

CONTENTS

Host Chapter	x
Program Committee and Transactions Staff	x
State of the Society, Terry Townsend, PE, 2006–2007 ASHRAE President	xi
Technical Program	xiii

TRANSACTIONS PAPERS

DA-07-001 The Use of Numerical Acoustics to Solve Classic Acoustics Problems at an HVAC Original Equipment Manufacturer James E. Bender and Patrick C. Marks	3
DA-07-002 Using Numerical Acoustics to Predict the Attenuation of HVAC Plenums (RP-1218) D.W. Herrin, Z. Tao, E.L. Scalf, S.A. Allen, and A.F. Seybert	10
DA-07-003 Using Numerical Methods to Analyze Multicomponent HVAC Systems (RP-1218) D.W. Herrin, Z. Tao, A.E. Carter, J. Liu, and A.F. Seybert	19
DA-07-004 Net Zero Energy Building Case Study: Science House Jason Steinbock, David Eijadi, and Tom McDougall	26
DA-07-005 Tale of Two Low-Energy Designs: Comparison of Mechanically and Naturally Ventilated Office Buildings in Temperate Climates Christine E. Walker, Leon R. Glicksman, and Leslie K. Norford	36
DA-07-006 Jack Evans Police Headquarters: 24-Hour Low Energy Use Susan Reilly, Tim S. Kraft, and Victor Olgyay	51
DA-07-007 Measured Energy Performance of a US-China Demonstration Energy-Efficient Office Building Peng Xu, Joe Huang, Ruidong Jin, and Guoxiong Yang	56
DA-07-008 Applications of Customized Absorption Heat Pumps with Heating Capacities above 500 kW Christoph Kren, Christian Keil, Stefan Plura, Michael Radspieler, Matthias Schicktan, and Christian Schweigler	65
DA-07-009 Designing Sustainable On-Site CHP Systems Milton Meckler, Lucas B. Hyman, and Kyle Landis	80
DA-07-010 Low-Temperature Heat Storage for Solar Heating and Cooling Applications Christian Schweigler, Stefan Hiebler, Christian Keil, Holger Köbel, Christoph Kren, and Harald Mehling	89
DA-07-011 Liquid Cooling for Extreme Heat Densities Herb Villa	97
DA-07-012 Performance of a Rack of Liquid-Cooled Servers Tahir Cader, Levi Westra, Andres Marquez, Harley McAllister, and Kevin Regimbal	101
DA-07-013 Comparison between Underfloor Supply and Overhead Supply Ventilation Designs for Data Center High-Density Clusters Roger R. Schmidt and Madhusudan Iyengar	115

DA-07-014	Capture Index: An Airflow-Based Rack Cooling Performance Metric James W. VanGilder and Saurabh K. Shrivastava	126
DA-07-015	Characterization of a High-Density Data Center Joseph F. Prisco	137
DA-07-016	Advanced Solar Irradiance Model and Procedure for Spectral Solar Heat Gain Calculation (RP-1143) Christian A. Gueymard	149
DA-07-017	Two-Dimensional CFD and Conduction Simulations of Heat Transfer in Horizontal Window Frames with Internal Cavities Arild Gustavsen, Christian Kohler, Dariush Arasteh, and Arvid Dalehaug	165
DA-07-018	Performance Criteria for Residential Zero-Energy Windows Dariush Arasteh, Howdy Goudey, Joe Huang, Christian Kohler, and Robin Mitchell.....	176
DA-07-019	Re-Inventing the Wheel in HVAC&R Technology: History Does Repeat! Bernard Nagengast.....	186
DA-07-020	Carl von Linde—Scientist, Inventor, Global Player Irene Reichert	192
DA-07-021	The Heating System of the Roman Baths Tahsin Basaran.....	199
DA-07-022	Best Practices for Data Center Thermal and Energy Management—Review of Literature Roger R. Schmidt and Madhusudan Iyengar.....	206
DA-07-023	Prediction of Distributed Air Leakage in Raised-Floor Data Centers Kailash C. Karki, Amir Radmehr, and Suhas V. Patankar	219
DA-07-024	Occurrence of Humid Air Diagrams within a Short Period at Three Distant Places on a Globe Branislav B. Todorovic.....	227
DA-07-025	Tobacco Smoke and Haze Control in the Houston Astrodome Preston McNall	232
DA-07-026	The Work of Frank J. Dean, Jr.: A Great Inventor and Innovator James A. Reese, Raymond H. Dean, Michael M. Roberts, and Bradley A. Crews	237
DA-07-027	Cascade Systems: Past, Present, and Future Pradeep K. Bansal and Sanjeev Jain	245
DA-07-028	A Model for Self-Contained Solid Door Refrigerated Display Cabinets R.J. Love and D.J. Cleland	253
DA-07-029	Protecting Buildings Against Bioterrorism—Review of Guidance and Tools F.E. Yeboah, F. Chowdhury, S. Ilias, H. Singh, and L. Sparks.....	263
DA-07-030	An Experimental and Modeling Assessment of Room Air Cleaners for Building Protection Vladimir Kogan, Christopher B. Harto, David J. Hesse, and Leslie Sparks	273

DA-07-031	Requirements for a Probabilistic Quantitative Relative Risk-Based Decision Methodology for Reducing Vulnerability of Building Occupants to Extreme IAQ Events T. Agami Reddy and William P. Bahnfleth	281
DA-07-032	Laboratory Evaluation of Residential Window Installation Methods in Stucco Wall Assemblies Neil P. Leslie	296
DA-07-033	Evaluating Stucco-Clad Building Wall Systems through Hygrothermal Modeling Christine E. Walker and Douglas Kosar	306
DA-07-034	Mold Risk Reduction Strategies for Builders Lewis G. Harriman, III, and Neil P. Leslie	321
DA-07-035	Use of Electronically Commutated Motors (ECMs) in Air Terminal Units Kerstin Lesley Kenty	334
DA-07-036	Air Distribution in Rooms with a Fan-Driven Convectector Tine S. Larsen, Rob H.W. Bindels, Lukasz Michalak, Michal Milewski, and Peter V. Nielsen	342
DA-07-037	A New Idea That Is 40 Years Old—Air Curtain Hospital Operating Room Systems Gerry Cook and Dan Int-Hout	349
DA-07-038	Evaluating RNG k - ε Models Using PIV Data for Airflow in Animal Buildings at Different Ventilation Rates Huawei Sun, Lingying Zhao, and Yuanhui Zhang	358
DA-07-039	Ventilation Effectiveness Criteria and Measurement Methods Applicable to Animal Buildings—A Review (RP-1301) Sheryll B. Jerez, Yuanhui Zhang, and Xinlei Wang	366
DA-07-040	A Semi-Automated Commissioning Tool for VAV Air-Handling Units: Functional Test Analyzer Philip Haves, Moosung Kim, Massieh Najafi, and Peng Xu	380
DA-07-041	Characterization and Cancellation of Static Nonlinearity in HVAC Systems Ashish Singhal and Timothy I. Salisbury	391
DA-07-042	Numerical Study of Air Movement in a Slot-Ventilated Enclosure Xinlei Wang, Jianbo Jiang, and Yuanhui Zhang	400
DA-07-043	Implementation of Controller Area Networks for Monitoring of Animal Environments Matthew J. Darr, Lingying Zhao, and M. Reza Ehsani	406
DA-07-044	Analysis of Airflow in a Full-Scale Room with Non-Isothermal Jet Ventilation Using PTV Techniques Lingying Zhao, Yuanhui Zhang, Xinlei Wang, and Gerald L. Riskowski	414
DA-07-045	A Review of Ventilation and Air-Conditioning Technologies for Energy-Efficient Healthy Buildings in the Tropics S.C. Sekhar	426
DA-07-046	Monitored Indoor Moisture and Temperature Conditions in Humid-Climate US Residences Armin Rudd and Hugh I. Henderson, Jr.	435

DA-07-047	Best Practices for Energy-Efficient Data Centers Identified through Case Studies and Demonstration Projects William Tschudi and Stephen Fok	450
DA-07-048	The Impact of Moore's Law on the Total Cost of Computing and How Inefficiencies in the Data Center Increase These Costs Robert F. Sullivan	457
DA-07-049	Comparative Analysis of CFD ΔP vs. Measured ΔP for Compressed Flexible Ducts Ahmet Uğursal and Charles Culp.....	462
DA-07-050	A Fast Algorithm for the Simulation of GCHP Systems Louis Lamarche and Benoit Beauchamp.....	470
DA-07-051	An Experimental Investigatin of Response Times for Duct-Mounted Relative Humidity Transmitters Shailesh N. Joshi, Michael B. Pate, Ron M. Nelson, John M. House, and Curtis J. Klaassen.....	477
DA-07-052	Withdrawn	
DA-07-053	Decoupled Modeling of Chilled-Water Cooling Coils Gang Wang, Mingsheng Liu, and David E. Claridge	484
DA-07-054	Withdrawn	
DA-07-055	Impact of the Position of the Radiators on Energy Consumption and Thermal Comfort in a Mixed Radiant and Convective Heating System Xiangyang Gong and David E. Claridge	494
DA-07-056	Applying the Effectiveness-NTU Method to Elemental Heat Exchanger Models Ipseng lu, N.A. Weber, Pradeep Bansal, and D.E. Fisher.....	504
DA-07-057	Comparative Analysis of Four Solar Models for Tropical Sites (RP-1309) Donghyun Seo and Moncef Krarti.....	514
DA-07-058	Impact of Solar Models on Building Energy Analysis for Tropical Sites (RP-1309) Donghyun Seo and Moncef Krarti.....	523
DA-07-059	Coupling Multiple Heat Production and Consumption Units by Employing a New Three-Pipe System Aristidis Afentoulidis and Merima Slateva.....	531
DA-07-060	Development and Performance of a Retrofittable, High-Efficiency Grease Filter System for Kitchen Hoods F.M. (Tim) Farrell, Thomas M. Fitch, and Michael J. Morgan.....	548
DA-07-061	Development of a Ground-Source Heat Pump System with Ground Heat Exchanger Utilizing the Cast-in-Place Concrete Pile Foundations of Buildings Ketaro Sekine, Ryozo Ooka, Mutsumi Yokoi, Yoshiro Shiba, and Suckho Hwang	558

DA-07-062	Development of a New Energy Management Programming Tool, TSC Tatsuo Inooka, Ryuji Yanagihara, Kazuhito Miyamoto, Taichi Murata, and Hiroshi Ninomiya	567
DA-07-063	New Procedure for Estimating Seasonal Energy Efficiency Ratio of Chillers Yoshiyuki Shimoda, Nattapon Choonchuachan, and Minoru Mizuno	578
DA-07-064	Predicting Individual Differences in Human Thermal Strain Using Computational Models Anthony E. Iyoho, Tai S. Jang, John A. Gall, and Satish S. Nair	586
DA-07-065	Quantifying Modeling Uncertainties for the Human Thermal System Anthony E. Iyoho, Tai S. Jang, Samuel B. Thornton, and Satish S. Nair.....	598
DA-07-066	Self-Assessed Productivity and the Office Environment: Monthly Surveys in Five European Countries Michael A. Humphreys and J. Fergus Nicol	606
DA-07-067	Simulated Performance Analysis of a Multizone VAV System under Different Ventilation Control Strategies Nabil Nassif and Mohammed Zaheer-uddin.....	617
DA-07-068	The Effects of Thermostat Setback and Setup on Seasonal Energy Consumption, Surface Temperatures, and Recovery Times at the CCHT Twin House Research Facility Marianne M. Manning, Mike C. Swinton, Frank Szadkowski, John Gusdorf, and Ken Ruest.....	630
DA-07-069	Use of Factorial Sensitivity Analysis in Multizone Airflow Model Tuning Joseph Firrantello, William P. Bahnfleth, Amy Musser, James D. Freihaut, and Jae-Weon Jeong.....	642