ASHRAE Philadelphia Chapter



Quaker City Climate

September 2021
Volume 57, Issue 1

INSIDE THIS ISSUE:

President's Message	2
Corporate Sponsorship	2
September Meeting Info	3
CRC Photos	4
SMCA Engineers' Night	5
ASHRAE Conference	6
Chapter Directory	6
Epidemic Task Force	6
Membership Promotion	7
CTTC Article	8-11
Basic Class Info	12-14

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Thursday, September 23, 2021
12:00 Noon to 1:30 PM

Virtual Meeting

"An Introduction to Thermal Comfort:
The Human Factors of Sensation, Perceptions and Responses "

Presented By:
Robert Bean, R.E.T., P.L. (Eng.)

See page 3 for more information.

There is no charge for this session,
however, you must register in advance to receive
the login information.

The link to the webinar will be sent to all registrants
prior to the event start time.

Click here to register.

There is still space available in the Philadelphia Chapter's
Basic HVAC Design Course!

See page 12 for more details.

ASHRAE Philadelphia Chapter Digital Directory

The link to the directory is on our home page on the website, or you may click here to advertise. Philadelphia Chapter Members have complimentary access!

2021-2022

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Young Engineers in ASHRAE
Tyler Holland

PRESIDENT'S MESSAGE

Greetings Chapter Members,

Welcome back as we have officially begun the 2021-2022 ASHRAE season. I would like to thank the 2020-2021 Board of Governors, led by Tim Reinking, for a successful year under unprecedented times. This season we are aiming to provide the Chapter with Distinguished Lecturers and top-level industry leaders as presenters. Topics will be interesting, diverse, and educational, with both technical and non-technical content. We are striving for a variety of formats including virtual presentations, in-person lecturers, and a hybrid of the two. We'll have a variety of breakfast, lunch and dinner sessions, tours, and social events.

My focus this year is to bring the Chapter back together in person. During my early stages of board involvement with YEA Chair and CTTC Chair, I have always encouraged membership involvement, especially monthly meeting attendance. This year, as Chapter President and with the help of our hardworking board members, we will be striving to provide a format for which every member can attend and benefit from our Chapter Programs. We will be hosting meetings in venues that will provide the opportunity to reach people that cannot attend in person and look to provide the social interaction and education that is bolstered by in person events.

In August, we've recently come back from the annual Region III Chapters' Regional Conference (CRC) which was hosted by the Central Pennsylvania Chapter in State College, PA., and was well attended by the eleven chapters within our mid-Atlantic region. The CRC is an event where the Chapter leadership are trained to better serve you.

This September, we look forward to hosting a member of ASHRAE's Distinguished Lecturer list, Robert Bean. Robert has authored many papers, articles and course curriculums and serves on numerous technical committees related to indoor environmental quality, building and energy systems. His motto is, "Design for people, good buildings follow."

The board and I look forward to seeing you this year!

Eric Feinschil
Philadelphia Chapter President
c021@ashrae.net

Become a 2021-2022 Corporate Sponsor !

Your firm's participation in this program would enable us to make a donation to Research Promotion which includes over $ 1.5 million in local research funding.

Some of the benefits your company will enjoy as a Corporate Sponsor includes a listing on the Chapter's website with a link to your own website, five free log-ins to the Digital Directory, a $100 discount on an advertisement in the Digital Directory, and tickets to attend our dinner meetings which include quality educational programs.

We offer a few different levels of corporate sponsorship. Each level will receive the same types of benefits, with some differences in quantities and discounting.

Contact hope@mmco1.com before October 1 if you are interested.

PHILADELPHIA CHAPTER PROGRAMS CALENDAR 2021-2022



Thursday, September 23, 2021
12:00 Noon to 1:30 PM

Virtual Meeting

"An Introduction to Thermal Comfort: The Human Factors of Sensation, Perceptions and Responses "

Presented By:
Robert Bean, R.E.T., P.L. (Eng.)

Click here to register.

Abstract

Next to sound, thermal discomfort is the second leading indicator of poor indoor environmental quality. In part this is due to industry using air temperature as the exclusive proxy for comfort and 72F (22C) as the metric for compliance. Participation in this course will equip members with a complete understanding of how people actually sense their thermal environments, the subjectivity of perceptions and the negative consequences of resulting responses. This is the course architectural, engineering, interior design, builder and trade school curriculums and manufacturers should teach - but don't.



Meet the Presenter

Robert Bean is director of www.healthyheating.com, and founder of Indoor Climate Consultants Inc. He is a retired engineering technology professional (ASET and APEGA) who specialized in the design of indoor environments and high performance building systems. Bean is a third term ASHRAE Distinguished Lecturer, recipient of the Lou Flagg Award, Distinguished Service Award and instructor for the ASHRAE Learning Institute. He has authored many papers, articles and course curriculums and serves on numerous technical committees related to indoor environmental quality, building and energy systems. His motto is, "Design for people, good buildings follow."

Region III Chapters' Regional Conference (CRC) Photos

Hosted by the Central Pennsylvania Chapter in State College, PA, August 12-14, 2021



Michael Calabrese (right) accepting an award
from Mark Tome



Tyler Holland (right) accepting the
Young Engineers in ASHRAE Award
From Mark Tome



Tyler Holland (center) accepting the
Student Activities Award
From Mark Tome (right)



Mick Schwedler, PE, Fellow ASHRAE,
LEED AP is ASHRAE's Society President
for the 2021-22 term.



Mark Tome - Region III Chair

SMCA Engineers' Night

Thursday, October 7, 2021

5:00 pm—6:30 pm Cocktail Reception and Vendor Display
6:30 pm Dinner followed by the Presentation

Sheraton Philadelphia Downtown
201 North 17th Street * Philadelphia, PA 19103

Duct Acoustics

Pat Brooks & Eli Howard of SMACNA

The acoustics in duct work is just as important if not more important than the acoustics in a room. SMACNA's Technical Staff's presentation on duct acoustics will elaborate in detail the importance of minimizing noise reduction in duct work. The presentation will include discussion topics – round elbow noise reduction, sound power splits, and lined vs. unlined duct in rectangular and round. These five areas focus on providing significant natural attenuation to reduce noise levels to acceptable limits. The Technical staff will discuss the impact of sound when it travels through a duct system and how the sound of the energy is transmitted to the duct surface.



Register online at www.smca.org

Registration Deadline is October 1, 2021

Sheet Metal Contractors Association of Philadelphia and Vicinity

955 Louis Drive
Warminster, PA 18974

Phone: 610-828-4055
Website: www.smca.org
Email: info@smca.org



2022 ASHRAE Winter Conference
January 29–February 2, 2022
Las Vegas, Nevada

AHR Expo
Jan. 31–Feb. 2, 2022
Las Vegas Convention Center

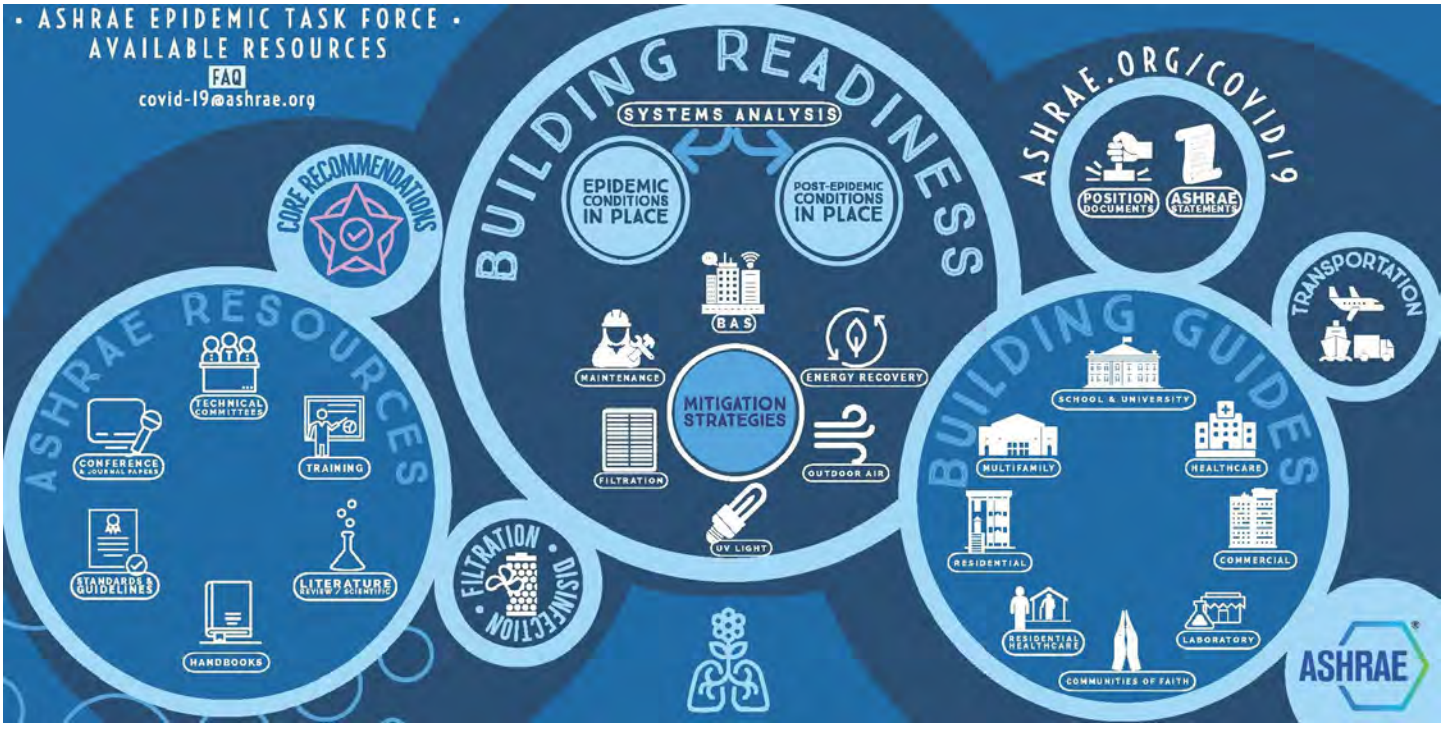
The 2022 ASHRAE Winter Conference will be a hybrid experience, offering both in-person and virtual options for participation for attendees. The in-person conference will be held in Las Vegas, Nevada at Caesars Palace.

Our 2021-2022 Chapter Digital Directory is now available.

This digital version has replaced the paper versions from years past. This provides flexibility during these challenging times, having access anywhere. It's easy to use, highly interactive, and always up to date. We hope you enjoy this refreshed publication.

The link to the directory is on our home page on the website, or you may click here to advertise or purchase access to the directory!

ASHRAE Philadelphia Chapter Digital Directory



The Philadelphia Chapter
of the
American Society of Heating,
Refrigerating and Air
Conditioning Engineers, Inc.

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Visit
our web site at:

www.ashraephilly.org

Follow us
on LinkedIn

Republication of material contained herein is expressly forbidden without official Chapter authorization. The Chapter does not speak or act for the Society. Any member with material to submit for inclusion in the *Climate* can send the information to:

Hope Silverman
P 610-971-2169
hope@mmco1.com

Material can include letters to the editor, member news, upcoming events, comments on chapter programs or issues, etc.

New Philadelphia Chapter & Society Members

Daniel Brown
Canaan Colwick
Kevin Constantine
Ryan Cras
Douglas Eaton
William Fink
Kalyan Ghosh
Imad Haq
Jessica Harrington
Richard Hayburn
Jessica Heist
Nathan Herbert
Tuyen Hoang
Ryan Kemble
Anita Lee
Carolyn Lodge
Cassandra Miller
Brett Pascone
Matthew Prisuta
George Schoenhard
Krista Shaw
Amanda Sullivan
Matthew Ward
Kwai-Lok Yoon

If you are currently experiencing hardship, especially with the current COVID-19 pandemic, please contact our Member Services Department at members@ashrae.org

One of our Member Services Representatives will assist you in determining your hardship case and provide guidance with respect to an adequate adjustment to your dues and other member benefits for the 2020 – 2021 Society Year.

What are the benefits of paying Philadelphia Chapter dues* ?

Discounts:

$200 Discount for Basic Class
$150 Discount for 90.1 Seminar
Free access to the Digital Directory
And much more!

* Note that Philadelphia Chapter Membership Dues are $35/year.

To receive discounts, please remit you Chapter dues when renewing online or applying for a new membership. Feel free to upgrade online by clicking here or contact c021@ashrae.net for assistance.

Membership Advancement

If you are currently an ASHRAE Associate Member, becoming a full Member is easier than you think! The following count toward the required **12 points** to advance to full membership status. You must update your ASHRAE online biography and send an email to membership@ashrae.org to advance.

Non-accredited degree = 4 points
PE = 4 points
Accredited degree = 6 points
Industry experience = 1 point/year

CTTC Article

New Regulatory Standards and their effect on Precision vs Comfort Cooling in Computer Rooms

Many engineers and contractors today are facing increasing concern about comfort (residential) cooling units being misapplied to computer room applications. There is no shortage of misinformation defining the appropriate use of air conditioning equipment and specifying the delineation between comfort cooling applications and computer room applications.

To make sense of it all, it helps to understand the history and the evolution of the various requirements for computer room cooling. These are fast changing requirements and many engineers, authorities having jurisdiction (AHJs), and end users are inadvertently misapplying comfort cooling units in computer rooms simply because they are not aware of the benefits of the application specific units or the regulatory aspects of the application.

Computer room air conditioners were developed in the 1960's to specifically address the unique environmental conditions at which the computer room had to be maintained. The high sensible load associated with the computer room required thin coils and high coil face velocities to provide the required cooling effect without stripping moisture from the space. The concern about this moisture stripping was primarily due to electrostatic discharge (ESD) which commonly takes place in low moisture content environments. At the time, it was all too common for electronic IT equipment to be damaged during servicing or reconfiguration due to electrostatic shock. To offset this moisture stripping the room had to be constantly re-humidified at great expense to the end user.

The computer room air conditioner (CRAC) was developed specifically to maintain the server and switch gear inlet temperatures and moisture content within an acceptable envelope. This is accomplished with variable capacity operation that closely matches cooling output to the IT load while simultaneously maintaining the moisture content using humidifiers or dehumidification operations. The American Society of Heating, Air Conditioning, and Refrigeration Engineers (ASHRAE) publication "Thermal Guidelines for Data Processing Environments" details the best practices envelope for maintaining the computer room for maximum uptime and IT equipment longevity. Units designed specifically to provide this tight control have advanced algorithms embedded in their programmable logic controllers that facilitate the constant monitoring and adjustment of the computer room environmental conditions.

Continued on next page . . . .

CTTC Article (continued)

Direct expansion comfort cooling systems are not designed for the high return air temperatures associated with the data processing environment. In ASHRAE standard 127-2012 the highest return air test dry bulb temperature is 105°F. At these high return temperatures the comfort cooling units may fail due to compressor failure caused by excessive suction gas temperatures. Computer room air conditioners are designed from the ground up to operate continuously at these elevated return temperatures.

Most comfort cooling systems are designed around the premise that they will only operate during the cooling season, and for this reason comfort cooling units must meet a minimum Seasonal Energy Efficiency Ratio (SEER). The seasonal hours of operation are defined in ANSI/AHRI 210/240- 2008 and are dependent on bin weather data. Typical operating hours from this standard would be 8 hours a day for 125 days a year for a total of 1000 hours of operation a year. By contrast, computer room air conditioners are engineered for 24 hour a day, year-round operation. They have a robust design that is intended to provide reliable mission critical cooling for 8760 hours a year.

Since computer rooms consume large amounts of power, CRAC manufacturers have dedicated thousands of hours of research and development in an effort to create the most energy efficient equipment for this particular application. Comfort cooling equipment has neither the tight control, robust design, nor the built in energy efficiency required to serve the computer room adequately.

Prior to 2010 there was no required energy efficiency standard for computer room cooling equipment in the United States. This type of equipment was exempt from HVAC efficiency requirements under the process cooling clause of ASHRAE 90.1 (Energy Standard for Buildings Except Low Rise Residential Buildings). In the ASHRAE 90.1-2010 standard, computer room units were for the first time no longer exempted from meeting an efficiency standard and were given an energy efficiency metric specific to this type of cooling equipment. This metric is the Sensible Co-efficient of Performance (SCOP) and is defined in ASHRAE 127-2007 (Method Of Testing For Rating Computer And Data Processing Room Unitary Air Conditioners). This metric is specific to the computer room air conditioner as it gives no credit for the latent cooling performed. This is not true of comfort cooling metrics such as EER and SEER. Units not rated for SCOP are not intended for use in computer rooms.

How does this translate to your local area? Let's take the example of New York State. On March 9, 2016 the New York State Fire Prevention and Building Code Council voted to adopt an update to both the commercial provisions and the residential provisions of the Energy Conservation Construction Code of New York State (ECCCNYS). The updated Commercial provisions of the energy code are IECC-2015 as modified by the 2016 New York State Supplement. For commercial buildings, the IECC allows alternative design with ASHRAE 90.1-2013 specifically for computer room design. The ECCCNYS-2016 addresses the design and construction of energy-efficient building envelopes and the installation of energy-efficient mechanical equipment. The ECCCNYS-2016 had an effective date of October 3, 2016.

Continued on next page . . . .

CTTC Article (continued)

In the ASHRAE 90.1-2013 a computer room is defined as the following:
"Computer room: A room whose primary function is to house equipment for the processing and storage of electronic data and that has a design electronic data equipment power density exceeding 20 watts per square foot of conditioned floor space."

ASHRAE 90.1-2013 contains table 6.8.1.1-11 that lists the required SCOP values for air conditioners used in computer rooms that meet the definition listed above.

TABLE 6.8.1-11 Air Conditioners and Condensing Units Serving Computer Rooms

Equipment Type	Net Sensible Cooling Capacity[a]	Minimum SCOP-127[b] Efficiency Downflow Units/Upflow Units	Test Procedure
Air conditioners, air cooled	<65,000 Btu/h	2.20/2.09	ANSI/ASHRAE 127
	≥ 65,000 Btu/h and < 240,000 Btu/h	2.10/1.99	
	≥ 240,000 Btu/h	1.90/1.79	
Air conditioners, water cooled	<65,000 Btu/h	2.60/2.49	ANSI/ASHRAE 127
	≥ 65,000 Btu/h and < 240,000 Btu/h	2.50/2.39	
	≥ 240,000 Btu/h	2.40 /2.29	
Air conditioners, water cooled with fluid economizer	<65,000 Btu/h	2.55 /2.44	ANSI/ASHRAE 127
	≥ 65,000 Btu/h and < 240,000 Btu/h	2.45/2.34	
	≥ 240,000 Btu/h	2.35/2.24	
Air conditioners, glycol cooled (rated at 40% propylene glycol)	<65,000 Btu/h	2.50/2.39	ANSI/ASHRAE 127
	≥ 65,000 Btu/h and < 240,000 Btu/h	2.15/2.04	
	≥ 240,000 Btu/h	2.10/1.99	
Air conditioners, glycol cooled (rated at 40% propylene glycol) with fluid economizer	<65,000 Btu/h	2.45/2.34	ANSI/ASHRAE 127
	≥ 65,000 Btu/h and < 240,000 Btu/h	2.10/1.99	
	≥ 240,000 Btu/h	2.05/1.94	

a. Net sensible cooling capacity: The total gross cooling capacity less the latent cooling less the energy to the air movement system. (Total Gross – Latent – Fan Power)
b. Sensible coefficient of performance (SCOP-127): A ratio calculated by dividing the net sensible cooling capacity in watts by the total power input in watts (excluding reheaters and humidifiers) at conditions defined in ASHRAE Standard 127. The net sensible cooling capacity is the gross sensible capacity minus the energy dissipated into the cooled space by the fan system.

Table courtesy of The American Society of Heating, Refrigeration, and Air Conditioning, Engineers

Comfort cooling units that have not been tested for the SCOP per ASHRAE 127-2007 and do not meet the minimums listed do not appear to meet the requirements laid forth in ECCCNYS. In addition to the state-specific energy requirements, there are the federal requirements for computer room cooling units that must be met to satisfy current federal regulations.

Continued on next page . . . .

CTTC Article (continued)

The minimum Sensible Coefficients of Performance (SCOP) requirement as set forth in the United States code of federal regulations, Title 10, Volume 3, Chapter II, Subchapter D, Part 431, and Subpart F for 2016 references the same value shown above in table 6.8.1-11. This federal requirement became effective in October, 2013. The federal government goes further in defining a computer room air conditioner as:

"Computer room air conditioner" means a basic model of commercial packaged air conditioning and heating equipment (packaged or split) that is:

1. Used in computer rooms, data processing rooms, or other information technology cooling applications.
2. Rated for sensible co-efficient of performance (SCOP) and tested in accordance with 10 C.F.R. section 436 and
3. Not a covered consumer product under 42 U.S.C. section 6291(1)-(2) and 6292.

Currently there are no minimum SCOP requirements for horizontal flow air conditioners, only those computer room air conditioners that are categorized as an up flow or down flow unit have minimum SCOP's that they must meet. The department of Energy (DOE) has given computer room air conditioning OEM's the following guidance in respect to horizontal flow CRACs:

1. They meet the definition of a computer room air conditioner as defined in 10 CFR 431.92
2. They are federally regulating pieces of HVAC equipment
3. They must be tested in accordance with ASHRAE 127-2007 before any information on energy consumption or cost of energy consumed may be disseminated.
4. They do not have to meet a specific minimum SCOP at this time.

To date, the Department of Energy (D.O.E.) has not exempted any state from this energy efficiency standard. States may petition D.O.E. to exempt a state regulation from preemption. In conclusion comfort cooling air conditioners should not be used in spaces that meet the definition of a computer room because:

- They are not designed for the tight energy efficient control required in the computer room.
- They may not meet the requirements of your local conservation code.
- They do not meet the federally mandated energy efficiencies and have not been submitted to the DOE for acceptance in this specific application.

ASHRAE – PHILADELPHIA CHAPTER

AMERICAN SOCIETY OF HEATING, REFRIGERATING AND
AIR-CONDITIONING ENGINEERS, INC. PHILADELPHIA CHAPTER

BASIC HVAC SYSTEM DESIGN COURSE

COURSE WILL BEGIN ON-LINE IN FALL 2021

Classes will meet Tuesdays and Thursdays from 6:15 PM to 8:30 PM beginning in October and continuing until the middle of March.

Classes will be in **virtual format** until further notice. Students are responsible for their own devices and internet connection. If in-person instruction can resume at some point, classes would be held in Center City Philadelphia. Students would be responsible for transportation and parking costs.

The Chapter reserves the right to provide the on-line format until conditions and room availability permit in-person instruction.

This is a demanding one-year course that introduces students to the fundamentals of HVAC design.

2021-2022 Course Subjects Include:

Fundamentals and Psychrometrics
Load and Heat Transfer Fundamentals
Load Calculations
Pumps, Piping & Piping Systems
Basic Steam & Boilers
Fans, Air Distribution & Duct Design
Refrigeration
Controls & Instrumentation
Equipment Selection

The class is a great way to further, or even begin, a career in HVAC.

The Basic Class tuition is $1,200 ($1,000 for ASHRAE Members who have paid both their National and Philadelphia Chapter dues). Tuition includes all course materials.

Class size is limited to 30 students. To enroll, complete and submit the application including a **non-refundable** deposit of $200 payable to "Philadelphia Chapter ASHRAE".

If you would like to enroll or receive further information, please contact:

Hope Silverman
Philadelphia Chapter ASHRAE
994 Old Eagle School Road, Suite 1019
Wayne, PA 19087-1866
Phone 610-971-2169
Fax 610-971-4859
E-mail: hope@mmco1.com
Web site: www.ashraephilly.org

Philadelphia Chapter ASHRAE

American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc.

Basic HVAC System Design Course Application

2021-2022

Personal Information

Name: _____
Last First Middle Initial

Home Address: _____
Street City State Zip

Phone No.: _____ Application Date: _____

Email: _____

Current or Most Recent Employment

Employer: _____ From: _____ To: _____ Total _____
Firm Name Date Date Years

Business Address: _____
Street City State Zip

Job Title: _____ Phone: _____ Fax: _____

Email: _____

Discipline: ____ Engineer ____ CAD/Designer ____ CAD/Drafting ____ Sales Rep ____ Trades ____ Administration

Learning Goals

Please describe what you hope to learn and take away from this class.

_____

_____

_____

Education

	School (Name & Location)	Years Attended	Major	Degree Or Diploma
High School				
College				
Other				

PAYMENT

AMOUNT:

Members: _____ $200 Deposit _____ $800 Balance Due _____ $1,000 Total Fee
Members are those who have paid their ASHRAE National and Philadelphia Chapter Dues

Non-Members: _____ $200 Deposit _____ $1,000 Balance Due _____ $1,200 Total Fee

PAYMENT AND REFUND DEADLINES:

- ***The deposit is non-refundable.***
- ***The remainder of the course fee must be paid prior to the first evening of class.***
- ***After the first two class sessions (first two nights), there will be NO REFUNDS.***

PAYMENT BY CHECK: _____ (made payable to "Philadelphia Chapter ASHRAE")

PAYMENT BY CREDIT CARD: ____ VISA ____ Master Card ____ American Express

Total Amount to be Billed to Card: _____

Credit Card Number: _____

Expiration Date: _____

Name on Card (please print): _____

Billing Address for Card: _____

_____

_____

RETURN THIS FORM WITH PAYMENT TO:

Hope Silverman
Philadelphia Chapter ASHRAE
994 Old Eagle School Road
Suite 1019
Wayne, PA 19087-1866
Phone 610-971-2169
Fax 610-971-4859
hope@mmco1.com

For Official Use Only

Date Received: _____ Tuition: _____ Deposit: _____ Check No.: _____ Balance _____