



Shaping Tomorrow's
Built Environment Today

1791 Tullie Circle NE ▪ Atlanta, Georgia 30329-2305 ▪ Tel 678.539.1211 ▪ Fax 678.539.2211 ▪ <http://www.ashrae.org>

Michael R. Vaughn, P.E.
Manager
Research & Technical Services

mvaughn@ashrae.org

TO: Steven Taylor, Chair TC 4.3, staylor@taylor-engineering.com
Xudong Yang, Research Liaison 4.0, zyang@tsinghua.edu.cn
Steven Taylor, Research Subcommittee Chair TC 4.3, staylor@taylor-engineering.com

FROM: Michael Vaughn, MORTS, mvaughn@ashrae.org

DATE: November 13, 2015

SUBJECT: Research Topic Acceptance Request (1776-RTAR), "Characterizing the air flow at the top of exhaust stacks for improved dispersion modeling"

During their fall meeting, the Research Administration Committee (RAC) reviewed the subject Research Topic Acceptance Request (RTAR) and voted 4-0-0 to reject it. The following list summarizes the consensus review comments and questions on this RTAR:

1. Need is not well justified. The previous ASHRAE Research project RP-897 (Adjacent Building Effects on Laboratory Fume Hood Exhaust Stack Design) did study the adjacent building effect on fume hood exhaust stack design. This is not mentioned or how this new research will be different. Also, not sure which 2011 equations authors are referring to in RTAR – 2011 Application Handbook Volume – Chapter 45?
2. The RTAR emphasizes the desire to improve modeling, but doesn't say anything about failures of existing methods, except that they might be too conservative. Also, the building top airflow and turbulence depends on not only building geometry, but also local weather (wind environment). How will this factor be considered?
3. Development of more simplified guidelines, however, would be useful to designers.
4. Consider inviting as co-sponsor RP 897 sponsoring TC (TC 5.8 - Industrial Ventilation). TC 9.10 – Laboratory Systems is listed as co-sponsor, but no TC 9.10 vote count or vote date provided on RTAR
5. The potential co-funder, Laboratory Exhaust Fan Manufacturers, is vague. Is there anyone specific?

By rejecting this RTAR, RAC is strongly suggesting to the TC that this particular topic be dropped from the TC research plan based on the information that has been provided.

An RTAR evaluation sheet is attached as additional information and it provides a breakdown of comments and questions from individual RAC members based on specific review criteria. This should give you an idea of how your RTAR is being interpreted and understood by others.

If the TC wishes to pursue this topic further, please incorporate the above information into the RTAR with the help of your Research Liaison, Xudong Yang, RL4@ashrae.net, prior to submitting it to the Manager of Research and Technical Services for further consideration by RAC. In addition, a separate document providing a point by point response to each of these comments and questions must be submitted with the RTAR. The response to each item should explain how the RTAR has been revised to address the comment, or a justification for why the Technical Committee feels a revision is unnecessary or inappropriate. The RTAR and response to these comments and questions must be approved by the Research Liaison prior to submitting it to RAC.

The next submission deadline for RTARs and WSs is **December 15, 2015** for consideration at the Society's 2016 winter meeting. The submission deadline after that is **May 15, 2016**.

Project ID	1776	
Project Title	Characterizing the Air Flow at the Top of Exhaust Stacks for Improved Dispersion Modeling	
Sponsoring TC	TC 4.3, (Ventilation Requirements and Infiltration)	
Cost / Duration	\$80k-\$100k 18M	
Submission History	1st Submission	
Classification: Research or Technology Transfer	Technology Transfer	
RAC 2015 Fall Meeting Review		
Essential Criteria	Voted NO	Comments & Suggestions
Background: The RTAR should describe current state of the art with some level of literature review that documents the importance/magnitude of a problem. References should be provided. If not, then note it in your comments.	7, 9	7- Need is not well justified. Not sure which 2011 equations they are referring to. Also, the previous ASHRAE Research project RP-897 did study the adjacent building effect on fume hood exhaust stack design. This is not mentioned or how this new research will be different. 9- There are no description about wind flow separation at the eaves or the parapet of building roof. The stack height should be higher than the roof separation flow. If the stack height is lower than the roof separation wind flow, the diffusion properties will be utterly changed. Most of the cases stack height is usually lower than the separation flow and we cannot expect well diffusion and dilution. Does the RTAR assume the stack height is higher than the separation flow? 10- The RTAR emphasizes the desire to improve modeling, but doesn't say anything I could find about failures of existing methods, except that they might be too conservative. Given the stated transition toward wind-sensitive VAV hood systems, it would seem that the only variable that can be controlled is stack height, which has its own problems (zoning, among them). So, what is the justification for spending? How much energy is at risk, at what cost, even in terms of directions (likely to use more or less energy, increase design stack heights or allow decreasing?)
Research Need: Based on the background provided is the need for additional research clearly identified? If not, then the RTAR should be rejected.	7, 9	7 - Authors are trying to make the currently employed empirical methods more accurate by incorporation more empirical approaches. The fact that making these equations further refined the safety factors as mentioned by the authors will go away or will be reduced is not true. Practicing engineers will still use these safety factors because the approach of calculation stack heights is empirical. 9 - The properties of exhaust flow dispersion depend strongly on the wind direction, building shape, terrain around the building and so on and therefore the precise properties will be only obtained from wind tunnel experiments or CFD simulation. If the data book will be used for this purpose, the data should be prepared with most modest dispersion cases for safety. 10 - see above.
Relevance and Benefits to ASHRAE: Evaluate whether relevance and benefits are clearly explained in terms of: a. Leading to innovations in the field of HVAC & Refrigeration b. Valuable addition to the missing information which will lead to new design guidelines and valuable modifications to handbooks and standards. Is this research topic appropriate for ASHRAE funding? If not, Reject.		7 - There is a need for better easy to use tools for such calculations. 9 - This is an important issues for use of roof top exhaust. 10 - Might be, but I didn't get any sense at all of how important.
IF ABOVE THREE CRITERION ARE NOT ALL SATISFIED - MARK "REJECT" BELOW & CONTINUE REVIEW BELOW		
Other Criteria	Voted NO	Comments & Suggestions
Project Objectives: Based on the background and need, evaluate whether the project objectives are: 1. Aligned with the need 2. Specific 3. Clear without ambiguity 4. Achievable If not, then appropriate feedback should be provided.	7	9 - The wind flow separation at the eaves or parapets of buildings should be included in the RTAR. 6 - The building top airflow and turbulence depends on not only building geometry, but also local weather (wind environment). How will this factor be considered? 10 - feels a bit nebulous and under-defined.
Expected Approach and Budget: Is there an adequate description of the approach in order for RAC to be able to evaluate the appropriateness of the budget? If not, then the RTAR should be returned for revision. Anticipated funding level and duration:	7	13 - The budget actually seems low for the work provided. I would be interested in seeing the scope expanded to include an effort to refine the more complex analysis to allow for more simplified application for design situations that do not warrant a highly detailed analysis. (This could be addressed in the WS stage). 9 - Too small budget. Maybe ten times budget will be required. 6 - The potential co-funder, Laboratory Exhaust Fan Manufacturers, is vague. Is there anyone specific?
References: Are the references provided?		
Decision Options	Initial Decision?	Final Approval Conditions
ACCEPT AS-IS		9- The RTAR should include the issues concerning wind flow separation at the building roof top.
ACCEPT W/COMMENTS		
REJECT		

ACCEPT Vote - Topic is ready for development into a work statement (WS).

ACCEPT W/COMMENTS Vote - Minor Revision Required - RL can approve RTAR for development into WS without going back to RAC once TC satisfies RAC's approval condition(s)

REJECT Vote - Topic is not acceptable for the ASHRAE Research Program

Research Topic Acceptance Request Cover Sheet

Date: _____

(Please Check to Insure the Following Information is in the Work Statement)

- A. Title
- B. Applicability to ASHRAE Research Strategic Plan
- C. Application of the Results
- D. State-of-the-Art (background)
- E. Advancement to State-of-the-Art
- F. Justification and Value to ASHRAE
- G. Objective
- H. Estimated Duration
- I. References

Title: _____

RTAR# (To be assigned by MORTS)

Results of this Project will affect the following Handbook Chapters, Special Publications, etc.:

Responsible TC/TG: _____

Date of Vote: _____

For			
Against	*		
Abstaining	*		
Absent or not returning Ballot	*		
Total Voting Members			

Co-sponsoring TC/TG/MTG/SSPCs (give vote and date):

RTAR Lead Author:

Expected Work Statement Lead Author:

Potential Co-funders (organization, contact person information):

Research Classification:

- Basic/Applied Research**
- Advanced Concepts**
- Technology Transfer**

Yes

No

Has an electronic copy been furnished to the MORTS?
Has the Research Liaison reviewed the RTAR?

* Reasons for negative vote(s) and abstentions

DRAFT RTAR Template

Title: _____

Summary

Describe in summary form the proposed research topic, including what is proposed, why this research is important, how it will be conducted, and why ASHRAE should fund it (50 words maximum)

Background

Provide the state of the art with key references (at the end of this document) substantiating it (300 words maximum)

Research Need

Use the state of the art described above as a basis to specify the need for the proposed effort (250 words maximum)

Project Objectives

Based on the identified research need(s), specify the objectives of the solicited effort that will address all or part of these needs (150 words maximum)

Expected Approach

Describe in a manner that may be used for assessment of project viability, cost, and duration, the approach that is expected to achieve the proposed objectives (200 words maximum).

Check all that apply: Lab testing (), Computations (), Surveys (), Field tests (), Analyses and modeling (), Validation efforts (), Other (specify) ()

Relevance and Benefits to ASHRAE

Describe why this effort is of specific interest to ASHRAE, its impact, and how it will benefit ASHRAE and the society. How does it align with ASHRAE Strategic Plans and Initiatives? How does it advance the state of the art in this area in general? Are there other stakeholders that should be approached to obtain relevant information or co-funding? (350 words maximum)

Anticipated Funding Level and Duration

Funding Amount Range: \$ _____

Duration in Months: _____

References

List the key references cited in this RTAR