

RESEARCH REPORT

is of value to BEM practitioners as well as to equipment designers. The *ASHRAE Handbook—Fundamentals* (2013) outlines several energy modeling tools that are widely used in the industry (e.g., DOE2, EnergyPlus, TRNSYS) and the current methodologies for equipment modeling (Regression Models and First-Principle Models). Unitary split systems, especially heat pumps, which are used widely in both Residential and Commercial applications pose unique challenges. Since not every rated split system match is lab tested, modeling is leaned on heavily. A weak link in this process is refrigerant charge inventory. Improving the robustness of charge migration modeling will result in greater confidence in the design and selection process for engineers in the field, rating agencies, and manufacturers.

1799-RP Validation of Extrapolation of Performance Rating Test Results for Small Energy Exchangers to Large Exchangers

May 2020 – January 2022; Intertek; Principal Investigator: Krishnan Gowri

The proposed research will increase the utility of ASHRAE Standard 84 by validating its applicability to large exchangers over a broad range of conditions. Air-to-air energy recovery is an important tool for reducing energy consumption in buildings and is now required in ASHRAE Standard 90.1-2013 in defined circumstances. The proposed research will support further use of air-to-air energy recovery in Standard 90.1, helping to meet the ongoing goals for reduced energy consumption in new and renovated buildings.

1800-RP Spray Evaporation on Enhanced Tube Bundles with Low GWP pure Refrigerants and Refrigerant/Miscible Oil Mixture

September 2018 – February 2021; Auburn University; Principal Investigator, Lorenzo Cremaschi; TC 1.3, Liquid to Refrigerant Heat Exchangers; Co-sponsored by: MTG.LowGWP, TC 8.5, Liquid-to-Refrigerant Heat Exchangers

This study would help the industry to understand the physics of thin film evaporation phenomenon for pure low GWP refrigerants and refrigerant/miscible oil mixtures on structured 3-D enhanced tubes and help optimize such exchangers for air-conditioning and refrigeration applications. The basic objective of this project will be to perform spray evaporation heat transfer and pressure drop tests on a tube bundle with low GWP refrigerants and refrigerant/miscible oil mixtures at various temperature and pressure conditions of interest to air-conditioning and refrigeration industry. The universal correlations and/or charts would be developed for the general benefit of the stakeholders. The investigator(s) is/are expected to present the results of the study in a manner that clearly and quantitatively shows the enhancement factors achieved compared to conventional flooded evaporators and its impact on the overall COP of a chiller.

1801-RP Standardizing and Utilizing ASHRAE Online BIM Data Exchange Protocols

September 2018 – August 2020 (P); Hitchcock Consulting; Principal Investigator, Robert Hitchcock; TC 1.5, Computer Applications; Co-sponsor, MTG-BIM, MTG, Building Information Modeling & TC 7.1, Integrated Building Design

The objective of this research project is to bring data exchange protocols based on ASHRAE publications, to usable completion and availability by aligning ASHRAE exchange protocols with relevant existing BIM standards, creating neutral format data content downloadable from the new ASHRAE data repository (data.ashrae.org) documenting end-user guidance to support ASHRAE members in implementing these data exchange protocols in the adoption of BIM in their professional practice. A long-term objective is to use this example to encourage ASHRAE committees to develop additional data exchange protocols based on their publications.

1806-RP Flammable Refrigerants Post-Ignition Simulation and Risk Assessment Update

January 2017 – January 2021 (P); Gexcon, US; Principal Investigator: Scott Davis; MTG, LowGWP

The objective of this project is to understand the Severity of events where flammable refrigerants are ignited under different scenarios for various HVAC&R products. Such understanding will allow for the assessment of the overall risks of using flammable refrigerants in HVAC&R products, considering both event Probability and Severity.

1810-RP Development of Reference Building Information Model (BIM) Test Cases for Improving Usage of Software Interoperability Schemas

May 2019 – February 2021 (P); BuildSimHub, Inc.; Principal Investigator, Weili Xu; TC 1.5, Computer Applications

The overall objectives of this research project are: 1) to develop 20+ gbXML test case documents that software vendors can follow to develop their own gbXML files that will then be uploaded to a web-based validator that will provide feedback on the validity of the files.; 2) Develop 20+ corresponding gbXML files, 1 for each test case, that provide templates for software vendors to base their outputs upon; 3) Further develop an existing web-based validator software tool that will validate the 20+ test cases; 4) Upload all deliverables including software vendor output files to data.ashrae.org. This is all in the name of improving the interoperability experience between BIM authoring tools and building analysis software tools.

1814-RP Actual Energy Performance of Secondary Schools and Medium Offices Designed to Comply with ASHRAE Standard 90.1-2010

September 2018–November 2020; Seventhwave; Principal Investigator, Xiaohui Zhou; TC 2.8, Building Environmental Impacts & Sustainability; Co-sponsor, TC 7.6, Building Energy Performance

The project will help ASHRAE maintain its leadership position by developing energy standards and other publications targeted to commercial buildings that will help engineers, designers, contractors and owners build