



1791 Tullie Circle, N.E./Atlanta, GA 30329
404-636-8400

TC/TG/MTG/TRG MINUTES COVER SHEET

(Minutes of all Meetings are to be distributed to all persons listed below within 60 days following the meeting.)

TC/TG/MTG/TRG No. 6.1 DATE August 2, 2017

TC/TG/MTG/TRG TITLE Hydronic and Steam Equipment and Systems

DATE OF MEETING June 27, 2017 LOCATION Long Beach, CA

MEMBERS PRESENT	YEAR APPTD	MEMBERS ABSENT	YEAR APPTD	EX-OFFICIO MEMBERS AND ADDITIONAL ATTENDANCE
Jason Atkisson	2016	Niels Bidstrup (non-quorum)	2015	
Scott Fisher	2015			
Larry Konopacz	2015			
David Lee	2015			
Frank Myers	2013			
Thomas Neill	2014			
Donald Prather	2013			
Rex Scare	2015			
Steve Tredinnick	2015			
Robert Walker	2015			

DISTRIBUTION: All Members of TC/TG/MTG/TRG plus the following:

TAC Section Head:	Mark C. Hegberg
All Committee Liaisons As Shown On TC/TG/MTG/TRG Rosters (Research, Standards, ALI, etc.)	ALI/PDC – James W. Bochat Chapter Tech. Transfer – Maggie Moninski Research – Harvey M. Sachs Standard – Cyrus H. Nasser 2017 HB Fundamentals – Van D. Baxter 2020 HB Systems – Caroline Calloway
Mike Vaughn, Manager Of Research & Technical Services	MORTS@ashrae.net

1. Call to Order:

Chair Scare called the meeting to order at 1:01pm. Chair Scare welcomed all in attendance and self-introductions were made. An attendance sheet was passed and signed by those in attendance. A roll call of voting members was conducted and a quorum was present with 9 of 11 voting members. One additional voting member arrived at 1:08pm.

Technical Committee 6.1 is concerned with all aspects of hydronic and steam systems. This includes the application of boilers, chillers, terminal units, and all accessories and controls making up the total system as well as the design of the integrated system. In addition to comfort applications of both heating and cooling, snow melting systems are included. Cooperation with other TCs is recognized in areas such as control, noise and vibration, refrigeration, pumps and hydronic and service water piping.

2. Setting of the Agenda:

The Chair passed out an updated Agenda. Motion by Fisher, second by Atkisson to approve the Agenda. Approved 8-0-1 CNV.

3. Approval of Las Vegas Meeting Minutes:

Motion by Fisher, second by Atkisson to approve the past meeting minutes. Motion passed 8-0-1 CNV.

4. Recognition of Liaisons:

Caroline Calloway, 2020 HB Systems & Equipment liaison was present. No report.

5. Chair's Report

Chair Scare summarized the key items from the Section 6 Breakfast.

- (a) The ASHRAE Code of Ethics was read, *"In this and all other ASHRAE meetings, we will act with honesty, fairness, courtesy, competence, integrity and respect for others, and we shall avoid all real or perceived conflicts of interests."* (See full Code of Ethics at www.ashrae.org/about-ashrae/ashrae-code-of-ethics)
- (b) The 2016-17 E-mail Alias List has been updated with the remaining aliases for the TC and will be posted on the ASHRAE website (www.ashrae.org/TCs) under the heading *Procedures, Forms & Information for TCs/TGs/MTGs and TRGs*, shortly after the Long Beach Meeting.
- (c) A new restructured TC Manual of Procedures (MOP) has been issued and is available at www.ashrae.org/TCs.
- (d) An updated TAC Presentation Template is available for TC members to use with their local Chapter.
- (e) The ASHRAE President, Tim Wentz, has offered to send letters to the employers of TC volunteers thanking them for supporting their employee's service on an ASHRAE TC. Members will receive an email in early July with details on requesting this letter.

- (f) 2017-18 Hightower Award nominations are due by September 1. This award recognizes outstanding technical leadership and contributions on a TC/TG/TRG during the past four years excluding research and standards activities. The nomination form can be found at www.ashrae.org/tcs. Nomination forms should be sent to Jason Atkisson or Rex Scare for submittal to TAC.
- (g) Nominations for the Service to ASHRAE Research Award for TC volunteer efforts in research are due to the RAC research liaison by September 1. Nominating forms can be found for this under www.ashrae.org/research. The nomination form is found at www.ashrae.org/TCs. Nomination forms should be sent to Jason Atkisson or Rex Scare for submittal to RAC.
- (h) Program statistics for Long Beach, with a total of 107 available slots: Seminars – 121 submitted, 61 presented; Workshops – 13 submitted, 9 presented; Forums – 11 submitted, 4 presented; Panel – 5 submitted, 2 presented; Conference Papers – 151 abstracts submitted, 129 approved, 71 presented.

6. Sub-Committee Reports

- A. Programs: David Lee (Chair). Subcommittee meeting minutes of June 26, 2017, are attached.

There were no sponsored programs at this meeting.

Chair Lee reviewed upcoming program submissions for Chicago and Houston.

Chair Lee asked for input and suggestions for programs at future meetings.

- B. Research: Tom Cappellin (Chair). Subcommittee meeting minutes of June 26, 2017, are attached.

This is Chair Cappellin's last meeting as chair of the Research Subcommittee. Chair Scare recognized Tom Cappellin's service as chair of the subcommittee.

- C. Handbook: Tricia Bruenn (Chair). Subcommittee meeting minutes of June 25, 2017, are attached.

Chair Bruenn discussed accessing the ASHRAE Authoring Portal for review by committee members. If a committee member cannot access the Authoring Portal, please contact Chair Bruenn.

- D. Chilled Water Plant Sub Committee: Steve Tredinnick (Chair). The sub-committee meeting was held on June 25. There were 11 attendees.

A current 9 page draft of the chapter was distributed as a discussion tool and to show progress. The current version of the Chapter currently resides on sub-committee chair Tredinnick's laptop since he is having issues with the authoring portal.

A table was added showing the chiller efficiency improvements between parallel, series and series-counterflow. The intent is to add an example to show the annual energy cost savings of the different chiller options.

The majority of the remaining time was used as a workshop to discuss the required clearances for proper pump base mounted pump installations. The discussion was centered on not only proper maintenance clearances, but also proper operational clearances. One key factor discussed was clearances from the back of the motor to a wall or other equipment that may block proper ventilation air circulation for cooling the motor. Stan Kutin and Larry Konopacz of Xylem provided insight and documentation from Siemens regarding motor clearances. The clearances vary by motor type and size but typically were a recommended one motor diameter on all sides to a wall and two motor diameters to another motor. This corresponds with standard engineering rule of thumb practices from Jason Atkisson of providing 6 feet in front of the pumps and 3 feet on all other sides.

Stocking motor spare parts was also discussed, but these were deemed to be minimal (seals, bearings, gaskets or the worst case couplings (data centers)) especially if a redundant pump was installed as the first level of redundancy.

E. Membership: Larry Konopacz (Chair). Chair Konopacz reminded all to update their member profiles, especially their e-mail addresses. To be placed on the roster and update their data it must be done by the member through the ASHRAE website.

F. Standards: Mike O'Rourke (Chair). Chair O'Rourke was not in attendance.

Frank Myers reported 90.1 was reviewing if active flow from a boiler must be stopped when there is no call for heat with multiple boilers in a boiler plant.

Frank Myers reported on SPC 155. A draft for public review should be issued by the end of the year. Last year's advisory public review was very successful and meaningful changes were reported. Expect the AHRI program to evaluate the new 155 protocol and look forward to providing summary information in about a month. It appears all fundamental issues have been resolved and what remains is updating for continuity and readability.

G. Web: Jessica Mangler (Webmaster). Webmaster Manger reports the website is up to date.

7. Liaison Reports from other TC's and Organizations.

No reports.

8. Old Business:

(a) MTG-O&MEE – Don Prather says there was no meeting.

- (b) SPC 208 – Method of Test for Determining Hydronic System Balance Valve Capacity. Mark Hegberg absent, no report.

9. New Business:

- (a) Steve Ferguson, Manager of Codes, discussed the ASHRAE Standard Development, US Model Code Development, and International Standards Development. Steve works for ASHRAE to work on Model Code interaction. Handout attached to detail what the TCs can do to get involved.
- (b) Changes in TC structure. Don Prather and Frank Myers are rolling off as Voting Members. Tom Cappellin is concluding his term as chair of the Research Subcommittee. Bob Walker is ending his duties as TC 6.1 Secretary. Chair Scare thanked all for their service to the Technical Committee.
- (c) New (and continuing) Voting Members are: Jason Atkisson, Larry Konopacz, David Lee, Bob Walker, Tom Cappellin, Niels Bidstrup, Scott Fisher, Thomas Neill, Steve Tredinnick, and Mark Hegberg.
- (d) Jason Atkisson is the new Chair, Larry Konopacz is the Vice Chair and Jennifer Leach is the Secretary for TC 6.1. David Lee continues as Chair of the Program Subcommittee; Jessica Mangler is the new Chair of the Research Subcommittee; Tricia Bruenn continues as Chair of the Handbook Subcommittee, Steve Tredinnick continues as Chair of the Chilled Water Plant Subcommittee; Mike O'Rourke continues as Chair of the Standards Subcommittee; new Membership Chair is Bob Walker; and new Webmaster is Mike Trantham.
- (e) Suggestion to name a new TC 6.1 liaison for 90.1. Frank Myers volunteered. Motion by Walker, second by Atkisson to approve appointment of Frank Myers as TC 6.1 liaison to 90.1. Motion passed 9-0-1 CNV.
- (f) Scott Fisher stated reviewing Handbook chapters was not a lot of work and asked all attending to take an hour to review a relevant chapter to insure the best possible material be published.
- (g) Frank Myers expressed appreciation to the Chair for his two years of service to the Committee.
- (h) Jen Leach asked for volunteers to review Conference Papers. Those interested were asked to give her their business card for future contact.
- (i) Chair Scare suggested in the future any programs rejected by CRC should be presented at the conclusion of future TC meetings.

10. Meeting Adjournment:

Motion by Meyer, second by Walker to adjourn the meeting. Motion passed 9-0-1 CNV. Meeting adjourned at 2:03pm.

Submitted by,
Bob Walker.
TC 6.1 Secretary



Shaping Tomorrow's
Built Environment Today

TC Sign-in Sheet

Meeting Info: TC 6.1 Date: 6/27/17

Name	Affiliation	E-mail	Member (Voting, Corresponding, or Guest?)	YEA Member? (Yes/No)
Larry Konopacz	Xylem, Inc	larry.konopacz@xyleminc.com	VM	No
STAN KUTIN	Bell & Gossett Xylem, Inc Brg	STAN.KUTIN@XYLEMINC.COM	PM	N
Steve Tredinnick	Burns & McDonnell	stredinnick@burnsmd.com	VM	N
CHRIS HAAS	INTERTEK	CHRIS.HAAS@INTERTEK.COM	G	N
DON PRATHER	ACCA-	donald.prather@acca.org	VM	No
Tom NEILL	MESTEK	tneill@mestek.com	VM	NO
Brandon Gill	Taylor Engineering	bgill@taylor-engineering.com	PM	NO
Frank Myers	The Myers Group, LLC	frmyers@ix.netcom.com	VM	No
BOB WALKER	Belimo	robert@wallier@us.belland.com	VM	NO
Rex SCARF	Armstrong Intl	rex@armstronginternational.com	Chair	No

6/27/17

Name	Affiliation	E-mail	Member (Voting, Corresponding, or Guest?)	YEA Member? (Yes/No)
Matthew Simpson	Watts Water Tech.	matthew.simpson@watts-water.com	Pres. CM	no
Jessica Marguer	AEI	jmarginer@aiei.org	Webmaster Incoming Research	Y
Mike Trantham	IMI Hydraulic	mike.trantham@imi-hydraulic.com	PCM	N
CAROLINE CALLOWAY	AERCO INTERNATIONAL	CCALLOWAY@ AERCO.COM	Pres Liaisons	N
Tricia M. Bruenn	Belmont	tricialb@msn.com	Handbook Chair	N
Tom Cappellin	Cappellin Consulting	tcappellin@msn.com	Research Chair	N
Scott Fisher	Retired	Sfishbmc@gmail.com	Voting	N
JASON ATKISSON	AEI	jatkisson@aieieng.com	Vice Chair	N
Chad Powell	Service Mechanical	chadpowell@service-mechanical.com	Guest	N
JEN LEACH	PATTERSON KELLEY	pernstojen@yahoo.com	CM	N
ROBERT BRAD	KEI inc	k9xake@gmail.com	CM	N

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6/27/17

Name	Affiliation	E-mail	Member (Voting, Corresponding, or Guest?)	YEA Member? (Yes/No)
Art Gieseler	Penn State	Art.Gieseler@ATP.org	PM	N
Tom Butcher	Brookhaven Lab	butcher@bnl.gov	CM	N
Aykut Yilmaz	ATRI	ayilmaz@adriner.org	CM	Y
Jennifer Guerrero-Ferreira	Bekaert Combustiontech	jennifer.guerrero@bekaert.com	CM	N
Jacob Sevelius	UPonor	Jacob.Sevelius@uponor.com	PM	Y
Andrew Koppi	UPonor	andrew.koppi@uponor.com	PM	N
Steve Ferguson	ASHRAE	S Ferguson@ashrae.org	Guest	N
DAVID LEE	ARMSTRONG FLUID TECHNOLOGY	dlee@armstrongfluidtechnology.com	VM	N

TC 6.1 Program Subcommittee Meeting - Minutes:

June 26, 2017

Attendees:

David Lee, Armstrong Fluid Technology – Program Subcommittee Chair
Larry Konopacz – Xylem
Bob Walker, Belimo
Rex Scare, Armstrong International
Jennifer Leach, Patterson Kelley
Tricia M. Bruenn, Belimo
Scott Fisher, State Farm – Retired
Mike Trantham – IMI Hydronic
Gang Wang – University of Miami
Ron George – Plumb-Tech Des / Plbg Eng / PHC Magazine
Tom Butcher – Brookhaven Lab

Minutes:

- 1 seminar submitted, not approved for Long Beach conference; 3 others seminars tentative not submitted
- Proposed seminars for Chicago conference (see below for key dates):
 - Steam System Design Fundamentals and Applications- Chair: Rex Scare, SAC co-sponsor
 - Pumps in seismic areas and restraints (For earth, wind and fire track) – Chair Larry [tentative]
 - Water hammer and steam (earth wind and fire) - Rex
 - Designing for HVAC resiliency - redundancy - Vanessa Castro, Jason [tentative]
 - Legionella and hot water heating – TBA [tentative]; contact SPC 188.
 - (Conference Paper) Hydronic System control valves – Mark H [tentative]

Key Dates for Chicago conference:

- | | |
|-------------------------|--|
| • July 7, 2017 | Conference Paper abstracts and Technical Papers due |
| • July 24, 2017 | Conference Paper accept/reject notifications |
| • August 1, 2017 | Seminar, Forum, Workshop and Paper Proposals Due |
| • August 7, 2017 | Revised Conference Papers/Final Technical Papers Due |
| • August 21, 2017 | Conference and Technical Paper Final Accept/Reject Notifications |
| • September 6, 2017 | Seminar, Forum, Workshop Accept/Reject Notifications |
| • December 1, 2017 | Upload of PPTs Begin |
| • January 8, 2018 | All PPTs Due Online |

To submit a Seminar:

<https://ashraem.confex.com/ashraem/w18/cfp.cgi>

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- Proposed seminars for Houston conference:

- Professional skills – Tricia Bruenn [tentative]
- Tom Butcher – Solid Oxide Fuel Cell Cogen
- Low Delta T on Chilled Water Systems - Steve Tredinnick, Tricia B, Barry Bridges TC1.4
- (*Conference Paper : co sponsor TC 6.10*) Energy, Cost and CO2 Savings Analyses of Reversible, Hybrid and Heating-Only Liquid Fuel Fired Absorption Heat Pumps in the Northeastern United States - Chris Keinath, Tom Butcher, Michael Garra-brant

Key dates for Houston conference:

- August 28 Conference Paper Abstracts, Technical Papers and paper session requests due
- September 8 Conference Paper Abstract Accept/Reject Notifications
- December 8 Final Conference Papers Submitted for Review (Includes Bio, Learning Objectives and Methods of Assessment); Request for Conference Paper Sessions Due

Other:

- Best approaches to getting programs approved. Technical papers are given 1st priority followed by Conference papers. Technical papers do not go through CEC. Seminars are the most competitive due to high number of submissions. If proposed program falls into one of the conference tracks (other than Fundamentals/Applications or Systems/Equipment), likelihood of acceptance is higher.

TC 6.1 Hydronic and Steam Heating Equipment and Systems

Research Subcommittee Meeting Agenda

Caesar's Palace – Las Vegas

3:15pm to 4:15pm - Monday, June 26, 2017 – Tichenor – Renaissance 2

Topics of Discussion

1. Notes from Research Subcommittee Breakfast.
2. Review Research Subcommittee minutes from Las Vegas Winter Conference.
3. The following topics have been placed on this committee's list as possible RTARs:
 - a. RTAR – Copper Tube Fitting Flow Factors and the Hydronic Coil Characteristic Modeling (Mark Hegberg).
 - b. RTAR – Allowance for Aging in Steel and Iron Pipe (Scott Fisher).
 - c. RTAR – Comparison of Computational Methods of Flexibility Analysis to Computer Modeling to Determine Thermally Developed L-Bend and U-Bend Anchor Forces (Scott Fisher).

Do we want to push these into development?

4. Chair is open to suggestions, from the committee, for other RTAR submittals to consider.

End of Agenda:

ASHRAE TC 6.1 Technical Committee
Hydronic and Steam Heating Equipment and Systems
Research Subcommittee Meeting Notes
Long Beach

3:15pm to 4:15pm - Monday, June 26, 2017

Discussion and Activity Notes:

1. Notes from the Research Subcommittee Chair's Breakfast are attached to these minutes.
2. Chair reviewed minutes made during ASHRAE'S 2017 Conference in Las Vegas.
3. There were three research projects discussed as possible RTAR submissions:
 - a. Copper Tube Fitting Flow Factors and Hydronic Coil Characteristic Modeling
This subject was discussed and rejected due to it have been addressed by previous research projects.
 - b. Allowances to be considered for Iron and Steel Pipes as They Age During Their Years in Service
This subject was discussed and rejected due to the testing of too many variables which would lead to extensive amount of time and cost to perform.
 - c. Computational methods of flexibility analysis to examine thermally developed 'L-bend' and 'U-bend' anchor forces
This subject was discussed and rejected due to it having been previously submitted and been rejected by RAC. The committee decided that this submittal would not be accepted, by RAC, if submitted as a new RTAR.
4. Scott Fisher suggested that the Research Subcommittee review ASHRAE Handbooks Chapters, maintained by TC 6.1, to determine if there would be possibility for RTARS that could support, or enhance, existing published material.
5. Meeting was adjourned.

End of Notes:

Notes prepared by Thomas E. Cappellin, Chair of TC 6.1 Research Subcommittee

Attachments: Attendance sign-in sheet
RAC Long Beach Update Notes



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TC Sign-in Sheet

Meeting Info: IC 6.1 Research Subcommittee - Date: June 26, 2017

Name	Affiliation	E-mail	Member Voting (V) Corresponding (C) Guest (G)	YEA Member? (Yes/No)
Thomas E. Cappellin	Cappellin Consulting Services	tcappellin@msn.com	C	No
Larry Konopacz	Xylem, Inc	larry.konopacz@xylem.com	V	No
Scott Fisher	Retired	sfishbmi@gmail.com	V	N
Jessica Mangler	AEI	jmangler@aieieng.com	Incoming Research	Y
Mike TranTham	IMI Hydronic	Mike.TranTham@imi-hydronic.com	C	N
Bob Walker	BERINO	robert.walker@us.belinco.com	V	N
Rex Seave	Armstrong	rexseave@att.com	V	N
Tricia M. Buenn	Belimo	tricia16@msn.com	CM	No
DAVID LEE	ARMSTRONG FLUID TECHNOLOGY	dlee@armstrongfluidtechnology.com	V	N

Harvey Sachs

ACEEE

Research Liaison

RESEARCH ADMINISTRATION COMMITTEE (RAC) UPDATE NOTES

ASHRAE 2017 ANNUAL CONFERENCE – LONG BEACH

1. Proposals Update:

- a. 7 RTARS considered by RAC:
 - i. 1 accepted
 - ii. 3 accepted with comments
 - iii. 3 rejected
- b. 11 Work Statements considered by RAC:
 - i. 1 accepted
 - ii. 7 conditionally accepted
 - iii. 3 returned
- c. RAC approved to fund Innovative Research Grant (IRG) proposal
- d. Unsolicited Research Proposal (URP):
 - i. Hold is removed.
 - ii. New Procedure is established.
 - iii. Will need to meet URP, RTAR, and WS criteria.
 - iv. Needs approval of RAC and TC prior to submission.
- e. Grants in Aid (GIA)
 - i. New Procedures – Incentivizes Meeting Recipients to attend Society meetings.
 - 1. Grant of funds to a full-time Graduate Student.
 - 2. 10-25 Grants awarded each year for following academic year.
 - 3. Past recipients not eligible.
 - 4. \$10,000 grant paid in two payments to student directly.
 - a. Payment #1: \$5,000 after confirmation of enrollment.
 - b. Payment #2: \$5,000 paid upon receipt of report documenting awardee's attendance at Society meeting within 18 months of award.
 - ii. Option for \$1,500 Honorarium Payment.

2. Award Nominations:

- i. Service to ASHRAE Research Reward
- ii. Homer Adams Award

3. Milestone Monitoring:

- a. Milestone/Task Monitoring starting with new project.
- b. PMS will be required to report on the status of milestone.
- c. Appropriate and timely actions will be taken for the delayed or non-completed milestone.

4. Technology Transfer:

- a. Seeking your suggestions
 - b. Dissemination of outcome of ASHRAE Research Projects to:
 - i. ASHRAE Membership
 - ii. Local ASHRAE Chapters
 - iii. HVAC Industry
 - c. How to articulate the outcome in 'Plain English'
5. There were three subjects discussed as possible RTAR submissions:
- a. Copper tube Fitting Flow Factors
 - b. Allowance for aging in Steel and Iron piping
 - c. Computational methods of flexibility analysis to examine thermally developed 'L-bend' and 'U-bend' anchor forces.
6. Feedback:
- a. Please provide RAC with TC feedback regarding RTAR and WS forms..

END OF RAC UPDATE NOTES

Agenda/Information for Handbook Volume/TC Meetings

2017 ASHRAE Annual Conference, Long Beach

Sunday, June 25, 9:00 to 10:00 a.m.

- **Welcome and Introductions** (Handbook liaisons identify which TCs they serve)
 - **Information Items**
1. TCs with chapters for the **2018 ASHRAE Handbook—Refrigeration** should approve their revised chapters NOW. All remaining 2018 *Refrigeration* chapters are due by end July 2017. Your Handbook Committee liaison can confirm your chapter's specific due date. [NOTE: *Even if you intend no changes to your chapter(s)*, you must confirm this to your Handbook liaison and complete and submit the Chapter Approval Checklist as well as written permissions to reuse material copyrighted by others.] For ASHRAE Handbook Online, TC-approved features or out-of-cycle revisions can be submitted at any time.
 2. To submit your chapter revisions and checklist with all applicable items by email to your Handbook Committee liaison, please also **copy Handbook Editor Mark Owen** (mowen@ashrae.org) and **Managing Editor Heather Kennedy** (hkennedy@ashrae.org) on your email submission, as a safeguard against revisions being lost because of email bounces, etc. If you use the ASHRAE Authoring Portal, notify the editors and your liaison of chapter completion as detailed in the instructions.
 3. The **ASHRAE Authoring Portal** (authoring.ashrae.org), an officially approved collaborative authoring tool for developing Handbook content, is now available. This optional, online tool allows multiple designated authors to write and/or revise Handbook chapters in Word without needing to email large files or obtain new software. An introduction will be part of Handbook training at 8:00 Sunday morning [Rm: Wilmore 2 (Renaissance)]. A PowerPoint presentation about the Portal is available on Handbook Central.
 4. Go to **ASHRAE Handbook Central** (click on the Handbook link under the Resources and Publications tab on the ASHRAE home page, then click on the link to Handbook Central) for easy access to
 - **ASHRAE Authoring Portal**. Use your regular ASHRAE Member login information to access the Portal and your file(s).
 - Important Handbook development guidance documents. (See next page for look at webpage.)
 5. **ASHRAE Handbook Online** (a free member benefit option) incorporates in its base subscription all the chapters in all four current Handbook volumes plus extra content. TCs have the opportunity to obtain or develop extra content or features and submit them for their chapters. Remember that simple spreadsheets or checklists are often the most helpful to users. Related *ASHRAE Journal* articles and case studies make good supplemental content. TC-approved features or out-of-cycle revisions can be submitted at any time. Guidelines are available on Handbook Central.
 6. The new **ASHRAE Technology Portal** hosts ASHRAE Journal Articles and ASHRAE Research Reports along with ASHRAE Transactions and Conference Papers and ASHRAE Conference Seminars. ASHRAE members have free access to download PDFs of ASHRAE Journal Articles and Research Reports. Other content is available to Members and nonmembers by subscription. The portal can be a great resource for finding ASHRAE references to cite for content in your chapters.
 7. **ASHRAE Terminology** is a free online glossary of more than 3700 terms related to the built environment, with a focus on HVAC&R and related topics. This resource can help your publication development efforts if they call for definitions of terms. Your input can also improve ASHRAE Terminology (maintained by TC 1.6) by checking for accuracy and omissions. Check it out at www.ashrae.org/ASHRAETerms.
 8. **Revision histories** of every chapter are available from your Handbook liaison. Compiled by Handbook editorial staff, these records show the level of revision each chapter received in the last several cycles. (See next page.)
 9. Be sure to schedule and officially request time and meeting space for your **Handbook Subcommittee meeting** for the 2018 Winter Conference in Chicago, and let your Handbook liaison know of changes (your liaison's contact information should be on your TC roster; if not, please contact Handbook Editor Mark Owen at 678-539-1187 or email: mowen@ashrae.org).
- **Questions and Answers**
 - **Liaison/TC Consultation**

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Educators' Resources

Volume	TC	Chapter No	1996Sys	2000Sys	2004Sys	2008Sys	2012Sys	2016Sys	Mean			Notes / Questions
HVAC Systems and Equipment	06.01	11	0	0	0	0	2	1	0.50			
HVAC Systems and Equipment	06.01	13	1	1	0	2	0	1	0.83			
HVAC Systems and Equipment	06.01	14	0	3	0	0	2	2	1.17			
HVAC Systems and Equipment	06.01	15	0	0	0	0	2	0	0.33			This is transferred to TC6.2
HVAC Systems and Equipment	06.01	28	2	0	1	0	1	2	1.00			This was transferred to another committee also.
HVAC Systems and Equipment	06.01	32	1	2	0	2	2	1	1.33			
HVAC Systems and Equipment	06.01	36	1	1	0	0	1	2	0.83			
HVAC Systems and Equipment	06.01	44	3	2	0	0	2	2	1.50			
HVAC Systems and Equipment	06.01	47	2	1	0	0	0	3	1.00			
HVAC Systems and Equipment	06.01	48		4	0	1	0	2	1.40			
		Avg for edition	1.000	1.400	0.100	0.500	1.200	1.600	0.990			
HVAC Systems and Equipment	06.01	46	1	1	0	0	1	0	0.50			Moved to 2022- in Fundamentals.
Volume	TC	Chapter No	1993Fund	1997Fund	2001Fund	2005Fund	2009Fund	2013Fund	2017Fund	Mean		Notes
Fundamentals	06.01	22	2	2	2	1	0	2	3	1.71		No current work on this volume.
												Key
												0 no changes 1 update/minimal changes 2 standard revision (5-50% of chapter) 3 major revision (>50% of chapter) 4 new/rewritten

General Notes:

- Handbook Subcommittee met on June 25, 2017. The above ratings, and general information from pages 1-3 of this report were discussed. (Sign-in sheet below.)

TC 6.1 Handbook Subcommittee Meeting Sunday 5:00 PM- 6:00 PM Alford, Renaissance

Name	Affiliation	E-mail	Member Status	YEA Member?
Steve Tredinnick	Burns & McDonnell	stredinnick@burnsmcd.com	VM	No
Larry Konopacz	Xylem, B&G	Larry.Konopacz@xyleminc.com	VM	No
Stan Kutin	Xylem, B&G	Stan.Kutin@xyleminc.com	CM	No
Brandon Gill	Taylor Engineering	bgill@taylor-engineering.com	PCM	No
Scott Fisher	Retired	sfishbmi@gmail.com	VM	No
Mike Trantham	IMI- Hydronic	mike.trantham@imihydronic.com	PCM	No
Tricia M. Bruenn	Belimo	tricia16@msn.com	CM	No
Jason Atkisson	Affiliated Engineers	jatkisson@aeieng.com	Vice-Chair	No
Chris Phelan	Thermo	chrishphelan@thermcoreps.com	PCM	No
Bob Walker	Belimo	robert.walker@us.belimo.com	VM	No
Rex Scare	Armstrong	rexs@armstronginternational.com	Chair	No
Caroline Calloway	AERCO	ccalloway@aerco.com	Handbook Liason	No
Tom Neill	Mestek	tneill@mestek.com	VM	No
David Lee	Armstrong Fluid Technology	dlee@armstrongfluidtechnology.com	VM	No

- Chapter 22- Fundamentals – changes to Figures 18 a-d are being considered for the on-line version. IP units are there, SI units are not. Options include: 1) Leaving as is 2) Creating tables in SI 3) Deleting tables from I-P 4) Deleting tables from IP and referencing Engineering Tool Box in both IP and SI versions. In addition, the IP version depicts sizes to 12” and the SI version depicts sizes to DN600.
- A special **Thank You** was given to Scott Fisher for all of his tremendous work on Chapter 22.
- 2020 Systems Chapters are in REVISION Status. Chapters are due for vote/approval in 2019.
- Please check to see if you are able to access the chapter in the portal if you have signed up as a reviewer. If you are interested in reviewing and did not yet, please contact Tricia M. Bruenn at tricia16@msn.com
- It is important to add real life examples into the chapters, and also to verify references. A list of permanent “permissions” will be put on the Authoring Portal within the next few months for our reference.
- Please see list of reviewers below. I will touch base at end of August to see if you have any questions on the reviewing process.

2020 Systems and Equipment Handbook

List of Chapters and Reviewers

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* May need access. See David Lee.		

End of Report.

Submitted by Tricia M. Bruenn at tricia16@msn.com

Please contact me with any questions.

Thank You and See you all in Chicago!



Shaping Tomorrow's
Built Environment Today

TC INVOLVEMENT IN ASHRAE AMERICAN STANDARDS, INTERNATIONAL STANDARDS AND CODES

ASHRAE AMERICAN NATIONAL STANDARDS

Once a recommendation for a new standard or guideline has been approved responsibility for the document moves from the Technical Committee (TC) to the Project Committee (PC), however, TCs can still be involved in numerous different ways. TCs and TC members can get involved by:

- Signing up for the ASHRAE Standards Action List serve (<https://www.ashrae.org/listserves>)
- Apply for membership on the committee
- Attend SPC and SSPC meetings and actively participate in discussion that are related to your TC.
- Allocate time at TC meetings to review and comment on addenda and standards
- Submit change proposals for updates to standards through the PC of interest
- Speak with the Chair of SPC/SSPC to request a formal liaison with the TC

U.S. MODEL CODE INTERACTION

ASHRAE Standards are often the basis for the U.S. model codes either by referencing an ASHRAE Standard in its entirety or portions of the Standard. The TC can become involved and request ASHRAE's involvement in a particular model code process.

- Identify the codes of interest. Typically includes:
 - International Code Council - IECC (International Energy Conservation Code), IMC (International Mechanical Code), IFC (International Fire Code)
 - International Association of Plumbing and Mechanical Officials -UMC (Uniform Mechanical Code), UPC (Uniform Plumbing Code), USEHC (Uniform Solar Energy and Hydronics Code)
 - National Fire Protection Association –NFPA 90A/B, NFPA 5000, NFPA 900
- Write a proposal or comment with strong technical substantiation to submit to the code change process for submission to Code Interaction Subcommittee for submission as an ASHRAE proposal/comment.
- Review the publicly distributed proposed changes to the code(s) of interest.
- Coordinate with ASHRAE staff for adjustments to proposals and for representation at Code hearings for the proposals submitted by your TC or PC either with testimony or public comment

INTERNATIONAL STANDARDS

ASHRAE is involved in the development of International Standards through the International Standards Development Organization (ISO). This year one of the initiatives for ASHRAE is globalization of Standards. ASHRAE is the Secretariat and Technical Advisory Group (TAG) Administrator for the following International Organization for Standardization (ISO) Technical Committees:

- ISO/TC 86, Refrigeration and air-conditioning (includes subcommittees) – Ties into ASHRAE Standards 15 and 34
- ISO/TC 205, Building environment design (includes working groups) – Ties into ASHRAE Standards 135, 135.1, 201, 205, 90.1, 62.1, 62.2, 55

ASHRAE is the TAG Administrators for the following ISO Technical Committees:

- ISO/TC 59/SC 13, Buildings and civil engineering works- ties into the ASHRAE MTG.BIM Building Information Modeling
- ISO/TC 142, Cleaning equipment for air and other gases - ties into ASHRAE Standard 52.2 and Guideline 26
- ISO/TC 163, Thermal performance and energy use in the built environment – Ties into ASHRAE Standards 90.1, 90.2, 189.1, 189.3

TCs can get involved in the following ways:

- Join a Technical Advisory Group (TAG)
- Join the TAG and attend ISO meetings as an expert
- Agree to be a resource for the TAGs to reach out to for review of these documents.

ADDITIONAL RESOURCES

There are additional resources available for TCs to better understand the process for involvement. These can be found here:

- TCs and PCs Similarities and Differences - <https://www.ashrae.org/TC-Training>
- ASHRAE Code Interaction - <https://www.ashrae.org/CIS>
- Introduction to International Standards - <https://www.ashrae.org/pctoolkit/training>
- Information on ASHRAE Standards development - <https://www.ashrae.org/pctoolkit/training>
- Direct questions to standards.section@ashrae.org, sreiniche@ashrae.org for ASHRAE standards, sferguson@ashrae.org or cbarbaree@ashrae.org for codes, bcx@ashrae.org for international standards