

# **14th International Conference on Indoor Air Quality and Climate (INDOOR AIR 2016)**

Ghent, Belgium  
3 - 8 July 2016

Volume 1 of 6

ISBN: 978-1-5108-3687-7

**Printed from e-media with permission by:**

Curran Associates, Inc.  
57 Morehouse Lane  
Red Hook, NY 12571



**Some format issues inherent in the e-media version may also appear in this print version.**

Copyright© (2016) by International Society of Indoor Air Quality and Climate (ISIAQ)  
All rights reserved.

Printed by Curran Associates, Inc. (2017)

For permission requests, please contact International Society of Indoor Air Quality and Climate (ISIAQ)  
at the address below.

International Society of Indoor Air Quality and Climate (ISIAQ)  
2548 Empire Grande  
Santa Cruz CA 95060  
USA

Phone: (831) 426-0148  
Fax: (831) 426-6522

[info@isiaq.org](mailto:info@isiaq.org)

**Additional copies of this publication are available from:**

Curran Associates, Inc.  
57 Morehouse Lane  
Red Hook, NY 12571 USA  
Phone: 845-758-0400  
Fax: 845-758-2633  
Email: [curran@proceedings.com](mailto:curran@proceedings.com)  
Web: [www.proceedings.com](http://www.proceedings.com)

# TABLE OF CONTENTS

## VOLUME 1

### ID 52 POLICY IN PRACTISE

<b>CHEMICAL EXPOSURE-RESPONSE RELATIONSHIP BETWEEN AIR POLLUTANTS AND REACTIVE OXYGEN SPECIES IN THE HUMAN RESPIRATORY TRACT</b> .....	1
<i>P. Lakey, T. Berkemeier, H. Tong, A. Arangio, M. Shiraiwa, K. Lucas, U. Poschl</i>	
<b>EVALUATION OF MEASUREMENT METHODS TO ACCOMPANY RECOMMENDATIONS FOR INDOOR AIR QUALITY GUIDELINES IN FRANCE</b> .....	3
<i>M. Keirsbulck, A. Paillat, V. Pernelet-Joly, G. Boulanger</i>	
<b>FIFTEEN YEARS' EXPERIENCE OF INDOOR AIR INVESTIGATIONS IN BELGIUM</b> .....	10
<i>M. Kuske, S. Bladt, N. Popovic, P. Rahier, D. Servais, P. Pourveur, M. Roger, L. Vanbeirvliet</i>	
<b>TOMBS - A SPECIFIC INDOOR ENVIRONMENT OF ILL HEALTH IMPACT</b> .....	18
<i>M. Majorošová, E. Pieckova</i>	
<b>NEW REGULATION FOR THE HOUSING HEALTH AND REQUIRED QUALIFICATIONS FOR THE CERTIFIED INDOOR ENVIRONMENT SPECIALISTS IN FINLAND</b> .....	26
<i>P. Metiainen</i>	
<b>HOUSING AS A MODIFIER OF AIR CONTAMINANT AND TEMPERATURE EXPOSURE IN GREAT BRITAIN: A MODELLING FRAMEWORK</b> .....	29
<i>A. Mavrogianni, J. Taylor, M. Davies, P. Wilkinson, C. Shrubsole, I. Hamilton, E. Oikonomou, P. Biddulph</i>	
<b>OCCUPANTS' PERCEPTIONS AND RESPONSES TO ENERGY USE AND INDOOR CLIMATE FROM THE NEWLY OCCUPIED PASSIVE HOUSES IN NORWAY: A QUESTIONNAIRE SURVEY</b> .....	37
<i>J. Guan, N. Nord, H. M. Mathisen</i>	
<b>A COMPARISON OF DIFFERENT VENTILATION STRATEGIES FOR DWELLINGS IN TERMS OF AIRFLOW RATES AND AIRFLOW PATHS</b> .....	45
<i>R. Van Gaeve, J. Laverge, S. Caillou</i>	
<b>DAYTIME AND NIGHT TIME VOC CONCENTRATIONS IN FINNISH SCHOOLS</b> .....	53
<i>M. Leppänen, M. Hyttinen, R. Holopainen, K. Salmi, P. Pasanen</i>	
<b>EVALUATING THE OXIDATIVE POTENTIAL OF INDOOR AND OUTDOOR PARTICLES WITH AN EPR ASSAY</b> .....	59
<i>S. Khurshid, S. Emmerich, A. Persily</i>	
<b>EXPLORATION OF LOW-COST OPEN SOURCE SENSOR TECHNOLOGY TO MONITOR THE BUILT ENVIRONMENT IN RESIDENTIAL BUILDINGS</b> .....	64
<i>J. Langmans, J. Meesters</i>	

### ID117 IAQ AND HEALTH EFFECTS

<b>EXPOSURE OF THE BELGIAN POPULATION TO INDOOR RADON: ASSESSMENT, CONTROL AND REGULATORY APPROACH IN THE FRAMEWORK OF THE NEW EUROPEAN DIRECTIVE</b> .....	66
<i>B. Dehandschutter, S. Bladt, S. Delmotte, M. Kuske, N. Popovic, P. Rahier, M. Roger</i>	
<b>HEALTH RISK ASSESSMENT OF INHALATION EXPOSURE TO 2-ETHYLHEXANOL, 2,2,4-TRIMETHYL-1,3-PENTANEDIOL DIISOBUTYRATE, AND TEXANOL IN INDOOR ENVIRONMENTS</b> .....	69
<i>K. Azuma, T. Tanaka-Kagawa, H. Jinno</i>	
<b>FIELD STUDY ON THE EFFECTS OF COLD INDOOR ENVIRONMENT ON LONG-TERM CARE OF THE FRAIL ELDERLY</b> .....	76
<i>Y. Hayashi, T. Ikaga, T. Hoshi, S. Ando</i>	
<b>MODELLING AND ANALYSIS ON EFFECT OF OCCUPANTS' HEALTH RELATED RESIDENTIAL INDOOR ENVIRONMENT IN CHINA TYPICAL REGIONS BASED ON SEM</b> .....	84
<i>B. Chen, Y. Chen, C. Zeng</i>	
<b>STATISTICAL ASSOCIATIONS BETWEEN HOUSING QUALITY AND HEALTH AMONG FINNISH HOUSEHOLDS WITH SMALL CHILDREN - RESULTS FROM TWO (REPEATED) NATIONAL SURVEYS</b> .....	90
<i>M. Turunen, K. Iso-Markku, M. Pekkonen, J. Tolonen, U. Haverinen-Shaughnessy</i>	
<b>UTILIZING AIR-LIQUID INTERFACE EXPOSURE SYSTEM TO EVALUATE THE INFLAMMATION RESPONSE OF OZONE AND <math>\beta</math>-PINENE OXIDATIVE-STRESS ON HUMAN LUNG EPITHELIAL CELL</b> .....	92
<i>C.-Y. Chuang, P.-C. Wu, Y.-T. Dai, C.-H. Liang</i>	
<b>STUDY ON HEALTH PERFORMANCE ASSESSMENT METHOD OF INDOOR ENVIRONMENT RESIDENTIAL BUILDINGS IN COLD REGION OF CHINA</b> .....	97
<i>B. Chen, M. Zhou, Y. Chen, C. Zeng, Y. Xu</i>	
<b>FORMALDEHYDE EXPOSED TO DIFFERENT DOSES OF ASTHMA TOXICOLOGY EFFECTS OF BIOLOGICAL INDICATORS</b> .....	105
<i>Y. Zhang, W. Yu</i>	
<b>CURRENT KNOWLEDGE ON THE HEALTH BENEFITS AND RISKS OF INDOOR AIR IONIZATION</b> .....	114
<i>P. Scheepers, A. Oerlemans, I. Ottenbros, J. Sanderink</i>	

<b>INDOOR AIR QUALITY AND ITS' HEALTH IMPACT IN URBAN LUCKNOW CITY HOMES- A CASE STUDY</b> .....	116
<i>A. Lawrence, T. Khan, J. Masih</i>	

**ID 99 THERMAL SENSATION AND ADAPTATION**

<b>ELECTROENCEPHALOGRAM (EEG) VARIATION ACCOMPANIED BY THERMAL PLEASURE (ALLIESTHESIA) WITH TEMPERATURE STEP-CHANGE</b> .....	123
<i>Y. Son, C. Chun</i>	
<b>DYNAMIC THERMAL COMFORT IN ARCHITECTURE AND URBAN AREAS DEVELOPMENT OF WEARABLE SENSING DEVICES</b> .....	131
<i>J. Nakagawa, S.-I. Tanabe</i>	
<b>EXPERIMENTAL INVESTIGATION OF AIRFLOW AND THERMAL COMFORT UNDER MIXING VENTILATION IN A FULL SCALE MODEL ROOM - COMPARISON OF LOBED AND CONVENTIONAL DIFFUSERS</b> .....	139
<i>P. Bragança, K. Sodjavi, A. Meslem, L. Serres</i>	
<b>THERMAL SENSATION AND ELECTROENCEPHALOGRAM (EEG)</b> .....	147
<i>M. Kim, Y. Choi, C. Chun</i>	
<b>THERMAL NEUTRALITY: THERMONEUTRAL ZONE VS. THERMAL COMFORT ZONE</b> .....	155
<i>L. Schellen, H. Pallubinsky, B. Kingma, W. Van Marken Lichtenbelt</i>	
<b>A THERMOPHYSIOLOGICAL MODEL OF THE HUMAN HAND</b> .....	157
<i>K. Katic, R. Li, W. Zeiler</i>	
<b>THERMAL MANIKINS CONTROLLED BY HUMAN THERMOREGULATION MODELS FOR INDOOR ENVIRONMENT RESEARCH</b> .....	165
<i>A. Psikuta, N. Martinez, A. Bogdan, B. Koelblen, S. Annaheim, R. Rossi</i>	
<b>INDOOR THERMAL ADAPTATION, EVIDENCES FROM MIGRANTS WITH DIFFERENT INDOOR THERMAL EXPOSURES</b> .....	169
<i>M. Luo, Y. Zhu</i>	

**ID116 MOULD AND MOISTURE RELATED HEALTH PROBLEMS**

<b>ANALYTICAL METHODS FOR MOULD EXPOSURE ASSESSMENT FROM AN ENVIRONMENTAL MEDICAL POINT OF VIEW</b> .....	177
<i>J. Hurraß, T. Gabrio, C. Herr, M. Raulf, G. Wiesmüller</i>	
<b>POSSIBILITIES AND LIMITATIONS OF HEALTH ASSESSMENT OF MOULD EXPOSURES INDOORS</b> .....	185
<i>G. Wiesmüller, B. Heinzow, U. Aurbach, K. Bergmann, W. Buzina, O. Cornely, S. Engelhart, G. Fischer, T. Gabrio, W. Heinz, C. Herr, J. Kleine-Tebbe, L. Klimek, M. Körberle, H. Lichtnecker, T. Lob-Corzilius, R. Merget, N. Mülleneisen, D. Nowak, U. Rabe, M. Raulf, H. Seidl, J. Steiss, R. Szewzyk, P. Thomas, K. Valtanen, J. Hurraß</i>	
<b>TOXICITY ASSESSMENT FROM INDOOR DUST USING E. COLI-LUX</b> .....	193
<i>E. Suominen, J. Atosuo, E.-M. Lilius</i>	
<b>HERTSMI-2 AND ERMI CORRELATING HUMAN HEALTH RISK WITH MOLD SPECIFIC QPCR IN WATER DAMAGED BUILDINGS</b> .....	195
<i>D. Lark, R. Shoemaker</i>	
<b>E. COLI LUX TEST FROM SETTLED DUST AS A NEW METHOD IN ASSESSING TOXICITY IN INDOOR AIR</b> .....	202
<i>T. Putus, J. Atosuo, E. Suominen, E.-M. Lilius, J. Kantele</i>	
<b>ASSESSING THE INDOOR AIR TOXICITY FROM THE CONDENSED WATER</b> .....	204
<i>J. Atosuo, E. Suominen, E. Aattela, E.-M. Lilius</i>	
<b>INDOOR AIR TOXICITY ASSESSMENTS USING NEUTROPHILS</b> .....	212
<i>E.-M. Lilius, J. Atosuo, E. Suominen</i>	
<b>OBSERVATION-BASED METRICS FOR RESIDENTIAL DAMPNES AND MOLD: A REVIEW FOCUSED ON PRACTICALITY AND EXPOSURE-RELATED ASSOCIATIONS WITH HEALTH</b> .....	220
<i>M. Mendell, K. Kumagai</i>	
<b>A META-ANALYSIS ON INDOOR BACTERIA AND CHRONIC HEALTH OUTCOMES</b> .....	228
<i>B. Khamsehi, J. Siegel</i>	

**ID155 FILTRATION**

<b>FACTORS AFFECTING CADR MEASUREMENTS</b> .....	230
<i>H.-Y. Hung, K.-T. Hou, C.-W. Lin, S.-H. Huang, Y.-M. Kuo, C.-W. Chen, C.-P. Chang, C.-C. Chen</i>	
<b>PERFORMANCE EVALUATION OF TWO TYPES OF CAR CABIN PARTICLE FILTERS IN CHINESE AND SWEDISH URBAN ENVIRONMENT</b> .....	232
<i>A. Sebastian, A. Löfvendahl, A. Andersson, J. Moldanova</i>	
<b>DEPOSITION PROCESS OF INDOOR AEROSOL PARTICLES ON INDIVIDUAL NANOFIBER DURING FIBROUS FILTRATION</b> .....	234
<i>R. Cai, L. Zhang</i>	

<b>DETERMINATION OF THE COLLECTION EFFICIENCY OF HVAC FILTERS FOR NANOPARTICLES <math>\geq 5</math> NM</b> .....	242
<i>C. Asbach, W. Mölter-Siemens, A. Maria Todea, A. Schmitz, F. Schmidt</i>	
<b>REMOVAL OF FINE AND ULTRAFINE PARTICLES FROM INDOOR AIR ENVIRONMENTS BY AIR PURIFIER</b> .....	244
<i>H.-L. Chen, C. Chiau Lin, R.-L. Hwang</i>	
<b>FILTER APPLICATION AND PERFORMANCE EVALUATION IN FAN-COIL CLASSROOMS FOR PARTICLE EXPOSURE REDUCTION FROM HAZE IN SINGAPORE</b> .....	251
<i>Q. Cao, A. Chen, J. Zhou, V. W.-C. Chang</i>	
<b>ACOUSTIC-AGGLOMERATION ENHANCED FILTRATION</b> .....	253
<i>B. Feng Ng, M. Pun Wan, J. Wen Xiong, S. Jeevan Elankovan</i>	
<b>INVESTIGATION OF COMBINE PROCESSES FOR ATMOSPHERIC MULTI-POLLUTANT REMOVAL THROUGH THE HVAC OF AN INDIVIDUAL HOUSE</b> .....	261
<i>K. Morisseau, A. Joubert, Y. Andres, L. Le Coq</i>	
<b>TESTS OF INDOOR AIR PURIFIERS WITH NEW AND AGED FILTERS</b> .....	269
<i>H. Finger, C. Asbach, T. Van Der Graaf, U. Schneiderwind</i>	
<b>EXPERIMENTAL STUDY ON INDOOR FINE PARTICLE CONCENTRATION CONTROL STRATEGIES FOR COMMERCIAL OFFICES</b> .....	271
<i>J. Ren, J. Liu, Y. Hou, F. Li</i>	
<b>IMPACT OF HIGH-EFFICIENCY FILTRATION WITH DIFFERENT VENTILATION RATES ON INDOOR/OUTDOOR (I/O) RATIOS FOR PARTICLE MASS AND NUMBER</b> .....	277
<i>S. Wang, M. Waring</i>	

### **ID67 REUSE RENOVATION**

<b>A COMPUTATIONAL EVALUATION OF THE IMPACT OF ENERGY RETROFITTING ON RADON CONCENTRATIONS IN BUILDINGS</b> .....	279
<i>J. McGrath, M. Byrne</i>	
<b>IMPACT OF VENTILATION ON IAQ IN RESIDENTIAL RETROFITS</b> .....	281
<i>P. Francisco, S. Cali, D. Jacobs, W. Rose</i>	
<b>EFFECT OF BUILDING RENOVATION ON ENERGY USE AND INDOOR ENVIRONMENT: COMPARISON OF SIMULATIONS AND MEASUREMENTS IN SIX APARTMENT BUILDINGS</b> .....	283
<i>V. Földváry, J. Kolarik, G. Bekö, D. Petráš</i>	
<b>EFFECTS OF ENERGY RETROFITS ON INDOOR GASEOUS POLLUTANT CONCENTRATIONS IN KAUNAS, LITHUANIA</b> .....	285
<i>T. Prasauskas, D. Martuzevicius, R. Sidaraviciute, E. Krugly, L. Du, U. Haverinen-Shaughnessy</i>	
<b>SIMULATION AND MONITORING RESULTS OF A COMPACT MVHR AND MICRO-HEAT PUMP FOR MINIMAL DISRUPTIVE RENOVATION</b> .....	291
<i>F. Ochs, D. Siegele, G. Dermentzis, W. Feist, M. Rothbacher</i>	
<b>ASSESSMENT OF THERMAL COMFORT AND CO<sub>2</sub> CONCENTRATIONS IN MULTI-FAMILY APARTMENT BUILDINGS BEFORE AND AFTER RETROFIT – LITHUANIAN CASE STUDY</b> .....	299
<i>L. Seduikyte, T. Prasauskas, D. Martuzevicius, U. Haverinen-Shaughnessy</i>	
<b>INDOOR CARBON MONOXIDE IN WEATHERIZATION HOMES</b> .....	307
<i>P. Francisco, S. Pigg, D. Cautley, D. Jacobs, S. Cali, W. Rose</i>	
<b>RETROKIT- RETROFITTING RESIDENTIAL MULTI-FAMILY BUILDINGS – EVALUATION OF EFFECTS ON INDOOR ENVIRONMENTAL QUALITY</b> .....	309
<i>Y. De Kluizenaar, P. De Jong, M. Van Vliet</i>	

### **ID77 TEST METHODS FOR EMISSIONS**

<b>IMPACT OF AN ENGAGEMENT CAMPAIGN ON USER BEHAVIOUR CHANGE IN OFFICE ENVIRONMENT</b> .....	311
<i>V. Fabi, V. Barthelmes, S. Corgnati</i>	
<b>DEVELOPING AN ASTM INTERNATIONAL METHOD FOR MEASURING EMISSIONS FROM SPRAY POLYURETHANE FOAM (SPF) INSULATION WITH MICRO-SCALE CHAMBERS</b> .....	319
<i>J. Sebroski, C. Thompson, J. Miller</i>	
<b>MEASURING AND CHARACTERIZING TRIS(2-CHLORO-1-METHYLETHYL) PHOSPHATE EMISSION FROM OPEN CELL SPRAY POLYURETHANE FOAM</b> .....	327
<i>D. Poppendieck, M. Gong</i>	
<b>THE INFLUENCE OF CHAMBER SIZE ON CHEMICAL EMISSIONS FROM OPEN AND CLOSED CELL SPRAY POLYURETHANE FOAM</b> .....	329
<i>D. Poppendieck, M. Gong</i>	

### **ID81 HOSPITAL/CLEAN ROOM**

<b>THERMAL COMFORT OF THE SURGICAL STAFF IN AN OPERATING ROOM: A NUMERICAL STUDY ON LAMINAR AND MIXING VENTILATION SYSTEMS</b> .....	331
<i>S. Sadrizadeh, S. Holmberg</i>	

<b>USING CFD SIMULATE ANALYSIS AND EXPERIMENT VERIFIED OF BONE MARROW TRANSPLANTATION WARD UNDER HORIZONTAL LAMINAR FLOW</b> .....	337
<i>Y.-L. Wu, J.-J. Zhao, S.-X. Liao, S.-T. Li</i>	
<b>LOCALLY ADJUSTED FLOOR TILES FOR ENERGY-EFFICIENT CLEANROOMS</b> .....	350
<i>B. Zielke, M. Kriegel</i>	
<b>PERFORMANCE OF PROTECTIVE LOCAL LAMINAR AIR SUPPLY IN HOSPITAL ISOLATION ROOMS</b> .....	352
<i>P. Kalliomäki, P. Saarinen, J. Tang, H. Koskela</i>	
<b>STUDY ON THE IMPACT OF CIRCULATING NURSE WALKING ON BACTERIA-CARRYING PARTICLES DISTRIBUTIONS IN OPERATING THEATRE</b> .....	354
<i>J. Wang, T.-T. Chow, B. Yang, T. Olofsson, H. Zhang</i>	
<b>AIR CONTAMINATION CONTROL IN HYBRID OPERATING THEATRES. PARTICLE CONTENT DURING DIFFERENT TYPES OF SURGERY WITH FOCUS ON DIATHERMY</b> .....	362
<i>F. Romano, J. Gustén, S. De Antonellis, C. Joppolo</i>	
<b>ON FIELD VENTILATION PERFORMANCE IN OPERATING THEATERS AGAINST AIRBORNE CONTAMINATION: A COMPARISON OF UNIDIRECTIONAL AND MIXED AIRFLOW SYSTEMS</b> .....	370
<i>C. Joppolo, F. Romano, R. Ricci, S. De Antonellis, J. Gustén</i>	
<b>DESIGN OF AIR DISTRIBUTION SYSTEM IN OPERATING ROOMS - THEORY VERSUS PRACTICE</b> .....	378
<i>M. A. Melhado, M. Loomans, J. Hensen, R. Lamberts</i>	
<b>AIR FLOW VELOCITY GENERATED BY DOOR MOTION BASED ON 1:10 SCALE EXPERIMENTS</b> .....	386
<i>A. Hathway, I. Papakonstantis</i>	

**ID47 BRIDGING THE GAP BETWEEN SCIENCE, POLICY AND PRACTICES (GOVERNMENT OF FLANDERS – DEPARTMENT OF ENVIRONMENT, NATURE AND ENERGY)**

<b>AIR QUALITY INDOORS AND OUTDOORS - JOINT HARMONIZATION EFFORTS IN A DIVERSE NETWORK OF INTERACTING SCIENTISTS</b> .....	388
<i>S. Nehr</i>	
<b>DO BUILDING INDUSTRY PROFESSIONALS AND STAKEHOLDERS BELIEVE WHAT IAQ EXPERTS THINK IS TRUE?</b> .....	390
<i>A. Rackes, M. Hamilton, P. Gurian, M. Waring</i>	
<b>HOW TO EVALUATE VENTILATION IN IAQ STUDIES</b> .....	392
<i>A. Persily, P. Wargocki</i>	
<b>POTENTIAL POLICY IMPACT OF REACH (ARTICLE 68.2) ON CMRS PRESENT IN INDOOR AIR IN THE EU AND THE RELATED CONSUMER EXPOSURE</b> .....	394
<i>L. Geerts, K. De Browere, M. Lor, D. Van Raemdonck, B. Joiret</i>	

**ID10 REACTIVE INDOOR AIR CHEMISTRY AND HEALTH**

<b>SESSION SUMMARY - REACTIVE AIR CHEMISTRY AND HEALTH: WORKSHOP SUMMARY</b> .....	403
--	-----

**ID28 INDIVIDUALIZED THERMAL SENSATION MODELS: MISSING LINKS & SOLUTIONS**

<b>SESSION SUMMARY - THERMAL SENSATION MODELS: MISSING LINKS AND SOLUTIONS</b> .....	408
<b>CHALLENGES IN MODELLING LOCAL THERMAL SENSATION</b> .....	413
<i>S. Veselá, B. Kingma, A. Frijns</i>	
<b>A MODEL FOR CALCULATING HEAT TRANSFER IN HUMAN BODY UNDER TRANSIENT AND NON-UNIFORM THERMAL ENVIRONMENT</b> .....	421
<i>D. Lai, Q. Chen</i>	
<b>THERMOREGULATION MODEL JOS-2 AND PREDICTION OF LOCAL THERMAL COMFORT</b> .....	429
<i>S. Tanabe, Y. Ozeki, M. Ogata, H. Miyajima</i>	
<b>SYSTEMATIC COMPARISON OF THE EXISTING WIDELY USED THERMAL SENSATION MODELS</b> .....	431
<i>B. Koelblen, A. Psikuta, A. Bogdan</i>	

**ID42 DEVELOPING OBSERVATIONAL INDICES FOR DAMPNES AND MOLD TO PROTECT HEALTH – TOWARDS IMPROVING CAUSAL RESEARCH OR TOWARDS SUPPORTING PRACTICE?**

<b>SESSION SUMMARY - DEVELOPING OBSERVATIONAL INDICES FOR DAMPNES AND MOLD TO PROTECT HEALTH - TOWARDS IMPROVING CAUSAL RESEARCH OR TOWARDS SUPPORTING PRACTICE?</b> .....	434
--	-----

## **ID1201 FIELD STUDIES OF PARTICLE FILTRATION EFFECTIVENESS**

<b>FILTER EFFECTIVENESS MAY BE REDUCED FOR SECONDARY ORGANIC AEROSOL (SOA): IMPACT OF RE-EQUILIBRATION OF SEMIVOLATILE PRODUCTS TO AEROSOL PHASE</b> .....	442
<i>C. Wang, M. Waring</i>	
<b>EVALUATION OF EXPOSURE TO OZONE AND ULTRAFINE PARTICLES DUE TO ELECTROSTATIC PRECIPITATOR OPERATION</b> .....	444
<i>J. Xiang, J. Mo, D. Day, L. Fang, C. Weschler, Y. Zhang, J. Zhang</i>	
<b>EVALUATION OF AN INTEGRATED FILTRATION SYSTEM FOR PARTICULATE MATTER REMOVAL AND OXIDATION PRODUCT FORMATION</b> .....	446
<i>J. Xiang, J. Mo, C. Weschler, L. Fang, D. Day, J. Zhang, Y. Zhang</i>	
<b>ASSESSMENT OF INDOOR PM<sub>2.5</sub> AMONG DIFFERENT ACMV SYSTEMS DURING THE 2015 SOUTHEAST ASIAN HAZE EPISODE</b> .....	448
<i>G. Parshetti, X. Ding, C. Sekhar, D. Cheong, K. Wai Tham</i>	
<b>IN-SITU INTEGRATED HVAC FILTER EFFICIENCY</b> .....	456
<i>M. Alavy, J. Stegel</i>	
<b>MEASUREMENT-BASED EVALUATION OF VENTILATION AND FILTRATION SYSTEMS FOR REDUCING OUTDOOR PM<sub>2.5</sub> IN A MODERN CALIFORNIA DETACHED HOUSE</b> .....	458
<i>B. C. Singer, W. W. Delp, D. R. Black, I. S. Walker</i>	

## **ID4 EXPLORING ISSUES OF INDOOR AIR QUALITY WITH RESPECT TO STRUCTURES RESULTANT FROM THE DESIGN AND IMPLEMENTATION OF ADAPTIVE REUSE OF HISTORIC STRUCTURES**

<b>INDOOR AIR QUALITY AND INTERIOR ENVIRONMENTAL CONDITIONS FOR ADAPTIVE REUSE OF HISTORIC STRUCTURES: A CASE FOR RESEARCH AND DEVELOPMENT OF GUIDELINES</b> .....	466
<i>J. Murphy</i>	
<b>RENOVATION OF A SINGLE FAMILY HOUSE IN A SOCIAL HOUSING GARDEN CITY IN BRUSSELS AS PRIVATE-PUBLIC COLLABORATION: AMBITIOUS TARGETS FOR ENERGY, INDOOR CLIMATE AND POST-OCCUPANCY MONITORING</b> .....	474
<i>P. Foldbjerg, S. Pauquay, J. Geuens</i>	
<b>ASSESSING HOW RETROFIT OF TRADITIONAL BUILDINGS IMPACTS INDOOR ENVIRONMENT AND OCCUPANT'S THERMAL COMFORT</b> .....	480
<i>E. Essah, V. Elliston</i>	
<b>INDOOR AIR QUALITY, THERMAL COMFORT, AND OCCUPANT BEHAVIOUR IN RETROFITTED ENERGY EFFICIENT HOMES</b> .....	488
<i>Á. Broderick, M. Byrne, M. Coggins</i>	
<b>NEW APPROACH TO INDOORS AIR QUALITY ASSESSMENT FOR CULTURAL HERITAGE CONSERVATION</b> .....	490
<i>D. Leyva Pernia, S. Demeyer, O. Schalm, W. Anaf, C. Meert</i>	

## **ID5 ENVIRONMENTAL AIRFLOWS AND HOW THEY MAY LEAD TO ISOLATION/CONTAINMENT FAILURE IN CRITICAL HOSPITAL/HEALTHCARE SETTINGS**

<b>EXPERIMENTAL INVESTIGATION OF HUMAN-WALKING-INDUCED WAKE FLOW: EXPERIMENTS BY PARTICLE IMAGE VELOCIMETRY (PIV)</b> .....	498
<i>N. Luo, W. Weng, M. Fu, X. Xu</i>	
<b>POSSIBLE DOUBLE-ROUTE TRANSMISSION OF SARS IN THE LARGEST NOSOCOMIAL OUTBREAK IN HONG KONG</b> .....	506
<i>S. Xiao, Y. Li</i>	
<b>DOOR OPENING AND SIMULATED HUMAN PASSAGE INDUCED AIRFLOWS THROUGH A HOSPITAL ISOLATION ROOM DOORWAY</b> .....	508
<i>P. Kalliomäki, P. Saarinen, J. Tang, H. Koskela</i>	
<b>SUBJECTIVE EVALUATION OF THE MICROENVIRONMENT GENERATED BY A HOSPITAL BED WITH LOCALIZED VENTILATION SYSTEM</b> .....	510
<i>N. Kehayova, Z. Bolashikov, A. Krikor Melikov</i>	
<b>MODELLING TRANSMITTED AIRBORNE INFECTION RISK IN HOSPITAL CORRIDORS</b> .....	518
<i>R. Wood, C. Noakes, D. Borman, A. Woods</i>	

## **ID40 INDOOR AIR QUALITY AND RELATED LOW-COST SOLUTIONS IN SCHOOL BUILDINGS**

<b>PARTICULATE MATTER IN URBAN NURSERY SCHOOLS IN A MEGA-CITY, SEOUL, KOREA</b> .....	520
<i>D. Rim, G.-N. Bae, J. Bum Kim</i>	
<b>IMPROVING VENTILATION IN PORTABLE CLASSROOMS: SIMPLE, LOW COST SOLUTIONS</b> .....	522
<i>S. Bourne, A. Novoselac, K. Kinney, J. Maestre, W. Jennings</i>	
<b>HEALTHY HIGH SCHOOL PRIDE (PARTNERSHIP IN RESEARCH ON INDOOR ENVIRONMENTS)</b> .....	524
<i>R. Corsi, N. Crain, K. Kinney, A. Novoselac, S. Horner, J. Maestre, L. Lesnick, M. Wade, W. Jennings, S. Bourne, B. B. Wilson</i>	

<b>IMPROVING AIR FILTER EFFICIENCY AS A STRATEGY TO REDUCE CHILDREN'S EXPOSURE TO TRAFFIC RELATED AIR POLLUTANTS IN ENERGY-EFFICIENT CLASSROOMS.....</b>	<b>526</b>
<i>M. Stranger, M. Spruyt, J. Laverge, T. Geens, E. Goelen, J. Staelens, K. Constandt, K. Constandt, K. Campenhout</i>	

### **ID1197 INDOOR SURFACE CHEMISTRY**

<b>SESSION SUMMARY - INDOOR SURFACE CHEMISTRY .....</b>	<b>528</b>
<b>SURFACE INTERACTIONS AS A SOURCE OF POTENTIALLY HARMFUL SPECIES IN INDOOR AIR .....</b>	<b>530</b>
<i>M. Kruza, N. Carslaw, A. Lewis</i>	
<b>KINETIC MODELLING OF MULTIPHASE REACTIONS BETWEEN O<sub>3</sub> AND SKIN LIPIDS .....</b>	<b>532</b>
<i>P. Lakey, T. Berkemeier, U. Pöschl, M. Shiraiwa</i>	
<b>PROBING INDOOR AIR CHEMISTRY THROUGH GAS PHASE AND SURFACE MEASUREMENTS .....</b>	<b>534</b>
<i>S. Liu, S. Thompson, J. Krechmer, R. Li, R. Wild, C. Warneke, J. De Gouw, S. Brown, S. Miller, J. Luongo, J. Jimenez, P. Ziemann</i>	
<b>EXPLORING THE NATURE OF INDOOR OXIDATIVE HETEROGENEOUS CHEMISTRY .....</b>	<b>536</b>
<i>S. Zhou, R. Alwarda, M. Forbes, J. Abbatt</i>	
<b>CORRELATION BETWEEN PHYSICO-CHEMICAL PROPERTIES OF NATURAL BUILDING MATERIALS AND ADSORPTION BEHAVIOUR OF VOLATILE ORGANIC COMPOUNDS.....</b>	<b>538</b>
<i>C. Da Silva, C. Rana, K. Mower, M. Ansell, A. Dengel, R. Ball</i>	

### **ID125 STC 33 MEETING – THERMAL COMFORT: THEORY AND PRACTICE**

<b>SESSION SUMMARY - STC 33 MEETING - THERMAL COMFORT: THEORY AND PRACTICE .....</b>	<b>546</b>
--	------------

### **ID2014 E-CIGARETTE**

<b>FORMALDEHYDE AND ACETALDEHYDE EMISSION RATES FROM E-CIGARETTES.....</b>	<b>548</b>
<i>F. Offermann</i>	
<b>NUMERICAL PREDICTION OF CONTAMINANT DISTRIBUTION IN HUMAN RESPIRATORY TRACT FOR EXPOSURE ASSESSMENT TO E-CIGARETTES.....</b>	<b>554</b>
<i>K. Kuga, T. Matsuo, S. Yoo, K. Ito, W. Chen, P. Wang, J. Liao, J. Fowles, D. Shusterman, K. Kumagai</i>	
<b>ENVIRONMENTAL EXPOSURE TO NICOTINE FROM ELECTRONIC VS. CONVENTIONAL CIGARETTE SMOKE: A PILOT STUDY.....</b>	<b>556</b>
<i>Z. Dunbar, L. Vogl, M. Palumbo, M. Travers, M. Goniewicz</i>	
<b>INDOOR VAPING: COMPOSITION AND HEALTH IMPACTS OF MAINSTREAM AND SECONDHAND EMISSIONS .....</b>	<b>558</b>
<i>M. Sleiman, J. Logue, V. Montesinos, M. Litter, M. Russell, L. Gundel, H. Destailats</i>	

### **ID29 INDOOR ENVIRONMENT DATA COLLECTION WITH TODAY'S TECHNOLOGY**

<b>SESSION SUMMARY - INDOOR ENVIRONMENT DATA COLLECTION WITH TODAY'S TECHNOLOGY .....</b>	<b>560</b>
<b>A WIRELESS INDOOR ENVIRONMENT SENSING SYSTEM AND DATA ANALYSIS METHODS .....</b>	<b>562</b>
<i>H. Zhou, X. Zhou, Y. Zhang, D. Chai, Y. Li, L. Qiao, Y. Jiang, H. Sun</i>	
<b>EXPLORATION OF FAMILY COMPOSITION BASED ON INDOOR NOISE DATA A DATA MINING APPROACH.....</b>	<b>570</b>
<i>H. Zhou, Y. Jiang, H. Sun</i>	
<b>A NOVEL APPROACH TO OCCUPANCY ESTIMATION USING MOTION AND CO<sub>2</sub> SENSORS .....</b>	<b>578</b>
<i>Kh. Han, B. Morris, T. Labreche, J. McMahon, S. McMahon, J. Zhang</i>	
<b>DEVELOPING HMI OF THE IMOD SENSING AND CONSULTING SYSTEM FOR INDOOR ENVIRONMENT HEALTH.....</b>	<b>580</b>
<i>N.-T. Chen, Y.-S. Chen, J.-Y. Lin, K.-S. Liu, Y.-S. Tsay, Y.-R. Dong</i>	

### **ID1203 A NEW STANDARD AND GUIDELINE ON INDOOR ENVIRONMENTAL PARAMETERS FOR DESIGN AND ENERGY EVALUATIONS OF BUILDINGS EN16798-1 AND TR16789-2 (EN15251REVISED)**

<b>SESSION SUMMARY - A NEW STANDARD AND GUIDELINE ON INDOOR ENVIRONMENTAL PARAMETERS FOR DESIGN AND ENERGY EVALUATIONS OF BUILDINGS EN16798-1 AND TR16789-2 (EN15251REVISED).....</b>	<b>586</b>
<b>MODELLING THE FATE OF BIOAEROSOLS IN HOSPITAL ROOMS.....</b>	<b>588</b>
<i>M.-F. King, C. Noakes, A. Sleigh</i>	
<b>M1-CLASS FOR OFFICE FURNITURE WITH TEXTILE COVERINGS AND PADDINGS.....</b>	<b>596</b>
<i>L. Sariola, H. Järnström, J. Sateri</i>	



<b>INDOOR CARBON DIOXIDE CONCENTRATIONS IN VENTILATION AND INDOOR AIR QUALITY STANDARDS</b> .....	603
<i>A. Persily</i>	
<b>DEVELOPMENT AND INVESTIGATION OF INDOOR AIR QUALITY INDEX AND THERMAL COMFORT INDEX</b> .....	611
<i>J. Cheol Kim, B. Hyeok Lee, T. Kim, K. Hwan Lee, S. Kang, S. Yong Lee</i>	

### **ID38 INDOOR EMISSIONS AND EXPOSURE**

<b>USE OF LARGE-SCALE TEST CHAMBERS FOR MEASURING EMISSIONS FROM FURNITURE: RESULTS FROM AN INTER-LABORATORY COMPARISON</b> .....	613
<i>C. Yrieix, M. Nicolas, M.-L. Roux, F. Maupetit</i>	
<b>CLEANING SPRAYS – AEROSOL CHARACTERIZATION AND A HUMAN EXPOSURE CHAMBER STUDY</b> .....	621
<i>C. Isaxon, K. Lovén, J. Nielsen, A. Gudmundsson, G. Wieslander</i>	
<b>PRODUCT EMISSIONS BY LABORATORY TESTING. THE EPHECT PROJECT EXPERIENCE</b> .....	623
<i>J. Bartzis, E. Tolis, P. Wolkoff, M. Stranger, G. Efthimiou, F. Maes, E. Goelen, G. Ventura, P. Carrer, E. Fernandes</i>	
<b>EVALUATION OF VOLATILE ORGANIC COMPOUNDS AND PARTICULATE EMISSIONS OF INCENSE AND CANDLE IN EMISSION TEST CHAMBER: IMPACT OF TEST PARAMETERS</b> .....	631
<i>P. Garnier, E. Quivet, G. Karr, A. Albinet, F. Maupetit, M. Nicolas</i>	
<b>IMPACT OF ENVIRONMENTAL GRADIENTS ON AEROSOL COMPOSITION MEASURED WITH REAL-TIME AEROSOL MASS SPECTROMETRY</b> .....	633
<i>M. Waring, P. Decarlo, A. Johnson</i>	
<b>ROOM FRAGRANCES – SPRAYS AND DIFFUSERS AS SOURCES OF INDOOR POLLUTANTS</b> .....	635
<i>E. Uhde, N. Schulz</i>	

### **ID1202 AIR QUALITY IN SPECIFIC ENVIRONMENTS**

<b>SESSION SUMMARY - AIR QUALITY IN SPECIFIC ENVIRONMENTS</b> .....	637
<b>INFLUENCE OF FUEL CHANGE ON INDOOR ENVIRONMENTAL QUALITY ON-BOARD A PASSENGER FERRY</b> .....	639
<i>S. Langer, J. Moldanova, C. Österman</i>	
<b>INDOOR AIR QUALITY IN PROFESSIONAL MAINTENANCE AND CLEANING SERVICE ROOMS</b> .....	647
<i>M. Hyttinen, J. Ruokolainen, T. Aarni, P. Pasanen</i>	
<b>INDOOR AIR QUALITY IN FRENCH HOSPITALS: LARGE SCALE SAMPLING CAMPAIGNS AND FIRST PHYSICAL-CHEMICAL RESULTS</b> .....	654
<i>E. Baurès, O. Blanchard, P.-Y. Donnio, A. Rivier, M. Guillaso, P. Le Cann, A. Luc, S. Belaz, F. Mercier, E. Surget, J.-P. Gangneux, A. Florentin</i>	
<b>THE EFFECTIVENESS OF THE INDOOR AIR QUALITY IMPROVEMENT PROJECT IN AN OFFICE BUILDING - A CASE STUDY</b> .....	656
<i>R.-Y. Chen, C.-Y. Yeh, J.-F. Lin</i>	
<b>AIR CONTAMINATIONS IN A CRAFT BREWERY</b> .....	658
<i>M. Dudzinska, B. Polednik, J. Czerwinski</i>	
<b>MEASUREMENT OF INDOOR AIR POLLUTANTS OF A NEWLY BUILT MUSEUM IN JAPAN</b> .....	660
<i>M. Yuda, N. Kagi, U. Yanagi, M. Kouyama, M. Kasahara</i>	

### **ID86 PRIMARY SCHOOLS**

<b>AIR FILTRATION FOR THE CONTROL OF THE PARTICLE CONCENTRATION WITHIN A SCHOOL EQUIPPED WITH A BALANCED VENTILATION SYSTEM</b> .....	662
<i>A. Ginestet, D. Pugnet, M. Robitu</i>	
<b>MULTIPLE EXPOSURES IN PUBLIC PRIMARY SCHOOLS IN DEPENDENCE OF BUILDING CHARACTERISTICS – COLOGNE PROGRAM ACTIVE HEALTH CARE</b> .....	670
<i>A. Keulers, G. Wiesmüller, C. Kaesler, G. Barth, W. Dott</i>	

## **VOLUME 2**

<b>INDOOR RADON CONCENTRATIONS IN PORTUGUESE SCHOOLS: PRELIMINARY SURVEY RESULTS</b> .....	672
<i>J. Madureira, I. Paciência, J. Cavaleiro Rifo, M. Pinto, A. Moreira, A. Pereira, E. De Oliveira Fernandes</i>	
<b>PHthalates Esters in the Dust/Soil of Elementary Schools</b> .....	680
<i>C.-Y. Lee, C.-N. Huang, C.-W. Lee</i>	
<b>IMPROVING INDOOR AIR QUALITY IN NEW ZEALAND CLASSROOMS WITH A SOLAR VENTILATION UNIT: THE AIR PARTICULATE PART</b> .....	682
<i>M. Boulic, B. Trompeter, T. Ancelet, J. C. G. Ramirez, P. Davy, R. Phipps, C. Cunningham, M. Baker, P. Howden-Chapman</i>	
<b>AIR POLLUTANTS TRANSFERS FROM ROADS IN THE SCHOOLS OF LILLE</b> .....	688
<i>E. Roux, C. Bugajny, D. Forestier, G. Cheppe, P. Desmettres, N. Dufour, C. Beaugard, O. Lemaitre</i>	

<b>CHARACTERIZATION OF INDOOR AND OUTDOOR PARTICLES OF PRIMARY SCHOOL CLASSROOM IN CHONGQING, CHINA AND ITS IMPACT ON CHILDREN</b> .....	696
<i>J. Xiong, W. Yu, R. Yao, B. Li</i>	
<b>COMPARATIVE PERSONAL EXPOSURE ASSESSMENT OF SCHOOL CHILDREN TO PARTICLE NUMBER CONCENTRATIONS IN AUSTRALIA, ITALY AND BHUTAN</b> .....	N/A
<i>L. Morawska, M. Mazaheri, G. Buonanno, S. Clifford, F. Fuoco, T. Wangchuk</i>	

### **ID70 SURFACES**

<b>PARTICLE RESUSPENSION FROM A SURFACE WHEN SWEEPED BY A HAIRBRUSH</b> .....	704
<i>T. Zhang, R. Xie, S. Wang</i>	
<b>INFLUENCE OF SUSPENDED PARTICLES ON CONVECTIVE MASS TRANSFER OF SVOCs AT FLAT SURFACES UNDER NON-EQUILIBRIUM STATE</b> .....	706
<i>J. Cao, X. Zhang, Y. Zhang</i>	
<b>ENDOTOXIN CONCENTRATION IN HOUSE DUST AND INDOOR AIR IN JAPAN</b> .....	708
<i>H. Kim, E. Lim, U. Yanagi, N. Kagi, K. Azuma, Y. U. H. Osawa, M. Hayashi</i>	
<b>SEMI-VOLATILE ORGANIC COMPOUNDS IN FRENCH DWELLINGS: AN ESTIMATION OF CONCENTRATIONS IN THE GAS-PHASE AND AIRBORNE PARTICLES FROM SETTLED DUST</b> .....	710
<i>W. Wei, C. Mandin, O. Blanchard, F. Mercier, M. Pelletier, B. Le Bot, P. Glorennec, O. Ramalho</i>	
<b>MAIN PARAMETERS OF INDOOR AIR WITH INNOVATIVE SURFACING MATERIALS BASED ON NATURAL SYLVITE</b> .....	712
<i>K. Chernyi</i>	
<b>ASSESSMENT OF VOLATILE ORGANIC COMPOUNDS AND FORMALDEHYDE EXCHANGES AT THE AIR/MATERIAL INTERFACE OF BUILDING PRODUCTS AND THEIR ASSEMBLIES: TOWARDS IMPROVING SELECTION CRITERIA OF BUILDING MATERIALS</b> .....	720
<i>A. Gross, P. Mocho, H. Plaisance, C. Cantau, C. Yrieix, V. Desauziers, N. Kinadjian</i>	
<b>HYGIENE INEQUALITY IN INDOOR SURFACE ENVIRONMENT</b> .....	722
<i>H. Lei, Y. Li</i>	
<b>RESUSPENSION OF MICROBES FROM CARPET FLOORING AND IMPLICATIONS FOR HUMAN EXPOSURE</b> .....	724
<i>Martti Täubel, S. Saari, A. Hyvärinen, R. Holopainen, A.-K. Viitanen, S. Vainiotalo, T. Tuomi, J. Keskinen, K. Hämeri, B. Boor</i>	
<b>SORPTION OF ORGANOPHOSPHORUS FLAME-RETARDANTS ON SETTLED DUST</b> .....	726
<i>X. Liu, M. Allen, N. Roache</i>	
<b>RESUSPENSION OF FLUORESCENT BIOLOGICAL AEROSOL PARTICLES FROM CARPETED FLOORING</b> .....	732
<i>B. Boor, M. Täubel, R. Holopainen, A.-K. Viitanen, S. Vainiotalo, T. Tuomi, J. Keskinen, A. Hyvärinen, K. Hämeri, S. Saari</i>	

### **ID110 HUMAN EMISSIONS**

<b>SKIN MOISTNESS INFLUENCES HUMAN EMISSIONS OF BIOLOGICAL AEROSOL PARTICLES</b> .....	734
<i>J. Zhou, W. Fang, A. Chen, L. Yang, Q. Cao, W. Nazaroff, V. W.-C. Chang</i>	
<b>HUMAN CO<sub>2</sub> GENERATION RATE CALCULATION BASED ON FIELD MEASUREMENT OF CO<sub>2</sub> CONCENTRATION IN A NATURALLY VENTILATED ROOM</b> .....	736
<i>G. Fan, J. Xie, J. Liu</i>	
<b>REAL-TIME MEASUREMENT OF PERSONAL EXPOSURES TO CARBON DIOXIDE</b> .....	744
<i>E. Gall, T. Cheung, I. Luhung, S. Schiavon, W. Nazaroff</i>	
<b>INFANT CRAWLING-INDUCED PARTICLE RESUSPENSION: SIZE-RESOLVED RESUSPENSION RATES DERIVED FROM A THREE-ZONE MODEL</b> .....	746
<i>B. Boor, R. Holopainen, M. Täubel, A.-K. Viitanen, A. Koivisto, S. Vainiotalo, K. Salmi, T. Tuomi, A. Hyvärinen, K. Hämeri, A. Novoselac, Y. Xu</i>	

### **ID63 (E)-CIGARETTES AND 3D PRINTERS**

<b>NUMERICAL STUDY ON THE INFLUENCE OF SMOKING LOAD IN A SMOKING ROOM WITH DISPLACEMENT VENTILATION AND MIXING VENTILATION</b> .....	748
<i>Y. Hashimoto, H. Takahashi</i>	
<b>EVALUATING AND CONTROLLING HUMAN EXPOSURE TO ULTRAFINE PARTICLE AND VOC EMISSIONS FROM DESKTOP 3D PRINTERS</b> .....	756
<i>D. Zhao, B. Stephens, P. Azimi, D. Zhao</i>	
<b>A PRELIMINARY STUDY FOR NICOTINE EXPOSURE OF THE PASSIVE SMOKERS BY USING PASSIVE SAMPLER</b> .....	758
<i>T. Amagai, Y. Miyake, Q. Wang, H. Bai, M. Noguchi, S. Nakai</i>	
<b>STUDY OF COLLECTION INSTRUMENTS FOR NICOTINE FROM ETS TO INVESTIGATE THE PERSONAL PASSIVE EXPOSURE</b> .....	762
<i>Y. Suzuki, M. Noguchi</i>	
<b>FINE PARTICULATE AND CHEMICAL EMISSIONS FROM CONSUMER 3D PRINTERS</b> .....	764
<i>A. Davis, M. Black, R. Weber, Q. Zhang, J. Wong</i>	

<b>BEHAVIOR OF NICOTINE IN THE ENVIRONMENTAL TOBACCO SMOKE (ETS)</b> .....	773
<i>M. Noguchi, A. Yamasaki, Y. Suzuki</i>	
<b>NUMERICAL PREDICTION OF CONTAMINANT DISTRIBUTION IN HUMAN RESPIRATORY TRACT FOR EXPOSURE ASSESSMENT TO E-CIGARETTES</b> .....	775
<i>K. Kuga, T. Matsuo, S.-J. Yoo, K. Ito, W. Chen, P. Wang, J. Liao, J. Fowles, D. Shusterman, K. Kumagai</i>	
<b>VOC AND PARTICLE EMISSIONS FROM HOME AND HOBBY 3D PRINTERS</b> .....	777
<i>S. Hartikainen, M. Johansson, M. Hyttinen, P. Pasanen</i>	

## **ID112 IAQ MEASURING TECHNIQUES**

<b>RAPID DETERMINATION OF THE ADSORPTION ISOTHERM BASED ON THE PARALLEL EXPONENTIAL KINETICS MODEL</b> .....	779
<i>C. Feng, Y. Cui, D. Wang</i>	
<b>PASSIVE AIR SAMPLING OF CYCLIC VOLATILE METHYL SILOXANES</b> .....	787
<i>C. Michelle Wang, A. Kierkegaard, A. Lewis, N. Carslaw</i>	
<b>A COLOUR SEQUENCE ENHANCED PARTICLE STREAK VELOCIMETRY</b> .....	795
<i>H. Wang, X. Shao, X. Li</i>	
<b>NON-DESTRUCTIVE TECHNIQUES TO EVALUATE MOISTURE IN BUILDINGS' COMPONENTS AS A TOOL FOR A BETTER INDOOR ENVIRONMENT</b> .....	803
<i>E. Barreira</i>	
<b>MODELLING THE CENTRELINE VELOCITY OF NON-ISOTHERMAL AIR JETS WITH ARBITRARY FLOW TRAJECTORIES</b> .....	805
<i>B. De Clercq</i>	
<b>"BIOSENSOR HUMAN BLOOD": ASSESSMENT OF INDOOR AIR QUALITY WITH A HUMAN-SPECIFIC METHOD</b> .....	813
<i>H. Finger, C. Asbach, S. Fennrich, S. Stoppelkamp, U. Hennig</i>	
<b>THE 40 M<sup>3</sup> INNOVATIVE EXPERIMENTAL ROOM FOR INDOOR AIR STUDIES (IRINA): DEVELOPMENT, VALIDATION AND OPERATION</b> .....	815
<i>P. Harb, S. Loganathan, F. Thevenet, V. Gaudion, N. Locoge</i>	
<b>INFLUENCES ON CORE SIZE OF LOCAL UNIDIRECTIONAL FLOW FIELDS</b> .....	822
<i>H. Rotheudt, B. Zielke, M. Kriegel</i>	
<b>EVALUATING THE NET ESCAPE PROBABILITY DISTRIBUTION OF CONTAMINANT FROM A LOCAL POINT TO EXHAUST OUTLET IN INDOOR ENVIRONMENT</b> .....	826
<i>E. Lim, K. Ito, M. Sandberg</i>	
<b>COMPARISONS OF RESULTS FROM VOC MEASUREMENTS IN ONE OFFICE, ONE RESIDENCE AND A SPIKED SAMPLE FROM NINE LABORATORIES IN SWEDEN AND FINLAND</b> .....	828
<i>B. Glas, M. Kempe, A.-S. Claeson</i>	

## **ID101 IEQ PERCEPTION**

<b>THERMAL COMFORT OF PEOPLE IN RURAL AREAS OF THE HOT-HUMID REGION OF CHINA</b> .....	830
<i>Y. Zhang, Z. Zhang, L. Jin</i>	
<b>THERMAL COMFORT IN A NATURALLY VENTILATED HIGH-RISE RESIDENTIAL BUILDING</b> .....	832
<i>X. Zheng, S. Kurvers, P. Van Den Engel, R. Schipper, P. Bluyssen</i>	
<b>HOW INDIVIDUAL IEQ FACTORS AFFECT PASSENGERS' OVERALL SATISFACTION IN CHINESE AIRPORT TERMINALS? A QUESTIONNAIRE STUDY SUPPORTED BY ENVIRONMENTAL MEASUREMENTS</b> .....	840
<i>Y. Geng, J. Yu, B. Lin</i>	
<b>VALIDATION AND COMPARISON OF THERMAL COMFORT MODELS AGAINST EXPERIMENTAL DATA</b> .....	848
<i>Z. Fang, Y. Cheng, J. Z Lin</i>	
<b>THERMAL ENVIRONMENT AND COMFORT IN SEMI-OPEN AND INTERIOR SPACES OF FOLK HOUSES IN HOT-HUMID AREA OF CHINA</b> .....	856
<i>L. Jin, Y. Zhang, Z. Zhang</i>	
<b>IMPROVEMENT OF THE THERMAL ENVIRONMENT AT JAPANESE FACILITIES FOR THE ELDERLY</b> .....	858
<i>N. Kaihara, M. Hayashi, K. Hoon, M. Bando, H. Osawa</i>	
<b>ADAPTIVE TEMPERATURE LIMITS FOR AIR CONDITIONED MUSEUMS IN TEMPERATE CLIMATE REGIONS BASED ON MEASUREMENTS AND 1200+ SURVEYS</b> .....	866
<i>R. Kramer, L. Schellen, M. Doornbos, H. Schellen</i>	
<b>ASSESSMENT OF INDOOR ENVIRONMENTAL QUALITY ON OCCUPANT SATISFACTION AND PHYSICAL PARAMETERS IN OFFICE BUILDINGS</b> .....	868
<i>Q. Jin, H. Wallbaum, T. Leiblein, T. Hofmann, M. Janser, W. Lukas</i>	
<b>ANALYSIS ON PERFORMANCE OF LIGHTWEIGHT INSULATION ROOF</b> .....	876
<i>X. Shen, L. Li, C. Fu, Y. Feng</i>	

## **ID76 INFLUENCE OF AMBIENT CONDITIONS ON EMISSIONS**

<b>EMISSION OF PHTHALATES AND PHTHALATE ALTERNATIVES FROM VINYL FLOORING AND CRIB MATTRESS COVERS: THE INFLUENCE OF TEMPERATURE</b> .....	884
<i>Y. Xu, Y. Liang</i>	
<b>PHTHALATES UPTAKE BY SETTLED DUST ON POLYVINYL CHLORIDE FLOORING AND THE INFLUENCE OF TEMPERATURE</b> .....	892
<i>Y. Xu, C. Bi</i>	
<b>EXPERIMENTAL STUDY OF PERSONAL EXPOSURE TO POLLUTANTS RELEASED AT FLOOR LEVEL: FLOOR HEATING VS AIR HEATING</b> .....	894
<i>L. Gagyte, A. Jurelionis, T. Prasauskas, D. Martuzevicius</i>	
<b>IMPACT OF HUMIDITY ON THE EMISSION CHARACTERISTIC PARAMETERS OF VOCs IN BUILDING MATERIALS: EXPERIMENT AND VALIDATION</b> .....	902
<i>C. Cai, S. Huang, W. Xu, Y. Zhang</i>	
<b>A COMPARATIVE SURVEY ABOUT WHETHER THE INDOOR THERMAL ENVIRONMENT SHIFT OCCUPANTS' COMFORT EVALUATION</b> .....	904
<i>W. Ji, M. Luo, B. Lin, Q. Ouyang, Y. Zhu</i>	
<b>IMPACT OF HUMIDITY ON EMISSION PARAMETERS OF FORMALDEHYDE FROM A MEDIUM DENSITY FIBERBOARD</b> .....	912
<i>M. Lv, W. Liang, X. Yang</i>	
<b>HIGHER MOISTURE CONTENT ASSOCIATED WITH THE GREATER EMISSION OF DEHP FROM THE PLASTIC WALLPAPER</b> .....	918
<i>N.-Y. Hsu, Y.-C. Liu, C.-W. Lee, C. C. Lee, H.-J. Su</i>	
<b>MULTIVARIATE ANALYSIS OF VOC EMISSIONS FROM MOISTURE DAMAGED WALL STRUCTURE – A PRELIMINARY EXAMINATION</b> .....	923
<i>V. Lappalainen, H. Järnström, E. Sohlberg, J. Laamanen, H. Viitanen, P. Pasanen</i>	
<b>INFLUENCE OF MOISTURE AGAINST ACETALDEHYDE EMITTED FROM WOOD-BASED MATERIALS</b> .....	925
<i>F. Nishioka, N. Kagi, H. Osawa, U. Yanagi, K. Hasegawa, K. Azuma, K. Hoon</i>	

## **ID94 IAQ INDUSTRIES AND VARIOUS ENVIRONMENTS**

<b>NUMERICAL STUDY OF NATURAL AND MECHANICAL SMOKE VENTILATION IN INDUSTRIAL COMPLEXES</b> .....	927
<i>A. Berg, S. Rott, M. Schmidt</i>	
<b>INFLUENCE OF INDUSTRIAL ACTIVITIES ON INDOOR AIR QUALITY AND RESPIRATORY HEALTH</b> .....	935
<i>S. Mentese, M. Tatman Otkun, A. Mirici, E. Palaz, D. Tasdibi, O. Cotuker, C. Bakar, S. Cevizci</i>	
<b>EXPOSURE TO NANOPARTICLE EMISSIONS INSIDE FIRING RANGES</b> .....	937
<i>M. Viana, A. S. Fonseca, A. Alastuey, X. Querol, A. Rodriguez</i>	
<b>ASSESSMENT OF ENDOTOXIN EXPOSURE AT BIOGAS PRODUCTION PLANTS IN SWEDEN</b> .....	939
<i>E. Bloom, B. Sahlberg, M. Remberger, M. Bibi, E.-L. Härnwall, A.-B. Antonsson</i>	
<b>EXPOSURE AND HEALTH RISK ASSESSMENTS OF VOCs NEARBY DYEING INDUSTRIAL COMPLEX</b> .....	941
<i>J. Shuai, W. Yang, J. Heo, B. Lee, D. Jung</i>	
<b>DYNAMIC DOWNSCALING ANALYSIS OF AIR QUALITY FROM URBAN TO HUMAN SCALE: PART 2 EXPOSURE CONCENTRATION IN A LARGE FACTORY SPACE</b> .....	948
<i>A. Murga, Y. Sano, K. Ito, Y. Kawamoto</i>	
<b>A CASE STUDY: MAINTENANCE OF CLEANLINESS IN A HIGH POWER LASER FACILITY</b> .....	950
<i>Y. Yu, E. Long, Q. Chen</i>	
<b>SAFETY AND HEALTH RISK PERCEPTIONS: A CROSS-SECTIONAL STUDY OF NAIL AND HAIR SALON CLIENTS</b> .....	956
<i>L. Milich, D. Shendell, J. Graber</i>	
<b>MONITORING OF INDOOR AIR IN DIFFERENT WORKING ENVIRONMENTS OF DIFFERENT FACTORIES IN PUNJAB, PAKISTAN</b> .....	964
<i>Z. Ali, M. Ashraf, T. Khan, I. Zainab, Z. Nasir, I. Colbeck, Z. Zonda</i>	

## **ID90 MUSEAMS, PUBLIC AND COMMERCIAL BUILDINGS**

<b>THERMAL COMFORT AND INDOOR AIR QUALITY STUDY DURING PEAK AND OFF-PEAK PERIODS IN A NATURALLY VENTILATED AND AIR CONDITIONED FOOD COURT IN SINGAPORE</b> .....	965
<i>C. Sekhar, D. Koh</i>	
<b>ASSESSMENT OF THE INDOOR ENVIRONMENTAL QUALITY OF PORTUGUESE GYMNASIUMS</b> .....	973
<i>R. Almeida, N. Ramos, E. Barreira, M. Santos</i>	
<b>NEW WEATHER-FEATURE VARIABLE TO ASSESS ENERGY USE UNDER TIGHT INDOOR ENVIRONMENTAL CONTROL IN HISTORICAL ART GALLERIES</b> .....	981
<i>S. Ganguly, F. Wang, Z. Chen</i>	
<b>LEVELS OF VOLATILE ORGANIC COMPOUNDS IN THE NATIONAL ARCHAEOLOGICAL MUSEUM – SPAIN</b> .....	989
<i>O. Vilanova, B. Sánchez, C. Canela</i>	

<b>THE IMPACT OF COMMERCIAL ACTIVITIES ON INDOOR AIR QUALITY</b> .....	991
<i>G. Thiault, L. Paillat, E. Faure, F. Rieunier, G. Goupil, L. Durupt, V. Eudes, H. Partaix</i>	
<b>QUALITY OF THE AIR IN INDOOR SWIMMING POOLS</b> .....	993
<i>M. Dudzinska, B. Polednik, J. Czerwinski, A. Polednik</i>	

### **ID71 CHEMISTRY**

<b>TOWARDS THE NEXT GENERATION OF INDOOR AIR CHEMISTRY MODELS</b> .....	995
<i>N. Carslaw, M. Kruza</i>	
<b>EXPLORATION OF THE INFLUENCE OF NITROGEN OXIDES ON SECONDARY ORGANIC AEROSOL FORMATION</b> .....	997
<i>R. Wells, L. Cena</i>	
<b>MEASURING INDOOR OZONE DECAY RATE IN CHINA</b> .....	999
<i>W. Ji, B. Zhao</i>	
<b>INDOOR AIR MEASUREMENTS OF SUB 3 NM PARTICLE NUMBER SIZE DISTRIBUTION USING AIRMODUS NANO CONDENSATION NUCLEUS COUNTER A11</b> .....	1007
<i>J. Vanhanen, M. Väkevä, E. Miettinen</i>	
<b>THE EXPERIMENTAL STUDY OF OZONE REACTION WITH INDOOR VOCs FROM PINWOOD AND ITS SECONDARY ULTRAFINE PARTICLE POLLUTION</b> .....	1009
<i>C. Ruiqing, P. Jing, J. Liu</i>	
<b>MEASUREMENTS AND MODELLING OF OH AND HO<sub>2</sub> RADICALS IN AN INDOOR CLASSROOM ENVIRONMENT DURING CLEANING ACTIVITIES</b> .....	1017
<i>D. Heard, T. Ingham, N. Carslaw, H. Walker</i>	
<b>FRAMEWORK TO PREDICT INDOOR AEROSOL CONCENTRATIONS AS A FUNCTION OF COMPOSITION, TEMPERATURE-BASED VOLATILITY, AND DEPOSITION</b> .....	1019
<i>M. Waring, P. Decarlo</i>	

### **ID66 IAQ MODELING AND BEDROOM IAQ**

<b>LONG-TERM GAS POLLUTANT CONCENTRATION MONITOR OF NEW STUDENT DORMITORIES WITH NATURAL VENTILATION</b> .....	1021
<i>Y. Yin, P. Jing, J. Liu</i>	
<b>A NUMERICAL STUDY ON THREE DIFFERENT VENTILATION MODES IN A GENERAL WARD IN SLEEPING ENVIRONMENTS</b> .....	N/A
<i>M.-Y. Chan</i>	
<b>INDOOR AIR QUALITY DURING SLEEP: CHARACTERIZATION AND EXPOSURE ASSESSMENT</b> .....	1030
<i>N. Canha, S. Candeias, S. Almeida</i>	
<b>THE COMPARISON BETWEEN KINETIC THEORY AND MASS TRANSFER MODELS TO PREDICT SERVICE LIFE OF ACTIVATED CARBON FILTERS IN REMOVING VOCs</b> .....	1032
<i>A. Khazraei Vazhemehr, F. Haghighat</i>	
<b>BACKWARD PROBABILISTIC MODEL FOR IDENTIFYING CONTAMINANT SOURCE IN AIR DUCT SYSTEM</b> .....	1034
<i>J. Gao, L. Zeng, X. Zhang</i>	
<b>THE IMPORTANCE OF PRESSURE INPUT FIDELITY FOR MULTIZONE BUILDING MODELS</b> .....	1042
<i>S. Herring, S. Parker, B. Lingard, S. Batchelor, M. Sohn, D. Lorenzetti, L. Rodriguez, P. Bieringer, D. Steinhof, M. Wolksi</i>	
<b>SENSITIVITY ANALYSIS OF THE AIR QUALITY MODEL INCA-INDOOR USING AUTOMATIC DIFFERENTIATION</b> .....	1044
<i>F. Guo, N. Blond, I. Charpenier, M. Mendez, J.-L. Ponche, D. Hauglustaine</i>	
<b>LOCALIZED BED VENTILATION FOR REDUCED EXPOSURE TO AIRBORNE CROSS-INFECTION FROM EXHALED AIR IN A DOUBLE-BED HOSPITAL ROOM WITH DISPLACEMENT BACKGROUND VENTILATION</b> .....	1046
<i>Z. Bolashikov, K. Kostadinov, A. Melikov</i>	
<b>NUMERICAL METHODS FOR STATE-SPACE MULTIZONE CONTAMINANT TRANSPORT</b> .....	1054
<i>S. Parker, M. Sohn, D. Lorenzetti</i>	

### **ID130 MICROBIOME ENVIRONMENT INTERACTIONS**

<b>MONITORING AIRBORNE MICROORGANISMS – AN IMPORTANT PARAMETER IN AIR INFECTION CONTROL OF HOSPITALS AND INTENSIVE CARE UNITS</b> .....	1056
<i>B. Wessén, P. Fründberg</i>	
<b>COMPARISON OF RESISTANCE IMPROVEMENT TO FUNGAL GROWTH ON PAINTS BY NANO-METAL IMPREGNATION</b> .....	1063
<i>C.-C. Lin, W.-Y. Chen, G.-C. Yao, Y.-C. Lin</i>	
<b>HOME MAINTENANCE AND INDOOR DAMPNES</b> .....	1065
<i>P. Taptiklis, J. Douwes, R. Phipps, M. Keall</i>	
<b>EFFECTS OF INDOOR AIR TEMPERATURE, RELATIVE HUMIDITY AND HOME DAMPNES ON AIRBORNE FUNGI IN 454 RESIDENCES FROM SHANGHAI, CHINA</b> .....	1067
<i>X. Wang, C. Huang, W. Liu, Z. Zou, R. Lu, L. Shen, J. Cai, J. Chang, X. Wei, C. Sun</i>	

<b>ANTIMICROBIAL EFFECT OF F7 POLYPROPYLENE FIBROUS FILTER CONTAINING ZINC PYRITHIONE</b> .....	1075
<i>Y. Andres, A. Joubert, L. Le Coq, S. Abd Ali</i>	
<b>MECHANISMS OF BIO-AEROSOL TRANSMISSION IN SANITARY PLUMBING SYSTEM AIRFLOWS</b> .....	1083
<i>M. Gormley, D. Kelly, T. Aspray</i>	
<b>EXPLORING THE RATE OF SURFACE MICROBIAL REDEVELOPMENT AFTER CLEANING IN SCHOOLS; DNA-SEQUENCING AND ATP ANALYSIS</b> .....	1091
<i>S. Kwan, R. Shaughnessy, U. Haverinen-Shaughnessy, J. Peccia</i>	
<b>HYGROTHERMAL PERFORMANCE OF VENTILATED ATTIC IN MARINE CLIMATE UNDER DIFFERENT CEILING AIR TIGHTNESS</b> .....	1093
<i>E. Iffu, F. Tariku</i>	

### **ID65 CFD FUNDAMENTAL**

<b>COMPARING THE PERFORMANCE OF K-ε TURBULENCE MODELS FOR ISOTHERMAL INDOOR AIRFLOW: A CASE STUDY</b> .....	1101
<i>S. Fu, P. H. Biwole, C. Mathis</i>	
<b>SENSITIVITY ANALYSIS IN NUMERICAL SIMULATION OF INDOOR AIRFLOW: BOUNDARY CONDITIONS</b> .....	1103
<i>S. Sadrizadeh, S.-H. Peng</i>	
<b>COMPARISON AND INTEGRATION OF CFD-BASED GENETIC ALGORITHM AND ADJOINT METHOD FOR THE INVERSE DESIGN OF INDOOR ENVIRONMENT</b> .....	1110
<i>W. Liu, R. You, Y. Xue, Q. Chen</i>	
<b>NUMERICAL SIMULATION OF ENHANCED MASS TRANSFER OF VOLATILE ORGANIC COMPOUNDS BY ELECTROHYDRODYNAMIC FLOW</b> .....	1118
<i>M. Qiang, P. Li, Z. Chen</i>	
<b>TOWARDS REAL-TIME IMMERSERD BOUNDARY LATTICE BOLTZMANN CFD SIMULATION TOOL FOR TRANSIENT INDOOR CONTAMINANT DISPERSION</b> .....	1120
<i>A. Khan, N. Delbosq, C. Noakes, M.-F. King</i>	
<b>FAST SIMULATION OF CHLORINE GAS DISPERSION IN BUILDINGS</b> .....	1122
<i>W. Tian, M. Sohn, W. Zuo</i>	

### **ID119 IMPACT OF POLICY, STANDARDS, PROTOCOLS AND AWARENESS**

<b>OPERATIONALIZING INDOOR AIR QUALITY MONITORING AND MANAGEMENT PROTOCOLS ACROSS A GLOBAL TECHNOLOGY COMPANY'S GLOBAL PORTFOLIO</b> .....	1124
<i>L. Riggs, P. Premchandran, C. Bayer</i>	
<b>REDUCING INDOOR ENVIRONMENTAL RISKS – THE LIFE CYCLE OF SAFER BUILDINGS</b> .....	1131
<i>C. Bird, C. Dewar, D. Dillon, J. Dalton, A. Ling</i>	
<b>ENVIRONMENTAL MONITORING IN CONTAMINATED BUILDINGS – BRINGING AFFORDABLE SCIENCE TO SAFE OUTCOMES</b> .....	1139
<i>C. Bird, C. Dewar, D. Dillon, A. Ling, J. Dalton, G. Whiteley</i>	
<b>DEMONSTRATION PROJECT OF THE IAQ CERTIFICATION SCHEME FOR PUBLIC USE FACILITIES IN KOREA</b> .....	1147
<i>S. Sook Kim, M. Sung</i>	
<b>THE DEVELOPMENT OF RISK INDEX ALGORITHM WHICH IS APPLIED TO CHEMICAL ACCIDENT BEHAVIOUR ANALYSIS/DAMAGE PREDICTION MODELS AND ENVIRONMENTAL RISK MAP TECHNOLOGY</b> .....	1149
<i>D.-C. Yoo, J.-R. Sohn, H.-J. Oh</i>	
<b>ESTIMATING CURRENT AND FUTURE INDOOR AIR POLLUTION AND TEMPERATURES IN ENGLAND</b> .....	1157
<i>J. Taylor, P. Symonds, A. Mavrogianni, M. Davies, C. Shrubsole, I. Hamilton, Z. Chalabi, P. Wilkinson</i>	
<b>SOME OBSERVED EFFECTS OF GREEN MARK ON INDOOR ENVIRONMENTAL QUALITY, OCCUPANT PERCEPTION, SATISFACTION AND HEALTH INDICATION BASED ON THE SAME COHORT MOVING FROM A NON-GREEN MARK-RATED OFFICE TO A GREEN MARK PLATINUM-RATED OFFICE IN SINGAPORE: A CASE STUDY</b> .....	1165
<i>L. Young, T. Wai, N. Silva, P. Wargoocki, N. Wee, C. Ling</i>	
<b>SELF INSPECTION IAQ TECHNIQUES FOR CONSTRUCTION</b> .....	1174
<i>B. Szymanski, O. Le Mauguen, J. Roquette, N. Kinadjian, C. Cantau</i>	
<b>WHY AND HOW TO PROMOTE GREENERY INSIDE BUILDINGS</b> .....	1176
<i>I. Oberti, F. Plantamura</i>	
<b>ENVIRONMENTAL POLICY, INDOOR ACTIVITIES, AND LONG-TERM INDOOR AIR QUALITY IN EMPEROR QIN'S TERRA-COTTA MUSEUM, CHINA</b> .....	1184
<i>T. Hu, J. Cao, H. Li</i>	

## **ID111 PARTICLES AND NEW POLLUTANTS**

<b>DEPOSITION REMOVAL OF SUBMICRON PARTICLES BY THE AIM OF A NEGATIVE AIR IONIZER - THE EFFECT OF DIELECTRIC CONSTANT .....</b>	<b>1186</b>
<i>H. Shih, Y.-Y. Wu, Y.-C. Chen, K.-P. Yu</i>	
<b>SEMI-VOLATILE ORGANIC COMPOUNDS IN INDOOR SETTLED AND HVAC FILTER DUST: SEASONAL VARIANCE AND ASSOCIATION WITH BUILDING CHARACTERISTICS.....</b>	<b>1188</b>
<i>C. Bi, J. Maestre, K. Kinney, J. Siegel, S. Horner, Y. Xu</i>	
<b>STUDY OF ACOUSTICS INDUCED DEPOSITION OF POLYDISPERSED PARTICLES IN AN ACOUSTIC AEROSOL REMOVAL SYSTEM .....</b>	<b>1196</b>
<i>W. Yuen, H. Lee, S. Fu, C. Chao</i>	
<b>THE INFLUENCE OF PARTICLE SIZE ON PARTICLE/AIR PARTITIONING OF PHTHALATES .....</b>	<b>1199</b>
<i>K. O'Connor, K. De Boer, J. Benning</i>	
<b>DETERMINATIONS OF BISPHENOL A IN HOUSEHOLD DUSTS BY SOLID-PHASE MICROEXTRACTION WITH MICROWAVE ASSISTED EXTRACTION .....</b>	<b>1201</b>
<i>S.-W. Tsai, C.-W. Chang, C.-J. Chang</i>	
<b>SYNTHETIC FIBERS IN INDOOR AIR AND SETTLED DUST: A FIRST OVERVIEW .....</b>	<b>1209</b>
<i>J. Gasperi, R. Dris, C. Mirande, C. Mandin, V. Langlois, B. Tassin</i>	
<b>CONCENTRATIONS OF NEW FLAME RETARDANTS IN HOUSE DUST FROM JAPAN .....</b>	<b>1211</b>
<i>Q. Wang, H. Nakayama, Y. Miyake, T. Amagai, K. Kume</i>	
<b>DIMENSIONAL STUDY OF THE DOWNWARD DISPERSION OF GASES DUE TO DENSITY DIFFERENCES .....</b>	<b>1218</b>
<i>H. Sagheby, B. Müller, M. Kriegel</i>	
<b>MULTIPLE OCCURRENCE OF PARTICLE-BOUND SEMI-VOLATILE ORGANIC COMPOUNDS IN DWELLINGS.....</b>	<b>1220</b>
<i>O. Ramalho, F. Mercier, O. Blanchard, M. Pelletier, W. Wei, B. Le Bot, P. Glorennec, C. Mandin</i>	

## **ID84 HIGH SCHOOL UNIVERSITY**

<b>EVALUATION OF TEMPERATURE BASED CLOSING CRITERIA AT NATURAL VENTILATION IN SCHOOLS BY SIMULATING THERMAL COMFORT, ENERGY CONSUMPTION AND CO<sub>2</sub>-CONCENTRATION .....</b>	<b>1225</b>
<i>S. Schmidt, A. Mayer</i>	
<b>MANAGED AIRING BEHAVIOR AND THE EFFECT ON PUPIL PERCEPTIONS AND INDOOR CLIMATE IN CLASSROOMS.....</b>	<b>1227</b>
<i>J. Toftum, M. Wohlgemuth, U. Christensen, G. Bekö, G. H. Clausen</i>	
<b>MONITORING OF INDOOR AIR POLLUTION IN CLASSROOM - CASE STUDY .....</b>	<b>1235</b>
<i>S. Vilcekova, E. K. Burdova, L. Meciarova, A. Estokova</i>	
<b>CARBON DIOXIDE AS INDOOR AIR QUALITY INDICATOR IN RENOVATED SCHOOLS IN LATVIA .....</b>	<b>1241</b>
<i>A. Klavina, I. Martinsons, J. Proskurina, V. Rodins</i>	
<b>SPATIAL AND TEMPORAL PARTICULATE MATTER VARIATION IN CENTRAL, TEXAS HIGH SCHOOLS .....</b>	<b>1247</b>
<i>A. Novoselac, L. Lesnick, N. Crain, R. Corsi, M. Wade</i>	
<b>INDOOR ENVIRONMENT IN SCHOOLS: COMPARING CONVENTIONAL AND HIGH PERFORMANCE SCHOOLS .....</b>	<b>1249</b>
<i>S. Batterman, G. Thun, F.-C. Su, C. Godwin, A. Wald, L. Zhong, J. Wineman, C. Somers, F. Watkins</i>	
<b>THE INDOOR VOCs CONCENTRATION, CHARACTERISTICS AND SOURCE ANALYSIS IN A NEW UNIVERSITY CAMPUS .....</b>	<b>1257</b>
<i>J. Kang, P. Jing, J. Liu, Z. Wang</i>	
<b>OXYGENATED VOLATILE ORGANIC COMPOUNDS (OVOCS) IN HIGH SCHOOLS .....</b>	<b>1265</b>
<i>R. Corsi, N. Crain, A. Novoselac, K. Kinney, S. Horner, Y. Xu</i>	
<b>COMPARISON BETWEEN MEASURED AND MODELLED HOX CONCENTRATIONS IN A CLASSROOM .....</b>	<b>1267</b>
<i>M. Mendez, D. Amedro, N. Blond, D. Hauglustaine, P. Blondeau, C. Afif, C. Fittschen, C. Schoemaeker</i>	

## **ID126 EXPOSURE PATHWAYS**

<b>RE-INGESTION OF POLLUTANTS IN THE BUILDING ENVIRONMENT: A REVIEW OF COMPUTATIONAL APPROACHES.....</b>	<b>1278</b>
<i>M. Chavez, T. Stathopoulos, A. Bahloul</i>	
<b>A COMPARATIVE STUDY OF NEBULISER TYPE IN THE ASSESSMENT OF SECONDARY INHALATION OF MEDICAL AEROSOLS .....</b>	<b>1286</b>
<i>M. Byrne, R. MacLoughlin, J. McGrath, A. O Sullivan, P. Power</i>	
<b>NUMERICAL PREDICTION OF AIRWAY TISSUE DOSIMETRY USING PBPK-CFD HYBRID MODEL INTEGRATED INTO COMPUTER SIMULATED PERSON .....</b>	<b>1288</b>
<i>S.-J. Yoo, K. Ito</i>	
<b>DEVELOPING THE EXPOSURE FACTORS FOR THE KOREAN CHILDREN POPULATION .....</b>	<b>1290</b>
<i>D. Jung, J. Heo, J. Shuai, S. Kim, J. Seo, H. Yoon, W. Yang</i>	

<b>HUMAN EXPOSURE TO SEMI-VOLATILE ORGANIC COMPOUNDS (SVOCs) VIA DUST INGESTION: A REVIEW OF INFLUENCING FACTORS</b> .....	1294
<i>G. Raffy, F. Mercier, P. Glorennec, C. Mandin, B. Le Bot</i>	

## **ID12 NEW DIRECTIONS IN INDOOR AIR CHEMISTRY: THE ROLE OF OXIDATION PROCESSES**

<b>SESSION SUMMARY - NEW DIRECTIONS IN INDOOR AIR CHEMISTRY: THE ROLE OF OXIDATION PROCESSES</b> .....	1298
<b>INDOOR OXIDATION: WHICH PROCESS DOMINATES CHEMICAL PROCESSING INDOORS?</b> .....	1302
<i>N. Carslaw</i>	
<b>DIRECT MEASUREMENTS OF THE SPECTRALLY RESOLVED SOLAR ACTINIC FLUX WITHIN INDOOR ENVIRONMENT</b> .....	1304
<i>A. Gandolfo, V. Bartolomei, M. Gomez-Alvarez, S. Tlili, H. Wortham, J. Kleffmann, S. Gligorovski</i>	
<b>SECONDARY INTAKE FRACTION (SIF) FRAMEWORK FOR PRODUCTS GENERATED BY CLEANING: EXAMPLE OF SECONDARY ORGANIC AEROSOL (SOA) DUE TO TERPENE OZONOLYSIS</b> .....	1306
<i>Y. Yang, M. Waring</i>	
<b>HOUSEHOLD PRODUCTS AND INDOOR AIR QUALITY: EMISSION, REACTIVITY AND BY-PRODUCTS IN BOTH GASEOUS AND PARTICULATE PHASES</b> .....	1308
<i>B. D'Anna, A. Meme, M. Nicolas, C. Rio, J. Nicolle, S. Rossignol, L. Chiappini</i>	
<b>OXIDANTS BEHAVIOUR IN A LOW ENERGY CONSUMPTION BUILDING WITH MECHANICAL VENTILATION</b> .....	1310
<i>M. Blocquet, M. Ward, M. Verrielle, S. Dusanter, S. Le Calve, B. Hanoune, L. Pillier, N. Locoge, C. Fittschen, C. Schoemaeker</i>	

## **ID23 VENTILATION RATE IN RESIDENTIAL AND COMMERCIAL BUILDINGS**

<b>ON-SITE EVALUATION OF VENTILATION STRATEGIES IN AIR-CONDITIONED RESIDENTIAL BUILDINGS</b> .....	1318
<i>Z. Ai, C. Mak</i>	
<b>ASSOCIATIONS BETWEEN AIR CHANGE RATE OF THE CHILD'S BEDROOM DURING NIGHT AND CHILDHOOD ASTHMA IN SHANGHAI, CHINA: A CASE-CONTROL STUDY</b> .....	1320
<i>W. Liu, C. Huang, X. Wang, J. Cai, L. Shen, Z. Zou, J. Chang, X. Wei, H. Wang, Y. Sun, J. Sundell</i>	
<b>VENTILATION RATE IN HOMES IN TIANJIN, CHINA</b> .....	1328
<i>Y. Sun, J. Hou, P. Wang, Q. Zhang, X. Kong, J. Sundell</i>	

## **ID31 BENEFICIAL MICROBIAL EXPOSURES AND POSITIVE BUILDING INTERVENTIONS**

<b>IMPACT OF VENTILATION AND CLEANING ON THE MICROBIOLOGY OF THE BUILD ENVIRONMENT IN TRIBAL HOMES: STUDY DESIGN AND INITIAL BASELINE DATA</b> .....	1334
<i>R. Shaughnessy, D. Reisdorph, U. Haverinen-Shaughnessy, J. Peccia</i>	
<b>TOWARDS ENERGY EFFICIENT AND HEALTHY BUILDINGS: AN OVERVIEW HOW (NOT) TO GET A LEGIONELLA PNEUMOPHILA INFECTION</b> .....	1336
<i>E. Van Kenhove, J. Laverge, A. Janssens</i>	
<b>INDOOR BACTERIAL AND FUNGAL COMMUNITIES EXPERIENCE GROWTH IN HOUSE DUST AT ELEVATED RELATIVE HUMIDITY</b> .....	1344
<i>K. Dannemiller, C. Weschler, J. Peccia</i>	
<b>EFFECT OF VENTILATION ON THE MICROBIOME INSIDE PORTABLE CLASSROOMS</b> .....	1346
<i>K. Kinney, J. Maestre, A. Novoselac, M. King, W. Jennings, S. Bourne, R. Corsi</i>	
<b>FARM-LIKE INDOOR MICROBIOME: TOWARDS ASTHMA PREVENTION</b> .....	1348
<i>J. Pekkanen, A. Karvonen, M. Täubel, R. Adams, B. Jayaprakash, A. Hyvärinen, P. Kirjavainen</i>	

## **VOLUME 3**

### **ID27 CFD PREDICTIONS OF NON-ISOTHERMAL FLOW – HOW TO MINIMIZE THE USER FACTOR?**

<b>SESSION SUMMARY - CFD PREDICTION OF NON-ISOTHERMAL FLOW</b> .....	1350
--	------

### **ID37 WORKSHOP: INCORPORATING DESIGN FOR HIGH PERCEIVED CONTROL INTO THE DESIGN PROCESS**

<b>SESSION SUMMARY - INCORPORATING DESIGN FOR HIGH PERCEIVED CONTROL INTO THE DESIGN PROCESS - AN INTERACTIVE WORKSHOP</b> .....	1356
--	------



<b>STUDY ON THE ADAPTIVE CONTROL OF INDOOR ENVIRONMENT IN THE HOT-HUMID AREA OF CHINA</b> .....	1362
<i>Y. Zhang, J. Mai, F. Wang, Y. Zhai, M. Zhang</i>	
<b>INDOOR THERMAL ENVIRONMENT AND ENERGY OF RESIDENTIAL BUILDINGS IN WINTER IN LANZHOU, CHINA</b> .....	1364
<i>J. Li, J. Zhang</i>	

### **ID1198 DETERMINING SVOC EMISSION PARAMETERS FROM BUILDING MATERIALS**

<b>MEASUREMENT OF EMISSIONS OF SEMI-VOLATILE ORGANIC COMPOUNDS FROM PRODUCTS AT ELEVATED TEMPERATURE USING <math>\mu</math>-CTE THERMAL EXTRACTOR FOLLOWED BY THERMAL DESORPTION GC/MS</b> .....	1373
<i>J. Zhu, M. Nicolas, P. Thiry, Y. Li, F. Maupetit</i>	
<b>FIELD MEASUREMENTS OF PCB EMISSIONS FROM BUILDING SURFACES USING A NEW PORTABLE EMISSION TEST CELL</b> .....	1379
<i>N. Lyng, R. Haven, L. Gunnarsen</i>	
<b>NOVEL SPME METHOD FOR MEASURING THE CHARACTERISTIC PARAMETER CONTROLLING EMISSIONS OF SVOCs FROM MATERIALS AND PRODUCTS</b> .....	1387
<i>X. Zhang, J. Cao, J. Little, Y. Zhang</i>	
<b>INVESTIGATION OF PARTICLE MEDIATED GAS PHASE TRANSPORT OF PHTHALATES</b> .....	1389
<i>J. Little, Y. Wu, C. Liu, E. Vejerano, L. Marr, M. Xie</i>	
<b>A SIMPLE METHOD TO MEASURE THE GAS-PHASE SVOC CONCENTRATION ADJACENT TO A MATERIAL SURFACE</b> .....	1391
<i>Y. Wu, J. Little, L. Marr, M. Xie, S. Cox</i>	
<b>DEVELOPMENT OF AN INNOVATIVE TOOL FOR ON-SITE MEASUREMENT OF SEMI-VOLATILE ORGANIC COMPOUNDS' EMISSIONS FROM MATERIALS</b> .....	1393
<i>M. Ghislain, J. Beigbeder, H. Plaisance, V. Desauziers</i>	

### **ID1200 THE NEXT STEPS IN SCHOOL IAQ**

<b>PERFORMANCE OF MECHANICAL VENTILATION SYSTEMS IN PRIMARY SCHOOLS IN ROTTERDAM, THE NETHERLANDS</b> .....	1395
<i>F. Van Dijken, A. Gelderblom</i>	
<b>INDOOR AIR QUALITY IN PORTUGUESE PRIMARY SCHOOLS DURING THE HEATING SEASON: A FOLLOW-UP STUDY</b> .....	1403
<i>J. Cavaleiro Rufo, J. Madureira, I. Paciência, L. Aguiar, J. Paulo Teixeira, K. Slezakova, M. Do Carmo Pereira, M. Pinto, A. Moreira, E. De Oliveira Fernandes</i>	
<b>PREVENTING INDOOR AIR PROBLEMS IN PUBLIC-PRIVATE PARTNERSHIP (PPP) SCHOOLS - CLEANING PERSPECTIVE</b> .....	1411
<i>L. Kakko, R. Holopainen, M. Leppänen</i>	
<b>A TRANSFORMATIONAL APPROACH TO THE GLOBAL PROBLEM OF POOR CLASSROOM ACOUSTICS</b> .....	1413
<i>P. Juneja</i>	
<b>INDOOR ENVIRONMENT QUALITY IN KINDERGARTENS AND PRIMARY SCHOOLS IN THE PROVINCE OF LUXEMBOURG IN BELGIUM</b> .....	1421
<i>M. Kuske, P. Deckers, C. Manette, F. Lacroix, F. De Ceulaer</i>	
<b>ANALYSIS OF CARBON DIOXIDE CONCENTRATIONS AND RELATIVE POTENTIAL FOR AIRBORNE INFECTIOUS DISEASE TRANSMISSION IN 30 HIGH SCHOOL CLASSROOMS</b> .....	1427
<i>L. Lesnick, M. Wade, N. Crain, R. Corsi, A. Novoselac</i>	

### **ID13 WHAT CAN WE LEARN FROM INDOOR POLLUTANTS MODELING?**

<b>SESSION SUMMARY - WHAT CAN WE LEARN FROM INDOOR POLLUTANTS MODELLING?</b> .....	1429
<b>A NEW APPROACH TO PREDICT GAS-PHASE CONCENTRATION OF SEMI-VOLATILE ORGANIC COMPOUNDS FROM AIRBORNE PARTICLES: AN APPLICATION TO FRENCH NATIONWIDE SURVEY</b> .....	1433
<i>W. Wei, C. Mandin, O. Blanchard, F. Mercier, M. Pelletier, B. Le Bot, P. Glorenec, O. Ramalho</i>	
<b>ANALYSIS OF OXIDATION PROCESSES IN INDOOR AIR USING THE TIME-RESOLVED INCA-INDOOR MODEL</b> .....	1435
<i>N. Blond, M. Mendez, P. Blondeau, C. Schoemaeker, D. Hauglustaine</i>	
<b>UNDERSTANDING THE INGRESS OF TRANSIENT OUTDOOR CONTAMINANTS INTO MULTIZONE BUILDINGS - A STATE-SPACE APPROACH</b> .....	N/A
<i>B. Lingard, S. Parker</i>	
<b>FORECASTING OF INDOOR AIR QUALITY PARAMETERS</b> .....	N/A
<i>L. Morawska, L. Falcão, S. Clifford, D. Broday, M. Mazaheri</i>	

## **ID2004 NATURAL VENTILATION**

<b>PASSIVE ENHANCEMENT OF NATURAL VENTILATION INDUCED BY SOLAR CHIMNEY</b> .....	1437
<i>C. Lei, R. Khanal, T. Wang, L. Thepolaan</i>	
<b>NATURAL VENTILATION IN RURAL CHINESE HOMES: ESTIMATING AIR EXCHANGE RATES FROM REAL-TIME PM<sub>2.5</sub> CONCENTRATIONS</b> .....	1439
<i>E. Carter, M. Secrest, K. Ni, S. Sauer, J. Schauer, X. Yang, J. Baumgartner, H. Niu</i>	
<b>VENTILATION CONCEPTS FOR ENERGY EFFICIENT HOUSING IN CENTRAL EUROPEAN CLIMATE - A SIMULATION STUDY COMPARING IAQ, MOLD RISK AND VENTILATION LOSSES</b> .....	1441
<i>G. Rojas, R. Pfluger, W. Feist</i>	
<b>INVESTIGATION OF THE IMPACT OF URBAN WIND-FLOW ON UNSTEADY WIND-DRIVEN NATURAL VENTILATION</b> .....	1449
<i>C. Halios, H. Gough, J. Barlow, C. Noakes, M.-F. King</i>	

## **ID26 ASSESSMENT AND MANAGEMENT OF RISK FACTORS AND ADVERSE EFFECTS IN THE MODERN OFFICE ENVIRONMENT**

<b>SESSION SUMMARY - ASSESSMENT AND MANAGEMENT OF RISK FACTORS AND ADVERSE EFFECTS IN THE MODERN OFFICE ENVIRONMENT</b> .....	1451
<b>PHYSICOCHEMICAL RISK FACTORS FOR BUILDING-RELATED SYMPTOMS: THERMAL CONDITIONS AND COMBINED EXPOSURES TO INDOOR AIR POLLUTANTS</b> .....	1455
<i>K. Azuma, K. Ikeda, N. Kagi, U. Yanagi, H. Osawa</i>	
<b>WHY EYE SYMPTOMS IN AIRCRAFT AND OFFICES?</b> .....	1462
<i>P. Wolkoff</i>	
<b>INDOOR AIR QUALITY AUDIT MANAGEMENT IN MODERN OFFICE BUILDINGS</b> .....	N/A
<i>J. Bartzis</i>	

## **ID8 CFD SIMULATION OF INDOOR ENVIRONMENT WITH FOCUS ON PARTICLE DYNAMICS MODELING**

<b>CFD MODELING OF AIRBORNE TRANSMISSION IN INDOOR ENVIRONMENTS: PROSPECTIVE AND RETROSPECTIVE APPROACHES</b> .....	1467
<i>C. Chao, S. Fu</i>	
<b>ON THE BOUNDARY CONDITIONS OF NUMERICAL PARTICLE SIMULATION IN INDOOR ENVIRONMENT</b> .....	1469
<i>S. Sadrizadeh, A. Ploskic</i>	
<b>IDENTIFICATION OF INDOOR INSTANTANEOUS AIRBORNE CONTAMINANT SOURCE UNDER DYNAMIC AIRFLOW</b> .....	1476
<i>H. Wang, S. Lu, J. Zhai, X. Liu</i>	
<b>IMPACTS OF MODELING SIMPLIFICATIONS ON PREDICTED DISPERSION OF HUMAN EXPIRATORY DROPLETS</b> .....	1484
<i>L. Liu, P. Nielsen, C. Xu, J. Wei, Y. Li</i>	

## **ID39 HIDDEN CONNECTIONS: BUILDING ENERGY USE AND INDOOR AIR QUALITY**

<b>MICROBIAL CONCENTRATIONS OF INSULATION MATERIAL SAMPLES TAKEN FROM OUTER WALL STRUCTURES</b> .....	1492
<i>P. Markkanen, H. Karhu, T. Mielo, P. Lönnblad</i>	
<b>INDOOR AIR QUALITY IMPROVEMENT AND ENERGY COST OF CENTRAL VENTILATION AIR CLEANING SYSTEMS</b> .....	1498
<i>P. Blondeau, M. Abadie, T. Duforestel, C. Tourreilles, A. Ginestet, S. Parat, P. Kaluzny, A. Durand, C. Deleglise, D. Pugnet</i>	
<b>INDOOR AIR QUALITY IN WEATHERIZED HOMES</b> .....	1506
<i>P. Francisco, S. Pigg, D. Cautley, B. Tonn</i>	

## **ID36 INFECTIOUS DISEASES AND INDOOR MICROORGANISMS IN LOW INCOME SETTINGS**

<b>SESSION SUMMARY - INFECTIOUS DISEASES AND INDOOR MICROORGANISMS IN LOW INCOME SETTINGS</b> .....	1508
<b>ASSOCIATIONS OF HOME CHARACTERISTICS WITH LEVELS OF ERGOSTEROL AND ENDOTOXIN IN BED DUST IN LOW-INCOME MULTI-FAMILY HOUSING</b> .....	1511
<i>J.-H. Park, Y. Park, T. Reponen, G. Adamkiewicz, G. Chew</i>	
<b>IMPACT OF WATER DAMAGE ON MICROBIAL COMMUNITIES IN RESIDENTIAL BUILDINGS</b> .....	1513
<i>I. Sylvain, R. Adams, M. Waring, M. Spilak, J. Taylor</i>	
<b>ASSESSING THE ROLE OF UK BUILDINGS ON THE TRANSMISSION OF TUBERCULOSIS</b> .....	1515
<i>H. Altamirano-Medina, Y. Li, M. Lalor, J. Taylor, A. Mavrogianni</i>	

<b>HOME MICROBIOME AND CHILDHOOD ASTHMA IN LOW INCOME RURAL HOMES</b> .....	1518
<i>J. Maestre, W. Jennings, D. Wylie, S. Dedesko, S. Horner, J. Siegel, K. Kinney</i>	
<b>INVESTIGATING THE IMPACT OF ARCHITECTURAL PLANNING AND FUNCTIONAL PROGRAM ON THE INDOOR MICROBIOME. A HEALTH CONCERN</b> .....	1520
<i>J. Nice, S. Bole</i>	

### **ID108 AIR CLEANERS**

<b>DURABILITY OF HCHO REMOVAL EFFICIENCY OF AIR CLEANER WITH PLASMA DISCHARGER</b> .....	1528
<i>T. Tanaka, K. Kagawa, A. Nozaki, Y. Narita</i>	
<b>IONIC LIQUIDS FOR THE PURIFICATION OF AIR INTAKES FOR MILITARY APPLICATIONS</b> .....	1532
<i>E. Biddinger</i>	
<b>REMOVAL OF CARBON DIOXIDE IN INDOOR ENVIRONMENT WITH SORPTION-TYPE AIR FILTERS</b> .....	1534
<i>A. Shiue, S.-C. Hu, S.-M. Chang, Y.-T. Chang, C.-H. Tseng, C.-C. Mao, A. Hsieh, A. Chan</i>	
<b>MEASUREMENT OF THE EFFECTIVENESS OF AIR CLEANER FOR PARTICLE REMOVAL</b> .....	1544
<i>S. Zhang, W. Yu</i>	
<b>APPLICATION OF CARBON NANO TUBES (CNTS) IN OZONE REMOVAL: A PILOT STUDY</b> .....	1551
<i>Q. Feng, S. Yang, X. Yang</i>	
<b>GRANULATION OF GROWTH MEDIA FOR INDOOR AIR PURIFICATION UTILIZING BOTANICALLY-BASED SYSTEMS</b> .....	1558
<i>A. Aydogan Akseli, G. Tardos, E. Biddinger</i>	
<b>LIFE-TIME PERFORMANCE OF GAS PHASE AIR CLEANERS AND THE EFFECT OF FILTER COMBINATION DESIGN</b> .....	1560
<i>L. Zhao, J. Liu, J. Pei, Z. Wang</i>	
<b>EFFECTS OF ULTRAVIOLET GERMICIDAL IRRADIATION ON REDUCING AIR-SIDE PRESSURE DROP FOR A COOLING COIL IN A HOT AND HUMID CLIMATE</b> .....	1566
<i>Y. Wang, C. Sekhar, W. Bahnfleth, Kok Wai Cheong</i>	
<b>PERFORMANCE EVALUATION OF HUMIDITY CONTROL AND VOC REMOVAL OF FOLIAGE PLANTS BY DESICCATOR EXPERIMENTS</b> .....	1571
<i>S. Sakuma, H. Matsumoto</i>	
<b>DECENTRALIZED AIR PURIFICATION BY USE OF HYDROGEN PEROXIDE VAPOR (HPV)</b> .....	1577
<i>F. Pfender, M. Krieger</i>	
<b>EVALUATION OF THE PERFORMANCE OF VOC-REMOVING AIR CLEANING TECHNOLOGIES OPERATED IN A MODERN CALIFORNIA DETACHED HOUSE</b> .....	1584
<i>H. Destailats, W. W. Delp, Q. Zhang, M. Gabor, D. R. Black, B. C. Singer</i>	
<b>BIOFILTRATION OF INDOOR POLLUTANTS BY ORNAMENTAL PLANTS</b> .....	1586
<i>V. Hörmann, K.-R. Brenske, C. Ulrichs</i>	

### **ID177 EMISSION TESTING**

<b>DETECTION OF VOC RELEASED FROM WOOD-BASED PANELS BY USING A NEW RAPID TEST METHOD</b> .....	1588
<i>J. Shen, W. Liu, C. Du</i>	
<b>DEVELOPMENT OF A REPRODUCIBLY EMITTING REFERENCE MATERIAL FOR VOLATILE ORGANIC COMPOUNDS</b> .....	1597
<i>B. Mull, M. Richter, W. Horn, D. Brödner, C. Schultealbert, T. Sauerwald</i>	
<b>VARIABLE VENTILATION RATE METHOD: RAPID MEASUREMENT OF THE KEY PARAMETERS OF SVOC EMISSION FROM INDOOR MATERIALS</b> .....	1599
<i>J. Xiong, B. Xu, J. Cao, Y. Zhang</i>	
<b>QUANTIFYING FORMALDEHYDE EMISSIONS FROM INDOOR PRODUCTS: IMPACT AND CONSEQUENCES OF THE MBTH DERIVATIZATION METHOD</b> .....	1601
<i>T. Schripp, R. Giesen, B. Meyer, E. Uhde, T. Salthammer</i>	
<b>CHARACTERIZATION OF VOC AND FORMALDEHYDE EMISSIONS FROM FURNITURE PRODUCTS: TEST CHAMBER MEASUREMENT AND REAL INDOOR EMISSION</b> .....	1603
<i>M.-L. Roux, M. Nicolas, C. Yrieix, F. Maupetit</i>	
<b>CHARACTERIZING A FORMALDEHYDE REFERENCE SOURCE FOR VALIDATION OF EMISSION TEST CHAMBERS</b> .....	1611
<i>R. Giesen, T. Schripp, T. Salthammer</i>	
<b>FULLY AUTOMATED, ON-LINE MICRO-SCALE CHAMBER METHOD FOR DETERMINATION OF VOLATILE ORGANIC COMPOUND (VOC) EMISSIONS FROM BUILDING PRODUCTS</b> .....	1613
<i>I. Mayer, Y. Nie</i>	
<b>MEASUREMENTS OF EMISSIONS OF LOW MOLECULAR WEIGHT COMPOUNDS FROM POLY (VINYL CHLORIDE) SHEETS WITH THE PASSIVE FLUX SAMPLER METHOD</b> .....	N/A
<i>M. Noguchi, A. Yamasaki</i>	
<b>DYNAMIC GENERATION FACILITY FOR THE CALIBRATION AND VERIFICATION OF VOC AND SEMI-VOC EQUIPMENT IN EMISSION TESTING</b> .....	1615
<i>A. Baldan, D. Heikens</i>	

## **ID57 CONFIGURATION OF VENTILATION SYSTEMS**

<b>A GUIDE FOR RENOVATION SOLUTION TYPES OF VENTILATION AND BUILDING ENVELOPES OF TYPICAL POST WWII APARTMENT BUILDINGS</b> .....	1618
<i>T. Kalamees, M. Thalfeldt, M. Zelenski, H. Meos, M. Laas, J. Kurnitski, K. Kiusk</i>	
<b>VENTILATION EFFECTIVENESS OF RESIDENTIAL VENTILATION SYSTEMS</b> .....	1626
<i>M. R. Adili, M. Schmidt</i>	
<b>VISUAL ASSESSMENT OF CONTAMINANT DISPERSION AND IMPACTS IN MULTIZONE BUILDINGS</b> .....	1634
<i>S. Parker, S. Williamson</i>	
<b>IMPACTS OF A SOLAR VENTILATION UNIT ON TEMPERATURE AND VENTILATION RATE IN NEW ZEALAND SCHOOLS: AN INTERVENTION STUDY</b> .....	1636
<i>Y. Wang, M. Boulic, R. Phipps, M. Plagmann, C. Cunningham, C. Theobald, P. Howden-Chapman, M. Baker</i>	
<b>EVALUATION OF SINGLE-SIDED NATURAL VENTILATION USING A SIMPLIFIED AND FAIR CALCULATION METHOD</b> .....	1644
<i>C. Plesner, T. Larsen, V. Leprince</i>	
<b>EFFECT OF ANGLE AND LOCATION OF EAVES ON THE UPWARD CROSS-VENTILATION OF DOUBLE-SPAN LEEWARD SAWTOOTH ROOF BUILDINGS</b> .....	1652
<i>J. Peren, T. Van Hooff, B. Leite, B. Blocken</i>	
<b>A NEW ANALYTICAL SOLAR CHIMNEY MODEL</b> .....	1660
<i>G. He, J. J. Zhang</i>	

## **ID91 IAQ SUBWAY/TRAIN**

<b>HEALTH RISK ASSESSMENT AND PERSONAL EXPOSURES TO VOCs IN METRO CARRIAGES OF SHANGHAI, CHINA</b> .....	1662
<i>Y. Gong, Y. Wei, J. Cheng, T. Jiang, L. Chen, B. Xu</i>	
<b>ESTIMATION METHOD OF COOLING LOAD DUE TO TRAIN WIND IN AN UNDERGROUND STATION</b> .....	1664
<i>K. Kimura, K. Shibata, N. Tanita, M. Sato, Y. Kondo</i>	
<b>THE EFFECT OF VENTILATION PROTOCOLS ON SUBWAY AIR QUALITY</b> .....	1672
<i>T. Moreno, C. Reche, V. Martins, M. Minguillón, M. Capdevila, E. De Miguel, S. Centelles, X. Querol</i>	
<b>EVALUATION OF ENERGY CONSUMPTION AND INDOOR AIR QUALITY OF SAPPORO UNDERGROUND WALKWAY IN THE COLD REGION, JAPAN</b> .....	1674
<i>Y. Kang, K. Nagano</i>	
<b>SIMULATION OF CO<sub>2</sub> CONCENTRATION IN A SUBWAY DURING CLOSE MODE OPERATION</b> .....	1680
<i>Y. Wang, Xiaofeng Li</i>	
<b>EXPERIMENTAL ANALYSIS OF DISPLACEMENT VENTILATION FOR THE NEXT GENERATION HIGH-SPEED TRAIN (NGT)</b> .....	1688
<i>D. Schmeling, A. Volkman, J. Bosbach</i>	
<b>CHARACTERISTICS OF PARTICLE CONCENTRATION AND WIND SPEED UNDERNEATH A TRAIN CABIN IN AN URBAN RAILWAY TUNNEL</b> .....	1696
<i>G.-N. Bae, J. Bum Kim, M. Hwang, G. Tahk, H.-H. Yoon, S.-H. Woo, G.-N. Bae, S.-J. Yook, H. Park</i>	
<b>NUMERICAL SIMULATION OF AIRFLOW AT PLATFORM OF AN UNDERGROUND METRO STATION IN DELHI CITY, INDIA</b> .....	1698
<i>P. Babu, M. Khare, R. Goyal</i>	
<b>OPTIMAL VENTILATION AND FILTRATION STRATEGIES FOR INDOOR AIR QUALITY IN METRO CARRIAGES</b> .....	1706
<i>P. Blondeau, M. Abadie</i>	

## **ID64 CFD VENTILATION**

<b>A NUMERICAL STUDY OF NON-ISOTHERMAL MIXING VENTILATION IN AN ENCLOSURE TO EVALUATE RANS TURBULENCE MODEL PERFORMANCE</b> .....	1714
<i>K. Kosutova, B. Blocken, T. Van Hooff</i>	
<b>NUMERICAL SIMULATION OF CROSS-VENTILATION FLOW: RANS MODEL VALIDATION</b> .....	1722
<i>T. Van Hooff, B. Blocken, Y. Tominaga</i>	
<b>COMPARISON OF VOLATILE ORGANIC COMPOUND CONCENTRATION WITH THE LOCAL MEAN AGE OF AIR IN VENTILATED CHAMBER</b> .....	1730
<i>D. Y. Park, S. Chang</i>	
<b>DYNAMIC DOWNSCALING ANALYSIS OF AIR QUALITY FROM URBAN TO HUMAN SCALE: PART 1 INTEGRATION OF WRF AND CFD TO PREDICT WIND PRESSURE COEFFICIENT</b> .....	1732
<i>Y. Sano, A. Murga, K Ito, Y. Kawamoto</i>	
<b>CFD ANALYSIS ON WIND-DRIVEN CROSS NATURAL VENTILATION IN BUILDING OF DIFFERENT BUILDING LENGTH</b> .....	1734
<i>Q. Wang, Y. Guan, Q. Lu</i>	
<b>INTEGRATED CFD AND HYGROTHERMAL TRANSFER ANALYSIS IN ENERGY RECOVERY VENTILATOR</b> .....	1740
<i>Y. Morinaga, H. Sotokawa, K. Kameishi, K. Ito</i>	

## **ID106 THERMAL COMFORT PERFORMANCE OF HVAC**

<b>A SIMULATION-BASED CASE STUDY FOR AN INTEGRATED COMFORT CONTROL WITH VRF AND VENTILATION SYSTEMS IN COOLING SEASON</b> .....	1742
<i>S. Ho Kim, J. Won Kim, H. Jun Moon</i>	
<b>A METHOD PROPOSED TO DETERMINE OPERATING PARAMETERS OF RADIANT CEILING TERMINAL</b> .....	1744
<i>Y. Yuan, X. Zhang, X. Zhou</i>	
<b>INDIVIDUALLY CONTROLLED LOCALIZED CHILLED BEAM IN CONJUNCTION WITH CHILLED CEILING: PART 2 – HUMAN RESPONSE</b> .....	1752
<i>T. Arghand, A. K. Melikov, Z. Bolashikov, R. Kosonen, I. Aho, Z. Pastuszka, J. Kaczmarczyk</i>	
<b>INDIVIDUALLY CONTROLLED LOCALIZED CHILLED BEAM IN CONJUNCTION WITH CHILLED CEILING: PART 1 – PHYSICAL ENVIRONMENT</b> .....	1760
<i>T. Arghand, A. Melikov, Z. Bolashikov, R. Kosonen, I. Aho</i>	
<b>THE EFFECTS OF CHANGING AIR CONDITIONING OPERATION AND WORKING CONDITIONS ON ENERGY CONSUMPTION IN A SUBURBAN OFFICE</b> .....	1768
<i>S. Takahashi, A. Itoh, E. Kuzuu, S.-I. Tanabe, S. Tsushima, G. Aoki, J. Yang, M. Tanaka, H. Kitora</i>	
<b>FIELD INVESTIGATION OF AN OCCUPANCY-BASED CLIMATE CONTROL TECHNOLOGY: IEQ PERFORMANCE DURING THE COOLING SEASON</b> .....	1776
<i>H. Kim, E. Oldham, J. Haberl</i>	
<b>STUDY ON THE THERMAL ENVIRONMENT OF THE ROOM EQUIPPED WITH POROUS CEILING RADIANT AIR-CONDITIONING SYSTEM</b> .....	1784
<i>H. Wang, C. Zhang, H. Zhu, D. Li</i>	
<b>INVESTIGATION OF THE RADIATION/CONVECTION COMBINATION AIR CONDITIONING SYSTEM PERFORMANCE</b> .....	1791
<i>Y. Miyasaka, T. Akimoto</i>	
<b>STUDY OF FLUCTUATING PERIOD AND AIRFLOW DISTANCE ON HUMAN THERMAL RESPONSE IN A SINUSOIDAL AIRFLOW PERSONALIZED VENTILATION SYSTEM</b> .....	1799
<i>Y. Xie, S. C. Fu, C. Wu, C. Chao</i>	
<b>THERMAL PERFORMANCE EVALUATION OF MACRO-PACKED PHASE CHANGE MATERIALS (MPPCM) UNDER HEAT BOUNDARY CONDITIONS</b> .....	1801
<i>S. Kim, S. Jin Chang, S. Wi, S.-G. Jeong</i>	

## **ID83 KINDERGARTEN**

<b>MULTIPLE EXPOSURES IN PUBLIC KINDERGARTENS IN DEPENDENCE OF BUILDING CHARACTERISTICS – COLOGNE PROGRAM ACTIVE HEALTH CARE</b> .....	1809
<i>C. Greven, C. Kaesler, G. Barth, G. Wiesmüller, W. Dott</i>	
<b>INDOOR AIR PROBLEMS IN NEW SCHOOLS AND DAYCARE CENTERS</b> .....	1811
<i>C. Vornanen-Winqvist, R. Mikkola, M. Mattila, U. Lignell, S. Hildén, T. Tuomi, H. Salonen, J. Kurnitski</i>	
<b>INVESTIGATION OF INDOOR RADON CONCENTRATIONS IN CHILD-CARE FACILITIES IN SOUTH KOREA</b> .....	1819
<i>C. Lee, D. Lee, Y. Cho, Y. Jin, Y. Gwak</i>	
<b>CHARACTERIZATION OF INDOOR AIR POLLUTANTS IN SINGAPORE CHILD CARE CENTRES IN DIFFERENT VENTILATION MODES</b> .....	1824
<i>B. Wang, V. W.-C. Chang, B. Liu</i>	
<b>EVALUATION OF INDOOR AIR QUALITY IN SCHOOLS AND NURSERIES FOLLOWING ODORS OR SYMPTOMS</b> .....	1828
<i>G. Thiault, L. Paillat, E. Faure, F. Rieunier, G. Goupil, L. Durupt, V. Eudes</i>	
<b>ENVIRONMENTAL BACTERIAL ANTIBIOTIC RESISTANCE GENES IN FLOOR DUST IN A NORWEGIAN KINDERGARTEN</b> .....	1830
<i>A. Nygaard, C. Charnock</i>	
<b>A STUDY ON DISTRIBUTION OF PM10 AND PM2.5 CONCENTRATIONS IN DAYCARE CENTERS, SEOUL</b> .....	1832
<i>H.-W. Lee, N.-N. Jeong, J.-R. Sohn, J. Seo</i>	

## **ID50 SOCIAL HOUSES**

<b>INDOOR CLIMATE IN RENOVATED AND ENERGY RETROFITTED SOCIAL HOUSING</b> .....	1837
<i>H. N. Knudsen, O. M. Jensen</i>	
<b>INVESTIGATION OF THERMAL ENVIRONMENT FOR EARTH BUILDING IN HOT-HUMID AREA OF CHINA</b> .....	1845
<i>J. Fang, M. Tang, P. Song, L. Jiang</i>	
<b>INDOOR AIR QUALITY IN SOUTH AFRICA: A CASE STUDY IN A SMALL, ISOLATED LOW-INCOME SETTLEMENT</b> .....	1853
<i>B. Language, S. Piketh, R. Burger</i>	
<b>PARTICULATE MATTER CONCENTRATIONS IN MULTI-UNIT SOCIAL HOUSING</b> .....	1854
<i>A. Mahdavi, D. Haaland, J. Siegel</i>	

<b>WEATHERIZATION AND INDOOR AIR IN LOW-INCOME SINGLE FAMILY HOMES IN DENVER, COLORADO: PRELIMINARY RESULTS</b> .....	1856
<i>S. Miller, J. Humphrey, P. Shrestha, J. Adgate, E. Root, E. Carlton</i>	

### **ID58 THERMAL COMFORT IN BEDROOMS**

<b>EFFECTS OF TEMPERATURE CYCLES ON THERMAL COMFORT AND SLEEP QUALITY OF SLEEPING PEOPLE</b> .....	1860
<i>L. Lan, Z. Lian</i>	
<b>EVALUATION OF SKYLIGHT SUFFICIENCY FOR THERMAL, LIGHT AND VISUAL ENVIRONMENT IN KF-STATION</b> .....	1862
<i>K. Furumoto, N. Ikeda, S.-I. Tanabe, H. Oishi, J. Nakano, S. Kato, Y. Ikeda</i>	
<b>HUMAN THERMAL RESPONSE FOR PEOPLE LYING AT REST IN THE ENVIRONMENT COOLED BY FANS AND AIR-CONDITIONERS</b> .....	1870
<i>Y. Chen, Y. Zhang</i>	
<b>EFFECTS OF FLUCTUATIONS IN THE THERMAL ENVIRONMENT ON QUALITY OF SLEEP</b> .....	1878
<i>M. Tagawa, E. Miyake, Y. Sakurai, N. Ikeda, A. Hirose, S. Tanabe, K. Matsumae, T. Matsubasa</i>	
<b>OPERATION OF GRADATED VENETIAN BLINDS BY HIGH SCHOOL STUDENTS AND DAYLIGHT UTILIZATION</b> .....	1886
<i>M. Matsuda, N. Harada, K. Utsumi, M. Nagoshi, A. Takimoto, S. Horikawa, S. Tsukami, M. Kuboki, E. Togashi, S.-I. Tanabe</i>	
<b>SENSORY EVALUATION OF BUILDING PRODUCTS: A CRITICAL DISCUSSION OF THE OVERALL METHOD</b> .....	1894
<i>T. Salthammer, E. Uhde, N. Schulz, R. Stolte</i>	
<b>THE EFFECTS OF INCREASED BEDROOM AIR TEMPERATURE ON SLEEP AND NEXT-DAY PERFORMANCE</b> .....	1896
<i>S. Petersen, P. Strøm-Tejsten, S. Mathiasen, M. Bach</i>	
<b>THE IMPACT OF VENTILATION AND DAYLIGHT ON LEARNING IN SCHOOLS – A SUMMARY OF THE ACTUAL STATE OF KNOWLEDGE</b> .....	1904
<i>S. Urlaub, G. Grün, P. Foldbjerg, K. Sedlbauer</i>	
<b>PILOT STUDY ON THE EFFECT OF NEUTRAL-HOT CONDITION AND AIRFLOW ON SLEEP QUALITY</b> .....	1912
<i>M. Zhu, Q. Ouyang, H. Shen, Y. Zhu</i>	
<b>BEDROOM THERMAL SATISFACTION AND AC USAGE PATTERNS IN NEW YORK CITY</b> .....	1920
<i>W. V. Lee, J. Shaman</i>	
<b>FIELD SURVEY ON INDOOR THERMAL ENVIRONMENT OF BEDROOM DURING SLEEP IN SOUTHEAST ASIA</b> .....	1922
<i>I. Mori, K. Tsuzuki</i>	

### **ID93 IAQ TRANSPORT**

<b>FINE AND ULTRAFINE PARTICLE CONCENTRATIONS CLOSE TO A HIGHWAY AND POTENTIAL IMPACT ON IAQ IN NEARBY RESIDENCES</b> .....	1927
<i>M. Kong, R. Chen, D. Chen, Y. Zhang, Y. Lu, B. Guo, J. Zhang</i>	
<b>INDOOR AIR POLLUTION AT THE JERUSALEM CENTRAL BUS STATION</b> .....	1935
<i>G. Sharf, D. Alper Simantov, M. Peleg</i>	
<b>EFFECT OF URBAN STREET CANYON ON INTAKE FRACTION FOR TRAFFIC POLLUTANTS</b> .....	1943
<i>Z. Luo, J. Hang, M. Lin, B. Wang</i>	
<b>INFLUENCE OF TEMPERATURE ON DYNAMIC EMISSION OF FORMALDEHYDE FROM INTERIOR MATERIALS IN VEHICLE CABINS</b> .....	1945
<i>S. Yang, X. Yang</i>	
<b>EFFECT OF INDOOR WIND ON TEMPERATURE DISTRIBUTION WITH DOOR OPENING AND CLOSING IN AN URBAN TRANSIT CAR DURING WINTER SEASON</b> .....	1952
<i>Y. Cho, S. Bark Kwon, D. Park</i>	
<b>EXPERIMENTAL ANALYSIS OF DIFFERENT VENTILATION CONCEPTS FOR THE PASSENGER COMPARTMENT OF A GENERIC CAR</b> .....	1954
<i>T. Dehne, A. Volkmann, D. Schmeling, J. Bosbach</i>	
<b>VEHICLE INTERIOR AIR QUALITY - (S)VOC EMISSION FROM MATERIALS: REGULATION, STANDARD METHODS AND ANALYTICAL IMPLEMENTATION</b> .....	1962
<i>C. Widdowson</i>	
<b>INVESTIGATION ON DEPOSITION EFFECT OF ROADSIDE TREES ON TRAFFIC RELEASED PM10 IN STREET CANYON</b> .....	1963
<i>F. Xue, X. Li</i>	
<b>NUMERICAL EVALUATION OF VERTICAL AIR VENTILATION SYSTEMS FOR FUTURE CAR CABINS</b> .....	1965
<i>N. Boughanmi, L. Enke, J. Frisch, C. Van Treeck</i>	

## **ID133 IAQ SURVEYS AND CASE STUDIES**

<b>THE RISK OF INDOOR AIR POLLUTANTS ACCUMULATION IN FIVE HOUSING TYPES IN HO CHI MINH CITY (VIETNAM)</b> .....	1973
<i>T. Thi Thu Thuy, D. T. K. Nguyen, T. N. Tran, P. D. H. Dinh, T. V. Le, O. Michel, C. Bouland, J.-M. Hauglustaine</i>	
<b>TYOLOGY OF HOUSES AND VENTILATION CHARACTERISTICS: A CASE STUDY IN HO CHI MINH CITY (VIETNAM)</b> .....	1981
<i>T. Thi Thu Thuy, D. T. K. Nguyen, T. N. Tran, P. D. H. Dinh, T. V. Le, O. Michel, C. Bouland, J.-M. Hauglustaine</i>	
<b>VENTILATION RATES BEFORE AND AFTER ENERGY RETROFIT IN MULTI-FAMILY BUILDINGS IN FINLAND</b> .....	1987
<i>V. Leivo, M. Turunen, A. Aaltonen, M. Kiviste, U. Haverinen-Shaughnessy</i>	
<b>INDEX FOR SURVEYS OF INDOOR POLLUTION IN BRUSSELS DWELLINGS</b> .....	1989
<i>C. Chasseur, S. Bladt, M. Wanlin</i>	
<b>FIELD TESTING OF VENTILATION IN LARGE SHOPPING CENTRES IN CHINA</b> .....	1997
<i>H. Li, X. Li</i>	
<b>THE ISOPA PASSIVE HOUSE - INDOOR AIR QUALITY PERFORMANCE</b> .....	2003
<i>E. Vangronsveld, K. Ahrika</i>	

## **ID61 PREVENTIVE HEALTH CARE**

<b>INDOOR AIR QUALITY AND SICK BUILDING SYNDROME IN TERTIARY BUILDINGS: CURRENT PROBLEMS AND FUTURE PERSPECTIVES</b> .....	2012
<i>C. Croitoru, I. Nastase</i>	
<b>MEASURING ENVIRONMENTAL CONTAMINATION IN PATIENT ROOMS AND IMPROVING CLEANING METHODS</b> .....	2018
<i>M. Iijima, M. Suzuki, M. Matsumura, M. Ogata, S.-I. Tanabe, H. Tsutsumi, S. Hori</i>	
<b>PERSONAL EXPOSURE AND BIOLOGICAL MONITORING IN ASSESSING ENVIRONMENTAL EXPOSURE TO TOLUENE</b> .....	2026
<i>W. Yang, D. Jung, J. Shual, S. Kim, J. Heo, B. Lee</i>	

## **VOLUME 4**

<b>LABORATORY TESTS OF THE INDOOR AIR FILTRATION EFFICIENCY OF GREEN WALLS</b> .....	2028
<i>B. Hanoune, A. Caron, A. Langlois, M.-A. Camesan</i>	
<b>OCCUPATIONAL HYGIENE TECHNICIAN WALKTHROUGH FOR ASSESSING INDOOR ENVIRONMENTAL QUALITY AND SAFETY RISKS UN URBAN HOSPITALS</b> .....	2030
<i>T. Cordon, D. Shendell, M. London</i>	
<b>INDOOR PARTICULATE MATTER POLLUTION RELATED TO CIGARETTE SMOKE AND ITS REMOVAL EFFECT OF AIR CLEANERS</b> .....	2038
<i>A. Nozaki, Y. Narita, Y. Ishii, T. Sakuma</i>	

## **ID109 PASSIVE CLEANING TECHNOLOGY**

<b>THE MOISTURE BUFFERING EFFECT OF FINISHING COATINGS ON WOODEN MATERIALS</b> .....	2045
<i>W.-L. Tseng, C.-T. Huang, Y.-S. Tsay, Y.-H. Chang</i>	
<b>PREPARATION AND ANTIBACTERIAL ACTIVITY OF SILVER NANOPARTICLES SUPPORTED BY TIO<sub>2</sub>-CHITOSAN NANOCOMPOSITES</b> .....	2053
<i>Y.-C. Wu, Y.-C. Chen, K.-P. Yu</i>	
<b>EVALUATION OF THERMAL ENHANCED WOOD-BASED MATERIALS WITH HIGH VOCS ADSORPTION BY USING CARBON-NANOMATERIAL</b> .....	2055
<i>S. Kim, S. Wi, S. Jin Chang, S.-G. Jeong</i>	
<b>TIO<sub>2</sub> NANOPARTICLES ELIMINATE EFFICIENTLY INDOOR AIR MOLDS AND BACTERIA</b> .....	2061
<i>E.-M. Lilius, J. Atosuo, E. Suominen</i>	
<b>PHOTOCATALYTIC NANOMATERIALS AS AN INDOOR AIR REMEDIATION TECHNOLOGY</b> .....	2063
<i>A. Gandolfo, B. Temime-Roussel, H. Wortham, S. Gligorovski</i>	
<b>ECO-FRIENDLY SUSTAINABLE BUILDING CONSTRUCTION MATERIALS: SIMULATION OF ADSORPTION AND DESORPTION FOR CONTROLLED MDF-PART 2</b> .....	2065
<i>S. Chinthala, S. Gulia, S. Stratbuecker, S. R. Bolineni, C. Da Silva, C. Rana, K. Mower, A. Dengel, M. Khare</i>	
<b>IMPACT OF PHOTOCATALYTIC PAINTS ON OXIDATIVE CAPACITY OF INDOOR ATMOSPHERE</b> .....	2071
<i>A. Gandolfo, V. Bartolomei, M.-E. Gomez-Alvarez, S. Tlili, H. Wortham, J. Kleffmann, S. Gligorovski</i>	
<b>ADJUSTABLE POLYCHROMATIC UVLED FOR BIOAEROSOL AND SURFACE DISINFECTION</b> .....	2073
<i>M. Hernandez, A. Handorean, J. Pagan</i>	
<b>LANGMUIR-HINSHLWOOD TYPE KINETICS OF GAS PHASE PHOTOCATALYTIC OXIDATION ON BUILDING MATERIAL AS A FUNCTION OF ILLUMINATION INTENSITY</b> .....	2075
<i>T. Yamaguchi, E. Sumiyoshi, K. Yamamoto, E. Lim, K. Ito</i>	

<b>LONG-TERM PERFORMANCE ANALYSIS OF THE INDOOR ENVIRONMENT PSBM USING THE MEMS SENSING SYSTEM</b> .....	2077
<i>C. C. Chen, C.-Y. Lee, H. Huang</i>	

#### **ID104 THERMAL COMFORT PERFORMANCE OF HVAC**

<b>INTERACTION OF THERMAL RADIATION WITH INDOOR TURBULENT NATURAL CONVECTION HEAT TRANSFER IN ROOMS WITH POROUS BUILDING ENVELOPE</b> .....	2083
<i>Y. Wang, J. Yang, X. Zhang, Y. Pan</i>	
<b>EXPERIMENTAL EVALUATION OF INTERMITTENT AIR JET VENTILATION STRATEGY: COOLING EFFECT AND THE ASSOCIATED ENERGY SAVINGS</b> .....	2091
<i>A. Kabanshi, H. Wigö</i>	
<b>PERSONALIZED HEATING – HEATERS' EFFECTIVENESS</b> .....	2099
<i>M. Vesely, P. Molenaar, Y. Zhao, W. Zeiler</i>	
<b>EFFECT OF A CHAIR-BASED PERSONALIZED ISOTHERMAL AIRFLOW SYSTEM ON THERMAL COMFORT</b> .....	2107
<i>S. Watanabe, J. Ishii</i>	
<b>MODELING OF A HYBRID SOLAR RADIANT COOLING SYSTEM IN A HIGH-RISE BUILDING IN MALAYSIA</b> .....	2109
<i>Y. H. Yau, H. Low</i>	
<b>LOW ENERGY COMFORT WITH AIR MOVEMENT IN SPORT FACILITIES</b> .....	2111
<i>Y. Zhai, C. Elsworth, H. Zhang, E. Arens, Y. Zhang, L. Zhao</i>	
<b>THERMAL COMFORT IN HIGH-RISE DOUBLE TRANSPARENT FACADE BUILDINGS - FACADE OPENING SIZE</b> .....	2113
<i>K. Valouskova</i>	
<b>THE EFFECT OF VERTICAL GREENERY WITH CROSS VENTILATION ON IMPROVING THERMAL COMFORT</b> .....	2121
<i>M.-C. Lu, W.-C. Chiu, Y.-S. Tsay</i>	
<b>NUMERICAL ANALYSIS OF THERMO-AEREAULIC BEHAVIOR FOR A VENTILATED ENCLOSURE, PROVIDED WITH RADIANT COOLING CEILING</b> .....	2129
<i>C. Teodosiu, V. Ilie, R. Teodosiu</i>	
<b>A MODEL FOR PREDICTING THE EVAPOTRANSPIRATION RATE OF WILD ALLAMANDA FOR LIVING WALL SYSTEMS</b> .....	2137
<i>J.-Y. Lin, C.-H. Lin, Y.-S. Tsay</i>	

#### **ID75 I/O MODELS**

<b>MODELING THE IMPACT OF RESIDENTIAL HVAC FILTRATION ON INDOOR PM<sub>2.5</sub> OF OUTDOOR ORIGIN AND ASSOCIATED LONG-TERM HEALTH IMPACTS FOR REDUCING PREMATURE MORTALITY</b> .....	2142
<i>D. Zhao, B. Stephens, P. Azimi</i>	
<b>RELATIONSHIP BETWEEN INDOOR AND OUTDOOR PARTICLE CONCENTRATIONS BY PENETRATION COEFFICIENT AND DEPOSITION RATE IN OFFICE BUILDING</b> .....	2144
<i>B. Lee, S. W. Yee, D. H. Kang, M. S. Yeo, K.-W. Kim</i>	
<b>THE IMPACT OF A PORTABLE AIR CLEANER ON RESIDENTIAL INDOOR AIR POLLUTION REDUCTIONS IN CHINA – AN INTERVENTION STUDY</b> .....	2146
<i>Q. Meng, H. Wang, J. Zhang, B. Li, R. Yao, Z. Fan, H. Kipen</i>	
<b>IMPACT OF OUTDOOR POLLUTIONS ON INDOOR ENVIRONMENTS – CASE STUDY OF THREE PRIMARY SCHOOLS IN THE UK</b> .....	2148
<i>R. Yao, Z. Luo, E. Essah, S. Huang, L. Zhao, M. Shahrestani</i>	
<b>IMPACT OF DIFFERENT STRUCTURE OF EXTERNAL WINDOW ON INDOOR AIR QUALITY WITH RESPECT TO PM<sub>2.5</sub> POLLUTION BASED ON INFILTRATION VENTILATION</b> .....	2155
<i>Z. Chen, C. Chen, S. Wei, L. Zhao, Y. Wan, Y. Wang, Y. Wu, K. Gu</i>	

#### **ID98 MICROBIOLOGY**

<b>CHARACTERIZATION AND ANTIFUNGAL PERFORMANCE OF NANO-SILVER SUPPORTED BY TiO<sub>2</sub> ON ASPERGILLUS NIGER SPORES</b> .....	2163
<i>Y.-C. Chen, K.-P. Yu, M.-C. Tsai</i>	
<b>IS LOW INDOOR HUMIDITY A DRIVER FOR HEALTHCARE-ASSOCIATED INFECTIONS?</b> .....	2165
<i>S. Taylor, W. Hugentobler</i>	
<b>OCCURRENCE OF VISIBLE MOULDS IN FRENCH SCHOOLS AND NURSERIES</b> .....	2170
<i>O. Ramalho, J. Ribéron, C. Mandin</i>	
<b>RETENTION OF FUNGAL ENZYME ACTIVITY IN PENICILLIUM, CLADOSPORIUM, ASPERGILLUS AND ACREMONIUM SAMPLES</b> .....	2172
<i>A. Salmela, V. Lappalainen, P. Pasanen, T. Reponen</i>	
<b>EXTERNAL REVIEW PROCEDURES IN FINNISH STATE-SUPPORTED MOLD RENOVATIONS</b> .....	2174
<i>T. Marttila, P. Annala, J. Suonketo, P. Kero, M. Pentti</i>	



<b>USE OF INDOOR AIR PARAMETERS AS INDICATORS OF WATER DAMAGE IN BUILDINGS: RESULTS FROM A FIELD STUDY OF PUBLIC AND PRIVATE HOUSING IN NEW YORK CITY</b> .....	2180
<i>M. Spilak, M. Waring, R. Adams, I. Sylvain</i>	
<b>THE MICROBIOME OF THE BUILT ENVIRONMENT AND MENTAL HEALTH</b> .....	2187
<i>A. Hoisington, L. Brenner, T. Postolache, C. Lowry, K. Kinney</i>	

### **ID2005 PERCEPTION/ODORS/SURVEYS**

<b>TRANSFERABILITY OF RESULTS OF OLFACTORY MEASUREMENTS UNDER LABORATORY CONDITIONS AND IN A FIELD TEST</b> .....	2189
<i>D. Hegemann, M. Wesseling, D. Müller</i>	
<b>WHAT IS YOUR UNPLEASANT ODOR?</b> .....	2197
<i>A. Hasegawa, T. Shiiba, M. Mitsuda</i>	
<b>SENSORY EVALUATION OF BUILDING PRODUCTS: INFLUENCES OF DIRECT AND INDIRECT ASSESSMENT</b> .....	2202
<i>T. Salthammer, E. Uhde, N. Schulz, R. Stolte</i>	
<b>METHOD-VERIFICATION AND OPTIMISATION OF THE STANDARDISED ASSESSMENT OF ODOUR INTENSITY REGARDING ISO 16000-28</b> .....	2204
<i>L. Brosig, W. Horn, O. Jann</i>	
<b>COMPARISON OF VOC SAMPLING AND ODOUR TEST METHODS FOR MATERIAL TESTING</b> .....	2210
<i>M. Jönsson, P.-E. Gustavsson, M. Bude</i>	
<b>SENSORY RATINGS OF EMISSIONS FROM NONTRADITIONAL BUILDING MATERIALS</b> .....	2212
<i>B. Krejcirikova, J. Kolarik, R. Peuhkuri, C. Rode, P. L. Wargocki</i>	

### **ID2000 IAQ, VENTILATION AND ENERGY-EFFICIENCY IN EUROPEAN BUILDINGS: ADVANCING THE INTEGRATED IMPLEMENTATION OF RELATED NEW CONCEPTS, GUIDELINES, STANDARDS AND TOOLS**

<b>INDOOR AIR QUALITY AND VENTILATION IN THE FUTURE WORLD PRACTICE</b> .....	2214
<i>E. De Oliveira Fernandes, H. Santos, S. Kephelopoulos, P. Carrer, P. L. Wargocki</i>	

### **ID46 PREVENTIVE HEALTH CARE IN PRACTICE (GOVERNMENT OF FLANDERS – AGENCY FOR CARE AND HEALTH)**

<b>SESSION SUMMARY - PREVENTIVE HEALTH CARE IN PRACTICE</b> .....	2221b
<b>EFFECTS OF EDUCATIONAL ACTIVITY ON OPENING CONTROL OF WINDOWS WITH A NATURAL VENTILATION MAXIMIZATION SYSTEM FOR SCHOOL BUILDINGS</b> .....	2222
<i>A. Takimoto, M. Matsuda, S. Horikawa, S. Tsukami, M. Kuboki, E. Togashi, S.-I. Tanabe, N. Harada, M. Nagoshi, K. Utsumi</i>	
<b>REQUIREMENTS FOR INDOOR AIR IN REFUGEE ACCOMMODATIONS - A FIELD REPORT</b> .....	2230
<i>C. Hornberg, G. Wiesmüller, J. Hurraß, A. Bunte</i>	
<b>DESCRIPTION AND CATEGORIZATION OF DOMESTIC CARBON MONOXIDE POISONING EVENTS OCCURRING IN THE AREA OF PARIS AND RELATED TO THE USE OF EQUIPMENT CONNECTED TO INDIVIDUAL FLUE</b> .....	2232
<i>C. Bassi, G. Goupil, G. Thiault, F. Taurines, A. Verrier</i>	

### **ID43 EMISSIONS FROM BUILDING MATERIALS INTO THE INDOOR AIR. SOURCES AND CONTROL**

<b>SESSION SUMMARY - EMISSIONS FROM BUILDING MATERIALS INTO THE AIR. SOURCES AND CONTROL</b> .....	2234
<b>A NOVEL SOLUTION FOR REDUCING THE TRANSFER OF CONTAMINANTS AMONG ADJACENT APARTMENTS</b> .....	2236
<i>A. Iqbal, A. Afshari</i>	
<b>LABORATORY TEST OF SOURCE ENCAPSULATION FOR DECREASING PCB CONCENTRATIONS</b> .....	2244
<i>B. Kolarik, H. Andersen, P. Markowicz, L. Gunnarsen, L. Larsson</i>	
<b>EXPERIENCES IN USING A SURFACE EMISSIONS TRAP TO IMPROVE THE INDOOR AIR QUALITY BY EFFICIENT EXPOSURE REDUCTION</b> .....	2252
<i>L. Larsson, J. Mattsson</i>	
<b>LONGTERM EFFECTS FROM DAMAGED FLOORS IN APARTMENTS</b> .....	2254
<i>P. Mettinen, H. Mussalo-Rauhamaa</i>	
<b>EFFICIENCY AND PERFORMANCE TESTS OF THE SROPTIVE BUILDING MATERIALS THAT REDUCE INDOOR FORMALDEHYDE CONCENTRATIONS</b> .....	2259
<i>C.-C. Lee, K.-C. Huang, J.-W. Chang, Y.-S. Tsay, F.-M. Lin, C.-M. Chiang</i>	

## **ID1196 IMPACT OF THE OUTDOOR AIR QUALITY ON INDOOR ENVIRONMENTS**

<b>CHEMICAL CHARACTERIZATION OF INDOOR AND OUTDOOR PM<sub>2.5</sub>, PM<sub>10</sub> AND VOCs IN A PUBLIC BUILDING IN DOHA CITY, QATAR</b> .....	2267
<i>D. Saraga, T. Maggos, K. Kakosimos, E. Fthenou, H. Hassan, Z. Truman, V. Tsiouri, S. Karavoltsos, A. Sakellari, C. Vasilakos, E. Sadoun</i>	
<b>ON-LINE HOURLY VOC MONITORING IN A LOW ENERGY BUILDING: IMPACT OF BUILDING MATERIAL EMISSIONS, OUTDOOR SOURCES AND VENTILATION ON AMBIENT CONCENTRATIONS</b> .....	2268
<i>M. Verrielle, T. Leonardis, S. Dusanter, C. Schoemaeker, N. Locoge</i>	
<b>AIRTIGHTNESS AND INFILTRATION OF FINE PARTICULATE MATTER FROM OUTDOOR OF AN APARTMENT BUILDING IN KOREA</b> .....	2274
<i>J. Bang, S. Jo, M. Sung</i>	
<b>DETERMINING POLLUTION INFILTRATION RATES FOR A BUILDING IN A DENSELY PACKED URBAN NEIGHBOURHOOD</b> .....	2276
<i>J. Barlow, A. Brocklehurst, C. Halios</i>	
<b>AN EXPERIMENTAL STUDY TO INVESTIGATE THE IMPACT OF OUTDOOR PARTICLES ON INDOOR AIR IN RESIDENTIAL HOUSING UNITS</b> .....	2284
<i>D. Hwa Kang, D. Hee Choi</i>	
<b>ANALYSIS OF INDOOR AND OUTDOOR OZONE CONCENTRATIONS IN 30 HIGH SCHOOL CLASSROOMS</b> .....	2286
<i>M. Wade, L. Lesnick, R. Corsi, A. Novoselac, N. Crain</i>	

## **ID35 DO HEALTHY BUILDINGS NEED TECHNOLOGY?**

<b>SESSION SUMMARY - DO HEALTHY BUILDINGS NEED TECHNOLOG?</b> .....	2288
---	------

## **ID19 CLOTHING AND ITS IMPACT ON EXPOSURE TO AIR POLLUTANTS IN INDOOR ENVIRONMENTS**

<b>SESSION SUMMARY - CLOTHING AND ITS IMPACT ON EXPOSURE TO AIR POLLUTANTS IN INDOOR ENVIRONMENTS: A REVIEW OF THE INDOOR AIR 2016 SYMPOSIUM</b> .....	2296
<b>ROLE OF CLOTHING IN DERMAL EXPOSURE TO PHTHALATES: INSIGHTS FROM SAMPLING BOTH SKIN AND JEANS</b> .....	2301
<i>M. Gong, C. Weschler, Y. Zhang</i>	
<b>MEASUREMENTS OF DERMAL UPTAKE OF NICOTINE DIRECTLY FROM AIR AND CLOTHING</b> .....	2303
<i>G. Bekö, G. Morrison, C. Weschler, H. Koch, T. Salthammer, T. Schripp, J. Toftum, G. Henrik Clausen</i>	
<b>ROLE OF CLOTHING IN TRANSDERMAL UPTAKE OF GAS-PHASE SVOCs: TRANSIENT MODEL DEVELOPMENT AND EVALUATION</b> .....	2305
<i>J. Cao, Y. Zhang</i>	
<b>SIZE-RESOLVED TOTAL PARTICLE AND FLUORESCENT BIOLOGICAL AEROSOL PARTICLE EMISSIONS FROM CLOTHING</b> .....	2307
<i>Y. Tian, D. Licina, J. A. Huffman, N. Savage, W. Nazaroff</i>	
<b>DERMAL UPTAKE OF PHTHALATES FROM CLOTHING: COMPARISON OF MODEL TO HUMAN PARTICIPANT RESULTS</b> .....	2312
<i>G. Morrison, G. Bekö, C. Weschler</i>	
<b>EXPERIMENTAL APPROACH TO DETERMINE THE SVOC-UPTAKE OF DIFFERENT FABRIC TYPES</b> .....	2314
<i>E. Uhde, G. Morrison, T. Schripp, D. Varol</i>	

## **ID20 EMERGING RESEARCH AREAS IN INDOOR OXIDATIVE CHEMISTRY**

<b>INFLUENCE OF OPERATING PARAMETERS ON PHOTOCATALYTIC OXIDATION TREATMENT EFFICIENCY: CONTACT TIME INVESTIGATION</b> .....	2316
<i>V. Hequet, L. Olivier, V. M. Mboula, C. Raillard, A. Subrenat, L. Le Coq</i>	
<b>PHOTOCATALYTIC AIR-PURIFIERS FOR INDOOR AIR: EUROPEAN STANDARD AND PILOT ROOM EXPERIMENTS</b> .....	2321
<i>S. Lacombe, N. Costarramone, C. Cantau, V. Desauziers, C. Pecheyran, B. Kartheuser, T. Pigot</i>	
<b>IMPACT OF PHOTOCATALYTIC BUILDING PRODUCTS ON INDOOR AIR QUALITY UNDER VISIBLE LIGHT CONDITIONS</b> .....	2329
<i>V. Bartolomei, S. Delaby, D. Boutry, M. Nicolas</i>	
<b>OZONE CATALYTIC OXIDATION OF INDOOR FORMALDEHYDE OVER MNO<sub>x</sub>-CEO<sub>2</sub>/TIO<sub>2</sub> CATALYSTS PREPARED BY CHEMICAL VAPOR CONDENSATION AT ROOM TEMPERATURE: EFFECT OF A CERIA ADDITIVE</b> .....	2337
<i>J. Jurng, E. S. Park, M. Kim, H. Jung</i>	
<b>REACTIVE UPTAKES OF NO<sub>2</sub> ON PHOTOCATALYTIC PAINTS AS A FUNCTION OF TEMPERATURE</b> .....	2339
<i>A. Gandolfo, S. Gligorovski, H. Wortham</i>	

**ID2009 HUMAN EMISSIONS**

**MEASUREMENTS OF DERMAL AND ORAL EMISSIONS FROM HUMANS** ..... 2341  
*S. Tsushima, G. Bekö, R. Bossi, S.-I. Tanabe, P. L. Wargocki*

**PERSONAL ACTIVITIES AS SOURCES OF HUMAN PERSONAL CLOUDS** ..... 2343  
*D. Licina, Y. Tian, W. Nazaroff*

**CONTRIBUTIONS OF HUMAN EMISSIONS TO INDOOR AIR COMPOSITION** ..... 2345  
*A. Goldstein, X. Tang, P. Misztal, W. Nazaroff*

**CHARACTERIZATION OF EXHALED BREATH DROPLETS FROM INFLUENZA PATIENTS IN THE TROPICS** ..... 2347  
*T. Wai, V. Kwong, D. Wen*

**EFFECTS OF EXPOSURES TO HUMAN BIOEFFLUENTS** ..... 2349  
*X. Zhang, P. Wargocki, Z. Lian*

**ID48 APPLICATION AND VALIDATION OF MODELS FOR WHOLE BUILDING INDOOR-OUTDOOR CONTAMINANT TRANSPORT**

**SESSION SUMMARY - APPLICATION AND VALIDATION OF MODELS FOR WHOLE BUILDING INDOOR-OUTDOOR CONTAMINANT TRANSPORT** ..... 2351

**ASSESSING THE VALIDITY OF COMPUTATIONAL MODELLING APPROACHES IN PREDICTING PARTICULATE MATTER CONCENTRATIONS DURING HOUSEHOLD EMISSION SCENARIOS** ..... 2354  
*J. McGrath, M. Byrne*

**SIZE-RESOLVED INDOOR FLUORESCENT BIOAEROSOL FROM OUTDOOR ORIGIN: A SEVEN- DAY MEASUREMENT IN AN OFFICE** ..... 2357  
*Y. Xie, O. A. Fajardo, W. Yan, B. Zhao, J. Jiang*

**MODELLING OF OUTDOOR POLLUTANT TRANSFERS IN BUILDINGS** ..... 2365  
*E. Powaga, B. Collignan*

**A CONTAM VALIDATION CASE STUDY OF A MULTI-FLOOR OFFICE BUILDING USED IN THE JOINT URBAN 2003 DISPERSION FIELD TRIALS** ..... 2373  
*S. Batchelor, B. Lingard, S. Parker, S. Herring*

**FIELD OBSERVATIONS OF DENSE GAS TRANSPORT IN OFFICE TRAILERS AND SYNTHETIC BUILDINGS** ..... 2375  
*M. Sohn, W. Delp, W. Chan*

**ID34 STRATUM VENTILATION**

**SESSION SUMMARY - STRATUM VENTILATION FOR UNIFORM OR DIFFERENTIATED THERMAL ENVIRONMENTS?** ..... 2377

**ID107 THERMAL COMFORT PERFORMANCE OF HVAC**

**INFLUENCE OF DIFFERENT AIR DISTRACATION SYSTEM ON TEMPERATURE BARRIER FREE AND ENERGY SAVING: A CASE STUDY IN JAPANESES DETACHED HOUSE** ..... 2380  
*Y. Fan, M. Toyoshima, E. Takeda*

**VISUALIZATION OF INTERNAL AIRFLOW DISTRIBUTION AND ENERGY PERFORMANCE OF A HEAT EXCHANGE TYPE AIR FLOW WINDOW** ..... 2388  
*S. Inoshima, H. Matsumoto*

**COMFORT EVALUATION OF TASK AIR UNIT INTEGRATED WITH AMBIENT AIR DIFFUSER** ..... 2395  
*T. Akimoto, K. Yoshida, T. Yanai, T. Matsumoto, Y. Nakashima*

**OPTIMIZATION OF RADIANT TERMINAL LAYING PATTERNS BASED ON THERMAL COMFORT** ..... 2403  
*X. Sui, Y. Yan, M. Zhang, Y. Lu*

**UNSTEADY AIR SUPPLY IN DISPLACEMENT VENTILATION: IMPACT ON THERMAL COMFORT AND ENERGY DEMAND** ..... 2411  
*E. Lichtner, N. Schultz, M. Kriegel*

**EVALUATION OF APPROACHES TO REDUCE PLENUM TEMPERATURE VARIATIONS IN THE UFAD SYSTEM** ..... 2413  
*J. Hyun Oh, K. Hyung Yu, S. Sook Kim*

**EFFECTS OF ENVIRONMENTAL CHANGE INTO DIFFERENT HOT CLIMATE ON HUMAN BODY** ..... 2415  
*K. Li, N. Li, Y. Li, M. Xu, X. Yang, S. Zhang*

**THE DYNAMIC BEHAVIOUR OF INDOOR AIR TEMPERATURE INDUCED BY EARTH-TO-AIR HEAT EXCHANGER (EAHE)** ..... 2422  
*D. Yang, H. Wei*

**EXPERIMENTAL STUDY OF THERMAL COMFORT IN A STRATUM-VENTILATED CLASSROOM WITH LAPTOPS** ..... 2430  
*Y. Cheng, Z. Lin, A. M. L. Fong, Z. Fang*

## **ID92 IAQ PLANE BOAT**

<b>FACTORS AFFECTING ENDOTOXINS IN SETTLED DUST IN DIFFERENT INDOOR ENVIRONMENTS - A REVIEW</b> .....	N/A
<i>H. Salonen, C. Duchaine, V. Le tourneau, M. Mazaheri, S. Laitinen, S. Clifford, S. Lappalainen, K. Reijula, L. Morawska, R. Mikkola</i>	
<b>MODELLING AIR DISTRIBUTION IN AIRCRAFT CABINS WITH A SIMPLIFIED GASPER MODEL</b> .....	2438
<i>R. You, W. Liu, J. Chen, C.-H. Lin, D. Wei, Q. Chen</i>	
<b>INVESTIGATION OF REACTION PRODUCTS OF OZONE AND ORGANIC COMPOUNDS IN A SIMULATED AIRCRAFT CABIN</b> .....	2446
<i>A. Mizukoshi, K. Azuma, D. Tanaka, M. Inoue, S. Usui, J. Okumura</i>	
<b>STUDY ON THE EXPERIMENTAL SIMULATION OF SOLAR LOAD AND PASSENGER LOAD IN PASSENGER CABIN</b> .....	2453
<i>Y. Cho, D. Park, S. Bark Kwon</i>	
<b>PERSONAL EXPOSURE OF SEAFARERS TO AIR POLLUTANTS AND PERCEIVED INDOOR AIR QUALITY ON A PASSENGER FERRY</b> .....	2455
<i>C. Österman, S. Langer, J. Moldanova</i>	
<b>RESEARCH ON 1D-3D CO-SIMULATION FOR CABIN AIR ENVIRONMENT</b> .....	N/A
<i>T. Y. X. Chen</i>	
<b>THE INFLUENCE OF AIR DISTRIBUTION MODES IN AIRCRAFT CABIN ON PASSENGERS' THERMAL COMFORT</b> .....	2463
<i>T. Wu, W. Cui, Q. Ouyang, Y. Zhu, J. Kang, J. Liu</i>	
<b>EXPERIMENTAL INVESTIGATIONS ON THE GASPER JET INSIDE A 7-ROW AIRCRAFT CABIN MOCKUP</b> .....	2471
<i>J. Li, S. Dai, J. Liu</i>	
<b>LOAD CALCULATION METHOD OF THE AIR CARRIED ENERGY RADIANT AIR-CONDITIONING SYSTEM</b> .....	2479
<i>J. Liu, G. Gong, Z. Zhang, X. Mei, Y. Fang</i>	

## **ID151 AHU AND DUCTS**

<b>ECODESIGN &amp; VENTILATION: MAKEOVER NECESSARY?</b> .....	2481
<i>Y. Lambert, I. Pollet</i>	
<b>AIR QUALITY OF POLYSTYRENE, STEEL, PVC AND WOODEN VENTILATION DUCTS</b> .....	2487
<i>S. Kurvers, F. Van Zeist, A. Andrejevic, P. Bluysen</i>	
<b>STUDY ON THE IMPROVEMENT OF MICROBIAL POLLUTION IN DUCT VIA ANTI-MICROBIAL COATING</b> .....	2495
<i>Y.-S. Tsay, L. Han-Chang, Y. Yu-Chun</i>	
<b>DEVELOPMENT OF A SMART INSPECTION TOOL FOR MEASURING THE LEVEL OF CONTAMINATION INSIDE AIR DUCTS</b> .....	N/A
<i>S. Thys</i>	
<b>EVALUATION OF CONTRIBUTION OF AN AIR-CONDITIONING AND MECHANICAL VENTILATION (ACMV) SYSTEM TO LEVEL OF INDOOR BIOAEROSOLS</b> .....	2502
<i>J. Wen Xiong, M. Pun Wan, V. W.-C. Chang, B. Feng Ng</i>	
<b>DEVELOPMENT OF A MODIFIED CONCEPT AND ACOUSTIC MEASUREMENTS OF THE COUNTERFLOW HEAT RECOVERY FAN</b> .....	2510
<i>C. Speer, R. Pfluger, A. Speer</i>	
<b>THE PERSISTENCE OF THE RESPIRATORY VIRUSES ON FILTERS OF AIR HANDLING UNITS</b> .....	2517
<i>V. Bandaly, Y. Andres, P. Le Cann</i>	
<b>TIME-SERIES PROFILE OF BIOACCUMULATION ON AN HVAC FILTER IN A SINGAPORE UNIVERSITY LIBRARY</b> .....	2519
<i>I. Luhung, Y. Wu, V. W.-C. Chang, W. Nazaroff</i>	
<b>A PASSIVE DESIGN SOLUTION FOR BUILDING VENTILATION SYSTEMS: BALANCING ENERGY AND FILTER SAVINGS FOR MAXIMUM ECONOMIC BENEFIT DURING OPERATION</b> .....	2521
<i>J. Gallagher, D. Morgan, A. McNabola</i>	
<b>VOC TRANSFER IN ENERGY RECOVERY DEVICES FOR VENTILATION SYSTEMS</b> .....	2529
<i>B. Sicre, R. Külpmann</i>	

## **ID60 CLOTHING DERMAL ADSORPTION**

<b>DEVELOPING A THERMAL EXTRACTION METHOD FOR THE QUANTIFICATION OF DIMETHYLFORMAMIDE IN PROTECTIVE CLOTHING</b> .....	2531
<i>T. Schripp, T.-T.-H. Co, E. Uhde</i>	
<b>FURTHER ADVANCES IN MODELING TRANSDERMAL UPTAKE OF SVOCs</b> .....	2533
<i>G. Morrison, G. Bekö, C. Weschler</i>	
<b>DERMAL ABSORPTION OF SEMIVOLATILE ORGANIC COMPOUNDS FROM THE GAS-PHASE: SENSITIVITY OF EXPOSURE ASSESSMENT TO KEY PARAMETERS</b> .....	2535
<i>M. Pelletier, O. Blanchard, B. Le Bot, C. Mandin, F. Mercier, O. Ramalho, N. Bonvallot, P. Glorennec</i>	

<b>PHthalates and Alternative Plasticizers and Potential for Contact Exposure in Children's Backpacks and Toys</b> .....	2537
<i>Y. Wu, J. Little, M. Xie, L. Marr</i>	
<b>SIMULTANEOUS DETERMINATION OF ALTERNATIVE FLAME RETARDANTS OF HEXABROMOCYCLODODECANE IN CURTAIN</b> .....	2539
<i>Y. Miyake, H. Nakayama, T. Amagai, S. Ogo, K. Kume, T. Kobayashi, S. Takasu, K. Ogawa</i>	
<b>PERFORMANCE TEST OF TECHNICAL CLEANROOM CLOTHING SYSTEMS</b> .....	2546
<i>F. Romano, B. Ljungqvist, B. Reinmuller, J. Gustén, C. Joppolo</i>	
<b>A METHOD FOR RAPIDLY MEASURING AIR-CLOTH PARTITION COEFFICIENTS FOR SVOCs</b> .....	2554
<i>G. Morrison, A. Eftekhari, M. Buechlein</i>	

### **ID131 CHEMISTRY**

<b>PHthalates, Organophosphates, Polybrominated Diphenyl Ethers, Pesticides, and Their Alternatives in Indoor Air and Dust in U.S. Schools</b> .....	2556
<i>H. Li, C. Bi, Y. Xu, N. Crain, A. Novoselac, K. Kinney, R. Corsi</i>	
<b>EXPLORATION OF THE INFLUENCE NITROGEN OXIDES HAVE ON TERPENE OZONOLYSIS</b> .....	2558
<i>R. Wells, J. Harrison, J. Ham, S. Jackson</i>	
<b>INFLUENCE OF SUSPENDED PARTICLES ON THE EMISSION OF ORGANOPHOSPHATE FLAME RETARDANT FROM INSULATION BOARDS</b> .....	2560
<i>B. Lazarov, R. Swinnen, D. Poelmans, M. Spruyt, E. Goelen, A. Covaci, M. Stranger</i>	
<b>OZONE-INITIATED GASEOUS PRODUCTS ON USED FILTER SURFACES DURING THE WINTER HAZE PERIOD IN BEIJING 2014</b> .....	2562
<i>J. Mo, Z. Long, J. Deng, Y. Zhang</i>	
<b>OZONE CATALYTIC OXIDATION OF ACETALDEHYDE BY MANGANESE OXIDE HONEYCOMB CATALYST SUPPORTED BY AEROSOL-SYNTHESIZED CVC-TIO<sub>2</sub> PARTICLE</b> .....	2564
<i>J. Jurng, M. Kim, E.-S. Park, H. Jung</i>	
<b>ASSESSMENT OF VARIOUS INDOOR HONO FORMATION MECHANISMS BASED ON IN SITU MEASUREMENTS AND MODELING</b> .....	2566
<i>M. Mendez, D. Amedro, N. Blond, D. Hauglustaine, P. Blondeau, C. Afif, C. Fittschen, C. Schoemaeker</i>	

### **ID102 IEW CASE STUDIES AND SURVEYS**

<b>SENSELAB - A PLAYGROUND FOR THE SENSES</b> .....	2568
<i>P. Bluysen, F. Van Zeist, S. Pont, S. Kurvers</i>	
<b>INDOOR THERMAL CONDITIONS AND AIR CONDITIONER USAGE IN HIGH-RISE RESIDENTIAL BUILDINGS IN SUMMER, CHONGQING, SOUTHWEST CHINA</b> .....	2570
<i>Y. Zhang, M. Liu, L. Luo, D. Mmereki</i>	
<b>COMPARATIVE HEATING PERFORMANCES OF GROUND SOURCE AND AIR SOURCE HEAT PUMP SYSTEMS FOR RESIDENTIAL BUILDINGS IN SHANGHAI</b> .....	2578
<i>Z. Liu, H. Tan</i>	
<b>THERMAL COMFORT AND INDOOR AIR QUALITY ON END-USER SATISFACTION LEVEL EVALUATION IN A NEARLY ZERO CARBON NEIGHBOURHOOD</b> .....	2586
<i>J. Vaillant Rebolgar, E. Himpe, A. Janssens</i>	
<b>ASSESSMENT OF THERMAL COMFORT IN SHOPPING CENTER TRANSITIONAL SPACES</b> .....	2594
<i>M. Avantiaggiato, A. Belleri, S. Dutton, W. Pasut, R. Lollini</i>	
<b>INDOOR ENVIRONMENTAL ASPECTS AND USER PERCEPTION WITHIN AN OFFICE LANDSCAPE: AN EXPLORATORY STUDY IN THE NETHERLANDS</b> .....	2602
<i>J. Van Duijnhoven, M. Aries, A. Rosemann, H. Kort</i>	
<b>ENERGY CONSUMPTION AND ENERGY SAVING MEANS IN SUBTROPICAL BUILDINGS</b> .....	2604
<i>J.-I. Tsutsumi, R. Nakamatsu, M. Matsuda</i>	
<b>EXPLORING THE INFLUENCE OF SOCIAL FACTORS ON INDOOR ENVIRONMENT QUALITY</b> .....	2612
<i>S. Snow, H. Gough, S. Chatterjee, A. Soska, M. C. Schraefel</i>	
<b>THERMAL COMFORT ASSESSMENT IN A DUTCH HOSPITAL SETTING – MODEL APPLICABILITY</b> .....	2620
<i>L. Ottenheim, M. Loomans, H. Kort, A. Trip</i>	

### **ID74 I/O MEASUREMENTS**

<b>ON-SITE MEASUREMENT OF URBAN ENVIRONMENTAL QUALITY FOR TWO DIFFERENT BUILDING CONFIGURATIONS</b> .....	2622
<i>D. Cui, C.-M. Mak, Z. Ai, K. C. S. Kwok</i>	
<b>THE EFFECT OF URBAN MICRO-CLIMATE ON INDOOR-OUTDOOR AIR EXCHANGE</b> .....	2628
<i>H. Gough, J. Barlow, Z. Luo, C. Halios, M.-F. King</i>	
<b>EFFECT OF OUTDOOR AIR ON INDOOR AIR POLLUTION IN HIGH-RISE APARTMENTS</b> .....	2636
<i>G.-N. Bae, J. B. Kim, C.-H. Kim, T.-J. Park</i>	
<b>INFLUENCE OF URBAN CHARACTERISTICS ON TEMPORAL VARIATIONS OF INDOOR PARTICLES</b> .....	N/A
<i>M. Mazaheri, C. Reche, I. Rivas, L. Crilley, M. Álvarez-Pedrerol, M. Viana, A. Tobias, A. Alastuey, J. Sunyer, X. Querol, L. Morawska</i>	

CAN I/O RATIO OF PM <sub>2.5</sub> BE USED TO ESTIMATE AIR EXCHANGE RATES? .....	2638
<i>L. Fang, J. Xiang, W. Xu, Y. Zhang, J. Mo</i>	

### **ID120 GENERAL IAQ CASE STUDIES AND SURVEYS**

COMPARISON OF INDOOR AIR PESTICIDES CONTAMINATION OF INHABITANTS FROM FIVE CONTRASTED HOMES .....	2640
<i>M. Millet, C. Raepffel, B. Appenzeller</i>	
CHARACTERIZATION OF INDOOR-OUTDOOR PARTICULATE MATTER CONCENTRATIONS AND BIOAEROSOL CONCENTRATION IN THE BUILDING .....	2644
<i>H.-J. Oh, J.-R. Sohn, H. Lee, J. Seo</i>	
METHOD PROPOSAL FOR ENERGY-SAVING OPTIMIZATION OF OFFICE BUILDING FACADES .....	2651
<i>T. Sato, T. Tanabe, N. Harada, M. Nagoshi, T. Matsunaga, N. Nagasawa, S.-I. Tanabe</i>	
INDOOR AIR CHARACTERISTICS OF 5 TYPICAL HOUSE TYPES IN HO CHI MINH CITY, VIETNAM.....	2659
<i>T. N. Tran, D. K. T. Nguyen, T. T. T. Tran, P. H. D. Dinh, I. Godin, J.-M. Hauglustaine, O. Michel, C. Bouland</i>	
CHARACTERIZING EXPOSURE TO VOLATILE ORGANIC COMPOUNDS IN RESIDENCES OF BAOTOU, CHINA: CONCENTRATIONS, SOURCES AND INFLUENCING FACTORS .....	2667
<i>Z. Bu, L. Wang, B. Li, J. Sundell, Y. Zhang</i>	
INDOOR MVOCs LEVELS AND INDOOR DAMPNES IN 60 RESIDENTIAL HOUSES IN EAST JAPAN .....	2669
<i>N. Shinohara, K. Hasegawa, N. Kagi, J. Sakaguchi, Y. Shiraishi, T. Mitamura</i>	
ASBESTOS SHORT FIBERS IN INDOOR AIR: A FIRST STUDY IN FRENCH BUILDINGS .....	2674
<i>T. Brown, C. Mandin, F. Chaventre, L. Martinon, G. Boulanger</i>	
COMPARISON OF ENERGY EFFICIENCY RATING AND ENERGY CONSUMPTION OF RESIDENTIAL BUILDINGS IN KOREA .....	2676
<i>H. Gi Kim, S. Sook Kim, J. Sang Seo, J. Kim</i>	

### **ID105 THERMAL COMFORT PERFORMANCE HVAC**

EVALUATION OF THERMAL COMFORT, INDOOR AIR QUALITY AND ENERGY SAVING OF A LOCAL EXHAUST VENTILATION SYSTEM IN AN OFFICE ROOM (LEVO).....	2678
<i>A. Ahmed, S. Gao, A. Kareem</i>	
DEVELOPMENT OF DESICCANT AIR CONDITIONING SYSTEM USING WAKKANAI SILICEOUS SHALE.....	2686
<i>Y. Nabeshima, J. Togawa, K. Nagano</i>	
EQUIVALENT TEMPERATURE BASED COMFORT ZONE STUDY UNDER TASK/AMBIENT CONDITIONING SYSTEM .....	2694
<i>Y. Ren, L. Duanmu, Q. Jin</i>	

## **VOLUME 5**

HEAT STRESS AND DIRECT LOAD CONTROL AIR CONDITIONING IN HOMES .....	2703
<i>P. Paevere, Z. Ren, J. Anticev</i>	
DEVELOPMENT OF A TASK DESK EQUIPPED WITH RADIANT COOLING AND HEATING SYSTEMS.....	2711
<i>J. Liu, S.-I. Tanabe, Y. Ishii, Y. Miyashita, G. Aoki, K. Fujino, D. Hatori, N. Hirasuga, S. Kato, S. Ito, H. Iwata, Y. Sumiyoshi</i>	
EFFECTS OF LATENT/SENSIBLE HEAT SEPARATION AIR-CONDITIONING AND NATURAL VENTILATION ON INDOOR THERMAL ENVIRONMENT IN ENVIRONMENT-FRIENDLY OFFICE .....	2719
<i>S. Sakai, T. Akimoto, Y. Miyasaka</i>	
PHYSIOLOGICAL AND PSYCHOLOGICAL EFFECTS ON WORKPLACE PRODUCTIVITY OF HVAC CONTROL BASED ON THE METABOLIC RATE OF OFFICE OCCUPANTS .....	2727
<i>R. Tsuchiya, T. Ikaga, M. Miura, K. Harayama, K. Mizutani, S. Ogawa</i>	
EFFECT OF USING A LOCAL HEATING DEVICE IN A COLD TOILET ON THERMAL COMFORT IN WINTER.....	2735
<i>J. Ishii, S. Watanabe</i>	
HEAT STORAGE EFFICIENCY OF A FLOOR HEATING SYSTEM UNDER DEMAND RESPONSE.....	2737
<i>C. Chia Chang, T. Kiyota, N. Uyama, J. Nakagawa, Y. Sakurai, H. Miyajima, S.-I. Tanabe</i>	

### **ID121 POLLUTANT CONTAINMENT AND INFILTRATION**

IMPROVEMENTS IN NATURAL AIR SUPPLY CONCERNING THERMAL WINTER COMFORT, IAQ AND ENERGY CONSUMPTION .....	2745
<i>I. Pollet, F. Losfeld, A. Vens, A. Candaele, J. Laverge</i>	
A NOVEL AIR DIFFUSER SOLUTION FOR CONTROL OF INDOOR AIR PARTICLE CONCENTRATION .....	2753
<i>H. Salmela, K. Heinonen, M. Niemeläinen, A. Taipale, J. Heinovaara, P. Nynäs, S. Enbom, A. Karvinen</i>	
CHARACTERIZATION OF SEWER SYSTEMS AS A MAJOR INTRUSION PATHWAY FOR VOC'S TO INDOOR AIR .....	2761
<i>B. Hvidberg, K. Nielsen</i>	

<b>CHALLENGES IN ESTIMATING NATURAL VENTILATION: EXPLORING THE BOUNDARY OF PRESSURE- AND MOMENTUM-DRIVEN FLOW REGIMES</b> .....	2764
<i>J. Lo, S. Wang, M. Waring</i>	
<b>RESIDENTIAL NATURAL GAS EMISSIONS FROM PIPE LEAKS AND HEATING APPLIANCES</b> .....	2772
<i>Z. Merrin, P. Francisco, S. Gloss</i>	
<b>EXPERIMENTAL STUDY OF HEATING ENERGY USE AND INDOOR ENVIRONMENT DURING OPERATION OF ACTIVE SOIL DEPRESSURIZATION RADON MITIGATION SYSTEM</b> .....	2774
<i>L. Zhou, J. Whyte, M. Armstrong, H. Schleibinger</i>	
<b>IN-SITU ANALYSIS OF RADON TRENDS IN A SMART HOME AND DEVELOPMENT OF ENERGY EFFICIENCY IMPROVEMENTS VIA SMART CYCLING</b> .....	2782
<i>M. Panzarino, P. Jansson, H. Ha, T. DiStefano</i>	
<b>WIND TUNNEL TESTS OF POLLUTANT INTER-FLAT DISPERSION CHARACTERISTICS IN SLAB-SHAPE MULTISTORY RESIDENTIAL BUILDINGS</b> .....	2790
<i>D. Mu, N. Gao</i>	

## **ID122 DEMAND CONTROLLED VENTILATION**

<b>THE STUDY OF THE IMPACT OF DEMAND CONTROLLED VENTILATION IN ENERGY CONSUMPTION OF OFFICES IN PORTUGUESE COMMERCIAL BUILDINGS</b> .....	2798
<i>J. Monteiro, M. Almeida, O. Castro</i>	
<b>THE CIRCADIAN RHYTHM OF TOTAL VOLATILE ORGANIC COMPOUNDS, CARBON DIOXIDE, AND FORMALDEHYDE CONCENTRATIONS AND THE PHYSICAL PARAMETERS IN ROOMS WITH AND WITHOUT AIR-RELATED IRRITATION SYMPTOMS</b> .....	2803
<i>E. Castagnoli, R. Mikkola, J. Kurnitski, H. Salonen</i>	
<b>A COMPARISON OF THE EFFECT OF CARBON DIOXIDE AND RELATIVE HUMIDITY SENSITIVE VENTILATION SYSTEMS ON INDOOR AIR QUALITY, HYGROTHERMAL AND ENERGY PERFORMANCE IN AN OFFICE ROOM MADE OF HEMP CONCRETE</b> .....	2810
<i>A. Le, O. Douzane, P. Geoffrey, D. Samri, J.-M. Roucoult, A. Tuan Nguyen, L. Lahoche, T. Langlet</i>	
<b>EFFECT OF ALTERNATE/OCCUPANCY CONTROLLED VENTILATION IN SCHOOLS ON THE EXPOSURE QUANTIFICATION</b> .....	2818
<i>C. Schoemaeker, V. Fèvre-Nollet, M. Verrièle, S. Dusanter, S. Le Calve, C. Trocquet, B. Hanoune, N. Locoge</i>	

## **ID62 PATHOLOGIES**

<b>THE ASSOCIATION OF HOME ENVIRONMENT AND LIFE STYLE WITH CHILDREN ASTHMA IN BEIJING, CHINA: A CROSS-SECTIONAL STUDY</b> .....	2826
<i>S. Huang, J. Sundell, Y. Zhang, Y. Zhang</i>	
<b>NATIONAL SURVEY ON HOME DAMPNESS AND CHILDREN'S ALLERGIC SYMPTOMS DURING CONSECUTIVE SURVEY PERIODS IN JAPAN</b> .....	2828
<i>K. Hasegawa, N. Kagi, J. Sakaguchi, N. Shinhara, Y. Shiraishi, T. Mitamura</i>	
<b>FUNGAL SINUSITIS AS A POSSIBLE CONSEQUENCE OF POOR INDOOR AIR QUALITY</b> .....	2830
<i>E. Pieckova, M. Majorošová, S. Wimmerová, J. Štrelinger</i>	
<b>ALLERGENIC POTENCY OF BIRCH POLLEN</b> .....	2839
<i>D. Wahlborg, M. Bjorling, L. Andersson</i>	
<b>ASSOCIATIONS BETWEEN RESIDENTIAL CHARACTERISTICS AND CHILDHOOD ILLNESSES REGARDING ECZEMA IN SHANGHAI, CHINA: A CROSS-SECTIONAL STUDY</b> .....	2847
<i>J. Cai, W. Liu, C. Huang, Z. Zou, Y. Hu, L. Shen</i>	
<b>HOME DAMPNESS AND CHILDHOOD ASTHMA AND ALLERGIC SYMPTOMS-THE INFLUENCE OF VENTILATION IN MORE THAN 40,000 CHINESE PRESCHOOL CHILDREN IN 8 CITIES</b> .....	2854
<i>Z. Zhao, Z. Lin, T. Wang, X. Zhang, H. Qian, Q. Deng, B. Li, C. Huang, X. Yang, Y. Zhang, D. Norback, J. Sundell</i>	
<b>EVALUATION OF PERCEIVED INDOOR ENVIRONMENTAL QUALITY OF FIVE-STAR HOTELS IN CHINA: A TEXT-BASED APPROACH</b> .....	2856
<i>M. Qi, E. Zhu, X. Li</i>	
<b>HOARSENESS IS ASSOCIATED WITH INDOOR AIR PROBLEMS AMONG TEACHERS</b> .....	2864
<i>T. Putus, H. Vertanen-Greis, J. Uitti, E. Loyttyniemi</i>	
<b>ASSOCIATIONS OF RESIDENTIAL ENVIRONMENT AND LIFESTYLE HABITS WITH ECZEMA AMONG PRESCHOOL CHILDREN IN SHANDONG, CHINA</b> .....	2866
<i>J. Chang, C. Huang, W. Liu, X. Wang, J. Cai</i>	

## **ID97 EMERGING ANALYTICAL TOOLS**

<b>A SENSITIVE METHOD USING SPME PRE-CONCENTRATION FOR THE QUANTIFICATION OF AROMATIC AMINES IN INDOOR AIR</b> .....	2876
<i>M. Millet, V. Lucaire, J.-J. Schwartz, O. Delhomme</i>	
<b>EVALUATION OF DIFFUSION PARAMETERS OF NEW PASSIVE SAMPLERS FOR ON-SITE MEASURING FORMALDEHYDE IN INDOOR AIR: EXPERIMENTAL AND NUMERICAL STUDIES</b> .....	2879
<i>P. Mocho, J. Vignau-Laulhere, H. Plaisance, V. Desauziers, K. Raulin</i>	

<b>A SAMPLING METHOD FOR VERY VOLATILE ORGANIC COMPOUNDS (VVOCS) USING CARBONACEOUS MULTI-BED SORBENTS</b> .....	2887
<i>J. Freitag, A. Schieweck, J. Gunschera, T. Salthammer</i>	
<b>EVALUATION OF A TUBE-TYPE PASSIVE SAMPLER IN THE CHAMBER BY THE METHODS DESCRIBED IN ISO 16107</b> .....	2889
<i>Z. Wang, Q. Wang, Y. Miyake, T. Amagai, Y. Fukushima, Y. Suzuki, T. Enomoto</i>	
<b>NON-LINEAR OPTICS FOR REAL-TIME FIELD STUDIES ON IAQ</b> .....	2895
<i>O. Le Mauguen, B. Szymanski, J. Aulnois, B. Hardy-Baransky, A. Colin</i>	
<b>TRACEABILITY FOR FORMALDEHYDE MEASUREMENTS</b> .....	2901
<i>S. Persijn, A. Baldan, D. Heikens</i>	
<b>SINGLE STAGE CENTRIFUGAL AIR SAMPLER: A THEORETICAL, NUMERICAL AND EXPERIMENTAL APPROACH FOR CUT OFF SIZE (D<sub>50</sub>) EVALUATION</b> .....	2907
<i>L. Sabatini, F. Romano, L. Marocco, J. Gustén, C. Joppolo</i>	
<b>REAL-TIME MONITORING OF FORMALDEHYDE CONCENTRATION DURING THE FIELD MERMAID CAMPAIGN</b> .....	2915
<i>C. Trocquet, P. Bernhardt, M. Berger, I. Malandain, C. Liaud, S. Englaro, S. Le Calve, M. Guglielmino</i>	

### **ID68 LOW ENERGY BUILDINGS**

<b>ENERGY CONSUMING BEHAVIOR OF THE OCCUPANTS IN A ZERO-ENERGY HOUSE</b> .....	2922
<i>A. Shibutani, S.-I. Tanabe, N. Nagasawa, T. Matsunaga, K. Utsumi, M. Ebe</i>	
<b>RESEARCH ON DEMONSTRATIVE BUILDING OF NET ZERO ENERGY HOUSE</b> .....	2930
<i>M. Takata, T. Akimoto, Y. Kawaraguchi, S. Tazawa, Y. Miyazawa</i>	
<b>COMPARATIVE ANALYSIS OF VOLATILE ORGANIC COMPOUND CONCENTRATIONS AT DIFFERENT CONSTRUCTION STAGES OF ENERGY-EFFICIENT TIMBER FRAME HOUSES: TEMPORAL TRENDS AND SOURCE IDENTIFICATION</b> .....	2938
<i>V. Desauziers, H. Plaisance, P. Mocho, J. Vignau Laulhere, N. Sauvat</i>	
<b>LONG-TERM INVESTIGATION MEASUREMENT AND QUESTIONNAIRE ON TERMINAL INDOOR ENVIRONMENT QUALITY IN SHENZHEN BAO'AN INTERNATIONAL AIRPORT</b> .....	2940
<i>C. Zhang, B. Lin</i>	
<b>FIRST ANALYSIS OF THE NATIONAL DATABASE ON INDOOR AIR QUALITY AND COMFORT IN ENERGY-EFFICIENT BUILDINGS</b> .....	2947
<i>M. Derbez, G. Wyart, O. Ramalho, J. Ribéron, S. Kirchner, C. Mandin</i>	
<b>FORMALDEHYDE CONCENTRATIONS IN A NET-ZERO ENERGY HOUSE: REAL-TIME MONITORING AND SIMULATION</b> .....	2955
<i>D. Poppendieck, S. Khurshid, S. Dols, L. Ng, B. Polidoro, S. Emmerich</i>	
<b>IEA EBC ANNEX 68 - INDOOR AIR QUALITY DESIGN AND CONTROL IN LOW ENERGY RESIDENTIAL BUILDINGS - SETTING THE METRICS</b> .....	2963
<i>M. Abadie, P. L. Wargoeki, C. Rode</i>	
<b>NET-ZERO ENERGY HOUSING RESEARCH ON THE PINE RIDGE INDIAN RESERVATION</b> .....	2971
<i>K. Cameron, L. Bailey, R. Pyatt, J. Benning, N. Tilsen</i>	

### **ID113 EMISSIONS FROM BUILDING PRODUCTS**

<b>FORMALDEHYDE EMISSION RATES FROM LUMBER LIQUIDATORS LAMINATE FLOORING MANUFACTURED IN CHINA</b> .....	2975
<i>F. Offermann</i>	
<b>WEATHERING OF NATURAL FIBERS REINFORCED COMPOSITES: STUDY OF THE IMPACT ON VOLATILE ORGANIC COMPOUNDS' EMISSIONS IN INDOOR AIR</b> .....	2983
<i>C. Badji, J. Beigbeder, H. Garay, A. Bergeret, J.-C. Bénézet, V. Desauziers</i>	
<b>MEASUREMENT OF CHEMICAL EMISSIONS FROM SPRAY POLYURETHANE FOAM (SPF) INSULATION USING AN AUTOMATED MICRO-SCALE CHAMBER SYSTEM</b> .....	2985
<i>Y. Nie, K. Thaxton, E. Kleine-Benne</i>	
<b>ANALYSIS OF THE INDOOR AIR VOC CONCENTRATION AND EMISSION RATES OF BUILDING MATERIALS IN SIX NEW RESIDENTIAL TIMBER FRAME BUILDINGS IN BELGIUM</b> .....	2987
<i>T. Haerinck, L. De Boever</i>	
<b>OCCURRENCE AND SOURCE IDENTIFICATION OF TXIB IN INDOOR AIR OF THE RHINE/MAIN AREA, GERMANY</b> .....	2989
<i>L. Zhou, M. Hiltcher, W. Püttmann</i>	

### **ID128 MICROBIOME SURVEYS**

<b>COMPOSITIONS OF FUNGAL SPECIES WITHIN THE GENUS ASPERGILLUS IN VISIBLE MOLDS IN RESIDENTIAL BUILDINGS IN SEOUL, SOUTH KOREA</b> .....	2991
<i>C. An, N. Yamamoto</i>	
<b>QUANTITATIVE ASSESSMENT OF MICROBES FROM SAMPLES OF INDOOR AIR AND DUST</b> .....	2993
<i>H. Leppänen, M. Täubel, B. Jayaprakash, A. Vepsäläinen, A. Hyvärinen</i>	



<b>EVALUATION OF THE EXPOSURE TO THE MYCOTOXINS AEROSOLIZED AFTER DEVELOPMENT OF TOXIGENIC MOULDS ON WALLPAPER</b> .....	2995
<i>B. Aleksic, M. Draghi, S. Ritoux, S. Bailly, M. Lacroix, I. Oswald, J.-D. Bailly, E. Robine</i>	
<b>FUNGAL AEROSOLS AND DIVERSITY IN MOULDY INDOOR AIR</b> .....	3002
<i>A. Komlavi Afanou, I. Engh, A. Straumfors, L. Madsø, J. Mattsson, W. Eduard</i>	
<b>AIRBORNE BACTERIA AND FUNGI IN DIFFERENT INDOOR ENVIRONMENTS: LEVELS AND DOSE RATES</b> .....	3004
<i>I. Paciência, J. Madureira, J. Cavaleiro Rufo, L. Aguiar, J. Paulo Teixeira, M. Pinto, A. Moreira, E. De Oliveira Fernandes</i>	
<b>MEASURED COLONY FORMING UNITS IN OPERATING ROOMS WITH TEMPERATURE CONTROLLED AIRFLOW</b> .....	3013
<i>H. Bashir, S. Holmberg, P. Ekolind</i>	
<b>EVALUATION OF MOULD GROWTH IN A SPORT FACILITY USING DIFFERENT PREDICTING MODELS</b> .....	3017
<i>E. Barreira, R. Almeida, N. Ramos</i>	
<b>MICROBIAL EXPOSURES IN SEVERELY MOISTURE DAMAGED HOMES IN FINLAND</b> .....	3019
<i>M. Valkonen, K. Järvi, H. Leppänen, T. Syrjänen, T. Rokkonen, J. Pekkanen, M. Taubel, A. Hyvarinen</i>	
<b>SIZE DISTRIBUTIONS AND COMPOSITION OF INHALABLE MICROBIAL AEROSOLS IN INDOOR AND OUTDOOR AIR IN SINGAPORE</b> .....	3021
<i>Y. Wu, I. Luhung, W. Nazaroff, W.-C. Chang, A. Chen</i>	
<b>MICROBIAL ANALYSES OF AIRBORNE DUST COLLECTED FROM UNIVERSITY DORM ROOMS</b> .....	3023
<i>S. Miller, J. Luongo, N. Fierer</i>	

### **ID9 NUMERICAL SIMULATION OF INDOOR ENVIRONMENT**

<b>MODELING PARTICLE DEPOSITION ON THE SURFACES AROUND A DIFFUSER IN AN INDOOR SPACE</b> .....	3037
<i>C. Chen, C. Lin, D. Wei, Q. Chen</i>	
<b>CFD SIMULATIONS OF MIXING VENTILATION AT LOW REYNOLDS NUMBERS: EFFECT OF SPATIAL DISCRETIZATION SCHEME</b> .....	3045
<i>T. Van Hooff, B. Blocken</i>	
<b>THE DYNAMIC SIMULATION OF CONTAMINANT AIR INVASION PRODUCED BY DOOR MOVEMENT</b> .....	3053
<i>L. Chang, X. Zhang, Y. Cai</i>	
<b>NUMERICAL INVESTIGATION OF DOOR MOTION BETWEEN CLEAN ROOMS</b> .....	3059
<i>T. Askan, M. Krieger</i>	

### **ID41 IMPACT OF DEMAND CONTROLLED VENTILATION ON INDOOR AIR QUALITY, VENTILATION EFFECTIVENESS AND ENERGY EFFICIENCY**

<b>SESSION SUMMARY - IMPACT DEMAND CONTROLLED VENTILATION ON INDOOR AIR QUALITY, VENTILATION EFFECTIVENESS AND ENERGY EFFICIENCY (ID41)</b> .....	3067
<b>VENTILATION IMPACT OF OUTDOOR CO2 CONCENTRATION INCREASE</b> .....	3070
<i>M. K. Kim, X. Jiaotong</i>	
<b>RESIDENTIAL DEMAND CONTROLLED EXTRACT VENTILATION COMBINED WITH HEAT RECOVERY VIA A HEAT PUMP</b> .....	3072
<i>I. Pollet, C. Coulier, A. Vens, F. Grillet</i>	
<b>ACCURACY OF PEOPLE-COUNTING SYSTEM BASED ON MOTION DETECTION FOR DEMAND CONTROLLED VENTILATION</b> .....	3081
<i>K. Lee, B. Lee</i>	
<b>IMPACT OF DEMAND CONTROLLED VENTILATION ON INDOOR AIR QUALITY, VENTILATION EFFECTIVENESS AND ENERGY EFFICIENCY IN A SCHOOL BUILDING</b> .....	3083
<i>B. Merema, H. Breesch, M. Sourbron</i>	

### **ID15 HEALTH IMPACT OF AIR POLLUTION ON SENSITIVE GROUPS (INFANTS/CHILDREN, ELDERLY AND ASTHMA PATIENTS)**

<b>SESSION SUMMARY - HEALTH IMPACT OF AIR POLLUTION ON SENSITIVE GROUPS (INFANTS/CHILDREN, ELDERLY AND ASTHMA PATIENTS) INCLUDING ULTRAFINE PARTICLES - AN EMERGING RESEARCH FIELD</b> .....	3091
<b>THE STATE OF THE SCIENCE REGARDING THE POTENTIAL HEALTH RISKS OF INDOOR EXPOSURE TO PARTICULATE MATTER</b> .....	3098
<i>D. Butler, G. Madhavan</i>	
<b>EARLY HOME ENVIRONMENT AND THE CHANGE OF HOME ENVIRONMENT IN RELATION TO THE NEW ONSET AND REMISSION OF ASTHMATIC AND ALLERGIC SYMPTOMS IN 4246 PRESCHOOL CHILDREN IN URUMQI, CHINA</b> .....	3102
<i>Z. Lin, D. Norback, Z. Zhao, H. Kan, X. Zhang, T. Wang</i>	

<b>MORE SBS SYMPTOMS OF PARENTS, MORE ASTHMA AND ALLERGIC RHINITIS OF CHILDREN</b> .....	3104
<i>L. Wang, Y. Zhang, J. Sundell</i>	
<b>THE CANADIAN HEALTHY INFANT LONGITUDINAL DEVELOPMENT (CHILD) STUDY: INDOOR MARKERS OF MOISTURE IN A PROSPECTIVE BIRTH COHORT</b> .....	3106
<i>J. Scott, C. Lepine, M. R. Sears, D. Lefebvre, D. Dai, J. Siegel, L. Erdman, P. Subbarao, S. Turvey, J. R. Brook, T. K. Takaro, P. Mandhane, A. Becker</i>	

#### **ID45 EMERGING ANALYTICAL TOOLS FOR THE MONITORING OF INDOOR AIR COMPOSITION**

<b>IMPROVED SAMPLING METHOD FOR ORGANIC NITRATES</b> .....	3109
<i>R. Wells, J. Ham, S. Jackson, J. Harrison</i>	
<b>APPLICABILITY OF CARBONACEOUS SORBENTS FOR THE DETERMINATION OF VERY VOLATILE ORGANIC COMPOUNDS (VVOCs) IN INDOOR AIR</b> .....	3111
<i>J. Freitag, A. Schieweck, J. Gunschera, T. Salthammer</i>	
<b>USING IN VITRO ORAL DIGESTION MODEL AND SPME-GC/MSMS TO ASSESS BIOACCESSIBILITY OF ENDOCRINE DISRUPTING COMPOUNDS IN INDOOR DUST</b> .....	3113
<i>A. Sonnette, L. Alleman, P. Coddeville, M. Millet</i>	
<b>NEW DEVELOPMENTS IN DIFFUSIVE SAMPLING FOR IAQ MONITORING</b> .....	3115
<i>E. Goelen, F. Maes, W. Swaans, M. Spruyt, F. Geyskens, G. Otten</i>	
<b>PORTABLE NOVEL MICRO-DEVICE FOR BTEX REAL-TIME MONITORING: ASSESSMENT DURING A FIELD CAMPAIGN IN A LOW ENERGY JUNIOR HIGH SCHOOL CLASSROOM</b> .....	3117
<i>R. Nasreddine, V. Person, C. Serra, C. Schoemaeker, S. Le Calve</i>	
<b>ANALYSIS OF VERY VOLATILE ORGANIC COMPOUNDS WITH THERMAL DESORPTION GC-MS</b> .....	3125
<i>A. Pech, O. Wilke, W. Horn, O. Jann</i>	

#### **ID2013 BUILDING MATERIALS AND REFERENCES EMISSIONS**

<b>EMISSIONS OF VERY VOLATILE ORGANIC COMPOUNDS (VVOC) FROM PARTICLE BOARDS</b> .....	3127
<i>O. Wilke, O. Jann</i>	
<b>HEALTH-BASED EVALUATION OF CHEMICAL EMISSIONS FROM CONSTRUCTION PRODUCTS TO INDOOR AIR: DEVELOPMENT AND APPLICATION OF THE EU-LCI HARMONISATION FRAMEWORK</b> .....	3129
<i>D. Crump, P. Harrison, K. De Browere, A. M. Scutaru, C. Daeumling, P. Wolkoff</i>	
<b>COMPARISON OF VOC EMISSIONS FROM INDIVIDUAL AND COMBINED BUILDING PRODUCTS</b> .....	3135
<i>F. Maupetit, J. Nicolle, M. Nicolas, P. Blondeau</i>	
<b>VOC EMISSIONS OF MATERIALS USED IN THE CONSTRUCTION OF ENERGY-EFFICIENT TIMBER FRAME HOUSES: CHEMICAL COMPOSITION AND EMISSION KINETICS</b> .....	3143
<i>H. Plaisance, J. Vignau Lauthere, P. Mocho, N. Sauvat, V. Desauziers</i>	
<b>ECO-FRIENDLY SUSTAINABLE BUILDING CONSTRUCTION MATERIALS: EMISSION CHARACTERISTICS-PART 1</b> .....	3145
<i>M. Khare, S. Gulia, S. Chinthala, C. Rana, K. Mower, C. Da Silva, A. Dengel</i>	
<b>RESEARCH ON RADON EMISSION ON THE BUILDING MATERIALS IN KOREA</b> .....	3153
<i>D. Lee, S. Lim, H. Ju Park, C. Lee</i>	

#### **ID2010 WHAT HAVE WE LEARNED FROM STUDIES OF INDOOR MICROBIOMES IN DIFFERENT ENVIRONMENTS? (SLOAN)**

<b>LESSONS LEARNED: MICROBIOME ASSESSMENTS IN NON-RESIDENTIAL ENVIRONMENTS</b> .....	3157
<i>K. Kinney, A. Hoisington, J. Maestre, J. Siegel, M. King</i>	
<b>BUILDING PLUMBING DESIGN SHAPES WATER MICROBIOME: AN IMPORTANT SOURCE OF INDOOR AIR MICROBES</b> .....	3159
<i>A. Pruden, M. Edwards, W. Rhoads, P. Ji, D. Dai, A. Pearce</i>	
<b>NEW METHODS MEET AN AGE-OLD CONCERN: MICROBES IN THE CLASSROOM</b> .....	3161
<i>S. Bhangar, W. W. Nazaroff</i>	
<b>MICROBIAL GROWTH IN HIDDEN LOCATIONS AS THE SOURCE OF INDOOR AIR CONTAMINATION</b> .....	3163
<i>M. Pitkaranta, J. Repo, K. Laine</i>	

#### **ID18 INDOOR ENVIRONMENTAL QUALITY AND HEALTH IN GREEN/SUSTAINABLE BUILDINGS, PART 2**

<b>SESSION SUMMARY - INDOOR ENVIRONMENTAL QUALITY AND HEALTH IN GREEN / SUSTAINABLE BUILDINGS, PART 1 AND PART 2</b> .....	3170
<b>WHAT IS KNOWN ABOUT CURRENT MICROBIAL SCIENCE, THE BUILT ENVIRONMENT, AND HEALTH?</b> .....	N/A
<i>J. Bennett</i>	

<b>IMPACT OF THE NEW CHILEAN AIR-TIGHTNESS REGULATION ON INDOOR AIR POLLUTION IN DWELLINGS WITH INEFFICIENT HEATING SOURCES</b> .....	3172
<i>C. Shrubsole, R. Narváez, H. Altamirano-Medina</i>	
<b>COMFORT OF COOLING BY PERSONAL AIR MOVEMENT</b> .....	3180
<i>J. Verhaart, L. Quaas, W. Zeiler, R. Li</i>	
<b>THE EFFECTS OF IMPROVED ENERGY EFFICIENCY ON INDOOR ENVIRONMENTAL QUALITY IN MULTI-FAMILY BUILDINGS</b> .....	3188
<i>L. Du, T. Prasauskas, V. Leivo, M. Turunen, M. Kiviste, D. Martuzevicius, U. Haverinen-Shaughnessy</i>	
<b>VENTILATION PERFORMANCE AND INDOOR AIR POLLUTANTS DIAGNOSIS IN 20 FRENCH LOW ENERGY HOMES</b> .....	N/A
<i>G. Guyot, R. Jobert, A. Bailly, A. M. Bernard, S. Déoux, E. Parent, A. Huet, S. Berthault, C.-S. Coeudevez</i>	
<b>WHAT DO PEOPLE NEED FROM ENERGY AND INDOOR ENVIRONMENTS?</b> .....	3190
<i>G. Raw</i>	
<b>IMPACT OF GREEN MARK CERTIFICATION SCHEME ON THE QUALITY OF INDOOR ENVIRONMENT IN OFFICE BUILDINGS IN SINGAPORE</b> .....	3198
<i>P. L. Wargoeki, N. Da Silva, K. Wai Tham, C. Lim, J. Young Lee</i>	

#### **ID14 CITIZEN SCIENCE AND INDOOR AIR QUALITY**

<b>SELF-REPORTED HEALTH AND COMFORT IN STUDENT HOMES: FIRST RESULTS FROM A SURVEY AMONG STUDENTS FROM DIFFERENT UNIVERSITIES IN THE NETHERLANDS</b> .....	3200
<i>P. Bluysen, M. A. Ortiz, A. Andrejevic, F. Van Zeist, C. Roda, S. Kurvers</i>	
<b>EVALUATION OF PORTABLE HEPA AIR PURIFIERS AGAINST TRAFFIC RELATED ULTRAFINE PARTICLES WITH INPUT FROM COMMUNITY</b> .....	3207
<i>T. Reponen, R. Peck, M. Yermakov, J. Kim, M. Rao, S. Grinshpun</i>	
<b>WILL INDOOR ENVIRONMENTAL TRAINING MODIFY PUPILS' PERCEPTION OF HOW AIR QUALITY AFFECTS THEIR HEALTH?</b> .....	3209
<i>S. Holos, B. Hoiskar, M. Jovasevic-Stojanovic, H. Keune, P. Hazel, D. Topalovic</i>	
<b>HIGH SCHOOL STUDENTS AS POTENTIAL ACTORS IN MONITORING AND IMPROVING INDOOR ENVIRONMENTAL QUALITY: SCIENTIFIC QUALITY OF WORK PERFORMED BY STUDENTS INVOLVED IN CITI-SENSE PILOT STUDIES</b> .....	3211
<i>J. Robinson, S. Holøs, B. Hoiskar, M. Jovasevic-Stojanovic, D. Kocman, H. Keune</i>	
<b>IS A PROJECT AIMING AT ENGAGEMENT OF CITIZENS A BIASED ACTIVITY? IS THAT A PROBLEM?</b> .....	3219
<i>H. Keune, P. Hazel, J. Robinson, S. Holøs, B. Hoiskar</i>	
<b>INCREASED KNOWLEDGE AND SCIENTIFIC THINKING FOLLOWING PARTICIPATION OF SCHOOL STUDENTS IN AIR-QUALITY RESEARCH</b> .....	3223
<i>Y. Golumbic, A. Baram-Tsabari, B. Fishbain</i>	

#### **ID33 THE NEXT GENERATION OF VENTILATION**

<b>SESSION SUMMARY - THE NEXT GENERATION OF VENTILATION</b> .....	3231
<b>AN INTEGRATED UTILITY MAXIMIZATION APPROACH TO NEXT-GENERATION COMMERCIAL BUILDING VENTILATION</b> .....	3233
<i>A. Rackes, T. B. David, M. Waring</i>	
<b>TECHNOLOGICAL PENDANT VENTILATION IN A TEMPORATE CLIMATE - A UK CASE STUDY</b> .....	3235
<i>G. McGill, T. Sharpe</i>	
<b>ECONOMIC, ENVIRONMENTAL AND HEALTH IMPLICATIONS OF ENHANCED VENTILATION IN OFFICE BUILDINGS</b> .....	3237
<i>P. Macnaughton, J. Pegues, U. Satish, S. Santanam, J. D. Spengler, J. Allen</i>	
<b>PERFORMANCE EVALUATION OF DUCTED AND DUCTLESS PERSONAL VENTILATION SYSTEMS</b> .....	3239
<i>M. Schuss, A. Mahdavi, M. Taheri, U. Pont</i>	
<b>POLLUTANT EXPOSURE CONTROL STRATEGIES IN COMMERCIAL BUILDINGS</b> .....	3247
<i>M. Zaatari</i>	
<b>SMART MANAGEMENT OF IAQ BASED ON REAL-TIME SENSING OF POLLUTANTS</b> .....	3249
<i>D. Martuzevicius, D. Ciuzas, A. Mikuckas, T. Prasauskas, E. Krugly, A. Jurelionis</i>	

#### **ID24 WHAT IS THE ROLE OF "HEALTH" IN INDOOR AIR SCIENCE?**

<b>INDOOR AIR HUMIDITY AND ASSOCIATED HEALTH EFFECTS: THE AIRWAYS, EYES, INFLUENZA VIRUS, SLEEP QUALITY, AND VOCAL CORD</b> .....	3251
<i>P. Wolkoff</i>	
<b>ASTHMA, AIRWAY INFECTIONS AND RHINITIS AMONG ADULTS IN RELATION TO MEASURED HOME ENVIRONMENT IN SINGLE-FAMILY BUILDINGS IN SWEDEN</b> .....	3256
<i>J. Wang, K. Engvall, G. Smedje, H. Nilsson, D. Norback</i>	
<b>A FOLLOW-UP STUDY ON VENTILATION IN DORMITORY AND ITS ASSOCIATION WITH RESPIRATORY INFECTIONS</b> .....	3258
<i>P. Wang, Y. Sun, Q. Zhang, J. Hou, J. Sundell</i>	

<b>PHTHALATE CONCENTRATIONS IN DUST COLLECTED IN CHILDREN'S BEDROOMS AND ITS HEALTH EFFECTS</b> .....	3265
<i>Q. Zhang, Y. Sun, P. Wang, J. Hou, X. Kong, J. Sundell, C. Bornehag</i>	

**ID1178 CHANGING THE GAME IN THE MANAGEMENT OF INDOOR AIR QUALITY – REAL TIME MONITORING FOR IMPROVED HEALTH, COMFORT AND ENERGY EFFICIENCY**

<b>SESSION SUMMARY - CHANGING THE GAME IN THE MANAGEMENT OF INDOOR AIR QUALITY - REAL TIME MONITORING FOR IMPROVED HEALTH, COMFORT AND ENERGY EFFICIENCY</b> .....	3272
--	------

**ID1182 RESULTS FROM A LARGE MULTIDISCIPLINARY STUDY CENTER; CISBO**

<b>DIURNAL AND SEASONAL VARIATION IN AIR EXCHANGE RATES AND INTERZONAL FLOWS MEASURED BY ACTIVE TRACER GAS IN FIVE DANISH HOMES</b> .....	3280
<i>G. H. Clausen, G. Bekö, J. Toftum</i>	
<b>ANYBODY HOME? - INDOOR MICROBIAL EXPOSURE IN DANISH RESIDENCES</b> .....	3282
<i>G. Holst, A. Dorte Pørneki, J. Lindgreen, C. Brooks, J. Douwes, A. Linneberg, T. Sigsgaard</i>	
<b>ULTRAFINE PARTICLE EXPOSURE IN DANISH RESIDENCIES</b> .....	3285
<i>G. Bekö, D. Karotki, A. Wierzbicka, J. Toftum, S. Loft, G. Clausen</i>	
<b>INDOOR-OUTDOOR PARTICLE EFFECTS ON HEALTH IN MIDDLE-AGED AND ELDERLY</b> .....	3287
<i>S. Loft, D. Karotki, G. Bekö, J. Hemmingsen, K. Jantzen, G. H. Clausen, T. Sigsgaard, P. Møller</i>	
<b>INTERVENTION REDUCING PARTICLE EXPOSURE IN HOMES OF 50+ YEAR OLDS</b> .....	3289
<i>L. Gunnarsen, M. Spilak, D. G. Karotki, M. Frederiksen, B. Kolarik</i>	
<b>INCREASING VENTILATION AS AN INTERVENTION IN HOMES OF ASTHMATIC CHILDREN</b> .....	3291
<i>N. Hogaard, B. Kolarik, L. Gunnarsen, T. Sigsgaard, S. Halken, L. Agertoft, S. Leisgaard Rubak, T. Petersen, M. Frederiksen, M. Spilak, N. Lyng</i>	
<b>XDOZ; CONTROLLED HUMAN EXPOSURE TO INDOOR AIR DUST AND OZONE</b> .....	3293
<i>G. Elholm, J. Bønløkke, V. Schläinssen, S. Loft, P. Wolkoff, T. Sigsgaard</i>	

**ID21 COOKING AND INDOOR AIR QUALITY**

<b>A FIELD SURVEY ON THE ENVIRONMENTAL QUALITY OF KITCHENS DURING HEATING PERIOD IN NORTHEAST CHINA</b> .....	3296
<i>B. Chen, M. Zhou, Y. Xu, C. Zeng, X. Zhang</i>	
<b>ENERGY EFFICIENT MEASURES TO REDUCE PM<sub>2.5</sub> EMISSIONS DUE TO COOKING</b> .....	3304
<i>P. Jacobs, E. Cornelissen, W. Borsboom</i>	
<b>ASSOCIATIONS BETWEEN HOUSEHOLD USAGE OF COOKING FUELS AND RESPIRATORY SYMPTOMS IN MIDDLE-SCHOOL TEENAGERS</b> .....	3310
<i>L. Li, J. D. Spengler, J. Sundell, S.-J. Cao, M. Alvarez-Reeves, G. Adamkiewicz</i>	
<b>EFFECT OF COOKING MEDIUM ON EMISSIONS DURING NORMAL AND FESTIVAL COOKING: A CASE STUDY OF URBAN DOMESTIC KITCHEN, INDIA</b> .....	3312
<i>S. Khandelwal, N. Kaul, A. Gupta, G. Das</i>	
<b>IMPORTANCE OF VENTILATION PROVISIONS IN EFFICIENT DISPERSION OF PARTICULATE AND GASEOUS POLLUTANTS: A CASE STUDY OF DIFFERENT COOKING MICROENVIRONMENTS, INDIA</b> .....	3320
<i>N. Kaul, S. Khandelwal, A. Gupta, G. Singh</i>	

**ID2011 WHAT HAVE WE LEARNED FROM MOBE RESEARCH THAT CAN ACTUALLY BE APPLIED TO BUILDINGS?**

<b>MICROBIAL DIVERSITY, BUILDINGS, AND HUMAN HEALTH</b> .....	3328
<i>J. Peccia</i>	
<b>APPLICATION OF THE ENVIRONMENTAL RELATIVE MOLDINESS INDEX IN FINLAND</b> .....	3330
<i>M. Täubel, A. Karvonen, T. Reponen, A. Hyvärinen, S. Vesper, J. Pekkanen</i>	
<b>GUT MICROBIOME, BIODIVERSITY, BUILDING CONNECTION</b> .....	N/A
<i>D. Thaler</i>	
<b>PREBIOTIC BUILDINGS: A NOTE OF CAUTION</b> .....	3334
<i>J. Siegel</i>	
<b>FLOODS AND WHATEVER</b> .....	N/A
<i>M. Hernandez</i>	

**ID56 VENTILATION MEASUREMENT TECHNOLOGIES**

<b>APPLICABILITY OF PERSONAL MONITORS FOR ASSESSING THE EXPOSURE TO INDOOR NANOPARTICLES</b> .....	3336
<i>C. Asbach, H. Kaminski, C. Monz, D. Dahmann, V. Neumann, M. Fierz, S. Clavaguera, S. Plitzko, A. Meyer-Plath, B. Simonow, I. Iavicoli, L. Fontana, A. Maria Todea</i>	

<b>WIND EFFECTS ON TRACER GAS DISPERSION BETWEEN HORIZONTAL ADJACENT UNITS IN A BUILDING</b> .....	3338
<i>Y. Wu, T. Tung, J. Niu</i>	
<b>EXPERIMENTAL ASSESSMENT OF THE VENTILATION IN A RESIDENTIAL BUILDING: TRACER GAS AND FAN PRESSURIZATION MEASUREMENTS</b> .....	3346
<i>R. Almeida, E. Barreira, N. Ramos</i>	
<b>USING A COMBINED INSTRUMENTATION SYSTEM TO MEASURE THE PENETRATION OF AMBIENT OZONE AND FINE AND ULTRAFINE PARTICULATE MATTER INTO RESIDENTIAL BUILDINGS</b> .....	3348
<i>H. Zhao, B. Stephens</i>	
<b>INNOVATIVE USE OF FLUORESCENIN MICROPARTICLES FOR THE AIR PATH STUDY THROUGH AIRTIGHTNESS DEFECTS IN TIMBER FRAME WALL ASSEMBLIES</b> .....	3356
<i>N. Hurel, M. Pailha, M. Woloszyn</i>	
<b>ON MEASURING AIR INFILTRATION RATES USING TRACER GASES IN BUILDINGS WITH PRESENCE CONTROLLED MECHANICAL VENTILATION SYSTEMS</b> .....	3364
<i>M. Bjorling, J. Akander, J. S. Englund</i>	
<b>OPEN-SOURCE TOOL FOR THE AUTOMATED ANALYSIS OF AIR EXCHANGE RATES</b> .....	3371
<i>J. G. C. Laurent, R. Sanchez, P. Macnaughton, J. Spengler, J. Vallerino</i>	

## VOLUME 6

<b>ESTIMATION OF AIR EXCHANGE RATE FROM CO<sub>2</sub> LEVEL</b> .....	3380
<i>Y. Ssu-Hui, N.-Y. Hsu, J. J. Zhang, H.-J. Su</i>	

### **ID73 HOUSEHOLD ACTIVITIES/OCCUPANCY**

<b>A ONE-YEAR ROUND STUDY: SPATIAL VARIATIONS OF INDOOR VOC LEVELS AND INFLUENCES OF BUILDING/ENVIRONMENTAL CHARACTERISTICS AND OCCUPANTS' HABITS (BASIC INDOOR AIR POLLUTION INDEX)</b> .....	3382
<i>S. Mentese, D. Tasdibi</i>	
<b>COUPLED INDOOR/OUTDOOR AIRFLOW SIMULATION COMPARING FLUENT WITH A REAL-TIME GPU-BASED LATTICE BOLTZMANN METHOD</b> .....	3384
<i>M.-F. King, A. Khan, C. Noakes, H. Gough, J. Barlow, N. Delbosc</i>	
<b>HOUSEHOLD FORMALDEHYDE EXPOSURE IN RELATION TO LIFESTYLES BEHAVIORS AND DWELLING CHARACTERISTICS IN 454 RESIDENCES OF SHANGHAI, CHINA</b> .....	3386
<i>C. Huang, W. Liu, L. Shen, X. Wang, J. Cai, Z. Zou, R. Lu, J. Chang, X. Wei, C. Sun, J. Zhang, J. Sundell</i>	
<b>INVESTIGATING CORRELATION BETWEEN OCCUPANT ACTIVITIES AND GENERATION OF INDOOR AIR POLLUTANTS IN HO CHI MINH CITY, THE FASTEST-GROWING CITY IN VIETNAM</b> .....	3394
<i>D. N. T. Kieu, T. T. T. Tran, T. Ng. Tran, L. H. Ba, O. Michel, C. Bouland, J.-M. Hauglustaine</i>	
<b>CONTRIBUTION TO INDOOR AEROSOL CONCENTRATION FROM COMMON HOUSEHOLD POWDERS</b> .....	3402
<i>M. Byrne, R. Thomas</i>	
<b>PREDICTIVE CONTROL OF INDOOR ENVIRONMENT USING ESTIMATED OCCUPANT NUMBER BY VIDEO AND CO<sub>2</sub> CONCENTRATION</b> .....	3404
<i>Z. Chen, Q. Feng, F. Wang, Q. Zhao, Z. Cheng, J. Zou, Y. Zhang, J. Mai, Y. Li, H. Reeve</i>	
<b>PREDICTION OF USER-DRIVEN WINDOW OPERATION IN BUILDINGS</b> .....	3412
<i>A. Mahdavi, M. Del Bolgia, F. Tahmasebi, M. Schuss</i>	
<b>EFFECT OF OUTDOOR TEMPERATURE ON OCCUPANTS' WINDOW OPENING IN RESIDENTIAL BUILDINGS</b> .....	3419
<i>B. Jeong, J. Seok Park</i>	
<b>TOWARD A SYSTEMATIC ASSESSMENT OF WINDOW OPERATION MODELS IN BUILDINGS</b> .....	3425
<i>A. Mahdavi, F. Tahmasebi, M. Schuss</i>	
<b>OCCUPANT'S WINDOW OPENING AND CLOSING BEHAVIOUR PATTERN IN RESIDENTIAL BUILDINGS</b> .....	3432
<i>Y. Pei, J. S. Park, B.-C. Jeong, J. Park</i>	
<b>FIELD MEASUREMENTS OF INDOOR PARTICLE MATTER CONCENTRATION AFFECTED BY INDOOR OCCUPANTS' ACTIVITIES AND OUTDOOR CONDITIONS</b> .....	3438
<i>M. J. Alonso, G. Cao, H. M. Mathisen</i>	

### **ID124 VENTILATION EFFICIENCY**

<b>STUDY ON MICROBIAL CONTAMINATION-CONTROL OF EVAPORATIVE HUMIDIFIER FOR AIR CONDITIONING SYSTEM USING ELECTROLYZED WATER (PART2) EVALUATION EXPERIMENT OF STERILIZATION PERFORMANCE</b> .....	3446
<i>K. Ikeda, S. Nakai, K. Tamura</i>	
<b>EXPERIMENTAL STUDY ON THE IMPACT OF USING A FAN COIL IN THE EVALUATION OF VENTILATION EFFICIENCY OF COMMON AIR DIFFUSION STRATEGIES</b> .....	3454
<i>J. Monteiro, O. Castro, A. Bathelt</i>	
<b>MICROORGANISMS SPORES INACTIVATION BY PHOTOCATALYSIS IN AIR HANDLING UNIT</b> .....	3462
<i>Y. Andres, V. Hequet, K. Morisseau, L. Le Coq, C. Hort, V. Platel, P. Bruno, J.-F. Petit</i>	

<b>SINGLE COIL TWIN FAN AIR-CONDITIONING AND AIR DISTRIBUTION SYSTEM – ENHANCED AIR EXCHANGE EFFECTIVENESS THROUGH DV AND INTEGRATED PERSONALISED VENTILATION-UFAD STRATEGIES</b> .....	3468
<i>C. Sekhar, Kok Wai Cheong, K. Wai Tham, J. Juan Lim</i>	
<b>VENTILATION EFFICIENCY IN A LOW-ENERGY DWELLING SETTING – A PARAMETER STUDY FOR LARGER ROOMS</b> .....	3470
<i>D. Dijkstra, M. Loomans, B. Cremers, J. Hensen</i>	
<b>INVESTIGATION OF AN INNOVATIVE PERFORATED PANEL AT REAL SCALE CONDITIONS</b> .....	3478
<i>I. Nastase, A. Timpu, C. Croitoru, A. Meslem, F. Bode</i>	
<b>EXPOSURE TO AEROSOL AND GASEOUS POLLUTANTS IN A ROOM VENTILATED WITH MIXING AIR DISTRIBUTION</b> .....	3486
<i>M. Bivolarova, J. Ondráček, V. Zdímal, A. Krikor Melikov, Z. Bolashikov</i>	
<b>ACTUAL MEASUREMENT AND ANALYSIS ON MICROBIAL POLLUTION IN CENTRAL AIR-CONDITIONING SYSTEM</b> .....	3492
<i>Y. Lv, C. Wang, W. Yuan, S. Wei, J. Gao, B. Wang</i>	
<b>ASSESSING PROCEDURE FOR MEASURING VENTILATION EFFECTIVENESS IN MIXING VENTILATION: EXPERIMENTAL STUDY</b> .....	3500
<i>H. Amai, A. Novoselac</i>	
<b>EVALUATION OF FLUSH-OUT EFFECT AND ENERGY COST IN RESIDENTIAL BUILDINGS</b> .....	3508
<i>K. Lee, K. Han Kim, J. Seok Park</i>	
<b>ANALYSIS OF CONTAMINANT DISTRIBUTION IN AN OFFICE ROOM WITH LIQUID COOLING AIR-CONDITIONING SYSTEM</b> .....	3514
<i>L. Wang, S. Kato, H. Hwang</i>	

### **ID82 IAQ HOSPITAL/OFFICE**

<b>A SOURCE APPORTIONMENT STUDY ON PM SIZE DISTRIBUTION DATA COLLECTED IN MODERN OFFICES IN ATHENS, GREECE</b> .....	3522
<i>D. Saraga, I. Sakellaris, J. Bartzis</i>	
<b>MODELLING THE FOMITE TRANSMISSION OF DISEASES IN A HOSPITAL WARD</b> .....	3524
<i>S. Xiao, Y. Li</i>	
<b>SPATIAL VARIATION OF INDOOR AIR QUALITY IN HOSPITALS: IMPACT OF VENTILATION MODE ON POTENTIAL EXPOSURE</b> .....	3526
<i>A. Chamseddine, M. El-Fadel, I. Alameddine</i>	
<b>BEHAVIOUR OF VOCs IN A ROOM IN HOSPITAL</b> .....	3536
<i>P. Pasanen, P. Rautiainen, J. Ruokolainen, P. Saarinen, M. Hyttinen</i>	
<b>THE HOSPITAL WARDS SURFACE CLEANLINESS WHILE CLEANING OF THE VENTILATION SYSTEMS</b> .....	3538
<i>L. Kakko, R. Holopainen</i>	
<b>INDOOR AIR QUALITY MODEL EVALUATION IN A MODERN OFFICE</b> .....	3543
<i>D. Missia, J. Bartzis, C. Dimitroulopoulou, I. Sakellaris, G. Efthimiou</i>	
<b>QUESTIONNAIRE STUDY OF INDOOR ENVIRONMENT IN TWO OFFICE BUILDINGS IN NORWAY: ONE ORDINARY RENOVATED AND THE OTHER HIGHLY ENERGY EFFICIENT RENOVATED</b> .....	3551
<i>J. Guan, M. J. Alonso, H. M. Mathisen</i>	
<b>INDOOR ALDEHYDE LEVELS IN DIFFERENT ENVIRONMENTS OF CENTRAL SOUTHERN SPAIN</b> .....	3559
<i>F. Villanueva, B. Cabañas, E. Martínez, P. Martín, S. Salgado</i>	
<b>CHEMICAL CHARACTERIZATION OF THE INDOOR AIR QUALITY OF A UNIVERSITY HOSPITAL: CONTRIBUTION OF OUTDOOR AND INDOOR SOURCES OF AIR POLLUTANTS</b> .....	3562
<i>P. Scheepers, L. Van Wel, G. Beckmann, R. Anzion</i>	

### **ID78 SENSORS**

<b>LABORATORY EVALUATION OF TWO PARTICULATE MATTER SENSORS FOR THEIR RELIABILITIES</b> .....	3564
<i>S. Won Kim, S.-I. Kim, G. Hyun Lee, J. Young Park, K. Lee</i>	
<b>EXPLORATION OF LOW-COST OPEN SOURCE SENSOR TECHNOLOGY TO MONITOR THE BUILT ENVIRONMENT IN RESIDENTIAL BUILDINGS</b> .....	N/A
<i>J. Meesters, J. Langmans</i>	
<b>GAS SENSITIVE SIC-FET SENSORS FOR INDOOR AIR QUALITY CONTROL</b> .....	3566
<i>D. Puglisi, M. Bastuck, M. Andersson, J. Huotari, J. Lappalainen, A. Schütze, A. Lloyd Spetz</i>	
<b>PARALLEL CALIBRATION OF LOW COST INDOOR PM<sub>2.5</sub> MONITORS</b> .....	3568
<i>M. Taylor, I. Nourbakhsh, R. Paetz, J. Schapiro</i>	
<b>LABORATORY ASSESSMENT OF LOW-COST MONITORS</b> .....	3576
<i>A. Mamikonda, N. Zikova, P. Hopke, A. R. Ferro</i>	
<b>PERFORMANCES AND LIMITATIONS OF ELECTRONIC GAS SENSORS TO INVESTIGATE AN INDOOR AIR QUALITY EVENT: MONITORING OF VOC REMOVAL BY A GREEN WALL</b> .....	3578
<i>A. Caron, P. Harb, N. Redon, F. Thevenet, P. Coddeville, B. Hanoune</i>	

<b>LOW-COST INDOOR AIR QUALITY DIAGNOSES FOR A FAST CHARACTERIZATION AND LOCALIZATION OF CHEMICAL POLLUTANTS IN SCHOOL BUILDINGS .....</b>	<b>3586</b>
<i>J. Delahaye, C. Levy, H. Buée, J. Georges Des Aulnois</i>	

### **ID114 EMISSIONS FROM CONSUMER PRODUCTS**

<b>CHARACTERISATION OF VOC EMISSIONS RELEASED FROM FURNITURE PRODUCTS.....</b>	<b>3591</b>
<i>C. Leroux, L. Verines, G. Boulanger, M.-L. Roux, C. Yrieix</i>	
<b>FIELD CAMPAIGN CHARACTERIZATION OF INCENSE AND CANDLE EMISSIONS IN INDOOR ENVIRONMENTS (EBENE PROJECT).....</b>	<b>3598</b>
<i>M. Nicolas, D. Buiron, E. Quivet, A. Albinet, G. Karr, F. Maupetit</i>	
<b>CANDLES AND INCENSES AS INDOOR AIR FRESHENERS: HEALTH RISK ASSESSMENT FROM REAL EMISSION MEASUREMENTS.....</b>	<b>3604</b>
<i>G. Karr, A. Albinet, E. Quivet, D. Buiron, F. Maupetit, M. Nicolas</i>	
<b>DETERMINING THE EXPOSURE FACTORS OF HOME AND AUTO CARE PRODUCTS FOR EXPOSURE ASSESSMENT.....</b>	<b>3606</b>
<i>J. Young Park, K. Lee, W. Yang, M. Lim, S. Park</i>	
<b>SAMPLING AND ANALYSIS OF COMBUSTIBLE AIR FRESHENERS .....</b>	<b>3608</b>
<i>C. Widdowson</i>	
<b>REDUCING THE FORMALDEHYDE EMISSION IN COOKED CHINESE MEDICINE WITH LYCIUM BY DIFFERENT VENTILATION RATE AND ROUTE.....</b>	<b>3609</b>
<i>M.-C. Lee, L.-H. Huang, H. Chen, L. Wong, K. Mui</i>	
<b>MONITORING RELEASE OF ELEMENTAL MERCURY FROM COMPACT FLUORESCENT LAMPS IN A CONTROL ROOM AT DIFFERENT POINT USING THREE MULTIPATH-PATH ATOMIC ABSORPTION SPECTROPHOTOMETER.....</b>	<b>3612</b>
<i>A. Gioda, S. Khan, A. Huaman De La Cruz, M. Fernanda Caceres, J. Mauricio Ceron Cifuentes, R. Aucelio</i>	
<b>CHEMICAL EXPOSURES RELATED TO UPHOLSTERED FURNITURE AND OTHER CONSUMER PRODUCTS .....</b>	<b>3615</b>
<i>M. Black, A. Davis, S. Kerber</i>	
<b>DEVELOPMENT AND OPTIMIZATION OF A TD-GC/MS METHODOLOGY FOR DETECTION AND QUANTIFICATION OF FURAN RELEASED IN AIR USING OF AN EXPERIMENTAL DESIGN. STUDY A FURAN DIFFUSION IN AIR.....</b>	<b>3618</b>
<i>Z. Alsafr, G. Scholl, V. Rocca, N. Molitor, A.-C. Romain, G. Eppe</i>	

### **ID72 COOKING/BURNING**

<b>PM AND VOCS DETERMINATION FROM THE COMBUSTION OF UNTREATED COALS.....</b>	<b>3619</b>
<i>M. L. Barabad, W. Jung, M. Versoza, K. Lee, D. Park</i>	
<b>SEASONAL DIFFERENCES IN THE DETERMINANTS OF PERSONAL EXPOSURE TO AIR POLLUTANTS AMONG RURAL WOMEN COOKING AND HEATING WITH BIOMASS FUELS IN THE EASTERN TIBETAN PLATEAU .....</b>	<b>3623</b>
<i>E. Carter, K. Ni, A. Lai, H. Niu, J. Schauer, M. Ezzati, X. Yang, J. Baumgartner, Y. Zhang, M. Shan, Y Wang</i>	
<b>EXPERIMENTAL STUDY OF INDOOR AIR QUALITY IN TWO TYPES OF NORWEGIAN HOUSES HEATED BY WOOD STOVE.....</b>	<b>3625</b>
<i>G. Cao, L. Georges, Ø. Skreiberg, M. Seljeskog</i>	
<b>FIREWOOD USE FOR RESIDENTIAL PURPOSES IN BRAZIL: A CASE STUDY .....</b>	<b>3633</b>
<i>A. Gioda</i>	
<b>INFLUENCE OF ULTRAVIOLET RAY ON OIL MIST CONCENTRATION WITHIN AN EXHAUST DUCT AND ANALYSIS ON CHEMICAL SUBSTANCE IN OIL MIST DURING COOKING.....</b>	<b>3636</b>
<i>A. Okuda, Y. Kondo, H. Yoshino, K. Hironori, Y. Machii, H. Yoshino, H. Komiyama, H. Komatsu</i>	
<b>AIR QUALITY IMPLICATIONS OF HEATING WITH WOOD STOVES .....</b>	<b>3643</b>
<i>P. Francisco, Z. Merrin, N. Lam, T. Bond, R. Thompson, C. Weyant</i>	
<b>DOMESTIC COMBUSTION PROCESSES: MUTAGENICITY ASSESSMENT OF AEROSOLS .....</b>	<b>3645</b>
<i>N. Canha, I. Lopes, E. Vicente, A. Vicente, B. Bandowe, S. Almeida, C. Alves</i>	
<b>ATTRIBUTION OF AIR POLLUTION FROM SOLID FUEL TO COOKING AND HEATING IN NEPALESE HOMES .....</b>	<b>3652</b>
<i>T. Bond, N. Lam, R. Thompson, B. Upadhyay</i>	

### **ID129 MEASUREMENT TECHNIQUES AND HEALTH IMPLICATIONS**

<b>QPCR - A RAPID TOOL FOR DETERMINATION OF MICROBIAL CONTAMINATION ON BUILDING MATERIALS.....</b>	<b>3654</b>
<i>H. Rintala, M. Lindh, T. Meklin</i>	
<b>A HIGH COLLECTION EFFICIENCY TECHNIQUE FOR AIRBORNE ULTRAFINE – BIOAEROSOLS.....</b>	<b>3656</b>
<i>C.-C. Cheng, Y.-P. Chen, Y.-C. Chen, K.-P. Yu</i>	
<b>INDOOR AIR TOXICITY ASSESMENT USING E. COLI-LUX.....</b>	<b>3658</b>
<i>E. Suominen, J. Atosuo, E.-M. Lilius</i>	

<b>DETERMINING INDOOR BIOAEROSOLS USING MOLECULAR TECHNIQUES .....</b>	<b>3660</b>
<i>N. Grydaki, C. Whitby, I. Colbeck</i>	
<b>THE VALUE OF MEASUREMENT OF VIABLE MICRO-ORGANISMS IN ANALYSING INDOOR AIR .....</b>	<b>3664</b>
<i>G. Thierauf, A. Van Faassen</i>	
<b>ANALYSIS OF INFECTION SPREAD WITH AGENT SIMULATION BASED ON MICROBIOME MEASUREMENT .....</b>	<b>3666</b>
<i>H. Nagano, S. Kato, Y. U</i>	

### **ID100 PHYSIOLOGICAL RESPONSES TO TEMPERATURE**

<b>EXPERIMENTAL STUDY OF ELDERLY AND YOUTH'S THERMAL RESPONSES TO TEMPERATURE TRANSIENT .....</b>	<b>3668</b>
<i>C. Li, H. Yu, M. Zhao, Z. Wang, Y. Yu</i>	
<b>EXPERIMENTAL STUDY ABOUT OFFSET EFFICIENCY OF AIR VELOCITY ON THERMAL COMFORT IN WARM ENVIRONMENTS .....</b>	<b>3676</b>
<i>C. Du, H. Liu, B. Li, M. Tan, Y. Wei</i>	
<b>OPTIMUM INDOOR THERMAL COMFORT CONDITIONS REQUIRED AFTER ENTERING A ROOM FROM OUTDOOR SUMMER HEAT .....</b>	<b>3684</b>
<i>R. Matsuzaki, E. Miyake, Y. Miyashita, S.-I. Tanabe</i>	
<b>IMPACT OF HIGH HUMIDITY ON THERMAL AND HUMID RESPONSES OF PEOPLE IN THE HOT-HUMID AREA .....</b>	<b>3692</b>
<i>L. Jin, Y. Zhang, Zhongjun Zhang</i>	
<b>RELATIONSHIP BETWEEN INDOOR TEMPERATURE NEAR THE FLOOR AND WINTER BLOOD PRESSURE IN WINTER: A MULTI-LEVEL ANALYSIS .....</b>	<b>3695</b>
<i>Y. Nakajima, T. Ikaga, K. Kario, S. Ando, M. Kuwabara, S. Nakamura</i>	
<b>ANALYTICAL METHOD OF SOLAR RADIATION INFLUENCE ON THERMAL SENSATION ACCOUNTING FOR TRANSMISSION THROUGH CLOTHING AND CLOTHING DISTRIBUTION .....</b>	<b>3703</b>
<i>T. Sakoi, S. Hosoya, Y. Kurazumi, T. Togami, H. Takita</i>	
<b>THE EFFECT OF HIGH AIR TEMPERATURE AND HIGH CO<sub>2</sub> CONCENTRATION ON PHYSIOLOGICAL RESPONSES AND WORK PERFORMANCE .....</b>	<b>3711</b>
<i>W. Liu, P. L. Wargocki</i>	
<b>EFFECT OF ACOUSTICS, TEMPERATURE AND VENTILATION RATE ON PERFORMANCE .....</b>	<b>3719</b>
<i>H. Koskela, J. Varjo, A. Haapakangas, H. Maula, V. Hongisto, P. Kalliomäki</i>	
<b>THE INFLUENCE OF MODERATE HEAT STRESS ON THERMAL COMFORT, MOTIVATION AND MOOD AT WORK PLACES – A META-ANALYTIC SYNTHESIS .....</b>	<b>3721</b>
<i>S. Urlaub, A. Steidle, G. Grün, K. Sedlbauer</i>	
<b>THE INFLUENCE OF MODERATE HEAT STRESS ON PERFORMANCE - A META-ANALYTIC SYNTHESIS .....</b>	<b>3723</b>
<i>S. Urlaub, A. Steidle, G. Grün, C. Van Treeck, M. Denzler, K. Sedlbauer</i>	
<b>EFFICIENCY OF INDEX ETVO FOR EVALUATION OF INDOOR THERMAL ENVIRONMENT WITH AND WITHOUT SOLAR RADIATION .....</b>	<b>3730</b>
<i>K. Nagano, T. Horikoshi</i>	
<b>EFFECTS OF SOLAR HEAT LOAD ON THE THERMOREGULATORY RESPONSES OF YOUNG AND OLDER MEN .....</b>	<b>3738</b>
<i>K. Tsuzuki, I. Misaka, K. Narita, Y. Ishimaru</i>	

### **ID154 BEHAVIOUR RESPONSE**

<b>OUTDOOR THERMAL BIOCLIMATIC ENVIRONMENTS AND HUMAN BEHAVIOR PATTERN UNDER SUBARCTIC CLIMATE OF NORTH SWEDEN - A PILOT STUDY IN UMEÅ .....</b>	<b>3745</b>
<i>B. Yang, T. Olofsson</i>	
<b>PHYSIOLOGICAL RESPONSES TO CHANGES IN RELATIVE HUMIDITY IN THERMALLY NEUTRAL, WARM AND HOT CONDITIONS .....</b>	<b>3747</b>
<i>N. Kakitsuba</i>	
<b>ASSESSMENT OF THERMAL COMFORT IN SEMI-OUTDOOR SPACE SERVED BY HIGH VOLUME LOW SPEED (HVLS) FAN .....</b>	<b>3754</b>
<i>D. Kok Wai Cheong, K. Fong Wilson Soh</i>	
<b>PREDICTION OF THE EFFECT OF THE COOLING METHODS DURING WATCHING OUTDOOR GAMES IN SUMMER .....</b>	<b>3762</b>
<i>H. Miyajima, M. Ogata, S.-I. Tanabe</i>	
<b>VARIATION OF HEART RATE AND WORK PERFORMANCE AFTER WALKING OUTSIDE IN SUMMER .....</b>	<b>3768</b>
<i>Y. Morinaka, Y. Masuda, H. Matsumoto</i>	
<b>DEVELOPMENT OF AN OUTDOOR THERMAL ENVIRONMENT ANALYZER AND ITS PROPERTIES FOR MEASUREMENT .....</b>	<b>3776</b>
<i>T. Sakoi, Y. Kurazumi, T. Kamiya, T. Mochida, K. Iizuka, K. Tsuzuki</i>	
<b>INVESTIGATION OF INDOOR AIR QUALITY AND ITS IMPACT ON HUMAN ACTIVITY .....</b>	<b>3784</b>
<i>P. Kapalo, F. Dommita, S. Vilcekova, L. Meciariova</i>	



<b>THERMAL COMFORT AND HEATING USAGE BEHAVIOR IN INTERMITTENT AND CONTINUOUS HEATING RESIDENCES IN SHANGHAI</b> .....	3792
<i>X. Zhou, J. Zhang, S. Zheng, S. Lei, D. Mou, X. Zhang</i>	
<b>EFFECT OF TEMPERATURE ON OCCUPANTS' BEHAVIORS AND SUBSEQUENT PM<sub>2.5</sub> CONCENTRATION</b> .....	3800
<i>W. S. Luo, N.-Y. Hsu, H.-J. Su</i>	
<b>POTENTIAL ADAPTIVE BEHAVIOUR TO COUNTERACT THERMAL DISCOMFORT IN SPACES WITH DISPLACEMENT VENTILATION OR UNDERFLOOR AIR DISTRIBUTION SYSTEMS</b> .....	3804
<i>A. Kabanshi, S. Schiavon, S. Liu</i>	

### **ID85 SCHOOL COMFORT AND PERFORMANCE**

<b>INDOOR MICROCLIMATE IN A SOUTH AFRICA SCHOOL: IMPACT OF INDOOR ENVIRONMENTAL FACTORS</b> .....	3808
<i>E. Essah, W. Kwawu, L. Motsatsi</i>	
<b>EFFECTS ON PUPIL WELL-BEING AND PERFORMANCE OF CLASSROOM VENTILATION RETROFITS</b> .....	3816
<i>J. Toftum, P. L. Wargoeki</i>	
<b>LARGE-SCALE CO<sub>2</sub> MEASUREMENT CAMPAIGNS IN DANISH SCHOOLS</b> .....	3818
<i>G. H. Clausen, J. Toftum, G. Bekö</i>	
<b>A CASE STUDY OF ASSESSMENT AND IMPROVEMENT OF THE INDOOR ENVIRONMENT OF A COLLEGE CAFETERIA</b> .....	3820
<i>N. Ramos, R. Almeida, P. Pereira</i>	
<b>WINTER THERMAL COMFORT AND INDOOR AIR QUALITY IN SWEDISH GRADE SCHOOL CLASSROOMS, AS ASSESSED BY THE CHILDREN</b> .....	3822
<i>D. Teli, J.-O. Dalenbäck, L. Ekberg</i>	
<b>DEVELOPING AN INDOOR AIR QUESTIONNAIRE FOR PRIMARY SCHOOLS</b> .....	3832
<i>S. Ung-Lanki, J. Lampi, J. Pekkanen</i>	
<b>AN EXPERIMENTAL EVIDENCE ON THE COOLING ENERGY SAVING OF NATURAL VENTILATED CLASSROOMS IN TAIWAN</b> .....	3834
<i>K.-T. Huang, R.-L. Hwang</i>	
<b>EXPERIMENTAL INVESTIGATION ON THERMAL COMFORT IN UNIVERSITY CLASSROOMS</b> .....	3836
<i>A. Moraru, D. D'Alessandro, D. Valeri</i>	

### **ID118 IAQ INFECTION AND HEALTH EFFECTS**

<b>A POSSIBLE FAN-ASSISTED ADENOVIRUS 4 OUTBREAK AMONGST STAFF IN A PAEDIATRIC WARD - A FAILURE OF CONTACT AND/OR AEROSOL CONTAINEMENT</b> .....	3842
<i>J. Tang, E. Hoyle, J. Erez, H. Kirk-Granger, E. Collins</i>	
<b>ASSOCIATIONS BETWEEN INDOOR ENVIRONMENTAL DAMP AND COLD SYMPTOMS AMONG PRESCHOOL CHILDREN IN SHANGHAI, CHINA</b> .....	3846
<i>C. Sun, C. Huang, Z. Zou, W. Liu, Y. Hu, L. Shen</i>	
<b>EXPOSURE IMPACT OF INFECTION ROUTES: DROPLET, AIRBORNE, AND CONTACT</b> .....	3854
<i>M. Ogata, M. Suzuki, M. Matsumura, M. Ichikawa, S.-I. Tanabe, S. Hori, H. Tsutsumi</i>	
<b>SPREAD OF SEVERE ACUTE RESPIRATORY SYNDROME (SARS) BEYOND AMOY GARDENS</b> .....	3862
<i>J. Wei, Y. Li</i>	
<b>DEVELOPMENT OF AN INDOOR AIR QUALITY INDEX FOR RISK ASSESSMENT IN HOSPITALS</b> .....	3864
<i>A. Chamseddine, M. El-Fadel, I. Alameddine</i>	
<b>INDOOR AIR QUALITY AND RESPIRATORY HEALTH AMONG TURKISH INFANTS IN ANKARA, TURKEY</b> .....	3872
<i>S. Lakestani, G. Gullu, S. Acar Vaizoglu, B. Guviz Dogan, B. Sekerel</i>	
<b>HEALTH AND HOUSEHOLD-RELATED BENEFITS OF LOW-INCOME WEATHERIZATION</b> .....	3880
<i>B. Tonn, E. Rose, B. Hawkins</i>	
<b>WHY CHINESE CHILDREN ARE SICK IN URBAN MODERN BUILDINGS-REPORT FROM AN ONGOING STUDY ON ASSOCIATIONS BETWEEN HOME ENVIRONMENTAL FACTORS AND HEALTH OUTCOMES OF CHILDREN IN TIANJIN, CHINA</b> .....	3882
<i>Y. Sun, J. Sundell, J. Hou, X. Kong, P. Wang, Q. Zhang</i>	
<b>HEALTH IMPACT OF INDOOR AIR CHEMICAL EXPOSURE ON A MULTIPLE CHEMICAL SENSITIVITY SUSPECTED PATIENT: CASE REPORT STUDY</b> .....	3889
<i>H. Nakaoka, N. Suzuki, T. Yamada, E. Todaka, C. Mori, A. Eguchi</i>	

### **ID115 EMISSION MODELING AND CASE STUDIES**

<b>USING THE POWER-LAW MODEL WITH SHORT-TERM VOC EMISSIONS DATA FROM BUILDING MATERIALS TO PREDICT LONG-TERM EMISSION CHARACTERISTICS</b> .....	3891
<i>W. Ye, D. Won, X. Zhang</i>	
<b>AN IMPROVED MASS TRANSFER MODEL FOR SIMULATING FORMALDEHYDE EMISSIONS FROM A MEDIUM-DENSITY FIBERBOARD (MDF) IN ACTUAL BUILDINGS</b> .....	3899
<i>W. Liang, X. Yang, M. Lv</i>	

<b>FACTORS CONTROLLING VOLATILE ORGANIC COMPOUNDS IN DWELLINGS IN AUSTRALIA</b> .....	3907
<i>M. Cheng, I. Galbally, S. Molloy, P. Selleck, M. Keywood, S. Lawson, J. Powell, R. Gillett, E. Dunne</i>	
<b>ANALYSIS OF HUMIDITY AND CARBON DIOXIDE CONCENTRATION TO IMPROVE THE INDOOR AIR QUALITY IN JAPANESE BUILDINGS</b> .....	3908
<i>M. Hayashi, H. Osawa, H. Kim, U. Yanagi, N. Kagi, N. Kaihara</i>	
<b>DETERMINING CONVECTIVE MASS TRANSFER COEFFICIENTS IN INDOOR SEMI-VOLATILE ORGANIC COMPOUNDS FATE MODEL FOR REALISTIC BUILDINGS</b> .....	3916
<i>X. Wang, C. Luo, M. Zeng</i>	
<b>EFFECT OF VENTILATION RATE ON INDOOR AIR QUALITY AND ENERGY PERFORMANCE OF AN OFFICE ROOM MADE OF HEMP CONCRETE</b> .....	3918
<i>A. Dung Tran Le, B. Rocq, O. Douzane, T. Carpentier, C. Seigneur, J.-M. Roges, J.-M. Roucoult, L. Lahoche, T. Langlet</i>	
<b>CHARACTERIZATION OF MID- AND LONG TERM EMISSIONS FROM BUILDING MATERIALS: IMPACT OF USE AND WEAR CONDITIONS</b> .....	3926
<i>M. Nicolas, B. D'Anna, A. Albinet, F. Maupetit, L. Chiappini</i>	

**ID103 OUTDOOR AND INDOOR IEQ**

<b>CREATING LOCAL COOLING SPOTS IN HIGH-DENSITY URBAN ENVIRONMENT: RESULTS FROM ON-SITE MONITORING</b> .....	3929
<i>J. Niu, J. Liu</i>	
<b>NUMERICAL SIMULATION ON INDOOR AIR TEMPERATURE AND ENERGY CONSUMPTION OF A CAMPUS OFFICE BUILDING UNDER INTERMISSION HEATING</b> .....	3934
<i>B. Xu, J. Zhou, S. Zhou, H. Di, W. Hu</i>	
<b>CORRESPONDENCE BETWEEN IAQ ASSESSMENT BASED ON SURVEY AND T, RH, CO<sub>2</sub> MONITORING</b> .....	3942
<i>A. Szczurek, M. Maciejewska</i>	
<b>WIND TUNNEL STUDY OF PEDESTRIAN LEVEL WIND ENVIRONMENT: EFFECTS OF BUILDING LIFT-UP DESIGN</b> .....	3949
<i>Y. Du, C.-M. Mak, K. C. S. Kwok, K. T. Tse, Z. T. Ai, J. L. Niu, Y. W. Dai</i>	
<b>CHARACTERISTICS OF PEDESTRIAN LEVEL WIND ENVIRONMENT IN TWISTED WIND FLOW AROUND A ROW OF BUILDINGS</b> .....	3956
<i>X. Zhang, T. Tse, K. Kwok, A. Weerasuriya</i>	
<b>THE RELATIONSHIP BETWEEN INDOOR AND OUTDOOR TEMPERATURE, RELATIVE HUMIDITY, AND ABSOLUTE HUMIDITY IN SIX CHINESE CITIES</b> .....	3964
<i>H. Zhang, H. Yoshino, U. Yanagi, Kenichi Hasegawa, Z. Li, J. Xie, J. Liu, Y. Lv, N. Li, S. Zhu</i>	
<b>A METHOD TO ASSESS THE OUTDOOR THERMAL COMFORT AROUND AN ELEVATED DESIGN BUILDING: COUPLED CFD AND ONSITE MONITORING</b> .....	3972
<i>J. Liu, J. Niu, Q. Xia</i>	
<b>EFFECTS OF CAMPUS LAYOUT ON OUTDOOR THERMAL ENVIRONMENT AND OF CLASSROOM FORMS ON INDOOR THERMAL ENVIRONMENT</b> .....	3979
<i>W.-M. Shih, N.-X. Tan, M.-H. Liu, T.-P. Lin</i>	
<b>ANALYSIS OF THE INDOOR THERMAL ENVIRONMENT OF CHONGQING TRADITIONAL STONE HOUSES IN SUMMER</b> .....	3987
<i>M. Peng, Z. Yang, Y. Xu, Q. Yu</i>	

**ID2017 WHAT HAVE WE LEARNED ABOUT BUILDINGS FROM THE APPLICATION OF DNA-BASED METHODS (SLOAN)**

<b>PRACTICAL USES OF INDOOR MICROBIOME SURVEYS: INFORMATICS AND SEQUENCING</b> .....	3994
<i>K. Bibby</i>	

**ADDITIONAL PAPERS**

<b>DISSOLUTION OF ALKALI METAL DOPANT IN FLAME-MADE PT/NA<sub>x</sub>-AL<sub>2</sub>O<sub>3</sub> CATALYSTS: ENHANCED BENZENE CATALYTIC OXIDATION PROPERTY AND ACTIVATION MECHANISM</b> .....	3996
<i>Y. Deng, R. Yue, F. Zhao, W. Li, X. Qian, Y. Chen</i>	
<b>CFD SIMULATION FOR THE BUOYANCY FLOWS AND POLLUTANT DISPERSION THROUGH DIFFERENT SCALE URBAN AREAS</b> .....	4004
<i>P.-Y. Cui, Y.-F. Mao, Z. Li, W.-Q. Tao</i>	
<b>COMPARISON OF SAMPLING METHODS FOR SMALL-SCALE ENVIRONMENTAL CHAMBER</b> .....	4012
<i>M. Li, S. Shen, J. Li</i>	
<b>ENVIRONMENTAL INFECTION CONTROL DURING HOSPITAL CONSTRUCTION AND RENOVATION</b> .....	4016
<i>K. Grosskopf, E. Mousavi-Rizi</i>	
<b>NUMERICAL SIMULATION ON THE INFLUENCE OF VELOCITY FIELD UPON EMISSION OF PHTHALATES FROM VINYL FLOORING</b> .....	4018
<i>Y. Mao, Z. Li, W. Tao</i>	
<b>THE IMPACT OF AIR POLLUTION ON THE ENERGY EFFICIENCY OF NATURAL VENTILATION IN CHINA</b> .....	4026
<i>M. Qin, Y. Yang</i>	

<b>HOME TEMPERATURE AND PHYSICAL ACTIVITY IN WINTER FROM A MULTI-LEVEL ANALYSIS OF FIELD SURVEY DATA</b> .....	4028
<i>M. Ito, T. Ikaga, S. Ando</i>	
<b>DEVELOPMENT OF CHEMICAL REACTION KINETICS OF VOC OZONATION</b> .....	4036
<i>B. Mohan, X. Cui, K. Chua</i>	
<b>CLEANROOMS WITH LOW MOLECULAR ORGANIC CONTAMINATION (MOC): FROM MATERIAL CLASSIFICATION MEASUREMENTS TO DIFFERENT ASSESSMENT METHODS REGARDING ORGANIC CONDENSABLES</b> .....	4043
<i>M. Keller, S. Weisser, U. Gommel</i>	
<b>IMPACT OF OCCUPANT ACTIVITIES ON INDOOR LEVEL OF PARTICULATE MATTER: A EXPERIMENTAL STUDY</b> .....	4045
<i>Z. Zou, Y. Liao, C. Huang, W. Liu</i>	
<b>ANNUAL CHARACTERISTICS OF INDOOR AIR QUALITY OF A SHOPPING MALL IN SHANGHAI CITY, CHINA</b> .....	4052
<i>J. Guan, S. Chen, W. Yang, Y. Li, H. Liao, Y. Ni</i>	
<b>THE EFFECT OF REFLECTIVE COATING ON RESIDENTIAL BUILDING SURFACE TEMPERATURES, INDOOR ENVIRONMENT AND THERMAL COMFORT IN WINTER: A CASE STUDY IN XIAMEN, CHINA</b> .....	4059
<i>Z. Chaoqun, B. Li, Y. Gao, B. Li, J. Peng</i>	
<b>ESTIMATION OF THE INHALATION RISK TO THE HEALTH OF CHILDREN IN CONDITIONS OF AIR CONTAMINATION IN KINDERGARTENS BY FORMALDEHYDE CONTAINED IN FURNITURE AND DECORATION MATERIALS</b> .....	4069
<i>I. May, S. Kleyn, N. Nikiforova</i>	
<b>EVALUATION OF PARTICULATE MATTER BY INNER FACTORS ACCORDING TO BUILDING LOCATION IN ELEMENTARY SCHOOLS IN SEOUL, KOREA</b> .....	4074
<i>J.-H. Seo, J. Moon, W. Chi, J. Yang, J.-R. Sohn</i>	
<b>HEALTH AND ENVIRONMENTAL IMPACT ASSESSMENT OF COOKSTOVE USING INTEGRATED ENVIRONMENTAL PERFORMANCE SCORE</b> .....	4078
<i>I. Parajuli, H. Lee</i>	
<b>A DESIGN OF THE TEST CHAMBER AND PASSIVE BEAMS TO CONDUCT THE ASHRAE 1666 TRP EXPERIMENT TO EVALUATE THERMAL AND VENTILATION PERFORMANCE OF STRATIFIED AIR DISTRIBUTION SYSTEMS COUPLED WITH PASSIVE CHILLED BEAMS</b> .....	4086
<i>K. Ooi, M. Abdullah, H. Rep</i>	
<b>Author Index</b>	