

**The International Symposium  
on  
New Refrigerants and Environmental Technology 2018**

**- Latest Technology of Energy Conservation, New Refrigerants and Environment issue on  
Air conditioning and Refrigeration Equipment for lead up to the 21<sup>st</sup> Century -  
December 6 - 7, 2018  
International Conference Center Kobe, Main Hall**

***FINAL PROGRAM***

**Thursday, December 6**

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8:00~9:00     **Registration**

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9:00~9:10     **Opening Address**

**Opening Address (1)**     Toshiyuki Takagi, Chairman of the board, JRAIA

**Opening Address (2)**     Masatoshi Omura (Executive director, KOBE Tourism Bureau)

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9:10~9:40     **Keynote Address**

*History of Kobe symposium and the latest issues of the HVAC Industries*

Tetsuji Okada (President, JRAIA)

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**Main Moderator of Technical Session : Shigeharu Taira (Daikin Industries, Ltd.)**

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9:45~11:10     **Technical Session 1 : Environment issue**

Moderator : Hisao Mizuno (Mitsubishi Heavy Industries Thermal Systems, Ltd.)

Hisashi Otani (Sanden Advanced Technology Corporation)

*The Amendment of the Ozone Layer Protection Law - Measures against Fluorinated Gases in Japan -*

Toshio Kosuge (Minister of Economy, Trade and Industry (METI))

*The implementation of the F-gas regulation and the HFC phase-down in Europe*

Mihai Scumpieru (European Partnership for Energy and the Environment : EPEE)

*Update on Ecodesign and safety standards in Europe*

Els Baert (European Partnership for Energy and the Environment : EPEE)

*AHRI Research on Flammable Refrigerants*

Xudong Wang (The Air-Conditioning, Heating, and Refrigeration Institute : AHRI)

*Updates on Standards development and revision in China R&AC Industry following Kigali Amendment*

○ Jingliang Chen, Huicheng Liu (China Refrigeration and Air Conditioning Industry Association : CRAA)

11:15~11:35     **Poster Session Presentation**

Moderator : Shigeharu Taira (Daikin Industries, Ltd.)

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11:35~12:35     **Lunch Break**

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12:35~13:45 **Technical Session 2 : New Refrigerants (Appliance Manufacturer) 1**

Moderator : Shigeharu Taira (Daikin Industries, Ltd.)

Koji Yamashita (Mitsubishi Electric Corporation)

***Performance analysis of lower GWP refrigerant for air-conditioning systems using Energy flow +M***

○ Kiyoshi Saito, Keisuke Ohno (Waseda University)

***Performance evaluation of VRF systems using low GWP refrigerant***

Hiroichi Yamaguchi, ○ Atsushi Baba, Yuko Hattori (TOSHIBA CARRIER CORPORATION)

***Development of Hybrid VRF using R32 refrigerant***

○ Ikeda Soshi, Nishio Jun, Ishimura Katsuhiro, Okano Hiroyuki  
(Mitsubishi Electric Corporation)

***Development of an Air-source Heat Pump Using Low-GWP Refrigerants to Heat Circulation Water***

○ Kei Akatsuka, Takachika Mori (Mitsubishi Heavy Industries Thermal Systems, Ltd.)

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13:45~13:55 **Refreshment Break**

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13:55~15:05 **Technical Session 3 : New Refrigerants (Appliance Manufacturer) 2**

Moderator : Shigeharu Taira (Daikin Industries, Ltd.)

Koji Yamashita (Mitsubishi Electric Corporation)

***Development of condensing units using R463A***

○ Yusuke Arai, Takashi Ikeda, Hiroshi Sata, Ryo Tsukiyama (Mitsubishi Electric Corporation)

***Development of scroll Condensing unit using R448A refrigerant***

○ Nobuyoshi Kawase, Masaki Uno, Masahiro Nishide, Atsuhiko Yokozeki, Hideyuki Ueda  
(Hitachi-Johnson Controls Air Conditioning, Inc.)

***Update on Next Generation Low GWP Refrigerants for Chillers Products***

○ Stephen A Kujak, Kenneth J Schultz (Ingersoll Rand - Trane)

***Development of Air-cooled Heat Pump Modular Chiller "HEXAGON FORCE 32" using Low GWP refrigerant HFC-32***

○ Minoru Sugimura, Kazuhisa Takemoto (Daikin Industries, Ltd.)

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15:05~15:15 **Refreshment Break**

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15:15~16:30 **Technical Session 4 : Safety of Refrigerants / Risk Assessment 1**

Moderator : Hiroichi Yamaguchi (Toshiba Carrier Corporation)

Masayuki Nonaka (Hitachi-Johnson Controls Air Conditioning, Inc.)

***Safety and risk assessment of flammable refrigerants, A2L and A3***

Eiji Hihara (The University of Tokyo)

***FLAMMABILITY EVALUATION OF LOCALIZED CLOUD OF LOWER FLAMMABILITY (2L) REFRIGERANT USING A LARGE VOLUME VESSEL - COMPARISON BETWEEN R32 AND R290***

Kenji Takizawa (National Institute of Advanced Industrial Science and Technology : AIST)

***Physical hazard assessment for natural refrigerant assuming application to the room air conditioner***

○ Tomohiko Imamura\*, Hiroyuki Takahashi\*\*, Shuhei Maejima\*\*, Osami Sugawa\*  
(Suwa University of Science\*, Tokyo University of Science, Suwa\*\*)

***The assessment of real scale physical hazard of residential use room air-conditioner using natural refrigerant***

○ Hiroumi Shiina, Akira Matsugi, Tei Saburi, Sirou Kubota

(National Institute of Advanced Industrial Science and Technology : AIST)

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16:30~16:40 **Refreshment Break**

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16:40~18:00 **Technical Session 5 : Safety of Refrigerants/ Risk Assessment 2**

Moderator : Hiroichi Yamaguchi (Toshiba Carrier Corporation)

Masayuki Nonaka (Hitachi-Johnson Controls Air Conditioning, Inc.)

***Risk evaluation report of commercial packaged air conditioner for facilities using lower flammability refrigerants***

○ Masahiko Nakamoto, Akiyoshi Yamamoto, Hisao Ooishi, Syunji Sasaki,  
Kazuhiko Kawai (Commercial A/C for facilities Risk Assessment SWG, JRAIA)

***International safety standard revision situation for flammable refrigerants Progress of IEC / SC61D / WG16***

Hitoshi Hashimoto (Refrigerants related to International Standards WG, JRAIA)

***Overview: Risk Assessment of Mini-split Air Conditioners using A3 Refrigerant***

○ Kenji Takaichi, Shigeharu Taira, Atsushi Baba, Tsutomu Imoto, Syunji Itakura,  
Hironori Mori, Hiroaki Makino (Mini-Split Risk Assessment WG3, JRAIA)

***Risk Assessment of Built-in Refrigerated Display Cabinets using A3 Refrigerant***

○ Yoshihisa Sakamoto, Toshimasa Kato, Shigeki Ishihara, Akira Kobayashi,  
Hidekazu Kainuma, Makoto sato, Katsuyuki Osawa, Hiroshi Nagai, Koji Yamashita,  
Masahiko Nakagawa (Built-in refrigerated display cabinet risk assessment WG3, JRAIA)

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18:20~20:20 **Welcome reception**

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Room "Kairaku" Portopia Hotel (Main Building / B1F)

**Friday, December 7**

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8:30~9:00     **Registration**

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9:00~10:40    **Technical Session 6 : Compressor/Lubricant 1**

Moderator : Akira Hiwata (Panasonic Corporation)

Takeshi Okido (JXTG Nippon Oil & Energy Corporation)

***Development of Scroll Compressor for R32 Refrigerant***

○ Hiroki Ikebe, Hiroshi Kitaura, Yasuhiro Murakami, Kazuhiko Matsukawa,  
Yasuo Mizushima (Daikin Industries, Ltd.)

***Development of R290 Variable Speed Scroll Compressor***

○ Weihua Guo, Joe Healy, David Ayers (Emerson Climate)

***Development of an Evolutionary Three-Dimensional Scroll Compressor***

○ Takuma Yamashita\*, Hajime Sato\*, Takahide Ito\*, Yoshiyuki Kimata\*\*, Yohei Hotta\*\*  
(Mitsubishi Heavy Industries, Ltd.\* , Mitsubishi Heavy Industries Thermal Systems, Ltd.\*\*)

***Compressor Technology and Sustainability***

Oliver Javerschek (Bitzer Kuehlmaschinenbau GmbH)

***Improvement of seizure properties on edge BELL-MOUTH geometry of journal bearing***

○ Yoshinori Ishida\*, Hatsuhiko Usami\*\* (Panasonic Corporation\*, Meijo University\*\*)

***Tribological Properties of Low-GWP HFO Refrigerant / oil Mixtures***

○ Shinichiro Ido, Tatsuya Sasaki, Kota Mizuno, Shuhei Koyama  
(Mitsubishi Electric Corporation)

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10:40~10:50    **Refreshment Break**

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10:50~12:15    **Technical Session 7 : Compressor / Lubricant 2**

Moderator : Akira Hiwata (Panasonic Corporation)

Takeshi Okido (JXTG Nippon Oil & Energy Corporation)

***Tribological Study on Polyol Esters under Low GWP Refrigerants***

○ Yohei Shono, Takeshi Okido, Kiyomi Sakamoto (JXTG Nippon Oil & Energy Corporation)

***Evaluations of PVE Lubricants for refrigeration systems with the Low GWP refrigerants***

Tomoya Matsumoto (Idemitsu Kosan Co., Ltd.)

***Understanding the Lubricant Needs and Direction for Next Generation Refrigerants***

○ Joseph A Karnaz\*, Jun Liu\*\* (Shrieve Chemical Products, Inc.\* , Shrieve Chemical  
(Shanghai), Ltd.\*\*)

***Proper Selection of Lubricants for Low GWP Refrigerant Systems***

○ Julie Majurin, Kane Liu (CPI Fluid Engineering)

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12:15~13:15    **Lunch Break**

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13:15~14:55 **Technical Session 8 : Energy Conservation**

Moderator : Shuji Fukano (Mayekawa Mfg Co., Ltd.)

Takeshi Watanabe (Daikin Industries, Ltd.)

***Development of CO<sub>2</sub> refrigeration and hot water supply system***

○ Toyoaki Kiya, Osamu Kosuda (Panasonic corporation)

***Development of a high temperature heat pump using reusable heat as the heat source***

○ Takeru Kimura\*, Hideki Fuchikami\*, Kousaku Nishida\*, Mizuo Kudo\*, Akito Machida\*,

Kiyoshi Saito\*\*, Yutaka Ota\*\*, Masafumi Katsuta\*\*

(Mayekawa Mfg Co., Ltd.\* , Waseda University\*\*)

***Development of Efficient Heat Pump System for EV/PHEV***

Hiroyuki Kobayashi (DENSO CORPORATION)

***Achieving New Levels of Energy Efficiency and Sustainability with Opteon?***

***HFO Refrigerants and Blowing Agents in Appliance Applications***

Ernest B. Wysong, ○ Harrison K Musyimi (The Chemours Company)

***Development of Multi Package Air-conditioner "GREEN MULTI" using Low GWP refrigerant HFC-32***

○ Takuya Kotani, Ryuuta Ohura (Daikin Industries, Ltd.)

***Development of High Efficiency Room Air Conditioner "Eolia" with double temperature air flow***

○ Hiroshi Yamamoto, Kensuke Adachi, Hideyuki Kouno

(Daisuke Kawazoe, Panasonic corporation)

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14:55~15:05 **Refreshment Break**

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15:05~17:00 **Technical Session 9 : New Refrigerants (Refrigerant Manufacturer)**

Moderator : Masami Taniguchi (Denso Corporation)

Makoto Hayano (Fujitsu General Laboratories Limited.)

***Evaluation of thermophysical properties, heat transfer characteristics and cycle performance for HFO1123 mixtures***

Yukihiro Higashi (International Institute for Carbon-Neutral Energy Research, Kyushu University)

***Opteon™ Low GWP Refrigerant Solutions - Market Adoption & Looking Ahead to the Future***

○ Joshua Hughes, Barbara H Minor (The Chemours Company)

***Next Generation Low-GWP Refrigerants "AMOLEA™"***

Masato Fukushima (AGC Inc.)

***The progress of retrofit to R22 equipment using lower GWP refrigerant***

○ Hitomi Arimoto\*, Shun Ohkubo\*, Yuzo Komatsu\*, Ivan Rydkin\*\*, Pega Hrnjak\*\*\*

(Daikin Industries, Ltd.\* , DAIKIN AMERICA, INC.\*\* , Creative Thermal Solutions Inc.\*\*\*)

***Development of low-GWP refrigerants for low temperature applications***

Robert E Low (Mexichem UK Ltd.)

***Flammability and risk assessment of low environmental impact refrigerants for R-134a and R-404A replacement***

Sarah Kim\*, Thomas A Lewandowski\*\*, John M Kondziolka\*\*, Laurent Abbas\*\*\*

(Arkema Inc.\* , Gradient\*\*, Arkema France\*\*\*)

***Reduced GWP Refrigerants for Residential and Commercial Air Conditioning System***

○ Samuel Yana Motta, Ankit Sethi (Honeywell International)

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17:00~17:10 **Closing Remarks**

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***High -speed refrigerant recovery system Refrigerant recovery takes the longest time at site, our system can reduce time by up to 50% with low cost***

Shintaro Ogawa (ASADA CORPORATION)

***REFRIGERANTS R454B, R452B and R32***

***Latest motor technology combined with economiser function ensure peak efficiency despite demanding conditions***

○ Ricardo Rodriguez\*, Matthias Hammerschmidt\*, Ferdinand Spannan\*\*  
(BITZER Kühlmaschinenbau GmbH\*, Bitzer Japan K.K.\*\*)

***Proposal of newly developed car A / C tools with high recovery ratio for R1234yf and R134a.***

Issei Higami, ○ Kenji Yamasaki (DENGEN CO., LTD.)

***NEDO Development project for refrigerants with Low-GWP in refrigerating and air-conditioning systems***

○ Masazumi Godo, Naoki Ichikawa, Mika Suzawa, Masamichi Abe  
(New Energy and Industrial Technology Development Organization : NEDO)

***Experimental Thermophysical Property Evaluation for Low-GWP and natural refrigerants***

○ Yohei Kayukawa, Yuya Kano, Yoshitaka Fujita  
(National Institute of Advanced Industrial Science and Technology : AIST)

***Condensation heat transfer of HFO1123 / HFC32 mixture in a multiport tube***

○ Daisuke Jige, Shogo Kikuchi, Norihiro Inoue  
(Tokyo University of Marine Science and Technology)

***Trend of measurement of HFOs and HCFOs refrigerant transport properties***

○ Akio Miyara, Keishi Kariya, Md Jahangir Alam, Kotaro Yamaguchi (Saga University)

***Ararm for R32 Accorded with a guideline JRA GL-20:2016***

Fumihiko Mitsui (FUSO co, Ltd.)

***Education of refrigerant leak prevention technology improvement***

○ Masatomo Sakaguchi, Tsutomu Osawa  
(Japan Association of Refrigeration and Air-Conditioning Contractors : JARAC)

***Stationary R32 refrigerant leak detector Technologies contribute to the prevention of specific inert gas emissions which cause the global warming effect***

○ Hideki Takeyama, Masayuki Ohnishi (ICHINEN TASCO CO., LTD.)

***Void Fraction Characteristics of Vertically Upward Gas-Liquid Two-Phase Flows in Non-Circular Tubes.***

○ Hitoshi Asano, Hideki Murakawa, Katsumi Sugimoto (Kobe University)

***Maintenance tool to deal with CO<sub>2</sub> refrigeration cycle Experiment of sealing technology for supercritical fluid***

Shigeru Suwa (Pro-Step Co., Ltd.)

***Development of the Large Capacity Semi-hermetic Single Screw Compressor for Ice Storage Chiller***

○ Hideyuki Goto, Kazuki Mori, Harunori Miyamura, Hideki Matsuura (Daikin Industries, Ltd.)

***Effect of Additives to Suppress The Combustion of Oil on Pump-Down Accidents***

○ Tomohiro Higashi, Chaobin Dang, Eiji Hihara, Yuji Shitara (The University of Tokyo)

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***Overview of risk assessment for A2L refrigerant***

Satoru Fujimoto (Environmental Planning Committee, JRAIA)

***Study on safe use of equipment using A3 refrigerants***

Koji Murozono (Environmental Planning Committee, JRAIA)

***Risk Assessment of Mini-split Air Conditioners using A3 Refrigerant***

Tsutomu Imoto (Mini-Split Risk Assessment WG3, JRAIA)

***Risk Assessment and Safety Measure of Built-in Refrigerated Display Cabinets using A3 Refrigerant***

Hiroshi Nagai (Built-in refrigerated display cabinet risk assessment WG3, JRAIA)

***Performance Simulation of Residential Air Conditioner for High Ambient Temperature Region***

Komei Nakajima (Evaluation of Refrigerant WG, JRAIA)

***14<sup>th</sup> Gustav Lorentzen Conference 2020 in Kyoto***

Niccolo Giannett (Japan Society of Refrigerating and Air Conditioning Engineers : JSRAE)

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