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Session Chair: Bryce Shaffer

ID: 1081

High Efficiency Inverter Scroll Compressors.....707

Yasuhiro Murakami, Hiroshi Kitaura, Kazuhiko Matsukawa, Katsumi Katou, Yoshitomo Tsuka, Yasuo Mizushima

DAIKIN INDUSTRIES,LTD., Japan

Keywords: Scroll Compressor, Inverter Compressor, High Efficiency, Energy-Saving, Air Conditioning

ID: 1482

Development of Compact and High-Efficient Scroll Compressor With Novel Bearing Structure.....713

Sungyong Ahn¹, Junchul Oh¹, Junghoon Park¹, Seheon Choi¹, Byeongchul Lee¹, Hyunwoong Cho², Jeonghun Kim²

¹Air Conditioning Compressor Team, LG Electronics Inc.; ²Air Conditioning Compressor Development Team, LG Electronics Inc.

Keywords: VRF, Scroll Compressor, High Efficiency, Compact

ID: 1616

CFD Simulation of an Oil Flooded Scroll Compressor Using VOF Approach.....723

Hui Ding, Yu Jiang

Simerics Inc., United States of America

Keywords: Oil Flooded, Scroll Compressor, CFD, Two Phase Flow, VOF

C-14: Tribology and Lubrication II

Time: Wednesday July 13, 2016: 3:30 PM - 5:30 PM — Location: 202

Session Chair: Michael Perevozchikov

ID: 1213

A Numerical Investigation of the Oil Pump Suction Behaviour in a Hermetic Reciprocating Compressor.....731

Stefan Posch¹, Johann Hopfgartner¹, Martin Heimes¹, Erwin Berger¹, Raimund Almbauer¹, Peter Schöllauf²

¹Institute for Internal Combustion Engines and Thermodynamics, Austria; ²Secop Austria GmbH, Austria

Keywords: CFD, Oil Pump, Reciprocating Compressor

ID: 1214

A Numerical Friction Loss Analysis of the Journal Bearings in a Hermetic Reciprocating Compressor.....740

Stefan Posch¹, Johann Hopfgartner¹, Martin Heimes¹, Erwin Berger¹, Raimund Almbauer¹, Peter Schöllauf²

¹Institute for Internal Combustion Engines and Thermodynamics, Austria; ²Secop Austria GmbH, Austria

Keywords: Friction Loss, Journal Bearing, Reciprocating Compressor

ID: 1124

Effect of Refrigerant Gases (HFC134a and R600a) on the Tribological Behaviour of a Multifunctional DLC Coating.....749

Marcio Silverio¹, Roberto Binder¹, Emilio Rodrigues Hulse¹, Jose Daniel Biasoli De Mello²

¹Embraco, Brazil; ²Federal University of Santa Catarina, Brazil

Keywords: Tribology, DLC, Dry Lubrication, Wear

ID: 1617

Lubrication Analysis of Journal Bearings in R410A Rotary Compressor.....759

Yongjun Fu, Xingbiao Zhou, Hong Guo, Peipei Mei

Guangdong Meizhi Compressor Limited, China, People's Republic of

Keywords: Rotary Compressor, Lubrication, Metallic Contact, Journal Bearings

ID: 1612

Oil Flow Measurement at the Compressor Discharge.....764

Jiu Xu¹, Pega Hrnjak^{1,2}

¹Air Conditioning and Refrigeration Center, University of Illinois at Urbana-Champaign; ²Creative Thermal Solutions Inc., Urbana, Illinois

Keywords: Compressor, Oil, Annular-Mist Flow, Video Processing, OCR

ID: 1051

Study on Flow Characteristics of Oil Viscosity Pump for Refrigerant Compressors.....774

Kiyoshi Sawai¹, Doi Manabu¹, Noriaki Ishii², Noboru Iida³, Kenji Kinjo³

¹Hiroshima Institute of Technology, Japan; ²Osaka Electro-Communication University, Japan; ³Panasonic Corporation, Japan

Keywords: Oil Pump, Flow Characteristics, Refrigerant Compressor

C-15: Rotary Compressors I

Time: Wednesday July 13, 2016: 3:30 PM - 5:30 PM — Location: 206

Session Chair: Doug Collings

ID: 1410

Performance Comparison of Single-stage and Two-stage Hermetic Rotary CO₂ Compressor.....782

Li Zhang, Min Yang, Xiaolong Huang

R&D Center, Shanghai Hitachi Electrical Appliances Co., Ltd.,

Keywords: CO₂, Compressor, Performance Comparison, Single Stage, Two Stage

ID: 1356

CFD Analysis and Experiment Study of the Rotary Two-Stage Inverter Compressor With Vapor Injection.....788

Liyang Deng, Shebing Liang, Jia Xu, Yusheng Hu

Compressor and Motor Institute of Gree Electric Appliances, Inc. of Zhuhai, China, People's Republic of

Keywords: Vapor Injection, Bias Angle of Crankshaft, Performance

ID: 1369

Comparative Research on Air Conditioner With Gas-Injected Rotary Compressor Through Injection Port on Blade.....795

Liu Xingru, Wang Baolong, Shi Wenxing

Tsinghua university, China, People's Republic of

Keywords: Air Source Heat Pump; Vapor Injection; Rotary Compressor; Simulation; Heating Capacity;

ID: 1463

Development of a New Dual-Cylinder Rotary Compressor for VI System.....801

Guoyong Yang, Cheng Zhang, Yanping Wu, Siqing Liao

Guangdong Meizhi Compressor Limited, China, People's Republic of

Keywords: Vapor Injection, Rotary Compressor

ID: 1502

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Geon-woo Kim¹, Ki-young Noh¹, Byung-chaeh Min¹, Sang-jin Song¹, Sang-kyung Na¹, Tae-seung Yoon¹, Kenichiro Teshima², Jang-sik Yang³, Gyung-min Choi⁴, Duck-jool Kim⁴

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Keywords: Rolling Piston Rotary Compressor. Radial Clearance. Leakage. Flow Coefficient. Numerical Analysis

ID: 1317

The Influence of Main Bearing Parameters on the Bearing Wear in Rotary Compressor.....815

Lingchao Kong, Qingfu Zhao, Liping Ren, Jia Xu, Xiaotong Cheng, Yusheng Hu

Compressor and Motor Institute of Gree Electric Appliances, Inc. of Zhuhai, China, People's Republic of

Keywords: Finite Element Method, Bearing Wear, Contact Stress, Rotary Compressor

C-16: Testing and Measurement

Time: Thursday July 14, 2016: 9:45 AM - 12:00 PM — Location: 202

Session Chair: Stefan Bertsch

ID: 1100

Design and Realization of an Automated Test-Stand for Variable Capacity Household Compressors.....822

Bernhard Vetsch¹, Gabriel Feichter¹, Adrian Bachmann², Stefan S. Bertsch¹

¹Interstate University of Applied Sciences of Technology NTB, Switzerland; ²V-ZUG COOLING TECHNOLOGY LTD, Switzerland

Keywords: Household Compressor, Compressor Efficiency, Compressor Test-Stand

ID: 1216

Experimental Study on the Thermal Behavior of a Domestic Refrigeration Compressor During Transient Operation in a Small Capacity Cooling System.....832

Johann Hopfgartner¹, Martin Heimel¹, Erwin Berger¹, Stefan Posch¹, Raimund Almbauer¹, Stefan Stangl²

¹TU Graz, Austria; ²Secop Austria

Keywords: Transient, Measurement, Domestic, Reciprocating Compressor, R600a

ID: 1185

A Methodology for Characterization of Vapor-Injection Compressors.....840

Fernando M. Tello Oquendo, Emilio Navarro-Peris, José González-Maciá

Institute for Energy Engineering, Universitat Politècnica de València, Spain

Keywords: Characterization, Scroll Compressor, Vapor-Injection, Calorimetric Bench

ID: 1533

Characterization and Performance Testing of Two-Stage Reciprocating Compressors Using a Hot-Gas Load Stand With Carbon Dioxide.....850

Xinye Zhang¹, Bin Yang¹, Andres Osorio², Dylan Bethel², Orkan Kurtulus¹, Eckhard Groll¹

¹Purdue University, United States of America; ²BlackPak Inc

Keywords: Reciprocating Compressors, Carbon Dioxide, Hot Gas Cycle

ID: 1531

Characterization and Performance Testing of Two-Stage Reciprocating Compressors During the Dynamic Charging of a Tank With Air.....861

Xinye Zhang¹, Bin Yang¹, Andres Osorio², Dylan Bethel², Orkan Kurtulus¹, Eckhard Groll¹

¹Purdue University, United States of America; ²BlackPak Inc

Keywords: Reciprocating Compressors, Dynamic Charging Process

ID: 1348

A Comprehensive Evaluation of Regression Uncertainty and the Effect of Sample Size on the AHRI-540 Method of Compressor Performance Representation.....871

Vikrant Aute¹, Cara Martin²

¹Center for Environmental Energy Engineering, University of Maryland, College Park; ²Optimized Thermal Systems, Inc., Beltsville, MD, USA

Keywords: Compressor, Performance, Data, Representation, Uncertainty

C-17: Centrifugal Compressors

Time: Thursday July 14, 2016: 9:45 AM - 12:00 PM — *Location:* 206

Session Chair: Christian Bach

ID: 1393

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Qichao Yang, Yuanyang Zhao, Yue SHU, Xiaosa LI, Liansheng LI

Hefei General Machinery Research Institute, Hefei, P.R. China

Keywords: Centrifugal Compressor, Characteristic, Experiment Study, Surge

ID: 1048

The Effects of Blade Fillets on Aerodynamic Performance of a High Pressure Ratio Centrifugal Compressor.....887

Justin Jongsik Oh

Danfoss Turbocor, United States of America

Keywords: Centrifugal Compressor, Fillets, Impeller, CFD

ID: 1456

Experimental Research on Surge and Stability Enhancement of Centrifugal Compressor.....896

Yuanyang Zhao, Qichao Yang, Liansheng Li, Jun Xiao, Guangbin Liu, Le Wang

Hefei General Machinery Research Institute, China, People's Republic of

Keywords: Centrifugal Compressor; Casing Treatment; Surge; Active Control

ID: 1181

Performance Gain for Multiple Stage Centrifugal Compressor by Using Non-Equal Impeller Configuration.....903

Yuanjie Wu, Chris Thilges, Philippe Guillerot

Ingersoll Rand -Trane Company, United States of America

Keywords: Centrifugal Compressor, Impeller, Compressor Performance

ID: 1088

Design of Oil-Free Turbocompressors for a Two-Stage Industrial Heat Pump Under Variable Operating Conditions.....913

Adeel Javed¹, Cordin Arpagaus², Stefan Bertsch², Jürg Schiffmann¹

¹École Polytechnique Fédérale de Lausanne, Switzerland; ²NTB University of Applied Sciences of Technology Buchs, Switzerland

Keywords: Two-Stage Heat Pump, Oil-Free Turbocompressors, Operational Deviations, System Design and Performance Evaluation, Uncertainty Quantification

C-18: Noise, Vibration, & Harshness II

Time: Thursday July 14, 2016: 1:00 PM - 3:00 PM — *Location:* 202

Session Chair: Patricia Davies

ID: 1158

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Hikaru Wada, Hideki Matsuura, Satoru Takanezawa, Ayumi Ogawa

DAIKIN INDUSTRIES,LTD, Japan

Keywords: Swing Compressor, Accumulator, Measurement, Acoustic Resonance, Low Vibration

ID: 1254

Study on the Contribution of Compressor Noise to Refrigerator Overall Noise.....931

Shoufei Wu, Jiayou Song, Gaowei Shen

Jiaxipera Compressor Co., Ltd, China, People's Republic of

Keywords: Compressor, Refrigerator Noise

ID: 1259

Analysis and Control of Severe Vibration of a Screw Compressor Outlet Piping System.....939

Ying Zhao¹, Bin Zhao¹, Qiang Zhou¹, Xiaohan Jia^{1,2}, Jianmei Feng^{1,2}, Xueyuan Peng^{1,2}

¹Xi'an Jiaotong University, China, People's Republic of; ²National Engineering Research Center of Fluid Machinery and Compressors, China, People's Republic of

Keywords: Screw Compressor, Gas Pulsation, Vibration

ID: 1121

Prediction of Compressor Muffler Frequency Response Function Using CFD.....947

Tadeu Tonheiro Rodrigues, Cristiano Stumpf, Ricardo Mikio Doi

Embraco, Brazil

Keywords: Acoustic, Muffler, CFD, Wave Equation

ID: 1503

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Jesus Ruano, Joan Lopez, Oriol Lehmkuhl, Joaquim Rigola, Carles David Pérez Segarra

CTTC, Universitat Politecnica de Catalunya, Spain

Keywords: Computational Methods, Compressor Technologies, Mufflers

ID: 1022

Gas Pulsation Control by a Shunt Pulsation Trap With Perforated Tubes and an Optional Absorptive Silencer.....966

Paul Xiubao Huang¹, Sean Yonkers¹, David Hokey²

¹Hi-Bar MC Tech. LLC, United States of America; ²Howden-Roots LLC

Keywords: PD Compressors, Gas Pulsation Control, Shunt Pulsation Trap, Parallel Dampening

C-19: Rotary Compressors II

Time: Thursday July 14, 2016: 1:00 PM - 3:00 PM — *Location:* 206

Session Chair: Margaret Mathison

ID: 1037

Development of a Novel Structure Rotary Compressor for Separate Sensible and Latent Cooling Air-Conditioning System.....974

Chunhui Liu, Haifeng Zhang, Lei Zhang, Jin Pan

Shanghai Hitachi Electrical Appliance Co., Ltd, People's Republic of China

Keywords: Rotary Compressor, SSLC, Performance, Reliability

ID: 1104

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Raito Kawamura, Shin Sekiya, Tatsuya Sasaki, Hideaki Maeyama, Shinichi Takahashi, Kanichiro Sugiura

Mitsubishi Electric Corporation, Japan

Keywords: Rotary Vane Compressor, Wing-Vane Compressor, Compression Mechanism, Non-Contact Vane, Friction Loss

ID: 1085

A Study on High Efficiency Wing-Vane Compressor - Part.2: Lubrication Characteristic of the Partial Arc Guide Bearing -.....990

Tatsuya Sasaki, Shin Sekiya, Raito Kawamura, Hideaki Maeyama, Shinichi Takahashi, Kanichiro Sugiura

Mitsubishi Electric Corporation, Japan

Keywords: Rotary Vane Compressor, Wing-Vane Compressor, Compression Mechanism, Non-Contact Vane, Friction Loss

ID: 1293

A Study on High Efficiency Wing-Vane Compressor - Part.3: Experimental Evaluation of the Prototype -.....998

Raito Kawamura, Shin Sekiya, Tatsuya Sasaki, Hideaki Maeyama, Shinichi Takahashi, Kanichiro Sugiura

Mitsubishi Electric Corporation, Japan

Keywords: Rotary Vane Compressor, Wing-Vane Compressor, Compression Mechanism, Non-Contact Vane, Friction Loss

ID: 1468

Optimal Structural Design of Swing Double-Vane Compressor.....1005

Junjie Ma, Xiang Chen, Xu Yang, Zongchang Qu

Xi'an Jiaotong University, China, People's Republic of

Keywords: Swing Double-Vane Compressor, Simulation, Structural Design, Efficiency

ID: 1596

Modeling and Testing the Thermal Effect of Lubricating Oil Sprayed in Sliding-Vane Air Compressors Using Pressure-Swirl Nozzles.....1014

Gianluca Valenti¹, Stefano Murgia², Ida Costanzo¹, Giulio Contaldi², Alessandro Valenti³

¹Politecnico di Milano, Italy; ²Ing. Enea Mattei S.p.a.; ³Valenti Energie S.r.l.

Keywords: Sliding-Vane Compressor, Positive-Displacement Compressor, Oil Injection, Oil Spray, Pressure-Swirl Nozzle.

C-20: Valves II

Time: Thursday July 14, 2016: 3:30 PM - 5:30 PM — Location: 202

Session Chair: Akash Bhatia

ID: 1267

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Alexander Lof¹, Chris Millward¹, Azhar Nawaz^{1,2}

¹Research & Development, voestalpine Precision Strip AB, Sweden; ²Research & Development, voestalpine Precision Strip AB, Sweden

Keywords: Flapper Valve, Reed Valve, Hermetic, Semi-Hermetic, Compressors, Stainless Steel, Damping, Fatigue

ID: 1355

Analysis of Viscous Slip at the Wall in Gas Flows of R134a and R600a Through Metallic Microtubes.....1030

Ernane Silva¹, Murilo F. Nicoluzzi¹, Marcos Rojas-Cardenas², Cesar J. Deschamps¹

¹Federal University of Santa Catarina, Brazil; ²Université Fédérale Toulouse Midi-Pyrénées, France

Keywords: Leakage, Slip Flow, Reed Valve, Microtube

ID: 1228

Experimental Investigation of Damping Coefficient for Compressor Reed Valves.....1039

Sergio Koerich Lohn¹, Evandro Luiz Lange Pereira¹, Humberto Ferreira Camara¹, Cesar Jose Deschamps²

¹Embraco, R&D; ²POLO Research Labs for Emerging Technologies in Cooling and Thermophysics

Keywords: Reed, Valve, Damping

ID: 1313

A Combined Experimental-Numerical Procedure to Estimate Leakage Gap of Compressor Valves.....1048

Gustavo C. Rezende, Ernane Silva, Cesar J. Deschamps

Federal University of Santa Catarina, Brazil

Keywords: Valves, Leakage, Testing & Evaluation

ID: 1238

Integrating Numerical Models for Efficient Simulation of Compressor Valves.....1056

Ajay Parihar¹, David Myszka², Benjamin Robinet¹, Thomas Hodapp¹

¹Emerson Climate Technologies; ²University of Dayton, United States of America

Keywords: Valves, FSI

C-21: Scroll Compressors III

Time: Thursday July 14, 2016: 3:30 PM - 5:30 PM — Location: 206

Session Chair: Kirill M. Ignatiev

ID: 1079

Experimental Investigations on the Performance Improvement of Oil-Gas Separator in Electric Driven Scroll Compressor for Eco-Friendly Vehicles.....1066

Donglim Nam^{1,4}, Poyoung Lee¹, Seungbin Jung¹, Geonho Lee², Yunki Kwon³, Jinho Lee⁴

¹R&D Center of Doowon Heavy Industrial Co., Ltd., Korea, Republic of (South Korea); ²Department of Building Engineering Services, Doowon Technical University College; ³Department of Computer Aided Design, Doowon Technical University College; ⁴School of Mechanical Engineering, Yonsei University

Keywords: Electric Driven Compressor, Oil Separator, Vortex Finder, Pressure Drop

ID: 1344

Influencing Factors Study of the Variable Speed Scroll Compressor With EVI Technology.....1076

Xiaoli Kang, Yusheng Hu, Caixia Shan, Yun Liu, Xiaojun Gao, Gang Lv

GREE ELECTRIC APPLIANCES, INC. OF ZHUHAI, China, People's Republic of

Keywords: Enhanced Vapor Injection; Scroll Compressor; the Area of Supplementary Channel; the Position of Supplementary Inlet; gas Force

ID: 1497

Lubrication Tests to Support Optimal Performance Design Guidelines for Thrust Slide-Bearings in Scroll Compressors.....1084

Noriaki Ishii¹, Eiji Nonoguchi¹, Keiko Anami⁵, Atsushi Sakuda², Yuya Terada¹, Yusuke Imai², Kiyoshi Sawai³, Charles William Knisely⁴

¹Osaka Electro-Communication University, Japan; ²Panasonic Corporation Appliances Company; ³Hiroshima Institute of Technology; ⁴Bucknell University, USA; ⁵Ashikaga Institute of Technology, Japan

Keywords: Scroll Compressor, Thrust Slide-Bearing, Optimization, Design Guideline, Friction Power Loss

ID: 1613

Visualization and Simulation of Oil Flow in a Scroll Compressor Plenum.....1093

Jiu Xu¹, Pega Hrnjak^{1,2}

¹Air Conditioning and Refrigeration Center, University of Illinois at Urbana-Champaign; ²Creative Thermal Solutions Inc., Urbana, Illinois

Keywords: Compressor, Oil, CFD, Flow Visualization, Droplet

ID: 1634

Numerical Simulation and Experimental Examination of an Oldham Coupling.....1101

Hang Ye¹, Zhigang Huang¹, Jinduo Ye²

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Keywords: Scroll Compressor, Oldham Coupling, Numerical, Experimental, Prediction