TC/TG/TRG No. TC 4.2 DATE: Jan. 29th , 2015

TC/TG/TRG TITLE: Climatic Information

DATE OF MEETING: January 27st , 2015 LOCATION: Chicago, IL

MEMBERS PRESENT	MEMBERS ABSENT		EX/OFFICIO MEMBERS AND ADDITIONAL ATTENDEES
Dru Crawley (Chair, Stnds ,VM) Juan-Carlos Baltazar (Vice Chair,CM) Joe Huang (Sec,Prog,VM) Steve Cornick (Res, VM) Didier Thevenard (Hdbk,VM) Chip Barnaby (VM) Philip Jarrett (VM) Don Colliver (CM)	Norm Bourassa (VM) John Kennedy (VM) Larry Degelman (VM) Joshua New (CM) Dave Westberg (VM) Evyatar Erell (VNQ) Chuck Khuen (VNQ) Geoffrey Levermore (VNQ)	Michelle Contri (PCM) Xin Qiu (PCM) Paulo Velasco (PCM) Anthony Arguez (CM) William Bahnfleth (CM) Constantinos Balaras (CM) Bryan Becker (CM) Mahabir Bandari (CM) J Patrick Carpenter (CM) Jui-Chen Roger (CM) Reda Djebbar (CM) Brian Fricke (CM) Chris Gueymard (CM) Kenneth Hubbard (CM) Achilles Karagiozis (CM) John Keller (CM) Clayton Lampman (CM) Linda Lawrie (CM) Neal Lott (CM) Robert Lucas (CM) Stuart Malkin (CM) Robert Morris (CM) Ulrike Passe (CM) Richard Perez (CM) Ronald Petersen (CM) Michael Roth (CM) Thomas Stoffel (CM) Charles Whitlock (CM)	Michael R Bilderbeck (TAC SH) Peter Lyons (Guest) Justin Wong (Guest)

TAC CHAIR	Eric Adams	PROF DEV COMM (ALI)	Darin Nutter
TAC SECTION HEAD	Michael Bilderbeck	STANDARDS LIAISON	James Aswegan
RAC RESEARCH LIAISON	Xudong Yang	STAFF LIAISON (RESEARCH/TECH)	Mike Vaughn
HANDBOOK LIAISON	Larry Akers		

Abbreviations: VM = Voting Member, CM = Corresponding Member, VNQ= Voting Member Non-quorum

ASHRAE TC/TG/TRG ACTIVITIES SHEET

DATE: Current as of 27 January 2015

TC/TG/TRG NO.: TC 4.2 **TC/TG/TRG TITLE**: Climatic Information

CHAIR: Dru Crawley **VICE CHAIR**: Juan-Carlos Baltazar **SECRETARY**: Joe Huang

TC/TG/TRG MEETING SCHEDULE

Location-Past 12 Months	Date	Location-Planned Next 12 Months	Date
Chicago, IL	2015-01-27	Atlanta, GA	2015-06-30
Seattle, WA	2014-07-01	Orlando, FL	2016-01-26
New York, NY	2014-01-21	St. Louis, MO	2016-06-28

TC/TG/TRG SUBCOMMITTEES

Function	**Chairman**
Handbook	Didier Thevenard
Research	Steve Cornick
Standards	Drury Crawley
Program	Joe Huang
Honours	Joe Huang

RESEARCH PROJECTS-CURRENT

Project Title	Contractor	Monitoring Comm.	Report Made At Meeting
1561-RP Procedures to Adjust Observed Climatic Data for Regional or Microclimatic Variations	Novus Environmental Inc.	Steve Cornick (Chair), Robert Morris, Anthony Arguez, Dru Crawley, Hartwig Kunzel	Essentially complete, final report and software expected Feb 28, NCX through July 1, 2015.
1699-WS Update Climatic Design Data in Chapter 14 of the 2017 Handbook of Fundamentals	Klimaat	Neal Lott (Chair), Philip Jarrett, Steve Cornick, Larry Degelman, Dru Crawley, Anthony Arguez, Steve Bruning (TC 4.1)	Second PMS meeting held in Chicago January 25, 2015, with contractor participated remotely.

LONG RANGE RESEARCH PLAN

Rank Title	RTAR			Work Statement			RAC Approval for bidding
	Writ-ten	TC Approved	Subm'd to RAC	Writ-ten	TC Approved	Subm'd to RAC	
1700-RTAR Moisture Design Reference Years for	Yes	Yes	Yes	Yes	No	Yes	WS conditionally approved by RAC in 2014 and needs

Hygrothermal Analysis and Design of Buildings (1325-RP Update)							only RL approval to proceed , but placed on hold until SSPC 160 give some indication as to the disposition of previous 1325-RP.

HANDBOOK RESPONSIBILITIES					
Year	Volume	Chapter Title	No.	Deadline	Handbook Sub. Liaison
2016	HOF	Climatic Design Information	14	Feb. 2016	James Aswegan

STANDARDS ACTIVITIES – List and Describe Subjects

TC 4.2 is the cognizant TC for Std.169 *Weather Data for ASHRAE Building Standards*. The TC 4.2 HOF data has been incorporated into this proposed standard. Other coordination will be undertaken as needed such as with SSPC 169.

TECHNICAL PAPERS from Sponsored Research-Title, when presented (past 3 yrs. present & planned)

- Temperature Trends for Locations Listed in the Tables of Climatic Design Conditions in the 2013 Handbook of Fundamentals (RP-1613) (SE-14-010, Jun 2014)
- Development of 3012 IWEC2 Weather Files for International Locations (RP-1477) (NY-14-029, Jan 2014)
- Revising ASHRAE Climatic Data for Design and Standards, Part 1:Overview and Data (RP-1613) (DE-13-016, June 2013)
- Revising ASHRAE Climatic Data for Design and Standards, Part 2:Clear-Sky Solar Radiation Model (RP-1613) (DE-13-017, June 2013)

TC/TG Sponsored Transactions-Title, when presented (past 3 yrs. present & planned)

Technical Paper Session 5: Improvements to Climatic Data for ASHRAE Calculations – Denver CO, June 2013.

TC/TG Sponsored Seminars-Title when presented (past 3 yrs. present & planned)

- Seminar 65 - Impacts of Environmental Change on Building Design and Their HVAC Systems – San Antonio, TX, June 2012
- Seminar 10 – New Weather Data for Design Calculations and Energy Simulations – Atlanta, GA, June 2015
- Seminar 23 – Climate Change: ASHRAE Design Day Weather Data – Atlanta, GA, June 2015 (co-sponsored with TC 4.1)

TC/TG Sponsored Forums-Title, when presented (past 3 yrs. present & planned)

JOURNAL PUBLICATIONS, when published (past 3 yrs. present & planned)

Attachments:

Schedule and Agenda
Minutes
Action Items
TC/TG Activity Feedback Form
Research Subcommittee Agenda
Program Subcommittee Minutes
1699-RP PMS/Handbook Subcommittee Minutes

2015 Winter Meeting Schedule and Agenda, Chicago, Illinois
TC 4.2 (Climatic Information) and Related Activities

Time/Date	Meeting/Event	Room (Floor, Hotel)
Saturday, 24 January 2015		
	No activities planned	
Sunday, 25 January 2015		
1:00 p.m. - 2:30 p.m.	1699-RP PES, "*Update Climatic Design Data in Chapter 14 of the 2017 Handbook of Fundamentals*"	Salon 10 (3rd, Palmer House)
2:30 p.m. - 3:30 p.m.	TC 4.2 Program Subcommittee	Salon 10 (3rd, Palmer House)
3:30 p.m. - 5:00 p.m.	1561-RP PMS, "*Procedures to Adjust Observed Climatic Data for Regional or Mesoscale Climatic Variations*"	Salon 10 (3rd, Palmer House)
Monday, 26 January 2015		
10:00 a.m. - 12:00 p.m.	SSPC 169, *Climatic Data for Building Design Standards*	Indiana (3rd, Palmer House)
4:15 p.m. - 6:00 p.m.	TC 4.2 Research Subcommittee	Clark 7 (7th, Palmer House)
Tuesday, 27 January 2015		
1:00 p.m. to 3:30 p.m.	TC 4.2, Climatic Information, Full Committee	Buckingham (5th, Palmer House)
Wednesday, 28 January 2015		
	No activities planned	

AGENDA, ASHRAE TC 4.2 Climatic Information

1:00 – 3:30 PM, Tuesday, 27 January 2015
Buckingham, 5th Floor, Palmer House, Chicago, Illinois

Scope: TC 4.2 is concerned with identification, analysis and tabulation of climatic data for use in analysis and design of heating, refrigeration, ventilation and air-conditioning systems. Promotion of effective use of weather information in these applications is also included.

1:00 PM	Call to order Roll call Introductions Approval of agenda Approval of minutes of Seattle meeting (July 2014) Report from the Chair/Announcements Introduction of liaisons (liaison announcements/requests)	**Crawley** **Baltazar**
1:15 PM	Membership Roster Rollovers (for July 2015)	**Crawley**
1:20 PM	Review of Action Items and Status	**Baltazar**
1:35 PM	Research Reports on status of current, future and completed research projects: ● 1561-RP, Procedures to Adjust Observed Climatic Data for Regional or Microclimate Variations ● 1699-RP, Update Climatic Design Data in Chapter 14 of the 2017 Handbook - Fundamentals ● Other potential research projects ● Long-term research plan	**Cornick**
2:15 PM	Handbook ● 1699-RP Update of Climatic Data for 2017 Handbook - Fundamentals ● Revisions and errata	**Thevenard**
2:30 PM	Program ● Chicago, January 24-28, 2015 ● Atlanta, June 27-July 1, 2015 ● Orlando, January 23-27, 2016 ● Future conferences	**Huang**
2:45 PM	Standards Report SSPC 169 Climatic Data for Building Design Standards	**Crawley**
3:00 PM 3:10 PM	Old business New business	**Crawley**
3:30 PM	Adjournment	

Next Meeting: Atlanta, Georgia, Tuesday 30 June 2015

Minutes of ASHRAE TC 4.2 Climatic Information meeting

1:00 – 3:30 PM, Tuesday, 26 January 2015

Chair Dru Crawley called the meeting to order at 1 pm.

Vice-Chair Juan Carlos Balthazar did the roll call. There were 8 voting members present, 7 voting members (three non-quorum) absent. Quorum was met.

Introductions all around

Dru asked for changes to the Agenda. Steve Cornick requested that Justin Wong be added to the agenda to talk about Australian climate zones.

Dru said that the minutes from Seattle were sent out two weeks ago, but with some requested changes over the past week. Secretary Joe Huang explained the changes in the minutes were in reference only to the status of one project (RP-1561). Steve said that a No-Cost Extension (NCX) was not extended to 1561 during the meeting, so that note should be struck.

Action Item: Phil Jarrett moved, and Chip Barnaby seconded, that the minutes be accepted with the one requested change. Motion was passed 7-0-1.

Steve summarized the Research activities of the TC.

RP-1561. The Contractor is expected to deliver the draft final report on Feb. 1, and the user manual on Feb 28. The project will need a NCX to give the PMS time to review the final report. Steve recommends that a NCX be extended to after the Atlanta meeting, i.e. July 1, 2015, although the Contractor can always finish ahead of time.

Action item: Steve moves that a NCX be granted to RP-1561 to July 1, 2015. Motion was passed 7-0-1.

RP-1669. The Contractor met with the PMS later on the same day. The contract has just started, and the discussion has been on the new elements to be added to the Handbook table, e.g., extreme high and lows. There were some technical questions about the all-sky variable. The Contractor will produce a new WDViewer. The Contractor seems confident he can deliver the products within the timeline and budget. A PMS conference call is being planned for May.

Draft Work Statements

1700-WS. We need to find a new home for the data, because that should not be the mission of either TC 4.2 or SSPC-160. Therefore, the WS is currently on hold, and will eventually roll off, unless another TC were to bring it up and have it revised.

RTARs/WS under development – there hasn't been much work on the following topics, but they should be left on the research agenda because they are important topics:

1) Sky temperature (Barnaby and Gueymard) – nothing has been done the topic will stay on the agenda pending possible future action.

2) Evaluation of renanalysis data (Huang) – This RTAR has been returned from RAC with a number of comments. Joe has circulated those comments and his responses on the TC 4.2 Group, but has yet to send them to RAC. Joe would like comments and suggestions from the TC before he responds to RAC.

3) TMYs - there was a lot of discussion on this topic, but barring some definitive action, it will roll off the research agenda. Joe showed a partially-completed RTAR to update the IWEC2 weather files, and have as a deliverable to generate complete time series of climatic data that's can be of use by ASHRAE and TC 4.2 to support other research. Joe will circulate the completed RTAR to the TC 4.2 Group once this is done.

4) New days to deliver weather data on the Web. Dru says that ASHRAE is changing in this area, citing

as an example that ASHRAE is now starting to deliver the Handbook on the Web.

New Research Ideas - Joe described the presentation from a TC 4.7 seminar on the energy modeling of tall building where the presenter modified the weather file for different building heights, and showed that the top stories of the building were in a different ASHRAE Climate Zone than the lower stories. Joe thought that TC 4.2 could develop a small RTAR to develop recommended procedures for adjusting weather files for elevation.

Guests Jason Wong and Peter Lyons gave a presentation on Australian climate zones, showing maps that divided up Australia into over 100 building climate regions. Peter noted that "political jurisdictions are used for convenience in areas with no people, but you won't get away with it in the populated areas". Jason explained the climate statistics used to define the Australian climate zones. In the work being carried out by Jason's company, Team Catalyst, they are using ASHRAE IWEC2 instead of RMY files, because they are felt to have better ground temperatures, and are more easily extended to additional locations using NCDC's ISD database.

This concludes the research report by Steve.

Additional Research Topics:

Ulrike reported that her project on generating future weather data for Iowa is now completed, and that she can provide the report to the TC, as well as turn it into a RTAR.

Joe suggested that TC 4.2 give recommendations to NREL in respect to the production of TMY4s. Dru asked that Joe enter the name of the NREL scientist (Manajit Sengupta) into the minutes.

Program:

Joe summarized the program plan which included two items – a seminar on new sources of weather data that was first proposed and rejected by CEC in June 2013 (potential speakers Phil Jarrett on Environment Canada products, Dru Crawley on new ASHRAE weather products, and someone from NREL on their work on solar data and TMY4s), and a workshop co-sponsored with TC 4.1 on alternate design day procedures (potential workshop participants Steve Bruning from TC 4.1, Joe Huang, Paulo Velasco, and possibly one more from TC4.2).

Action Item: Joe Huang moved, and Steve Cornick seconded, that this program plan be accepted. Motion passed 6-0-1.

Standards

Dru discussed changes that have been made to Standard 169. The map has to be redone, and the errata needs to be improved. ASHRAE 90.1 will now have to make a minor change for the new Climate Zone 0 for tropical climates. Standard 169 is making progress because the weather data is now finally out of the ASHRAE 90.1 Standard after ten years.

Dru asked that those members interested to be on Standard 169 to send him information, which has to be submitted to ASHRAE in April.

New Business:

Steve Cornick spoke on outreach with other TCs. Steve mentioned that he had a discussion with Joe about various climate statistics that had been generated long ago for which there might be other statistics that were more appropriate. For example, ASHRAE-90.1 is using liquid precipitation (rainfall) as an indicator of latent loads, whereas latent enthalpy hours might be more appropriate. We need better coordination with the other TCs.

Action Item: Steve will work with Joe to develop an outreach program by April.

Meeting adjourned 2:30 by unanimous vote 7-0-1.

ASHRAE TC 4.2 Climatic Information
TC 4.2 Action Item Summary

Chicago (January 2015)

Item	*Who*	*Status*
Action Item: Phil Jarrett moved, and Chip Barnaby seconded, that the minutes be accepted with the one requested change. Motion was passed 7-0-1.	N/A	N/A
Action item: Steve moved that a NCX be granted to RP-1561 to July 1, 2015. Motion was passed 7-0-1	N/A	N/A
Action Item: Joe Huang moved, and Steve Cornick seconded, that this program plan be accepted. Motion passed 6-0-1.	N/A	N/A
Action Item: Steve will work with Joe to develop an outreach program by April.	Steve Cornick, Joe Huang	N/A

TC/TG/TRG Activity Feedback Form

Please provide feedback on your TC/TG/TRG activities and return this form by Tuesday night 9:00 pm to your Section Head by email or drop off a printed copy in the Section Head's mailbox folder outside the ASHRAE Headquarters Room.
Include activities performed since the last TC meeting (e.g. any letter ballots, submissions to RAC, award nominations, etc.)

PLEASE DO NOT LEAVE NUMERIC CELLS EMPTY. ENTER 0 IN CELLS IF THERE IS NO COUNT.

TC#	4.2	Committee Name:	CLIMATIC INFORMATION
		Chair:	Dr Drury B Crawley, PhD

Meeting was Held (City)	Chicago, Il	(Day)	Tuesday	(Date)	1/27/2015

Membership	Quorum Established (Yes/No)		
	Number Present	Remote Participants	Total on Committee Roster
Voting Members (excluding Non-Quorum Members)	8	0	12
Non-Quorum Members	0	0	1
Corresponding Members	4	0	30
Provisional Members	0	0	0
Visitors/Guests	2	0	n/a
All members/guests who are **ALSO** YEA members	0	0	0

Handbook Responsibilities		Standards Responsibilities	
Total Number of Chapters	1	Total Number of Standards	1
# Chapters voted out this meeting	0	# Standards recommended	0
Special Publications (last six months)	0	Title:	

Program Activities (For This Meeting)

Total # of Forums			Total # of Seminars			Total # of Paper Sessions			Other Presentations		
Submitted*	Sponsor	Co-sponsor	Submitted*	Sponsor	Co-Sponsor	Submitted*	Sponsor	Co-Sponsor	TC Research Results	Other Papers**	
0	0	0	1	0	0	0	0	0	0	0	0

Current Research Activities (active)		TC Management	
# of new/revised RTARs submitted	1	Minutes completed on time?	YES
# of other active RTARs	0	Agenda distributed on time?	YES
# of Work Statements submitted	0	Did Chair attend training?	YES
# of other active Work Statements	0	Did Vice Chair attend?	NO
# of active TRPs	0	Did Program Chair attend training?	YES
# of active RPs	2	Did Handbook Chair attend training?	YES
Problems getting RTAR/WS approved?		Did Research Chair attend breakfast?	YES

Other Technical Activities		Award Nominations (last six months)	
# FAQs updated this meeting		# of Distinguished Service Nominations	
# New members added to roster		# of Exceptional Service Nominations	
		# of Other Nominations: Hightower, Research, Fellow,etc	
		Specify Award :	

Any Concerns or requests for the Technical Activities Committee? (Please type in Space Below)

Appendix A. Research Subcommittee Agenda

AGENDA

ASHRAE TC 4.2 Research Subcommittee
4:15-6:00 pm, Monday, January 26th, 2015
Salon 10, Third Floor
Palmer House Hilton, Chicago Illinois

4:15	Call to order / introductions / changes to the agenda	Cornick
4:20	**Active Research Projects**	
	• **1561-RP** Procedures to Adjust Observed Climatic Data for Regional or Microclimatic Variations	Cornick
	• **1699-RP** Update Climatic Design Data in Chapter 14 of the 2017 Handbook of Fundamentals	Thevenard
4:50	**Draft Work Statements (on Research Plan or submitted)**	
	1700-WS A Global Database of Moisture Design Reference Years for Hygrothermal Analysis and Design of Buildings	Cornick
5:05	**New Research Topics/Research Plan**	
	• XX-RTAR Models for Generating Sky Temperatures for Building Modeling	Barnaby/Gueymard
	• XX-RTAR Evaluation of climate reanalysis data for use in ASHRAE applications	Bourassa/Huang
	• XX-RTAR Delivering Design Data in New Ways	Cornick/Bourassa
	• XX-RTAR Urban Climatology	Gueymard
	• XX-RTAR TMYs general discussion	All
5:10	**Old Business**	
	• Progress by the NASA Power Team to Generate ASHRAE Climatic Design Conditions and Global Climate Zone Maps using MERRA Data	Westberg
	• 1477-RP Solar calculations revisited	Huang
5:15	**New Business**	
6:00	**Adjourn**	

Next Meeting: June 29, 2015 Atlanta, Georgia

Appendix B. Minutes of 1699-RP PMS meeting

Minutes of 1699-RP PMS meeting
Chicago, 2015-01-25

Present:

- PMS: Anthony Arguez, Steven Brunning, Steve Cornick, Dru Crawley, Phil Jarrett, Didier Thevenard (chair).
- Contractor: Michael Roth (PI), Christian Gueymard (sub-contractor).
- Guests: Joshua New, Juan-Carlos Balthazar, Chip Barnaby, Justin Wong.

Absent: Larry Degelman (PMS).
Minutes prepared by Didier Thevenard.

The contractor went through the various aspects of the project and reviewed progress to date.
Task: Update and expand meteorological data

- Data acquisition: 1990 to 2014 is the period under consideration
    - ISD: As of Jan 1, 2015: 18,500 stations with 8+ years, 11,700 stations with 25+ years.
    - GRP119: Still to be done. *Action point*: Phil will provide the data as soon as possible. Phil will decide what the best format is.
    - Justin Wong has mentioned that it may be possible to obtain additional data for Australia. *Action point*: Justin (justin@teamcatalyst.com.au) will provide info as to where additional weather data from Australia can be obtained from.
    - Precip: GHCN, GPCC. *Action point*: Didier and Michael to discuss new data sets.
- Statistical analysis:
    - Code received from Didier
    - Contractor was able to replicate HOF2013 results
- New elements evaluation
    - Monthly average windspeed for F280. Average ground temperature would be interesting but may not be achievable. *Action point*: Chip and Phil to define exactly what these elements are in F280.
    - Extreme values of 5, 10, 20 year return periods. This was mentioned in Didier's final report for 1613-RP.
    - Historic highs and lows. This is requested by Steven Brunning, as it would be useful for legal cases. Michael can do the calculation since he has the data since 1901. *Action point*: Michael will check if NCDC also has historic highs and lows already tabulated. People expressed concerns that it is difficult to do station to station comparisons because not all have the same record length. The consensus is that we should provide not only min and max but also from which period it was derived and how complete that period of record is, and when the min/max occurred.

Task: Update and expand solar radiation data

- Clear-sky refinement
    - Chris is pulling aerosol data over arid areas with inclusion of albedo to correct satellite data.

  - Chris is improving spatial resolution (5 km instead of 50 km).
  - Difficult areas: Middle-East and Asia. Period will be 2000 to 2014 (15 years).
  - Michael will re-run REST2 after Chris is done. Equations for the condensed model will remain unchanged.
- All-sky radiation
  - Option currently explored: REST2 model fed with data from NASA MERRA cloud data downscaled to 0.1°×0.1°
  - The concern is that the resulting data may not be of as good quality as what can be obtained from other sources. *Action point*: Chris and Michael will do an analysis and see if the resulting data is any good (and they will provide sample sites to the PMS for evaluation).

Task: Update and expand weather tools

- Proposed weather toolkit development: should be ready within a few months. That's what will be used for the production of 2017 tables.
- Weather Data Viewer data update to 2017: Mike would like to move to a web-based application, however the consensus is that WDView should still be available. *Action point*: Didier and Michael to discuss how WDView can be updated with minimum effort.

Tasks: Re-analysis datasets

- As part of project, there will now be the possibility of generating design information from the MERRA, CFSR, and NARR data sets.
- Joe's RTAR will enable to evaluate how good these datasets are to derived climatic design conditions.

Next steps

- Quarterly progress and financial reports
- Preliminary list of stations
  - Preliminary Atlanta example for PMS review – June if all goes well
  - Website demo for PMS review – June if all goes well
  - Initial climate zone maps for 169 review
  - *Action point*: Didier to schedule a teleconference for the beginning of May for a progress review.