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THE ASHRAE TIMES

Newsletter of ASHRAE Singapore Chapter

President Message

Dear ASC members,

This is the 3rd Newsletter for the year 2014-2015 and I would like to provide you an update of our program and activities. During the last 12 months, we have organised many successful events such as the training courses on "Fundamentals of Air-Conditioning System" with BCA Academy in June and November 2014, DL (Distinguished Lecturer) seminar on Environmental Control and Energy Performance in Hospital and Healthcare Facilities with over 90 participants in June 2014 and Integrated Design Modelling And Emerging ACMV Technologies For Energy Efficient Healthy Buildings in April 2015 (both co-organized with BCAA), the 32nd Annual Installation Dinner in July 2014 with a record of 89 tables, a series of technical seminars which is free for ASC members which includes Energy Efficient Air-conditioning Technologies & Refrigerant Trends in October 2014, Leveraging Advanced IAQ Technologies for High Performance Green Buildings in November 2014, Modelling & Simulation for Urban and Built Environment in January 2015, Room Air Distribution For Enhanced IAQ And Energy Efficiency (DL seminar co-organized with NUS) in February 2015 and

INSIDE

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Managing Low Delta T Syndrome in HVAC System cum Members' night and Chinese New Year celebration dinner in March 2015, and also many activities organised for the YEA members and student members. I hope that you have also participated in some of the above events.

Some of the BOG members, Regional officers and I have also attended the Regional Planning Meeting (RPM) in May 2014, 17th Chapter Regional Conference (CRC) in August 2014 and Bilateral Meeting with ASHRAE Malaysia Chapter in November 2014. We have also signed two MOU with other professional societies, one with IES (The Institution of Engineers, Singapore) and one with IFMA (International Facility Management Association, Singapore Chapter).

We will have our AGM on 24 April 2015 evening at the Singapore Polytechnic, please come and support us. For the coming years, we will continue to organize technical talks and seminars, networking sessions and events, to fulfil ASHRAE's Mission to advance the arts and sciences of heating, ventilating, air conditioning and refrigerating to serve humanity and promote a sustainable world. Thanks.

Matthew Ngan

ASC President 2014-2015

ASHRAE Technical Seminar

By George XU

Technical Seminar on Energy Efficient Air-conditioning Technologies & Refrigerant Trends

ASHRAE Singapore Chapter (ASC) invited Mr. Anil Thakur, Marketing Director from Danfoss (Thailand) Co., Ltd, to give a technical seminar on "Energy Efficiency Air-conditioning Technologies & Refrigerant Trends" at Singapore Polytechnic Graduates' Guild (SPGG) on 16 Oct, 2014. During the seminar, Mr. Anil presented many cost-effective technology options, including manifold compressors, commercial Inverter scrolls and oil free magnetic bearing centrifugal, for the design of energy efficient air-conditioning systems to suit diverse applications. An overview of refrigerant trends for HVAC applications was also covered in the talk.

This seminar overwhelmingly attracted more than 75 registered participants from industrial companies, university, polytechnic and ITE. Two PDU points were awarded to professional engineers who attended this seminar.

Mr. Anil Thakur in action

Token of Appreciation presented by ASC President, Mr. Matthew Ngan

Photo of speaker with ASC student members and YEA members.

ASHRAE Technical Seminar

By George XU

Leveraging Advanced IAQ Technologies for High Performance Green Buildings

ASHRAE Singapore Chapter (ASC) invited Mr. Lui Wing Sin, GETC Asia Pte Ltd, on 27 November 2014, to share with what are the IAQ technologies available today. While energy efficiency seems to get more attention, indoor air quality is an extremely important component of green buildings that should not be overlooked. In fact, there are links between energy efficiency and indoor air quality that create design synergies.

ASHRAE, in its Position Document on Indoor Air Quality, has stated that "IAQ and building energy performance are substantially linked and these linkages must be considered starting at the very earliest stages and throughout the processes of building design, retrofit, and renovation".

This seminar aims to share with the participants advanced IAQ technologies which can meet the twin objectives of enhancing the indoor air quality and energy performance of buildings.

The attentive audience listening to Mr. Lui during the session (above & below).

Receiving an appreciation certificate from ASC President, Mr. Matthew Ngan

ASHRAE Technical Seminar

By George XU

Technical Seminar on "Modelling & Simulation for Urban and Built Environment"

On January 9th 2015, ASHRAE Singapore Chapter (ASC) invited three CTTC members, including the CTTC Chairman Dr. Poh Hee Joo, Dr. George XU and Mr. Sam Lam, and two industrial speakers, Dr. David Bryne from PD Simulation Pte Ltd and Mr. Rohan Rawte from IES Ltd, jointly presented their views and experiences with regard to urban microclimate and building performance simulation topics. The half-day seminar was held in Ngee Ann Polytechnic, thanks to the kind supports by Ngee Ann Polytechnic, PD Simulation Pte Ltd and IES Ltd.

The details about the seminar agenda are listed as follow.

1:30pm	Registration & Networking
2:00pm	Introduction of speakers
2:05pm	"Application Of CFD In Architecture, Urban Planning and Green Building Design In Singapore", Dr. Poh Hee Joo, Institute of High Performance Computing, A-STAR
2:45pm	"Combining 1D & 3D CFD for System Level Simulations", Dr. David Byrne, PD Solutions Pte Ltd
3:00pm	Tea Break
3:30pm	"Applied Computational Fluid Dynamics (CFD) in Built Environment", Dr. George XU, Parsons Brinckerhoff Pte Ltd
4:10pm	"Latest developments in computer simulations for ACMV & smart communities - IES Ltd. R&D showcase", Mr. Rohan Rawte, IES Ltd
4:25pm	"Building Energy Simulation - Tool for Designing High Performance Air-conditioning Systems", Mr. Lam Kwok Ho, Sam, Ngee Ann Polytechnic
5:05pm	Certificate of Appreciation by ASC President, Mr. Matthew NGAN
5:10pm	End of Seminar

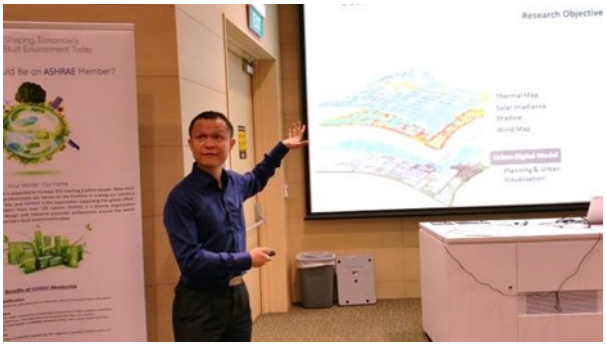




More than 50 participants from various sectors, including engineers from HVAC industries, ESD consultants, building architects, as well as researchers and students from relevant institutions have attended this BPS seminar. Nine of participants are registered professional engineers who were awarded Two PDU points for their attendance.

ASHRAE Technical Seminar

By George XU



Dr. Poh Hee Joo is in action to present the topic about urban simulations.

President of ASC, Mr. Matthew Ngan, is presenting appreciation certificates to invited speakers.

ASHRAE Technical Seminar

Seminar On "Managing Low Delta T Syndrome in HVAC System"

By Dennis Ho, Regional Application Consultant, Belimo Actuators Ltd

Studies show that Low Delta T Syndrome in HVAC system exists in many buildings. Cause of low delta T syndrome could be many but the end effect is always the same which is energy wastage.

Engineers and building managers understand that managing low delta T syndrome is essential for reducing energy wastage and maintaining sustainability. Often they tend to solve it by upgrading efficiency of chillers and pumps; or adding more measurement device into BMS system to enhance the chiller plant sequencing programme.

The questions, how effective and how much the investment and running cost of these solutions are? Can these solutions be implemented and completed within days?

This presentation aims to share with the participants a new approach of managing low delta T syndrome: advanced pressure independent control valve. This approach is probably the best solution in terms of investment cost, implementation, impact to existing building operation and maintenance in long run.

ASHRAE Distinguished Lecturer Program

By George XU

ASHRAE DL Talk on "Room Air Distribution for Enhanced IAQ and Energy Efficiency"

TL CHEN, P.E., C.Eng.
Primetech Engineers
Kuala Lumpur,
Malaysia

Prof. CHANDRA SEKHAR
National University of Singapore
Singapore

ASHRAE Singapore Chapter (ASC) and Department of Building, School of Design & Environment, National University of Singapore, has jointly organized ASHRAE Distinguished Lecturer Program on Room Air Distribution for Enhanced IAQ and Energy Efficiency. Two ASHRAE Distinguished Lecturers in Region 13, Prof. Chandra Sekhar from NUS, Singapore and Mr. TL Chen from Primetech Engineers, Malaysia, were invited to present their latest cutting-edge research and application topics. In details, Mr. TL Chen talked about Tropicalisation of of High Performance Strategies for Hot & Humid Climate Applications, and Prof. Sekhar shared his research efforts in Advanced Room Air Distribution Strategies for Effective Airborne Infection Control.

This seminar has overwhelmingly attracted more than 100 participants from various sectors including HVAC industry, ESD consultancy firms, and research institutions. The half-day talk offered a wonderful platform between the speakers and participants in terms of knowledge-sharing and experience-exchanging during and after the talk.

Dr. Sekhar & Mr. Chen presenting their topics to the attentive audience.

ASC President presenting Appreciation Certificates to the Distinguished Lecturers

Group photo for ASHRAE DLs and ASC BOG members.

ASHRAE Seminar

By George XU

ASHRAE DL Talk on "Integrated Design Modelling and Emerging ACMV Technologies for Energy Efficient Healthy Buildings"

With the collaborative efforts between ASHRAE Singapore Chapter (ASC) and BCA Academy (BCAA), a one-day ASHRAE Distinguished Lecturer Program, entitled as ***Integrated Design Modelling and Emerging ACMV Technologies for Energy Efficient Healthy Buildings***, was successfully organized at BCAA on April 7, 2015. Two ASHRAE Distinguished Lecturers, Prof. John Zhai from the University of Colorado at Boulder (UCB) and Prof. Chandra Sekhar from National University of Singapore were invited to present their DL topics. In details, the following topics were shared by the DLs with the audience:

1. Energy Performance and Modelling of Naturally Ventilated Buildings by Prof Zhai
2. Integrated Building Energy and CFD Simulations by Prof Zhai
3. Emerging ACMV Technologies for Energy Efficient Healthy Buildings in Hot and Humid Climates (Part 1 & 2) by Prof Sekhar

This seminar has attracted about 50 designers, engineers, researchers, officers and students from various disciplines. Audience were impressed with the attractive topics and wonderful presentation skills of the two DLs.

Prof. John Zhai (left) and Prof. Sekhar are in action presenting their topics.

(Below) Audience are paying undivided attention to the presenters.

Student Activities

By Mitesh Kumar

Changi District Cooling Systems (DCS) Plant Tour

06 Feb 2015 – The DHCS plant in Changi Business Park is the first district cooling systems (DCS) plant in Singapore and has been in commercial operation since June 2000 to provide district cooling service to the 66 hectares landscaped park. It is awarded Green Mark Platinum in FY12. The plant is designed to generate a cooling capacity of about 30,000 RT (refrigeration tonnes) for the entire business park.

The participants were briefed on DCS cooling system that comprises of a centrally located chilled water plant to serve a cluster of buildings for their air-conditioning needs. During the technical walkthrough of the plant the participants were explained how the plant distributes chilled water to its customers' buildings through a network of pipes. By aggregating the customers' energy loads, the overall installed capacity can be lower than if each building used a separate cooling unit. The aggregation also reduces the overall carbon footprint. The energy-efficient and space-saving attributes of DCS make it suitable and attractive to address the needs of city centres, large production plants, hospitals and property developments.

Student Activities

By Mitesh Kumar

City Square Mall Technical Visit

13 Feb 2015 – City Square Mall is Singapore's first eco-mall. For this technical visit, the student participants from ITE College East, Temasek Poly and NUS were shown some of the green features in this certified Green Mark Platinum mall such as;

- Use of building integrated photovoltaics to harness solar energy;
- Fabric Sun Screen for curtain wall at northwest elevation to mitigate the heat passing through the clear glass façade curtain wall;
- Energy efficient LED lighting for façade;
- Energy efficient lifts, escalators and travellators – designed with auto-lighting & ventilation fans, VVVFD & slow-down feature;
- Intensive green roof to lower ambient temperature and heat gain into the building;
- Sun Path and Shadow Casting Modeling were conducted for an efficient & effective analysis of the sun path's effect & shadow effect on the building for energy efficiency enhancement;
- Twin chute (organic & inorganic waste) pneumatic waste disposal system to improve the indoor air quality;
- Priority parking for hybrid cars that have lower environmental impact;
- Atrium with indoor trees creates a green environment and helps to absorb noise & reverberation.

YEA Activities

Marina Barrage Tour

By Kris Tan

6 Dec 2014 – Marina Barrage is Singapore's 15th reservoir which is also the first to locate in the hub of the city. It will increase Singapore's water catchment area from 1/2 to 2/3 of Singapore land area. Marina Barrage provides a tidal barrier to keep sea water out, helping to alleviate flooding in lower lying areas of Singapore. It has won many awards including BCA Green Mark Platinum Award for Infrastructure and ASEAN Outstanding Engineering Achievement Award.

The 3 main key objectives which Marina Barrage provided are (1) water supply, (2) flood control and (3) lifestyle attraction. Below are some features of Marina Barrage:

1. It stores fresh water from a massive catchment zone which enables Singapore to be less dependent of water imports from Malaysia;
2. The rooftop provides green recreation spaces for picnics and kiting for families;
3. Sea-sports enthusiastic individuals could enjoy water-based recreational activities such as kayaking, sailing, etc.
4. During heavy rain, the nine crest gates at the dam will opened to release excess storm water into the sea.
5. When there is heavy rain but the tide is low, the gates will open to release excess water into the sea. When heavy rain occurs with high tide, the gates will remain closed while the pumps will be activated to pump the excess water out to sea.
6. The solar park which houses Singapore largest collection of solar panels in operation.

The Sustainable Singapore Gallery broadcasts Singapore's efforts towards achieving environmental sustainability and intend to educate the public on major environmental and water issues.

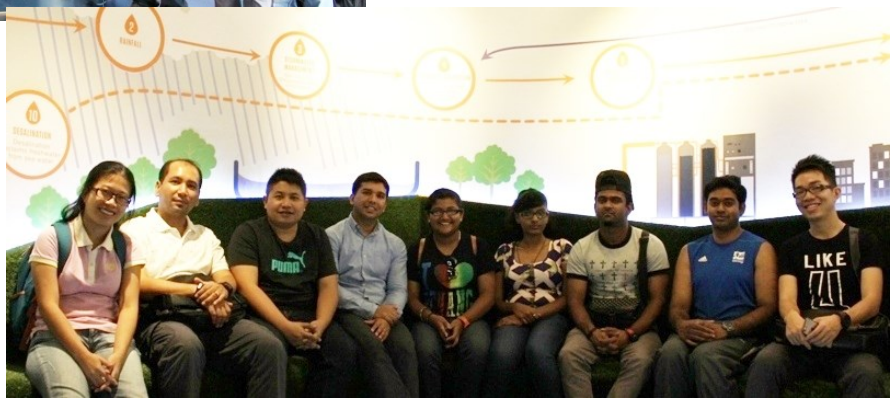
YEA Activities

NEWater Visitor Centre Tour

By Kris Tan

7 Feb 2015 – Singapore get the water supply via 'Four National Taps', (1) local catchment water, (2) imported water, (3) highly-purified reclaimed water known as NEWater, and (4) desalinated water. Singapore's four NEWater plants can meet up to 30% of the nation's current water needs. The tour includes fun-filled activities and interactive exhibits to show us an exciting journey through the Singapore water story. We started by watching an introduction video then we moved on to the interactive corner. The tour guide also walkthrough with us the 3-step purification process used in the production of NEWater:

1. **Microfiltration / Ultrafiltration –** This step is for removing the large contaminants. Treated used water passes through membranes to filter out large particles in this process. These include suspended solids, some bacteria and viruses.
2. **Reverse Osmosis –** This step is for filtering out smaller contaminants. A membrane (semi-permeable membrane) with extremely small openings is used in reverse osmosis. It only enables extremely small particles like water molecules to pass through and unwanted substances will be trapped on the membrane wall. The water obtained at this stage is very clean and safe for consumption.
3. **Ultraviolet Disinfection –** This is a safety backup process, ultraviolet light is used to inactivate all organisms as an additional safety barrier. After this is done, chemicals are added to restore the pH balance of the water. The final product, NEWater is ultra-clean and piped to industrial usage. A small amount is also pumped back into our reservoirs.



YEA Activities

Facility Tour to Marina Bay Sands (Organised by: IFMA Singapore Chapter)

By Leo Hindarto

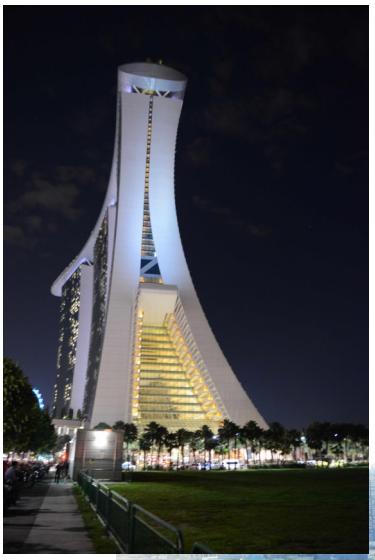
27 Feb 2015 – The facility tour was organised by International Facility Management Association (IFMA). Below are a brief summary on the events

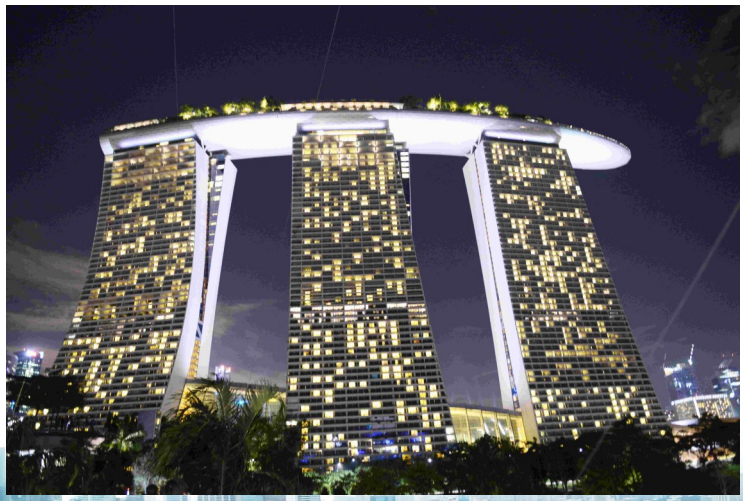
1. Chief Engineer, Mr. Au Seng Lye gave the participants (ASHRAE & IFMA Members) a succinct intro to MBS and showed an exclusive footage of the Making of MBS.

2. Participants were then given a rare glimpse of some of the "innards" of MBS (mostly M&E system at the Basement & L1), which were usually hidden from the public view. The operations of the various facilities at MBS seemed to be highly efficient and integrated, thus allowing a virtually seamless interaction amongst the internal staff and external agents.

3. The Management of MBS is receptive and supportive of the various energy improvement works proposed by the FM Team. This also enabled MBS to clinch a slew of awards, including the most recent, coveted BCA Green Mark Platinum award for Existing Non-Residential Buildings.

Lastly Mr Au shared his background, philosophy, experiences and challenges he faced in leading the FM Team at MBS. All in all, working at MBS is enjoyable and provides one with great satisfaction.





YEA Activities

Fujitsu Data Centre Tour

By Kris Tan

27 Mar 2015 – Fujitsu Data Centre featured energy-efficient technologies like power monitoring, ambient lighting and monitored temperatures to better managed the usage of energy and save costs. Ram, the Data Centre services manager presented to us the key features of the Data Centre which meets the customers' requirements and telecommunication services from a carrier-neutral services providers. Mr Pek also shared with us the business advantages. The Fujitsu Data Centre has the following features:

1. Raised floor with uniformed distributed loading capacity of 32kN/m2;
2. HCFC free fire-retardant insulation for under-slab to prevent condensation;
3. Laminated raised floor tiles for electrostatic discharge;
4. AC power to each suite is supplied from two separate UPS;
5. Each rack is equipped from 2 independent power feeds from independent distribution units;
6. Environmental control systems to provide optimal and stable operating environment, which is achieved through lighting, temperature and humidity monitoring and control;
7. Spot and water leakage detection system to provide early warning of leakage and condensation hassle that may lead to system failure.

Overall, this was a great experience since it was the first time which most of us have accessed a Data Centre. High-ended surveillance and access control systems were implemented for the highest level of security. Every access was controlled by a sophisticated distributed intelligence microprocessor-based access control and alarm system.

YEA Activities

Singapore District Cooling Plant Technical Tour

By Kris Tan / Leo Hindarto

17 Apr 2015 – Singapore District Cooling Pte Ltd (SDC) provides district cooling services to the developments at the Marina Bay New Business District. The SDC plant is well-hidden from public view, which is located about 25m (five floors) underground.

The tour started with a presentation, Jimmy Khoo, the managing director explained to us the main benefits of having an underground DCS, (1) free up precious GFA; (2) allows focused and close monitoring / optimisation of DCS performance and (3) provides high reliability for customers. He also dispelled on the common myth of inefficiency of DCS. After the presentation, Mr Ang, the GM (Operations) showed us around the plant facilities (e.g. control room, cooling tower, etc).

We are really thankful to the SDC team for taking their time and effort to share their knowledge and show us around the district cooling plant.

YEA Activities

New Initiatives

By Kris Tan

Below are some new ongoing initiatives:

1. Mentoring Program

Some YEA members indicated interest in mentoring students and YEA members, we have received forms from YEA members for being mentors. We are already working with the lecturers from ITE College East to attach their students to this program as mentees.

We are looking for more mentors and mentees which would like to gain / share knowledge with others. For any interested participants, please contact Kris at kristan.1983@gmail.com.

2. PE Study Group

Accordingly to the statistics from PEB Singapore, the overall passing rate for PE examination in 2014 is 32.1%. This study group aims to have more young engineers to be qualified professional engineers. As the exam syllabus is broad, this study group will be a support framework for young professionals to motivate each other and share knowledge.

We currently have a small group of professionals who meets up occasionally to study for PE examination. We would like to expand our study group. For any interested participants, please contact Kris at kristan.1983@gmail.com.

ASHRAE Singapore Chapter News

Annual Chapter Members Night 2015 & Lunar New Year Celebration

On 3rd March 2015, ASHRAE Singapore Chapter (ASC) invited all ASC members to join a celebration to usher in the Year of the Goat at SPGG.

In conjunction with the celebration, a seminar on "Managing Low Delta T Syndrome in HVAC System" was held after the celebration dinner.

The event was sponsored by Belimo Actuator Pte Ltd

Members Activities

By Adrian Tan

ASHRAE networking golf event was successfully held at Pulai Spring Golf Resort, Johor on 16th April 2015. Four flights of 16 golfers played at Pulai Course on a very sunny day.

Ivan Tay walked away with a Precision Pro V400 Rangefinder as the best golfer of the day under Stableford system 36 scoring method. After a hardworking afternoon, the golfers were rewarded with a sumptuous dinner at the Qing Palace Chinese Restaurant.

The golf event ended at 8.30pm after dinner with the golfers heading back to Singapore.

ASHRAE Singapore Chapter News

A Memorandum of Understanding (MOU) was made between the ASHRAE Singapore Chapter (ASC) and the International Facility Management Association (IFMA) Singapore Chapter on the 23rd January 2015.

The MOU is intended to promote, facilitate and extend professional and social links between ASC and IFMA to the benefit of members of both organisations and to assist in advancing the quality of engineering practice world-wide. This MOU is also intended to advance and promote the mutual interest of the Parties in joint seminars and courses

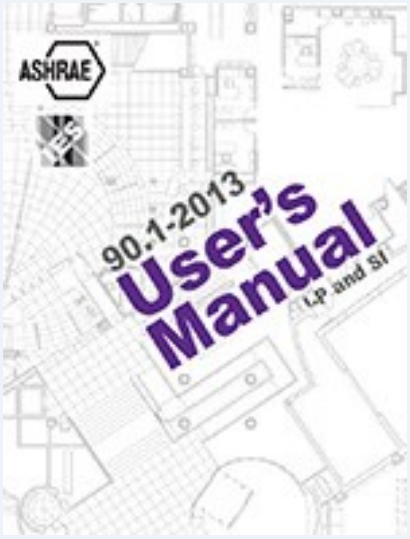
Presidents of both organisations signing the MOU

Witnesses signing the MOU

Seated from left , Mr Tony Khoo, President of IFMA, Mr. Matthew Ngan, President of ASC.

Standing from left, Mr. Alan Chua, Chair, Professional Development, Mr Henry Yeo, President Elect, ASC

The Complete Guide to Using Standard 90.1-2013



ANSI/ASHRAE/IES Standard 90.1-2013, *Energy Standard for Buildings Except Low-Rise Residential Buildings*, has been a benchmark for commercial building energy codes in the United States and a key basis for codes and standards around the world for more than 35 years. The standard provides the minimum requirements for energy-efficient design of most buildings, except low-rise residential buildings. It is an indispensable reference for engineers and other professionals involved in design of buildings and building systems.

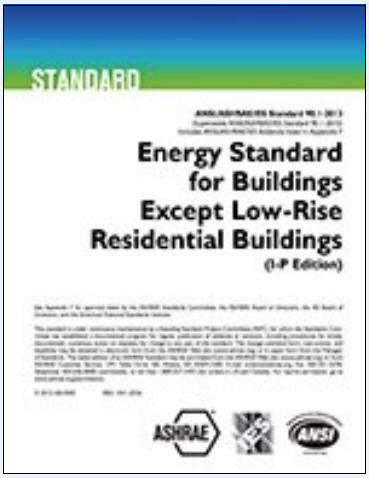
Because the standard is written in mandatory language and therefore not intended as a design specification or an instruction manual, this User's Manual was developed to minimize multiple interpretations of Standard 90.1 that may occur. This Manual helps users of Standard 90.1-2013 understand its principles and requirements and how to comply with them. It is written in clear, direct language, making it understandable to professionals and laymen alike. It also includes measurements and calculations in both I-P and SI units, making it usable with either edition of Standard 90.1.

With sample calculations, application examples, forms to demonstrate compliance, and references to helpful resources and websites, this Manual is intended for architects, engineers, contractors, code officials, and other building professionals, and is also suitable for use in educational programs. In addition, purchasers of this User's Manual can download interactive compliance forms and tools from ASHRAE's website

ASHRAE Datacom Series CD 4th Ed.

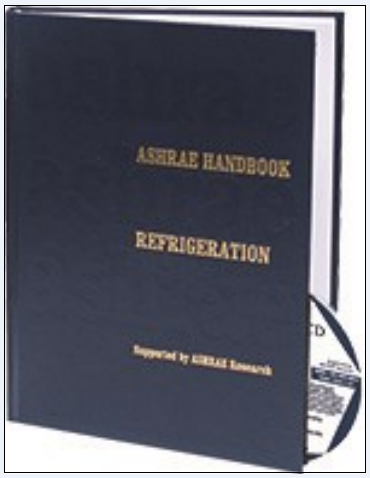
This CD-ROM presents the full text of all eleven ASHRAE Datacom Series publications and Standard 127-2012 in fully searchable and printable PDF format. The ASHRAE Datacom Series, authored by TC 9.9 Mission Critical Facilities, Technology Spaces and Electronic Equipment, provides a comprehensive treatment of datacom cooling and related subjects.

New Standard 90.1 Revised, Expanded



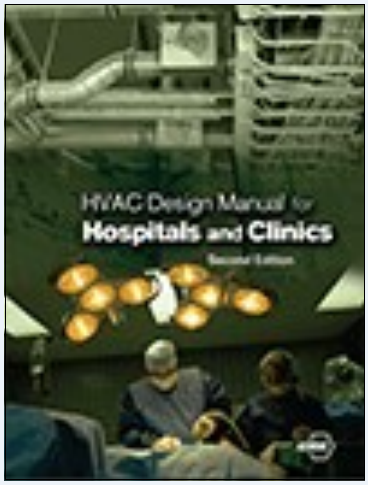
Standard 90.1 offers detailed minimum energy-efficient requirements for the *design and construction of new buildings. It's an indispensable* reference for engineers and other professionals involved in the design of buildings and building systems. The 2013 edition has been expanded to include new features, an expanded scope, and more detailed requirements, as well as incorporated changes from more than 100 addenda.

2014 ASHRAE Handbook Now Available



The 2014 ASHRAE Handbook—□" Refrigeration covers the refrigeration equipment and systems for applications other than human comfort. This volume includes data and guidance on cooling, freezing, and storing food; industrial and medical applications of refrigeration; and low-temperature refrigeration; and includes a dual-unit CD

ASHRAE Reference Offers Essential Guidance on Health Care HVAC Design



The new edition of *HVAC Design Manual for Hospitals and Clinics* provides in-depth design recommendations based on best practices from consulting and hospital engineers, with a focus on presenting what's different about health care HVAC.

For details on ordering of the above publications, please log on to

http://www.techstreet.com/ashrae?ashrae_auth_token