

CONTENTS

Host Chapter	x
Program Committee and Transactions Staff	x
State of the Society by Richard B. Hayter, ASHRAE 1995-1996 President	xi
Inaugural Address by James E. Hill, ASHRAE 1995-1996 President	xiv
Technical Program Abstracts	xvii

TECHNICAL PAPERS

3979 A Simulation Model of Electrically Heated Residences Validated with Field Data C. William Savery and James B. Lee	3
3980 Thermal Interference of Adjacent Legs in a Vertical U-Tube Heat Exchanger for a Ground-Coupled Heat Pump Norman K. Muraya, Dennis L. O'Neal, and Warren M. Heffington	12
3981 Modeled and Measured Effects of Compressor Downsizing in an Existing Air Conditioner/Heat Pump in the Cooling Mode William P. Levins, C. Keith Rice, and Van D. Baxter	22
3982 New Scroll Profiles Based on an Algebraic Spiral and Their Application to Small-Capacity Refrigeration Compressors Hirokatsu Kohsokabe, Masahiro Takebayashi, Yoshifumi Kunugi, Yasuhiro Ohshima, and Hiroaki Hata	34
3983 Derivation and Application of the SES Critical Velocity Equations William D. Kennedy, Joseph A. Gonzalez, and Greg Sanchez	40
3984 Numerical Modeling of Thermal Behavior of Fluid Conduit Flow with Transport Delay Tin-Tai Chow, Fred Ip, Alan Dunn, and Wai Leung Tse	45
3985 A Theoretical Model for Predicting Adiabatic Capillary Tube Performance with Alternative Refrigerants Robert R. Bittle and Michael B. Pate	52
3986 Laboratory Evaluations of Ozone as a Scale Inhibitor for Use in Open Recirculating Cooling Systems Seifollah Nasrazadani and Tah Jin Chao	65
3987 Maintaining Temperature and Humidity in Non-Humidity-Generating Spaces Namir F. Saman and Henry W. Johnstone	73
3988 Energy and IAQ Impacts of CO ₂ -Based Demand-Controlled Ventilation Stephen C. Carpenter	80
3989 Identification of Contaminants, Exposures, Effects, and Control Options for Construction/Renovation Activities Thomas H. Kuehn, Barbara Gacek, Ching-Hsu Yang, David T. Grimsrud, Kevin A. Janni, Andrew J. Streifel, and McGregor R. Pearce	89
3990 Controlling the Flow of Combustion Air and Fresh Air in Housing Mark Y. Ackerman and Clifford L. Hoyme	102
3991 Sensitivity of Fenestration Solar Gain to Source Spectrum and Angle of Incidence W. Ross McCluney	112
3992 Experimental Results from Single-Pipe Diffusers for Stratified Thermal Energy Storage Maurice W. Wildin	123
3993 Investigation of Dynamic Latent Heat Storage Effects of Building Construction and Furnishings David W. Bailey, Franz C. Bauer, Carol F. Slama, Chris G. Barringer, and John R. Flack	133
3994 Study of the Stability of Supercooled Water in an Ice Generator Shinichi Wakamoto, Kazushige Nakao, Naoki Tanaka, and Hiroshi Kimura	142

3995	Loss Coefficient Measurements in Divided-Flow Flat Oval Fittings Brad Townsend, Fariborz Khodabakhsh, and Stephen Idem	151
3996	Loss Coefficient Measurements for Flat Oval Elbows and Transitions Brad Townsend, Fariborz Khodabakhsh, and Stephen Idem	159
3997	Optimal Control of Duct Pressure in HVAC Systems Hanchu Li, Chidambar Ganesh, and David R. Munoz	170
3998	Study of Freezing-Point Depression of Selected Food Extracts Fumihiko Tanaka, Satoshi Murata, Kazuhiro Habara, and K.S.P. Amarasinghe	175
3999	Lubricant Return Comparison of Naphthenic and Polyol Ester Oils in R-134a Household Refrigeration Applications José L. Reyes-Gavilán, G. Thomas Flak, and Todd R. Tritcak	180
4000	Ventilation and Environmental Quality in Laboratory Animal Facilities Ronaldo G. Maghirang, Gerald L. Riskowski, and Leslie L. Christianson	186
4001	Development of Ventilation Rates and Design Information for Laboratory Animal Facilities: Part 2—Laboratory Tests Gerald L. Riskowski, Ronaldo G. Maghirang, and Wei Wang	195
4002	Survey of Design Considerations for Ventilating and Air-Conditioning Systems in Hong Kong Wan K. Chow and Wing Y. Fung	210
4003	Energy Performance of Evacuated Glazings in Residential Buildings Robert Sullivan, Fredric A. Beck, Dariush K. Arasteh, and Stephen E. Selkowitz	220
4004	Energy Study in an Educational Institute W.K. Chow, W.F. Ho, and W.K. Leung	228
4005	Scale Modeling of the Pressure Drop in a Stairshaft Yew-Wah Wong and Weng-Kong Chan	236
4006	Simplified Relationships for the Enhancement and Compressibility Factors of Moist Air Alberto Carotenuto and Marco Dell'Isola	242
4007	Cost-Efficiency Analysis in Support of the Energy Conservation Standards for Refrigerator/Freezers Sajid H. Hakim and Isaac Turiel	247
4008	Spray Evaporation Heat Transfer Performance of R-123 in Tube Bundles Shane A. Moeykens, John E. Kelly, and Michael B. Pate	259
4009	The Effect of R-123 Condensate Inundation and Vapor Shear on Enhanced Tube Geometries Lance E. Rewerts, Joseph B. Huber, and Michael B. Pate	273
4010	The Effect of R-134a Inundation on Enhanced Tube Geometries Lance E. Rewerts, Joseph B. Huber, and Michael B. Pate	285

SA-96-1 Air Distribution Developments

Airflow Characteristics of Jet Expansion for Nonisothermal Flow Conditions M.H. Hosni, Mohamed B. Abu-El-Hassan, and Paul L. Miller	301
Outdoor Air Delivery Rates to Occupants and Age of Air Zhenhai Li, Jianshun S. Zhang, and Leslie L. Christianson, Russell N. Kulp, and Leslie E. Sparks	313
Evaluation of Turbulence Effect on Air Distribution Performance Index (ADPI) Mohamed B. Abu-El-Hassan, M.H. Hosni, and Paul L. Miller	322
Room Air and Contaminant Distribution in Mixing Ventilation Per Heiselberg	332
Experimental Study of Vortex Diffusers Said Shakerin and Paul L. Miller	340

Airflow Distributions at Floor Level in a Slot-Outlet and Slot-Inlet Ventilated Room Jieming Wang and John R. Ogilvie	347
SA-96-2 Refrigerant Coil Design and Optimization	
Evaluating the Potential of Vortex-Enhanced Evaporator Performance for Refrigeration Applications Mark C. Gentry, Nicole C. DeJong, and Anthony M. Jacobi	361
Thermodynamic Optimization of Evaporators with Zeotropic Refrigerant Mixtures Franco Ragazzi and Curtis O. Pedersen.....	367
Principles of Refrigerant Circuiting with Application to Microchannel Condensers: Part I—Problem Formulation and the Effects of Port Diameter and Port Shape Matthew K. Heun and William E. Dunn	373
Principles of Refrigerant Circuiting with Application to Microchannel Condensers: Part II—The Pressure-Drop Effect and the Cross-Flow Heat Exchanger Effect Matthew K. Heun and William E. Dunn	382
SA-96-3 The Great Energy Predictor Shootout II: Measuring Retrofit Savings	
Great Energy Predictor Shootout II: Modeling Energy Use in Large Commercial Buildings Srinivas Katipamula	397
Great Energy Predictor Shootout II—A Bayesian Nonlinear Regression with Multiple Hyperparameters Yohimasa Chonan, Katsuyuki Nishida, and Takashi Matsumoto	405
Measuring Retrofit Energy Savings Using Autoassociative Neural Networks Kyung-Jin Jang, Eric B. Bartlett, and Ron M. Nelson	412
The Great Energy Predictor Shootout II: Measuring Retrofit Savings—Overview and Discussion of Results Jeff S. Haberl and Sabaratnan Thamilseran	419
SA-96-4 Flow Restrictions, Flow Control, and Pumping Considerations	
Automatic Balancing Valves in Distribution Networks Today Farhad Golestan.....	439
Measured vs. Calculated Head Loss for a Typical Centrifugal Pump Installation Roy C.E. Ahlgren	445
The Use of Centrifugal Pump Head in HVAC Water Systems James B. Rishel	449
SA-96-5 The Environmental Aspects of District Heating and Cooling	
Environmental Considerations for Geothermal Energy as a Source for District Heating Kevin D. Rafferty	457
Reduction in Air Emissions Attainable Through Implementation of District Heating and Cooling R. Gordon Bloomquist	461
Environmental Improvements Resulting from the Use of Renewable Energy Sources and Nonpolluting Fuels and Technologies with District Heating and Cooling Eino O. Kainlauri	468
Smart Energy Option: Reusing Wastewater for Cooling Energy Andrew Clapham, Joel Jackman, and Mary M. Lundt.....	472

SA-96-6 Glazing Unit Surface Temperatures: Thermography and Simulation

Surface Temperatures of Insulated Glazing Units: Infrared Thermography Laboratory Measurements	479
Brent T. Griffith, Daniel Türler, and Dariush K. Arasteh.....	479
Surface Temperature Measurement of Insulating Glass Units Using Infrared Thermography	
Hakim Elmahdy	489
A Study of Insulated Glazing Unit Surface Temperature Profiles Using Two-Dimensional Computer Simulation	
Pedro F. de Abreu, Roydon A. Fraser, Harry F. Sullivan, and John L. Wright	497
Condensation Resistance Validation Project—Detailed Computer Simulations Using Finite-Element Methods	
Yie Zhao, Dragan Curcija, and William P. Goss	508
Overview of a Project to Determine the Surface Temperatures of Insulated Glazing Units: Thermographic Measurement and Two-Dimensional Simulation	
Harry F. Sullivan, John L. Wright, and Roydon A. Fraser	516

SA-96-7 Developments in Refrigerator-Freezer Technology

Factors Affecting the Energy Consumption of Two Refrigerator-Freezers	
James Y. Kao and George E. Kelly	525
High-Efficiency Refrigeration Fan Motors	
Gerry N. Baker	536
Experimental Results of a Household Automatic Icemaker in a Refrigerator/Freezer	
Imam Haider, He Feng, and Reinhard Radermacher	541

SA-96-8 Building Energy Monitoring Methods and Applications

Energy Savings from Repair of Uncontrolled Airflow in 18 Small Commercial Buildings	
Charles R. Withers, Jr., James B. Cummings, Neil A. Moyer, Philip W. Fairey and Bruce B. McKendry	549
Monitoring Savings in Energy Savings Performance Contracts Using Energy Management and Control Systems	
Kristin E. Heinemeier, Hashem Akbari, and John S. (Steve) Kromer.....	562
Practical Considerations in Monitoring Building Energy Use	
Michael D. McDiarmid	576

SA-96-9 Heat Transfer and Fluid Flow Characteristics of Alternative Refrigerants and Refrigerant Mixtures

Design of Ammonia-Water Condenser with a Fluted Tube	
Yong Tae Kang, Weibo Chen, and Richard N. Christensen	587
Empirical Modeling of Stratified-Wavy Flow Condensation Heat Transfer in Smooth Horizontal Tubes	
Abtar Singh, Michael M. Ohadi, and Serguei V. Dessiatoun.....	596

SA-96-10 Humidity Control Strategies

Control Options for Various Humidification Technologies	
Robert B. Clemens	607
Mechanical Dehumidification Control Strategies and Psychrometrics	
Reinhold Kittler	613
Six Steps to Follow That Ensure Proper Humidification System Design and Control	
Chris B. Morton.....	618

Field Experiences in Residential Humidification Control with Temperature-Compensated Automatic Humidists	
Roger M. Pasch, Michael Comins, and Joseph S. Hobbins	628
Controlling Rotary Desiccant Wheels for Dehumidification and Cooling	
Kenneth W. Crooks and Nancy J. Banks.....	633
SA-96-11 Modeling of Environmental Impacts of Buildings and HVAC Systems	
Modeling the Influence of Building and HVAC System Parameters on Radon Levels in a Large Building	
Lixing Gu, Muthusamy V. Swami, and Michael T. Anello	641
Calculating Chiller Emissions and Source Energy Use	
Donald J. Aumann	649
Evaluation of Building Environmental Impacts: Two Case Studies	
Stephen Carpenter, and John Kokko.....	663
SA-96-12 Variable Water Flow Through Chillers—Should We and Why?	
Variable Flow—The Quest for System Energy Efficiency	
Donald M. Eppelheimer	673
Design Issues of Variable Chilled-Water Flow Through Chillers	
Thomas B. Hartman	679
Effect of Variable Flow on Centrifugal Chiller Performance	
George H. Redden	684
SA-96-13 Energy-Efficiency Programs at Department of Defense Installations	
Electrical Energy and Cost Savings Potential at DOD Facilities	
Steven J. Konopacki, Hashem Akbari, Larry D. Lister, and Lee P. DeBaillie	691
The Green Neighborhood Process: Energy Conservation Through Collaboration	
Brian M. Deal, Jeffrey S. Adams, and Marilyn H. Adams	699
Energy Use and Conservation Opportunities in Army Family Housing: Results of the Fort Hood Study	
Larry D. Lister, Alan T. Chalifoux, and Russell G. Derickson	707
The Model Energy Installation Program: Progress and Lessons Learned	
Alan T. Chalifoux, Bobby L. Lynn, Albert R. McNamee, Jr., Brian M. Deal.....	716
Energy End-Use Characterization at Fort Hood, Texas	
Hashem Akbari, Steven J. Konopacki, Larry D. Lister, and Lee P. DeBaillie	724
SOCIETY BUSINESS	
1996-97 ASHRAE Officers, Directors, Committee Members, and Staff	737
ASHRAE Chapter Officers.....	742
ASHRAE Technical Committees and Task Groups.....	745
ASHRAE Standards Project Committees	762
ASHRAE Past Meetings	769
Society Presidents.....	771
ASHRAE Honors and Awards.....	772
ASHRAE Intersociety Representatives	782
ASHRAE Associate Societies	783
In Memoriam	785
Index of Technical and Symposium Papers, Volume 102, Part 2	789