

CONTENTS

Host Chapterxi
Program Committee and Transactions Staffxi
State of the Society, Lee Burgett, PE, 2005–2006 ASHRAE President.....	.xii
Technical Programxv

TECHNICAL PAPERS

4822	An Indoor Thermal Climate Optimization Technique Taking Account of a Multi-Phase Design Process Ken Shoji, Shigeru Ohno, Yasushige Morikawa, Masayuki Oguro, and Shinsuke Kato	3
4823	Application of H_{∞} Compensator to a Plant with a Large Amount of Changes in Characteristics Yuji Yamakawa, Masakazu Kotaki, Takanori Yamazaki, Tadahiko Matsuba, Kazuyuki Kamimura, and Shigeru Kurosu	15
4824	Assessment of the Enthalpy Performance of Houses Using Energy Recovery Technology Boualem K. Ouazia, Mike C. Swinton, Michel Julien, and Marianne Manning	26
4825	Ceiling Radiant Cooling Panels Employing Heat-Conducting Rails: Deriving the Governing Heat Transfer Equations Yizai Xia and Stanley A. Mumma	34
4826	Comparative Analysis of Three Solar Models for Tunisia Moncef Krarti and Donghyun Seo	42
4827	Comparison of SPIV Measurements for Different Test Room Air Inlet Nozzle Configurations Paul A. Lebbin, Mohammad H. Hosni, Byron W. Jones, B.T. Beck, Chao-Hsin Lin, and Raymond H. Horstman.....	54
4828	Condensing Boilers and Baseboard Hydronic Heating Systems Thomas A. Butcher.....	60
4829	Development of an Interactive Web-Based Owning and Operating Cost Database (RP-1237) Barry Abramson, David L. Herman, and Lung-Sing Wong.....	68
4830	Service Life Data from an Interactive Web-Based Owning and Operating Cost Database (RP-1237) Barry Abramson, Lung-Sing Wong, and David L. Herman.....	81
4831	Efficacy of Intermittent Ventilation for Providing Acceptable Indoor Air Quality Max H. Sherman.....	93
4832	Environmental Impacts of Surface Water Heat Pump Systems Barbara H. McCrary, Stephen P. Kavanaugh, and Derek G. Williamson.....	102
4833	Impacts of Manufacturing Tolerances on the Effectiveness- Ntu Method for Regenerative Exchanger Design Wei Shang and Robert W. Besant.....	111
4834	Investigation into Airborne Transport Characteristics of Airflow Due to Coughing in a Stagnant Indoor Environment Shengwei Zhu, Shinsuke Kato, and Jeong-Hoon Yang	123
4835	Mass Generation Rates of Ammonia, Moisture, and Heat Production in Mouse Cages with Two Bedding Types, Two Mouse Strains, and Two Room Relative Humidities Gerald L. Riskowski, Paul C. Harrison, and Farhad Memarzadeh	134

4836	Model Predictive Control of Supply Air Temperature and Outside Air Intake Rate of a VAV Air-Handling Unit Shui Yuan and Ronald A. Perez	145
4837	Modeling and Testing of a Utility Peak Reducing Residential Hot/Dry Air Conditioner (HDAC) Using Microchannel Heat Exchangers Clark W. Bullard, John Proctor, Joseph Brezner, Kevin B. Mercer, and Robert A. Davis.....	162
4838	Simulated Influence of Roof Reflectance on the Building Energy Balance in Two Northern Cities Sebastian Freund, Daniel J. Dettmers, and Douglas T. Reindl	171
4839	Smoke Control Through a Double-Skin Façade Used for Natural Ventilation Wenting Ding and Yuji Hasemi	181
4840	Study on the Applicability of Combining a Desiccant Cooling System with a Heat Pump in a Hot and Humid Climate Yaw-Shyan Tsay, Shinsuke Kato, Ryoza Ooka, Makoto Koganei, and Norio Shoda.....	189
4841	The Effect of Elbows on the Accuracy of Liquid Flow Measurement with an Insertion Flowmeter Seongwoo Woo and Dennis L. O’Neal	195
4842	VAV Airflow Sensor Response in Relation to “Poor” Upstream Duct Geometry (RP-1137) Wayne Klaczek, Mark Ackerman, Pat Fleming, and Brian Fleck.....	202
4843	Effect of Data Availability on Modeling of Residential Air Conditioners and Heat Pumps for Energy Calculations (RP-1197) Michael R. Wassmer and Michael J. Brandemuehl	214
4844	Literature Review on Calibration of Building Energy Simulation Programs: Uses, Problems, Procedures, Uncertainty, and Tools (RP-1051) T. Agami Reddy	226
4845	Distribution of Water between Vapor and Liquid Phases of Refrigerants (RP-1239) Andy Gbur and John Senediak.....	241

SYMPOSIUM PAPERS

CH-06-1 How Long Can You Go? Low-Energy Buildings through Integrated Design

Combining Radiant and Convective Systems with Thermal Mass for a More Comfortable Home (RP-1140) David Scheatzle	253
Small House with Construction Cost of \$100K, Total Energy Cost of \$0.88 a Day Jeffrey E. Christian, Paige Pate, Phil Childs, and Jerry Atchley	269
Assessing the Performance of a Naturally Ventilated Office Building Christine E. Walker, Leslie K. Norford, and Leon R. Glicksman	281
Energy Performance Evaluation of a Low-Energy Academic Building Shanti D. Pless, Paul A. Torcellini, and John E. Petersen.....	295
Low-Energy Building Case Study: IAMU Office and Training Headquarters Tom McDougall, Kevin Nordmeyer, and Curtis J. Klaassen	312

	Evaluation of the Low-Energy Design Process and Energy Performance of the Zion National Park Visitor Center Nicholas L. Long, Paul A. Torcellini, Shanti D. Pless, and Ron Judkoff.....	321
CH-06-2	Radiant Systems: Back to Basics and Recent Successes	
	From Floor Heating to Hybrid HVAC Panel—A Trail of Exergy-Efficient Innovations Birol I. Kilkis.....	343
	Dynamic Evaluation of the Cooling Capacity of Thermo-Active Building Systems B.W. Olesen, M. de Carli, M. Scarpa, and M. Koschencz.....	350
	Radiant Cooled Floors—Operation and Control Dependant upon Solar Radiation Peter Simmonds, Bungane Mehlomakulu, and Thilo Ebert.....	358
	Applied Performance of Radiant Ceiling Panels for Cooling Peter Simmonds, Isaac Chambers, Bungane Mehlomakulu, and Chris Simmonds.....	368
CH-06-3	Tenability and Risk	
	Overview of Tenability Analyses in Smoke Management Applications James A. Milke, James P. Carroll, Bryan L. Hoskins, and Diana E. Hugue.....	379
	An Overview of Fire Hazard and Fire Risk Assessment in Regulation Richard W. Bukowski.....	387
	Experiments for the Characterization of Design Fires for Commercial Buildings George Hadjisophocleous and Ehab Zalok.....	394
	Predicting Flashover and Tenability Conditions in Train Fires—A CFD Approach J. Greg Sanchez.....	401
CH-06-4	Service Hot Water Demand: Then, Now, and Now What?	
	Hot Water Distribution System Piping Time, Water, and Energy Waste—Phase I: Test Results Carl C. Hiller.....	415
	Field Evaluation of Two Demand Electric Water Heaters Russell K. Johnson and Craig A. Clark.....	426
	Hot Water Distribution System Piping Heat Loss Factors—Phase I: Test Results Carl C. Hiller.....	436
CH-06-5	Application of Inverse Models	
	Control with Building Mass—Part I: Thermal Response Model Peter R. Armstrong, Steven B. Leeb, and Leslie K. Norford.....	449
	Control with Building Mass—Part II: Simulation Peter R. Armstrong, Steven B. Leeb, and Leslie K. Norford.....	462
	Validating, Editing, and Estimating Millions of Utility Bills Robert C. Sonderegger.....	474
	Building Shape Optimization Using Neural Network and Genetic Algorithm Approach Ramzi Ouarghi and Moncef Krarti.....	484

CH-06-6 Thermal Modeling of Phase-Change Materials in Building Envelopes: Old Problem, New Developments	
Use of Phase-Change Materials in Solar Domestic Hot Water Tanks Luisa F. Cabeza, Manuel Ibáñez, Cristian Solé, Joan Roca, Miquel Nogués, Stefan Hiebler, and Harald Mehling	495
Diurnal Load Reduction Through Phase-Change Building Components Kelly Kissock and Sutrisna Limas	509
Phase-Change Material Modeling within Whole Building Dynamic Simulation Dariusz Heim	518
Research on Thermal Storage Using Rock Wool Phase-Change Material Ceiling Board Takeshi Kondo and Tadahiko Ibamoto	526
CH-06-7 Demand Response Strategies for Building Systems	
Evaluation of Residential HVAC Control Strategies for Demand Response Programs Srinivas Katipamula and Ning Lu	535
Assessment of Demand Limiting Using Building Thermal Mass in Small Commercial Buildings James E. Braun and Kyoung-Ho Lee	547
An Experimental Evaluation of Demand Limiting Using Building Thermal Mass in a Small Commercial Building Kyoung-Ho Lee and James E. Braun	559
Case Study of Demand Shifting with Thermal Mass in Two Large Commercial Buildings Peng Xu and Philip Haves	572
CH-06-8 Latest Findings in Commercial Kitchen Ventilation Research	
A New Standard Method of Test for Determining the Grease Particulate Removal Efficiency of Filter Systems for Kitchen Ventilation Derek W. Schrock, Bernard A. Olson, Randall J. Urness, Thomas H. Kuehn, and Alan L. Breitenfeldt.....	583
Effects of Appliance Diversity and Position on Commercial Kitchen Hood Performance (RP-1202) Richard Swierczyna, Paul Sobiski, and Donald Fisher	591
Effects of Range Top Diversity, Range Accessories, and Hood Dimensions on Commercial Kitchen Hood Performance (RP-1202) Paul Sobiski, Richard Swierczyna, and Donald Fisher	603
CH-06-9 High Density Cooling Issues Update: January 2006	
Contamination Sources and Prevention in Data Processing Environments Joseph F. Prisco	615
An Analysis of the Effects of Ceiling Height on Air Distribution in Data Centers Vali Sorell, Yousef Abougabal, Kishor Khankari, Viralkumar Gandhi, and Aashish Watve	623
Seismic Considerations for Datacom Equipment Budy D. Notohardjono, Roger R. Schmidt, and Shawn M. Canfield	632
CH-06-10 Managing Return Air in Residential and Small Commercial Buildings	
Effects of Return Air Inlet Locations on Cooling Season Thermal Comfort in an Energy-Efficient Home William D. Rittelmann.....	641

Unbalanced Return Air in Residences: Causes, Consequences, and Solutions James B. Cummings and Charles R. Withers, Jr.	650
Unbalanced Return Air in Commercial Buildings Charles R. Withers, Jr., and James B. Cummings	656

CH-06-11 Thermal Storage Systems Aging Gracefully

Stratified Low-Temperature Fluid Thermal Energy Storage (TES) in a Major Convention District—Aging Gracefully, as Fine Wine John S. Andrepont.....	667
An Ice-Ball Storage Cooling System for a Laboratory Complex Chang W. Sohn, David M. Underwood, and Mike C.J. Lin.....	676
Thermal Energy Storage: Aging Gracefully in the Ocean State Robert A. Potter, Jr., Andrew Geurtsen, and Stuart Douglass	683

CH-06-12 Legionella Control and Preventing Legionellosis

Control of Legionellae in the Environment: A Guide to the US Guidelines Barry S. Fields and Matthew R. Moore.....	691
<i>Legionella</i> Prevalence in Cooling Towers: Association with Specific Biocide Treatments Richard D. Miller and D. Anne Koebel.....	700
Preventing Legionellosis with the Hazard Analysis and Critical Control Point (HACCP) System William F. McCoy.....	709

CH-06-13 Recent Advances in Simulation

Effect of Data Availability on Modeling of Residential Air Conditioners and Heat Pumps for Energy Calculations (RP-1197) Michael R. Wassmer and Michael J. Brandemuehl (See Technical Paper 4843, p. 214)	
Integrated Building and System Simulation Using Run-Time Coupled Distributed Models M. Trcka (Radosevic), J.L.M. Hensen, and A.J.Th.M. Wijsman	719
Literature Review on Calibration of Building Energy Simulation Programs: Uses, Problems, Procedures, Uncertainty, and Tools (RP-1051) T. Agami Reddy (See Technical Paper 4844, p. 226)	
A New Approach to Developing Building Energy System Simulation Programs Suitable for Both Design and Optimal Operation Jian Sun and T. Agami Reddy.....	729

CH-06-14 System Chemistry and Contaminants Research

Distribution of Water between Vapor and Liquid Phases of Refrigerants (RP-1239) Andy Gbur and John Senediak (See Technical Paper 4845, p. 241)	
--	--

Method of Test for Identification and Quantification of Organic Acids on Desiccants So as to Determine Refrigeration System Chemical Condition (RP-1240)	
Richard C. Cavestri	741
Effects of Chemicals in Process Fluids on the Breakdown of HFC/POE Systems (RP-1158)	
Ngoc Dung T. Rohatgi	747
Mechanism for Reaction between Polyolester Lubricant and Ferrous Metals, Part II: Research Phase (RP-1211)	
Robert E. Kauffman	762
Index of Technical and Symposium Papers, Volume 112, Part 1.....	771