16th IIR-Gustav Lorentzen Conference on Natural Refrigerants

Papers (DRAFT AS OF JULY 23)

ID	TITLE	PRESENTER	ORGANIZATION	COUNTRY
1101	CO2 Flow Boiling Heat Transfer Evaluation and Visualization in a Horizontal Round Tube with and without Oil at Low Temperatures	Elbel, Stefan	TU Berlin	Germany
1102	Variable-Speed Compressor Ratings Displayed Within Single Third-Degree Polynomial Function	Frei, Gerhard	COOLPLAN	Germany
1103	Simulating the Startup and Backup Operation of Next Generation Co2 Pumped-Loop Cooling Systems	Bhanot, Viren	CERN	Switzerland
1105	Energy Evaluation of Two Hydrocarbons Blends as an Alternative for the HFC R134a in a Vertical Beverage Cooler	Sánchez, D.	Jaume I Univ	Spain
1106	Experimental Comparison of CO2 and Different CO2/R290 and CO2/R1270 Blends in a Transcritical Refrigeration Plant With Different Cycle Arrangements	García-Vacas, D.	Jaume I Univ	Spain
1107	Experimental Comparison of CO2 and Alternative CO2/R1270 Mixtures in a Transcritical Refrigerating Plant. Energy Evaluation in an MT Application	García-Vacas, D.	Jaume I Univ	Spain
1108	Experimental Analysis of R744/R290 Blends in a Two-Stage Vapour Compression Heat Pump	García-Vacas, D.	Jaume I Univ	Spain
1109	Heat and Mass Transfer Modelling In a Tubular Bubble Absorber For Absorption Chillers Using Computational Fluid Dynamics	Amaris Castilla, C.	Universidad Industrial de Santander	Colombia
1110	Theoretical and Experimental Assessment of Propane and Propylene as Substitutes for Traditional HFC Refrigerants R410A and R404A	Longo, Giovanni A.	Univ of Padova	Italy
1111	Solution Examples for Cooling and Process Heating in Industrial Applications	Rangelov, Ivan	Danfoss A/S	Denmark
1113	A Novel Heat Pumping Cycle For Latent Process Heat Supply Using Sensible Heat Sources	Zotter, Gerald	ECOP Tech GmbH	Austria
1114	Hydrocarbons in Heat Pumps: An Experimental Investigation on the Influence of an Internal Heat Exchanger	Höges, Christoph	RWTH Aachen Univ	Germany
1117	Preliminary Study on Fault Detection in Gas Coolers for Transcritical CO2 Refrigeration Systems	Zadeh, Milad Morid	Univ of Southern	Denmark
1118	Experimental Investigation of Oil Free Absorption-Compression Heat Pumps With Liquid Injection Screw Compressor for high Temperature Applications	Hamid, Khalid	NTNU Norway	Norway
1119	Feasibility Study of a New Refrigerant Leak Detection Algorithm Using Transient Simulation	KIBO, Kosuke	Daikin Industries	Japan
1121	Simulation of High Temperature Heat Pump Performance	Lund, Thomas	Danfoss A/S	Denmark
1123	Good Vibes for Heat Pumps: Towards Refrigerant Charge Indication with Vibration Sensors	Klebig, Tim	RWTH Aachen Univ	Germany
1124	Developments in Low Charge Ammonia Refrigeration for Food Processing and Storage	Pearson, Andy	Star Refrigeration	UK
1126	Development of CO2 Dry Ice Heat Pump System	Yamaguchi, Hiroshi	Doshisha Univ	Japan
1127	A Transcritical R744 Refrigeration System Integrated with Pressure Exchanger for Heat Recovery – A Novel Dynamic Analysis for Supermarket Application	Sengupta, Ayan	BITS Pilani, India	India

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1128	Pressure Optimization of an R600a-R1150 Autocascade Cycle for Ultra-Low Temperature Applications	Martínez Angeles, M.	University Jaume I	Spain
1129	Assessment of CO2/R600a Blends in Parallel Compression Refrigeration Systems: A Focus on Fractionation	Martínez Angeles, M.	University Jaume I	Spain
1130	Energy-Efficient Multi-Drying-Chamber-Based Heat Pump Wood Drying System	Gao, Lei	Univ of Maryland	USA
1131	A Saturation Heat Pump System for Cold Climate Conditions	Gao, Lei	Univ of Maryland	USA
1138	The Effect of Lubricant Oil on Evaporation Heat Transfer for Ammonia Falling Liquid-Film	Akada, Ikuro	Mayekawa Mfg. Co	Japan
1139	CFD Modeling of Crystallization During the Freeze Concentration Process	Khan, Muhammad	Norwegian Univ	Norway
1140	Refrigeration Machine with Accurate Inline Sensors for Measuring Thermophysical Properties of Oil-Refrigerant Mixtures	Cikmaz, Caner	TU Chemnitz	Germany
1141	Comparison of Laminar vs RANS and Large-Eddy Simulation (LES) Turbulent Flow Models for the Analysis of R290 Leakage	Fayolle, Marine	Panasonic Corp	Japan
1142	Under Variable Conditions: Investigating the Off-Design Performance of Natural Refrigerants in Heat Pumps	Ostlender, Sebastian	Aachen Univ	Germany
1147	Experimental Investigation of an Ultrahigh-Lift Ejector Cycle With an Additional Subcooling Heat Exchanger	Herden, Dominik	TU Dresden	Germany
1148	Theoretical Analysis of the Optimal Ejector Operation Within the Classical Ejector Refrigeration System	Metsue, Antoine	Université de Sherbrooke	Canada
1149	Pressure Drops in Small-Diameter Tube U-Bends for Heat Exchangers Used for Low-Temperature Ammonia Refrigeration Applications	Cremaschi, Lorenzo	Auburn University	USA
1150	SophiA: Sustainable Off-grid Solutions for Pharmacies and Hospitals in Africa – Laboratory and Field Test Data of Three Stage Cascade System with CTES	Schmid, Oliver	UAS- Karlsruhe	Germany
1151	Identification of refrigeration Load Parameters for Display Cabinets from Monitoring Data	Schulte, Andreas	TU Braunschweig	Germany
1152	Optimizing Surplus Heat Utilization: A Case Study on CO2-Based Supermarket Refrigeration cycle with District Heating Integration in Southern Denmark	Thanasoulas, Sotirios	Danfoss	Denmark
1153	Assessment of Natural Refrigerants for Thermal Management in Battery-Electric Long-Distances Buses	Hellmuth, Jan Friedrich	TU Braunschweig	Germany
1155	Energy Efficient R-290 based Solar Micro Cold Store: An Experimental Assessment	Harischander, H.	IIT Bombay	India
1156	Review of Existing Hydrocarbon Refrigerants and Their Blends For Performance and Future Opportunities	Petersen, Michael	Trane Technologies	USA
1157	Assessment of All Possible Aliphatic Hydrocarbons from C2 to C5 for Future Performance Opportunities	Kujak, Steve	Trane Technologies	USA
1159	R744 Mass Transit Mobile Ac and Hp System in Bus Application	Schmig, Alex	Trane Technologies	USA
1160	Thermodynamical Analysis of Two-Phase Water Steam Ejector In High-Temperature Heat Pumps Cycles	Abu Khass, Omar	German Aerospace Ctr	Germany
1162	Natural or Synthetic Refrigerants: Does the Lubricant Care?	Karnaz, Joseph	Shrieve Chem Products	USA
1163	Performance Assessment of Low Charge Ammonia Refrigeration in a High Bay Automated Warehouse	Pearson, Andy	Star Refrigeration	UK
1164	Optimal Thermoelectric Heat Pump Design to Efficiently Perform the Power-To-Heat Process of a Thermal Energy Storage System	Aranguren, Patricia	Public Univ of Navarra	Spain

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1165	Conceptual Investigation On The Ejector Benefits In R744 Air Conditioning Heat Pump Systems For Electric Vehicles	Niroomand, Reza	Norwegian Univ	Norway
1166	Theoretical Investigations On Using High-Temperature Heat Pumps In Combination With District Heating Networks	Wang, Haochen	Chemnitz Univ of Tech	Germany
1167	A Correlation Of Optimal Intermediate Pressure In Trans-Critical Carbon Dioxide Distributed Compression Cycle	NIE, Junrui	Beijing Univ of Tech	China
1168	Shape Optimization and Fluid Control of Near Isothermal Compressor for Transcritical Carbon Dioxide Cycle	Liu, Haopeng	Univ of Maryland	USA
1170	Performance Testing of CO2-NH3 Cascade Tunnel Freezer for Seafood Processing	Arun, B. S	ICAR-CIFT	India
1171	Market Trends and Drivers in New Product Development of Natural Refrigerant Components	Karampour, Mazyar	Danfoss	Sweden
1172	Heat Recovery and Heat Pump Applications using CO2 as Refrigerant	Karampour, Mazyar	Danfoss	Sweden
1173	Numerical Modelling of Two-Phase R-744 Ejectors in R-744 Heat Pumps	Markussen, Wiebke	Danish Tech Inst	Denmark
1174	Energy, Environmental, and Economic Evaluations of Electrochemical Looping Heat Pump Technology	Zhu, Mingjie	Purdue University	USA
1175	Energy Saving of a CO2 Transcritical System in a Cold Storage: Combination of Freezer Floor Heating & Gas Cooler Subcooling	Zha, Shitong	Heatcraft Refrigeration	USA
1176	Design and Experimentation of a New CO2 Air Conditioning System	Zhang, Xinrong	Peking University	China
1177	R744 Heat Pumps with Ejectors for Heating and/or Cooling: Opportunities, Challenges, and Results	Silva, Alessandro	Bitzer US, Inc.	USA
1178	Enhancing Heat Transfer Efficiency of a Gas Cooler in CO2 Transcritical System through Evaporative Cooling on Superhydrophilic Fin Surface	Das, Chayan	Birla Institute	India
1180	Development of a Residential Thermodynamic Active Mechanical Ventilation Machine Working With Propane	Piovesan, Simone	Clivet SpA	Italy
1181	Simulation and Test Results of a Innovative CO2 Residential Monoblock Heat Pump for Domestic Hot Water	Fiabane, Claudia	CLIVET	Italy
1182	Defrost Modelling and Characteristics of Air Source CO2 Heat Pumps	Harikumar, Govind	Aarhus University	Denmark
1183	Study on Dynamic Characteristics of a Self-Lubricating Linear Compressor using Vapor Injection	Zhang, Shuo	CAS	China
1184	Optimal Design of Two-Stage Cylinder Diameters for Enhanced Performance in a Dual-Piston Carbon Dioxide Linear Compressor	Tang, Mingsheng	CAS	China
1185	Open-Source CFD Modelling of Two-Phase CO2 Ejectors	Alvandifar, Negar	Aarhus Univ	Denmark
1186	Model Based Performance Analysis Of A Transcritical Combined Heating and Cooling CO2 Cycle for a School Cantina in India	Bless, Marco	SINTEF Energy Res	Norway
1187	Modelling of an Onboard R290 RSW System for Ice Production on Small Fishing Vessels in India	Köster, Lukas	Sintef Ocean AS	Norway
1188	Comparative Study of Heat Storage System in Water Vapor Compression Heat Pump for Industrial Processes	Kim, Seon Tae	German Aerospace Ctr	Germany
1189	Outlining the Requirements For Propane-Based Heat Pump Solutions For Existing Multi Family Houses	Fugmann, Hannes	Fraunhofer-ISE	Germany
1192	Performance Analysis of an Active On-Board Refrigeration System Using R290 for Improved Fish Preservation in Small Fishing Boats	Dasgupta, Mani Sankar	Birla Inst of Tech	India

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1193	Multi-Objective Optimization of a Portable Air Conditioner Operating With R290 Using Genetic Algorithms	Ferretto, William	Politecnico di Milano	Italy
1194	First Experimental Results of a R744 Water-To-Water Heat Pump for Space Heating	D'Ignazi, Chiara	Politecnico di Milano	Italy
1195	Field Data of a R744 Unit Satisfying Thermal Requirements of a Resort in the South Mediterranean Climate	Minetto, Silvia	Natl Research Council	Italy
1196	Numerical Modelling of the Solid- and Fluid Dynamic Phenomena Controlling the Ring Plate Valve Motion and Tumbling	Ervik, Åsmund	SINTEF Energy Res	Norway
1197	Evaluating the Use of CO2-Hydrocarbon Blends as Working Fluids in High Temperature Heat Pumps	Toffoletti, Gabriele	Univ of Udine	Italy
1198	Design and Freezing Performance Study of a CO2 Plate Freezer at -50°C Evaporation Temperature	Ren, Shuai	NTNU	Norway
1199	Evaluation of Pentanes as Refrigerants for Heat Pumps with Sink Temperatures above 130°C	Benkert, Sebastian	Fraunhofer ISE	Germany
1201	Use of Adiabatic Technology for an Efficient Heat Rejection Process in Fin-And-Tube CO2 Gas Coolers	Demurtas, Dario	LU-VE Group	Italy
1202	Digital Twin of a Full-Scale Industrial Heat Pump Producing Steam Above 140°C	Ispir, Ali Can	Eindhoven Univ	Netherlands
1203	Performance Evaluation of a Low-Charge R290 Modular Heat Pump System	Wirtz, Mathilde	Natl Ren Engy Lab	USA
1204	Performance Improvement of Liquid Desiccant Air-Conditioning System With Tube-Extruded Distributor and Surface Treatment of Three-Fluid Contactor	Masuno, Katsuya	Waseda Univ	Japan
1205	High-temperature CO2 heat pump integration for milk powder spray drying	Kong, Lana	Univ of Waikato	New Zealand
1206	Investigating the Effect of Control Parameters on the Performance of a CO2-Based Thermal Network Connecting Decentralized Heat Pumps	Gholamrezaie, Sepehr	Polytechnique Montréal	Canada
1207	Investigation of Refrigerant Leakage Behavior Prediction using Machine Learning	Yokono, Ryoutarou	Daikin Industries	Japan
1208	Performance comparison of a lab and industrial scale propane-butane cascade heat pump	Bless, Marco	SINTEF Energy Res	Norway
1209	The Combined Potential of Using Air and Solar Source Evaporators in a CO2 Heat Pump	Azzolin, Marco	Univ of Padova	Italy
1210	Development and testing of a Steam Compression Heat Pump for low-grade waste heat recovery	Ramirez Stefanou, M.	TNO	Netherlands
1214	Heat Recovery Performance of an Integrated CO2 Commercial Refrigeration System With Dedicated Mechanical Subcooler	Sicco, Emanuele	Univ of Udine	Italy
1215	Transient and Dynamic Analysis of Refrigeration System Using Fixed Metering Devices for Natural Refrigerant	Jin, Zhequan	LG Electronics	South Korea
1217	Evaluation of the Influence of the Charge Variation in the Performance of an Air to Water Heat Pump Working with R290	Navarro Peris, Emilio	Univ Politecnica de Valencia	Spain
1218	Experimental Analysis of the Performance of a Reciprocating Compressor Working with Propane and PAG Oil	Azzolin, Marco	Univ of Padova	Italy
1221	Performance Evaluation of a Transcritical CO2 Refrigeration System for Supermarkets in Hot Climatic Conditions	Rai, Shubhanshu	IITB	India
1222	Low Charge R290-Subcooler to Improve the Performance of R744-Refrigeration Systems	Pertiller, Gerhard	Graz Univ of Tech	Austria
1224	Designing a CO2 Heat Pump Satisfying the Ecodesign Requirements:			

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1225	Novel Large Scale Combined Heating and Cooling CO2 System	Delêtre, Pierre-Jean	Teknologisk Inst	Denmark
1226	Analysis of Two-Stage High-Temperature Heat Pump Cycles for Steam Generation Using Hydrocarbons as Refrigerants	Navarro Peris, Emilio	Univ Politecnica de Valencia	Spain
1229	Design of a High-Temperature Heat Pump Providing Heat up to 200 °C	Vieren, Elias	Ghent University	Belgium
1232	Retrofitting Potential of R744 Heat Pump/Chiller for a Multispecialty Hospital	Singh, Simarpreet	Norwegian Univ	Norway
1233	Effects of a R744 Cooling Unit Design on the Overall Energy Performance of a Refrigerated Vehicle	Fabris, Francesco	Natl Res Council	Italy
1235	Applying Krypton as Refrigerant For Cooling of Future Particle Detector Trackers at CERN	Contiero, Luca	CERN	Switzerland
1236	Experimental Evaluation of a Novel Residential Propane (R290) Two-Stage Heat Pump System	Bani Issa, Abd Alrhman	Purdue University	USA
1237	Carbon-Neutral Steam Supply For a Chemical Plant: Simulation of the Integration of a High-Temperature Heat Pump Using CO2	Steinberg, Lukas	Ruhr-Univ Bochum	Germany
1238	CO2 Heat Pump With and Without Cooling Output for Hot Water Production in Tropical Climates	Reddy, Y. Siva Kumar	IIT Madras	India
1239	Closing the Knowledge Gaps with R290 Heat Pump Safety Testing	Methler, Timo	Fraunhofer ISE	Germany
1241	Design Optimization of Heat Exchangers utilizing Shape-Optimized, Non-Round Tubes for a Residential Air-Conditioning System using R290	Meruva, Vijay	Univ of Maryland	USA
1242	2-Phase CO2 Pressure Drop Measurements in Vertical and Horizontal Coaxial Transfer Lines for Cooling High-Energy Physics Detectors	Pakulski, Tymon	CERN	Switzerland
1244	Towards Defining the Optimal Design Parameters for a Test Setup Studying Heat Transfer With Carbon Dioxide at Supercritical Conditions	Pedano Medina, Camila	CERN	Switzerland
1245	Advancing Sustainable Refrigeration: In-depth Analysis and Application of Air Cycle Technologies			
1246	The Development of the CO2 Cooling Plants for the Upgrade Silicon Detectors of ATLAS and CMS at CERN	Verlaat, Bart	CERN	Switzerland
1247	Investigation of Indirect Measuring Methods For Evaluating The Energy Efficiency of a Low Temperature Refrigerating System Under Different Operating Conditions	Hudjetz, Stefan	Biberach Univ	Germany
1248	Simulation of a Novel Combination of a Compression Heat Pump and a Thermoelectric Heat Pump to Increase the Efficiency	Brunder, Johannes	Univ of Stuttgart	Germany
1249	CFD-based Correlation Development for sCO2 in TPMS-based Heat Exchangers for Heat Pump Water Heater Systems	Das, Arpita	Univ of Maryland	USA
1250	Thermodynamic Optimization and Field Tests of advanced CO2 Booster Systems with Integrated Mechanical Subcooling	Llopis, Rodrigo	Jaume I University	Spain
1251	Low-Charge Isobutane Heat Pump For Medium And High-Temperature Applications	Palm, Björn	KTH Royal Instit	Sweden
1256	Refrigerant Selection for District Heating's Large-scale Heat Pumps	Balyaligil, Gorkem	Siemens Energy	Sweden
1260	Influence of Thermal Energy Storage Integration Strategy on System Performance and Refrigerant Charge for Small-Scale R290 Heat Pumps	Othman, Alhussain Ali	Univ of Maryland	USA
1262	Heat pump product and market data - Tools and Analysis	Oltersdorf, Thore	Fraunhofer ISE	Germany

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1263	Optimization of R290 Variable Geometry Heat Exchangers	O'Malley, Brian	Univ of Maryland	USA
1269	High-Performance Condenser and Evaporator Heat Exchangers for a High-Temperature Heat Pump Utilizing a Natural Refrigerant	Zabihi Tari, Amir	Univ of Maryland	USA
1273	Optimal Solution Flow Rate of Liquid Desiccant Air-Conditioning System For Energy Saving	Tokano, Atsuya	Waseda Univ	Japan
1277	A comparison of Simplified Modeling Approaches and Simulation Quality of an Industrial R717-HTHP	Wernhart, Michael	Graz Univ of Tech	Austria
1280	CO2 Rack at Low Ambient Temperature: Challenge or Blessing Part II: Annual Energy Cost Analysis	Li, Daqing	Copeland	USA
1281	Design of an Integrated Energy System Using A Cascade High Temperature Heat Pump With Zeotropic Refrigerants	Eikevik, Trygve M.	Norwegian Univ	Norway
1283	Compilation of Equipment Maps for Refrigerators and Heat Pumps using Natural Working Fluid in Japan	Hashimoto, Katsumi	Central Res Instit	Japan
1285	The Importance of Engineering Safe, Efficient, and Low Carbon Use of Natural Refrigerants	Andersen, Stephen	IGSD	USA
1286	Development, Experimental Testing, And Performance Analysis Of A Two-Stage Steam Turbo Compressor Hthp For Solar Assisted Heat	Dowdell, Joshua	SINTEF Energy Res	Norway
1287	Critical Aspects in CFD-Modelling of R-290 Leakages	Esmaeelian, Jafar	KTH University	Sweden
1288	Refrigerant Charge Calculation Method for Brazed Plate Evaporators and Condensers	Will, Torsten	Fraunhofer-ISE	Germany
1289	Flow-Induced Noise Reduction Using Control Logic In Simultaneous Heating and Cooling Heat Pumps	Han, Changho	Korea University	South Korea
1291	Experimental and Numerical Study on the Performance of a MOF-Coated Heat Exchanger Under Pressure Swing Adsorption	Daiguji, Hirofumi	Univ of Tokyo	Japan
1292	Oil Sump Temperature in a High-Pressure Shell Scroll Compressor	Gómez, Nicolás	UPV	Spain
1293	Enhancing Cooling Performance of R744 Heat Pump System in Electric Vehicles Using Gas Injection Technology	Kim, Min Soo	Seoul Natl Univ	South Korea
1294	Real Unit Double Expansion Co2 Public Transport Application Heat Pump Simulation Model Comparison With Single Expansion Alternative Model	Houdek, Pavel	Trane Tech	Czech Repub
1295	Full Conversion to Natural Refrigerants - Feasible and Likely to Happen?	Nekså, Petter	SINTEF Energy Res	Norway
1297	Improving R600a Efficiency: RE170/R600 Natural Mixture Analysis	Calleja-Anta, Daniel	Univ Jaume I	Spain
1298	A Pump-Down Based Refrigerant Charge Fault Detection and Diagnostics Method Validated on Residential and Commercial Heat Pumps	Li, Zhenning	ORNL	USA
1300	Control and Dynamics of Solar Direct Drive Refrigerators	Jensen, Jonas Kjaer	Technical Univ	Denmark
1302	Study on Membrane-Based Vacuum Dehumidification Technology With Finite Permeance and Selectivity	Kim, Minsung	Chung-Ang Univ	South Korea
1303	Deployment of R290 in Heat Pump Water Heaters and Implications for Decarbonization	Nawaz, Kashif	ORNL	USA
1306	All-in-One Air Conditioning System For MXene Catalyst-Based H2O And CO2 Capture Application	Kang, Yong Tae	Korea University	South Korea
1307	Decarbonizing District Energy: Leveraging CO2 Heat Pumps at UBC Okanagan	Eslami Nejad, Parham	Vitalis	Canada
1308	**Plenary Paper:** Hydrocarbon Heat Pumps – a European Perspective	Palm, Björn	KTH Royal Instit	Sweden