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# 1791 Tullie Circle, N.E./Atlanta, GA 30329

**404-636-8400**

**APPROVED**

# 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. TC 1.11 DATE 5/21/2019

TC/TG/MTG/TRG TITLE Electric Motors & Motor Controls

DATE OF MEETING 15. January 2019 LOCATION Atlanta, GA

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| MEMBERS PRESENT(VM’s in **bold)** | YEAR APPTD | MEMBERS ABSENT(VM’s in **bold)** | YEAR APPTD | EX-OFFICIO MEMBERS AND ADDITIONAL ATTENDANCE |
| Dr Casey Briscoe | 2015 | **Terry Davies** | 2009 | Gang Wang gwang2@miami.edu |
| **Jerry Edwards** | 2014 | Alex Lifson | 2006 | Sannece Iyama ssiyama@lbl.gov |
| **Ken Fonstad** | 2012 | **Rainer Grosse-Kracht (MNQ)** | 2008 | Sam Jasinski Samuel.jasinski@navigant.com |
| Chandra K Gollapudi | 2017 | Florian Antretter | 2012 | Michael Westlake michael.westlake@carrier.utc.com |
| **Paul Lin** | 2012 | Kim Baker | 2015 |  |
| **Armin Hauer** | 2008 | Dr Kelly Chandler | 2014 |  |
| **Rick Heiden** | 2006 | Dr Charles H Culp III | 2011 |  |
| Robert Helt | 2000 | Mark Doty | 2010 |  |
| Jing Li | 2018 | David Lee | 2012 |  |
| Thomas Lowery | 1998 | Timothy Mathson | 2016 |  |
| Billy Rhinehart | 2003 | Sally Anne McInerny | 1998 |  |
| **Kezhen Shen** | 2016 | Hermann Renz | 2000 |  |
| **Michael Todd** | 2008 | Brian Reynolds | 2013 |  |
|  |  | Robert Richard | 2006 |  |
|  |  | Richard Robertson | 2014 |  |
|  |  | Colin Tait | 2010 |  |
|  |  | William Tinsley | 1999 |  |
|  |  | Thomas Watson | 2000 |  |
|  |  | Adam Willwerth | 2013 |  |
|  |  | Michael Wolf | 2014 |  |
|  |  | Craig Wray | 2007 |  |
|  |  | Nathan Fetting | 2018 |  |
|  |  | Tim Kline | 2017 |  |
|  |  | Nitin Naik | 2017 |  |
|  |  | Eric Norstrom | 2018 |  |
|  |  | Pavithra Santhanam | 2018 |  |
|  |  | Vladimir Suslov | 2019 |  |
|  |  | Sage Tomlinson | 2018 |  |
|  |  | Grant Wheeler | 2018 |  |
|  |  | Stephen Wren | 2017 |  |
|  |  |  |  |  |
| **DISTRIBUTION: *All Members of TC/TG/MTG/TRG plus the following:*** |
| TAC Section Head: | SH1@ashrae.net |
| All Committee Liaisons As Shown On TC/TG/MTG/TRG Rosters (Research, Standards, ALI, etc.) | TACchair@ashrae.netCTTC1@ashrae.netRL1@ashrae.netHBS3@ashrae.netSL1@ashrae.net |
| Mike Vaughn,Manager Of Research & Technical Services | MORTS@ashrae.net |

**ASHRAE TC/TG/TRG ACTIVITIES SHEET**

DATE: 15. January, 2018

TC/TG/TRG NO.: TC 1.11 TC/TG/TRG TITLE: Electric Motors and Motor Controls

CHAIRMAN: Paul Lin VICE CHAIRMAN: Chandra Gollapudi

SECRETARY: Rick Heiden

|  |
| --- |
| TC/TG/TRG MEETING SCHEDULE |
| Location-Past 12 Months | Date | Location-Planned Next 12 Months | Date |
| ChicagoHouston | 1/20186/2018 | Kansas CityOrlando | 6/20191/2020 |
| TC/TG/TRG SUBCOMMITTEES |
| Function | Chairman |
| StandardsResearchProgramHandbookWeb-masterMembershipALI coordinator (ASHRAE learning institute) | Armin HauerSage TomlinsonChandra GollapudiTom LoweryPaul LinJerry EdwardsRick Bunch |
| RESEARCH PROJECTS-CURRENT |   |   |
| Project Titlenone | Contractor | Monitoring Comm. Chpt. | Report Made At Meeting |
|  |  |  |  |
| LONG RANGE RESEARCH PLAN |   |
| Rank Title | W/S Written | Approved | To RAC |
| 1. RTAR 1793 – MOT for Motor Component Thermal Conductivity
 | Yes – Heiden | Yes | Yes |
| 1. RTAR TBD – Modelling VFD and Motor Efficiency
 |  |  |  |
| STANDARDS ACTIVITIES-List and Describe Subjects |
|  ASHRAE Standard 222-2018 - Standard Method of Test for Electrical Power Drive Systems  |
| TECHNICAL PAPERS from Sponsored Research-Title, when presented (past 3 yrs. present & planned)  |
|  |
| TC/TG Sponsored Transactions-Title, when presented (past 3 yrs. Present & planned) |
|  |
| TC/TG Sponsored Seminars (past 3 yrs. Present & planned) |
|  1/17 Seminar 12 - Variable Speed Drives and Chillers - Back to Basics |
| TC/TG Sponsored Forums-Title, when presented (past 3 yrs. Present & planned) |
|  |
| TC/TG Sponsored Workshops-Title, when presented (past 3 yrs. Present & planned) |
|  |
| JOURNAL PUBLICATIONS, when published (past 3 yrs. present & planned) |
|  |

**ASHRAE TC 1.11 Electric Motors and Motor Controls**

**Minutes for the Meeting at**

**Atlanta, GA**

**Tuesday, January 15, 2019**

1. **CALL TO ORDER**

**Introduction of Members and Guests.**

Technical Committee 1.11 was called to order at 1:02 PM by Chair Paul Lin. Paul first reviewed the ASHRAE ethics commitment. Technical Committee member and guest introductions were made and an attendance sheet was circulated. Paul asked for additions to the agenda and there were none. The membership list was reviewed and a quorum was established with 7 of 9 voting members present.

1. **APPROVAL OF MINUTES AND REVIEW OF ACTION ITEMS**

Paul asked if everyone reviewed the minutes from Houston and if there were any additions/corrections; None were discussed. It was noted several draft minutes from past meetings require approval.

**VOTE**

Ken Fonstad made a motion to approve minutes from Chicago with a second by Armin Hauer. There was no additional discussion and the motion passed 7-0-0-2-CV

**VOTE**

Armin Hauer made a motion to approve minutes including Houston Draft 1, Long Beach Draft 1 and Las Vegas Draft 2 with a second from Billy Rhinehart. There was no additional discussion and the motion passed 6-0-0-2-CNV.

**Report Action Items:**

None.

1. **TC MEMBERSHIP and COMMITTEE APPOINTMENTS**

Paul reminded everyone of their assigned committee positions for the 2019-2020 term as follows:

* Chair 🡪 Paul Lin
* VC 🡪 Chandra Gollapudi
* Secretary 🡪 Rick Heiden
* Research 🡪 Sage Tomlinson
* Standards 🡪 Armin Hauer
* Programs 🡪 Chandra Gollapudi
* Handbook 🡪 Tom Lowery
* Webmaster 🡪 Paul Lin
* Membership 🡪 Jerry Edwards

The membership roster shows 57 total members including liaisons with 9 voting members.

1. **CHAIR REPORT: Paul Lin**

Paul downloaded the latest roster to send out the agenda and minutes.

Paul established quorum with 7 voting members present of 9 total voting members

Topic - TAC letter to consolidate TC’s.

Discussion –

* Combine all the prime movers of HVAC (fan’s, compressors and components within) TC 1.11, 8.1 and 8.2
* Combine FG’s to align with ASHRAE’s mission
* TC 1.9 would be a likely candidate for inclusion

Questions from TAC and proposed comments by TC

We are looking for your input on potential synergies with other functional groups, for example, if you FG were to reform with 1 or 2 other groups, which ones do you think most align with your current scope?

* Proposed TC response 🡪 TC 1.9, 1.11, 5.1, 8.1, 8.2

I am excited about?

* Proposed TC response 🡪 none discussed at meeting

I would like to propose?

* Proposed TC response 🡪 Have one meeting a year and one conference call

I think we will have difficulty with?

* Proposed TC response 🡪 1) Administration of handbooks, research and programs and 2) How to hash out technical topics in sufficient depth

Topic - Up and coming meetings

In order 🡪 Kansas City, Orlando, Austin

1. **SUBCOMMITTEE REPORTS**
2. **Standards: Armin Hauer**
* Standard 205P – Standard Representation of Performance Simulation Data for HVAC&R and Other Facility Equipment. The initial approach of the standard specifies data models using the performance map.
* AMCA 214 – Model Fan Efficiency Regulation for Stand-Alone Commercial and Industrial Fans – call members
	+ Armin presented an overview of the standard which will be include in the minutes from this meeting
1. **Research: (TC Discussion)**

RTAR/WS Status

* WS 1793 Development of Method of Test for Motor Component Thermal Conductivity [TC8.2 lead, 8.2 & 1.11 co-sponsor]-
	+ RAC returned with comments around lack of co-funding and some question on benefit to ASHRAE, good faith efforts were made to collaborate with AHRI, UL and NEMA to no avail. RAC was still not supportive but section 8 research liaison recommended waiting for a new slate of RAC members and resubmit.
	+ TC 8.2 [Mark Adams, research s/c chair] discussed at Atlanta meeting and the TC agreed to resubmit
* RTAR TBD - Modeling Variable Frequency Drive (VFD) and motor efficiency at speed and load points not tested in Standard 1210/1211 to determine overall system efficiencies of any VFD-motor and fan, pump or compressor combination.
	+ Kezhen Shen reports RTAR is 75% done
	+ Paul and Kezhen will meet with target to complete by May

Idea backlog

* TC 5.1 belt drive RP 1769 – Experimental Evaluation of the Efficiency of Belt Drives for Fans is asking for a member from TC 1.11 to join the PMS for this project.
* How is the motor affected by Motor flux control
* How is motor/drive efficiency and control affected by torque fluctuations from the driven element
* Power quality trends by region and technology (surges, sags, etc) – currently no interest within the TC
* Data Center trends (i.e. 600 VDC ABB case) maybe a seminar – yes, TC interest as a future program
* Effects of motor type on VFD efficiency.  How does the MOT for VFD need to be changed for motors other than asynchronous? – yes, TC interest, but go both ways, VFD to motor and motor to VFD
* Survey available literature and databases used for motor-VFD performance modeling in HVAC design – currently no interest within the TC
* Motor-VFD performance rating updates for DOE MotorMaster Plus Database – currently no interest within the TC

Completed Projects Sponsored by TC 1.11

RP-1078 -- Early Detection of Insulation Degradation in Low Voltage Motors

RP-1076 -- Diagnostic Test and Analytical Methods for Resolving Fan/Motor Vibration Problems in Air-Conditioning Units

RP-1095 -- Measurements of Electrical Power Inputs to Variable Speed Motors and Their Solid State Power Converters: Phase I

RP-667 -- Measurements of Electrical Power Inputs to Variable Speed Motors and Their Solid State Converters

RP-685 -- Test and Analysis Methods for Resolving Fan/Motor Vibration Problems in Air-Conditioning Units

RP-770 -- Measurement of Electrical Power Inputs to Variable Speed Motors and Their Solid State Power Converters

1. **Programs: Chandra Gollapudi**

**Ideas and Discussion**

This meeting

New motor technology advancement seminar – was submitted and rejected for Atlanta, plan to resubmit for Kansas City

Kansas City

Submit the following:

* + Chair: Paul Lin
	+ Title: Advances in HVAC Motors and Controls
		- Motor Types Overview – Ken Fonstad
		- Fan or pump or compressor application – options for speakers include Rick (compressor) to find an additional speaker and Grant Wheeler to speak on high speed switched reluctance motors
		- Test standards for different type of motors – Dan Delany (Regal)

Ideas
Standard 222 now taking over MOT for AHRI 1210 – potential for Kansas City

* + Chair: Ken Fonstad
	+ Title: Expanding the Horizons of Motor Drive Testing
	+ why did 1210 go to 222
	+ why is 222 a good thing
	+ how could 222 be expanded to better serve the industry?

Is a switched reluctance motor dead or alive

Seminar and Forum proposals for Kansas City and Orlando are due by Feb 8 and Aug 2, respectively.

1. **Handbook *Chapter 45*: Tom Lowery**

Content providers and reviewers

Motors – Chandrin (lead), Armin, Paul, Robert, Rick

VFD – Tom (lead), Kezhen, Armin, Paul, Robert, Rick

Consider adding new content from;

standards 61800-5-1 replaces 508C, ASHRAE 222

New tech motor topologies

Tom will combine content and with a March target for 1st draft submitted to TC membership.

ASHRAE authoring portal could be used for this purpose

1. **Membership: Jerry Edwards (left meeting before report)**

TC Discussion

* Remote member participation may be added for next meeting.
* Jerry Edwards rolls off as voting member after Kansas City.
1. **WEB SITE** [*http://tc111.ashraetcs.org*](http://tc111.ashraetcs.org)**: Paul Lin**

Up to date.

Some mm still indicate draft and will be updated with approved versions.

1. **LIASION REPORTS**
2. **Section Head: Amir Jokar**

Use online Roster form

Submit activity form and highlight any action items for Liason

Regarding the initiative to evaluate combining TC’s, Amir requests TC Chair to submit referenced form as a combined opinions of the TC. Individual comments can also be sent to as noted in the original TAC letter.

1. **RAC: Shinsuke Kato**

None.

1. **NEMA/UL Motor Committee Liaison – Chandra Gollapudi**
* EU regulation on VFD 3/4kW to 1000kW going into effect 2021
* DOE – pool pump motor regulations are in existence. Discussions underway for motor regulations be developed to align.
* AFUE2 – furnace mfg through AHRI made petition to DOE to align regulations
1. **NEMA/UL Drive Committee Liaison – Terry Davies**

None.

1. **OLD BUSINESS**

None.

1. **NEW BUSINESS**

Doodle poll for upcoming webinar on IEC 61800-9-2, Paul will send out a specific communication on this

1. **ANNOUNCEMENT OF NEXT MEETING**

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1. **ADJOURNMENT**

**VOTE**:

Michael Todd made the motion to adjourn with a second by Armin Hauer, PASSED 5-0-0-2-CNV. The meeting was adjourned at 2:36PM.

Respectfully Submitted,

Rick Heiden

Secretary, TC 1.11

**Appendix I – Section 1 Breakfast Minutes, CEC Info, & Pub Info**

CEC – Seminar and Forum proposals for KC due Friday, Feb. 8, 2019

* Upcoming Meetings – Kansas City, MO June 22, 2019

 Orlando, FL Feb. 1-5, 2020

Movement towards combing TC’s. Discuss and provide feedback from TC’s on how your TC will be impacted and what TC’s could be combined together