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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 6/28/2018

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

DATE OF MEETING 6/26/2018 LOCATION Houston, TX

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| MEMBERS PRESENT  (VM’s in **bold)** | YEAR APPTD | MEMBERS ABSENT  (VM’s in **bold)** | | YEAR APPTD | EX-OFFICIO MEMBERS AND ADDITIONAL ATTENDANCE | |
| Paul Lin | 2012 | **Thomas Lowery** | | 1998 | Gang Wang | |
| **Michael Todd** | 2008 | John Cherney | | 2017 |  | |
| Chandra K Gollapudi | 2017 | **Jerry Edwards** | | 2014 |  | |
| Alex Lifson | 2006 | **Rainer Grosse-Kracht (MNQ)** | | 2008 |  | |
| **Ken Fonstad** | 2012 | **Rick Bunch** | | 1997 |  | |
| **Billy Rhinehart** | 2003 | Thomas Bourquin | | 2016 |  | |
| David Williams | 2016 | Dr Christian Ellwein | | 2016 |  | |
| **Armin Hauer** | 2008 | Nathan Fetting | | 2018 |  | |
| Kezhen Shen | 2016 | Amr Adel Galal | | 2016 |  | |
| Rick Heiden | 2006 | Benjamin House | | 2016 |  | |
| Sage Tomlinson | 2018 | Tim Kline | | 2017 |  | |
| **Terry Davies** | 2009 | Michael Westlake | | 2016 |  | |
| Jing Li | 2018 | Grant Wheeler | | 2018 |  | |
| Nitin Naik | 2017 | Stephen Lee Wren | | 2017 |  | |
|  |  | Dr Huojun Yang | | 2016 |  | |
|  |  | Florian Antretter | | 2012 |  | |
|  |  | Kim Baker | | 2015 |  | |
|  |  | Kenneth Bobick | | 2012 |  | |
|  |  | Dr Casey Briscoe | | 2015 |  | |
|  |  | Dr Kelly Chandler | | 2014 |  | |
|  |  | Rudy Chervil | | 2008 |  | |
|  |  | Robert Coleman | | 2008 |  | |
|  |  | Dr Charles H Culp III | | 2011 |  | |
|  |  | Ashish Desai | | 2014 |  | |
|  |  | Mark Doty | | 2010 |  | |
|  |  | James Dudt | | 2012 |  | |
|  |  | Alex Harvey | | 2012 |  | |
|  |  | Robert Helt | | 2000 |  | |
|  |  | David Lee | | 2012 |  | |
|  |  | Timothy Mathson | | 2016 |  | |
|  |  | Sally Anne McInerny | | 1998 |  | |
|  |  | David Miller | | 2012 |  | |
|  |  | Donald Perry | | 2006 |  | |
|  |  | Hermann Renz | | 2000 |  | |
|  |  | 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 |  | |
| **DISTRIBUTION: *All Members of TC/TG/MTG/TRG plus the following:*** | | | | | | |
| TAC Section Head: | | | | [SH1@ashrae.net](mailto:SH1@ashrae.net) | | |
| All Committee Liaisons As Shown On TC/TG/MTG/TRG Rosters (Research, Standards, ALI, etc.) | | | | [TACchair@ashrae.net](mailto:TACchair@ashrae.net)  [CTTC1@ashrae.net](mailto:CTTC1@ashrae.net)  [RL1@ashrae.net](mailto:RL1@ashrae.net)  [HBS3@ashrae.net](mailto:HBS3@ashrae.net)  [SL1@ashrae.net](mailto:SL1@ashrae.net) | | |
| Mike Vaughn,  Manager Of Research & Technical Services | | | | MORTS@ashrae.net | | |

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

DATE: June 26, 2018

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

CHAIRMAN: Thomas F Lowery VICE CHAIRMAN: Paul Lin

SECRETARY: Michael Todd

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| TC/TG/TRG MEETING SCHEDULE | | | | | | |
| Location-Past 12 Months | | Date | Location-Planned Next 12 Months | | | Date |
| Long Beach  Chicago | | 6/2017  1/2018 | Atlanta  Kansas City | | | 1/12-1/16 2019  6/22-6/26 2019 |
| TC/TG/TRG SUBCOMMITTEES | | | | | | |
| Function | | | | | Chairman | |
| Standards  Research  Program  Handbook  Web-master  Membership  ALI coordinator (ASHRAE learning institute) | | | | | Armin Hauer  Rick Heiden  Chandra Gollapudi  Tom Lowery  Paul Lin  John Cherney  Rick Bunch | |
| RESEARCH PROJECTS-CURRENT | | | |  |  | |
| Project Title  none | 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 | | | No | No | |
| STANDARDS ACTIVITIES-List and Describe Subjects | | | | | | |
| AHRI Standard 1210 / 1211 Performance Rating of Variable Frequency Drives, MOT is now ASHRAE 222, which is complete and out for publication as of June 2018 | | | | | | |
| 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**

**Hilton, 3rd floor, 336 A**

**Houston, Texas**

**Tuesday, June 26, 2018**

1. **CALL TO ORDER**

**Introduction of Members and Guests.**

Technical Committee 1.11 was called to order at 1:02 PM by Vice 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 5 of 8 voting members present.

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

Paul asked if everyone reviewed the minutes from Chicago Draft 2 and if there were any additions/corrections. None were discussed.

**MOTION**: Armin Hauer made a motion to approve the January 2018 Chicago minutes (Draft 2) with a second from Billy Rhinehart. There was no additional discussion and the motion passed 5-0-0-3-CNV.

**Report Action Items:**

None.

1. **TC MEMBERSHIP and COMMITTEE APPOINTMENTS**

Paul reminded everyone of their assigned committee positions for the 2018-2019 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

Kezhen Shen, Rick Heiden, and Paul Lin will roll on as voting members.

Rick Bunch, Billy Rhinehart, and Tom Lowery are rolling off as voting members.

The membership shows 57 total members. Effective July 1, there will be 8 voting members.

1. **CHAIR REPORT: Tom Lowery (Paul Lin)**

Paul downloaded the latest roster to send out the agenda and minutes. Only a few emails bounced back. ASHRAE 125 year celebration is coming and still looking for papers. Reminded folks not to use the ASHRAE letter head without proper approval.

**Up and coming meetings:** Atlanta, Georgia – January 12 to 16, 2019

1. **SUBCOMMITTEE REPORTS**
2. **Standards: Armin Hauer**

* ASHRAE SPC 222 - Standard Method of Test for Electrical Power Drive Systems
  + Approved and going for publication; timing simply dependent on ASHRAE staff now
* AMCA 208 – Calculation of Fan Energy Index
  + “wire-to-air-metric” includes drive and motor losses
  + Completed in March 2018
* IEC 61800, IEEE
  + No actions taken by S/C chair
  + Calculate combined efficiencies for different motor and drive combination at different operating points
  + Chandra to ask Dan Delaney to provide an update
* AHRI 1210/1211
  + Revision to now refer to ASHRAE 222 MOT pending
  + AHRI will discuss removing the old appendix MOT
* California Title 20 regulation of fans
  + CEC considers adopting AMCA 208 to be effective by 1/1/2020

1. **Research: Rick Heiden**

* Sage Thomlinson [satol@cpifluideng.com](mailto:satol@cpifluideng.com) has volunteered to take as research subcommittee chair after this meeting.

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
  + RL suggests getting co-funding and resubmitting within a year
  + TC 8.2 [Mark Adams, research s/c chair] will reach out to AHRI for funding and manage resubmission
* RTAR 1768 - Assessment of HVAC Equipment Idle Power Consumption as a Percentage of Built Environment Energy Load (5 – 1500 kW)
  + RAC informed we are withdrawing
* 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 and Sage Thomlinson preparing RTAR
  + Billy, Ken, Chandra, Armin, Paul, and Rick agreed to meet with Kezhen and Sage once they have the RTAR ready.

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**

* New motor technology advancement seminar – planning seminar for Atlanta
  + Paul Lin agreed to chair
  + Possible title: Advances in HVAC Motors, Controls, and Applications
    - AC induction, permanent magnet, switched reluctance, and ECM (motor types overview) – Ken & Terry to find speaker
    - Fan or pump or compressor application – 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) agreed to speak
    - Paul to coordinate within the next couple weeks to submit before the deadline.
* SPC 222 now taking over MOT for AHRI 1210 – potential for Kansas City
  + Standard completed, going to publication
  + Potential chair – Ken Fonstad
  + Possible title: Expanding the Horizons of Motor Drive Testing
  + Armin to investigate co-sponsorship with TC 5.1 (fans)
* Rick proposed a new topic that aligns with current research topics on motor cooling, especially for hermetic.

Seminar and Forum proposals for Atlanta are due by **Friday, August 3, 2018.**

The following are the tracks for the next two meetings.

Atlanta – Winter 2019

* Track 1: Systems and Equipment
* Track 2: HVAC&R Fundamentals and Applications
* Track 3: Refrigeration
* Track 4: Construction, Operation, and Maintenance of High Performance Systems
* Track 5: Common System Issues and Misapplications
* Track 6: The Convergence of Comfort, Indoor Air Quality, and Energy Efficiency
* Track 7: Building Integrated Renewables and Natural Systems
* Track 8: The Engineer's Role in Architecture

Kansas City – Summer 2019

* Track 1: Systems & Equipment in the Built Environment
* Track 2: Fundamentals and Applications
* Track 3: Optimization in HVAC&R
* Track 4: Commissioning New & Existing Buildings
* Track 5: Occupant Health & Safety
* Track 6: Modeling Throughout the Building Life Cycle
* Track 7: Professional Development
* Track 8: Research Summit
* Track 9: Radiant Heating & Cooling (Mini-Track)

Seminar and Forum proposals for Kansas City are due by **Friday, January 2, 2019.**

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

There is a new author’s portal for file sharing to help with Handbook revisions. Paul to talk to Tom to start the review process. Next update scheduled for publication in 2020 and must submit by June of 2019.

1. **Membership: Jerry Edwards**

None.

1. **WEB SITE** [*http://tc111.ashraetcs.org*](http://tc111.ashraetcs.org)**: Paul Lin**

Up to date.

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

None.

1. **RAC: Shinsuke Kato**

None.

1. **NEMA/UL Motor Committee Liaison – Chandra Gollapudi**

* New synchronous motor standard SM1-2017 for line start motors
* Labeling program to promote motor drive system (next meeting in August)
* DOE – 3 regulations on hold (import declaration rule, CCE rule, small motor RFI round 2)

1. **NEMA/UL Drive Committee Liaison – Terry Davies**

None.

1. **OLD BUSINESS**

None.

1. **NEW BUSINESS**

None.

1. **ANNOUNCEMENT OF NEXT MEETING**

Vice Chairman Paul Lin announced that the next meeting would be held in Atlanta, Georgia in January 2019 at the same time on Tuesday.

1. **ADJOURNMENT**

**MOTION**: Michael Todd made the motion to adjourn with a second by Armin Hauer, PASSED 5-0-0-3-CNV. The meeting was adjourned at 2:36PM.

Respectfully Submitted,

Michael Todd

Secretary, TC 1.11

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

  