analysis of energy performance of a heat pump electrically driven by the photovoltaic system in a single family house in Polish climatic conditions | |
| <i>Dorota Chwieduk</i> | |
| 0674 | 1435 |
| Heat Pump Modelling for Decarbonisation of a Non-continuous Meat Processing Site | |
| <i>Elsa Klinac, James K Carson, Timothy Walmsley, Duy K Hoang, Qun Chen, Donald J Cleland</i> | |
| 0676 | 1447 |
| A dynamic model of an industrial cascade refrigeration system | |
| <i>Jun Chang, Wei Yu, James Carson, Brent Young</i> | |

| | |
|---|------|
| 0687 | 1458 |
| A propane hydronic heat pump with energy storage | |
| <i>Bo Shen, Zhenning Li, Hanlong Wan, Kyle Gluesenkamp, Brian Fricke</i> | |
| 0689 | 1468 |
| Direct Expansion Heat Pump Using High Glide Low GWP Refrigerant | |
| <i>Bo Shen, Zhenning Li, Hanlong Wan, Samuel Yana Motta, Kyle Gluesenkamp</i> | |
| 0693 | 1480 |
| Performance analysis of high-temperature heat pump using low quality waste heat source from marine engines | |
| <i>Kazuhide Watanabe, Norihiro Inoue</i> | |
| 0696 | 1489 |
| Operating Strategies of an Industrial R717 Heat Pump Recovering Waste Heat of a Chiller | |
| <i>Manuel Verdnik, Philipp Wagner, René Rieberer</i> | |
| 0704 | 1500 |
| Heat Exchangers Circuitry Optimization using Low-GWP Refrigerants in Reversible Heat Pump Applications | |
| <i>Zhenning Li, Bo Shen, Hanlong Wan, Kyle Gluesenkamp, Brian Fricke</i> | |
| 0711 | 1510 |
| A hybrid method to evaluate the life cycle climate performance of heat pumps | |
| <i>Hanlong Wan, Bo Shen, Zhenning Li, Yunho Hwang</i> | |
| 0712 | 1517 |
| High temperature heat pumps for industry: Demonstration experience | |
| <i>Veronika Wilk, Bernd Windholz, Johannes Riedl, Sabrina Dusek, Thomas Fleckl</i> | |
| 0729 | 1525 |
| Waste heat and water recovery for an industrial dryer by employing an absorption heat pump | |
| <i>Giorgos Papakokkinos, Jesús Castro, Joaquim Rigola, Carlos David Pérez-Segarra, Carles Oliet Casasayas</i> | |
| 0732 | 1537 |
| Global Sensitivity Analysis applied to a dynamic energy simulation model: the case study of UniZEB prototype building | |
| <i>Beatrice Riccardi, Enrico Sisti, Laura Carnieletto, Michele De Carli, Mirco Rampazzo</i> | |
| 0735 | 1551 |
| Seasonal energy performance evaluation of a geothermal heat pump unit with lower-GWP refrigerants | |
| <i>José Manuel Santos Navarro, Jaime Sieres, Ignacio Ortega, Fernando Cerdeira, Estrella Álvarez</i> | |
| 0737 | 1562 |
| Experimental analysis of the use of a subcooler coupled with the evaporator in a water to water CO2 heat pump for hot water generation | |
| <i>Jose R. Garcia-Cascales, Fernando Illan-Gomez, F.J.S. Velasco, José Pablo Delgado-Marín, Ramon Antonio Oton-Martinez</i> | |
| 0740 | 1568 |
| Case study of Zielona Gora gas cogeneration plant converted to sorption chiller based trigeneration and its role in electroenergetical system. | |
| <i>Kacper Karzkowiak, Maciej Chorowski</i> | |
| 0753 | 1576 |
| Soft faults evaluation for electric heat pumps: mechanistic models versus machine learning tools | |
| <i>William Alfonso Mauro, Francesco Pelella, Luca Viscito</i> | |
| 0771 | 1588 |
| Energy Storage using Reversible Heat Pump and Organic Rankine Cycle | |
| <i>Praveen Kumar G, Dereje S. Ayoy, Saravanan Rajagopal, Alberto Coronas</i> | |
| 0773 | 1598 |
| Theoretical Analysis of Cycling Losses in Air Source Heat Pump Systems | |
| <i>Hongtao Qiao, Christopher Laughman</i> | |

| | |
|---|------|
| 0799 | 1609 |
| Feasibility study of ground source solar driven adsorption heat pump | |
| <i>Zacharie Tamainot-Telto, Jake Locke</i> | |
| 0831 | 1615 |
| Low Refrigerant Charge Air To Water Domestic Heat Pump Using R-290 As The Refrigerant | |
| <i>Marcel Beek van, Thijs Gorp van</i> | |
| 0834 | 1627 |
| A Proposal of Sustainability Figures illustrating the Status of the European Domestic Heat Pump Market | |
| <i>Thore Oltersdorf, Hannes Fugmann, Lena Schnabel</i> | |
| 0852 | 1635 |
| Process integration and work targeting of multiple heat pumps using mathematical programming | |
| <i>Timothy Walmsley, Andreja Nemet, Keegan Hall, Roger Padulles, Benjamin Lincoln, Florian Schlosser, Zdravko Kravanja, Brian Elmegaard</i> | |
| 0860 | 1645 |
| Modelling and optimization of cascade high-temperature heat pump using natural zeotropic refrigerant mixtures | |
| <i>Ganesan Palanichamy, Trygve Eikevik</i> | |
| 0872 | 1658 |
| Energy and exergy analysis of transcritical CO₂ ejector heat pump cycles for high-temperature heating | |
| <i>Lana Kong, Timothy Walmsley, Omar Abu Khass, Florian Schlosser, Donald J Cleland, Qun Chen, Duy Hoang, James K Carson</i> | |
| 0874 | 1670 |
| Development of the hybrid hot air-freeze dryer system with heat pump | |
| <i>Jung-Gil Lee, Cheonkyu Lee, Jin Man Kim, Dong An Cha, Seon-Chang Kim</i> | |
| 0886 | 1674 |
| Potential assessment of heat pumps integrated with thermochemical storage for domestic heating applications | |
| <i>Sai Yagnamurthy, Steven Metcalf, Robert Critoph</i> | |
| 0907 | 1683 |
| Range of application of heat pump systems on various natural refrigerants | |
| <i>Sofia Maslikova, Alexander Krotov, Yaroslav Samokhvalov, Georgy Kosenko, Tatiana Ustiugova</i> | |
| 0914 | 1696 |
| Optimization of solar energy and air source heat pump combined heating system in Tibet | |
| <i>Yuanxin Lin, Shuangquan Shao, Zhihao Jing</i> | |
| 0927 | 1707 |
| Refrigeration Integration & System Efficiency (RISE) | |
| <i>Jolyon Axelrod, Graeme Maidment, Edwin Bowater</i> | |
| 0937 | 1716 |
| Operation of large-scale heat pumps under fluctuating boundary conditions | |
| <i>Wiebke Meesenburg, Kenneth Kramer, Mathias Kjær Christensen, Peter Reinholdt, Jonas Lundsted Poulsen, Brian Elmegaard</i> | |
| 0957 | 1728 |
| Wetting and heat and mass transfer at structured vertical heat exchanger plates for compact absorption heat pumps | |
| <i>Thomas Lex, Christian Schweigler</i> | |