ASHRAE
Researching Today to Change Tomorrow

An Introduction to
ASHRAE's Research Program

ASHRAE Research

Since 1919,

the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) has supported research to improve quality of life. ASHRAE Research impacts the industry by advancing the way HVAC&R systems work and the way in which they are applied, and allowing development of technical information to create standards and guidelines which serve as the basis for testing and design practices around the world.

The Society has funded thousands of projects addressing such topics as sound, duct design, the effect of oil in refrigerants, load calculations, thermal conductivity, simplified energy analysis procedures, weather data, refrigerant property data, fire and smoke control and solar design. The most significant ASHRAE research has been in the areas of human comfort and the properties of materials and systems used in buildings and refrigeration systems.

"Only an organization such as ASHRAE has the ability to generate research funding, and is able to attract researchers from disparate backgrounds and institutions, and provide a forum to integrate their knowledge to advance the science of HVAC&R engineering and the art of human comfort."

ASHRAE research plays an important role in...

Your Health

- Preventing more than 70,000 surgical site infections that occur each year
- Decreasing the spread of airborne diseases
- Improving cancer treatment methods

Your Office

- It's getting hot in here—conserving energy in hot and humid climates
- Selecting boilers for efficient heat use
- Allowing drifting temperatures to save energy

Your Home and School

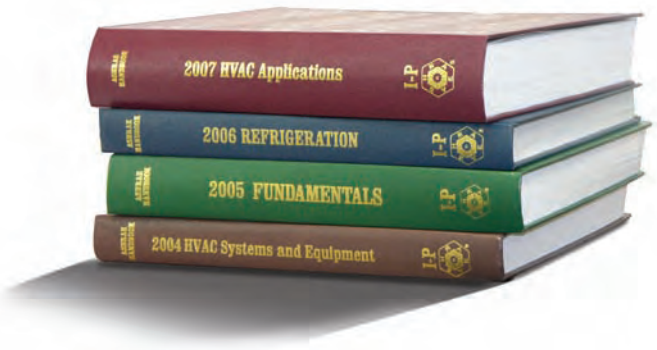
- Exploring whether classroom upgrades to improve temperature control and air quality improve the performance of schoolwork of children
- Searching for a greater understanding of the relationship between occupant health and ventilation rates, including offices and schools
- Lessening the risk of spoiled food by evaluating how food preservation is influenced by storage conditions

Why and How You Should Contribute to ASHRAE Research

How is ASHRAE research used?

- Papers reporting results of projects are presented at ASHRAE meetings and published in *ASHRAE Transactions* or ASHRAE's *HVAC&R Research Journal*.
- Projects of interest to a wide audience are described in articles published in the *ASHRAE Journal*.
- Results of are used to update the annual volumes of the ASHRAE Handbook.
- Subjects that have extensive use/popularity in the HVAC&R field are published as special publications, such as:
  - · *Cooling and Heating Load Calculation Manual*
  - · *Design of Smoke Control Systems for Buildings*
  - · *Design Guide for Cool Thermal Storage*
  - · *Air Conditioning Systems Design Manual*

ASHRAE Research also is used to update the Society's standards and guidelines, which provide uniform methods of testing for rating purposes by suggesting safe practices for design and installation and by providing other information which may serve to guide the industry. There are currently more than 100 ASHRAE standards and guidelines.



What Funds ASHRAE Research?

- Contributions from members and corporations
- A percentage of member dues
- Income from the ASHRAE cosponsored International Air-Conditioning, Heating, Refrigerating Exposition held in conjunction with each ASHRAE Winter Meeting
- Interest earned on the Research Reserve and ASHRAE Foundation

How is this money raised?

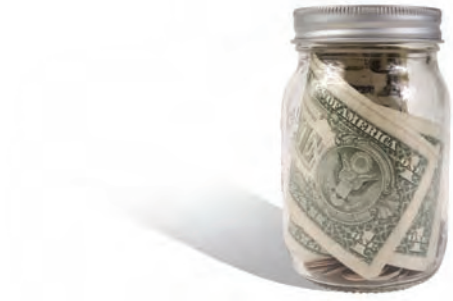
- By personal contacts between Research Promotion committee volunteers and potential contributors:
  - · Industrial corporations
  - · Contractors
  - · Consulting engineers
  - · Individuals
- By special contracts with major contributors ($1,000 minimum)
- By direct solicitation of ASHRAE members at the time of dues billing
- By self-generated contributions by corporations and individuals who recognize the value of ASHRAE research.
- Income from the ASHRAE cosponsored International Air-Conditioning, Heating, Refrigerating Exposition held in conjunction with each ASHRAE Winter Meeting

Are contributions tax deductible?

Yes! ASHRAE is qualified as a 501(c)(3) organization under the U.S. tax code, and investments in ASHRAE research are exempt from U.S. taxes. Similarly, Canadian investments are kept and spent in Canada on ASHRAE research projects. This permits Canadians carrying on business in Canada to claim their investments under section 37(1) on their Federal tax returns.

Does ASHRAE use research investments (contributions) to pay salaries, overhead, or committee expenses?

No! All funds raised through the research promotion effort go directly to research projects. Funds raised from other sources pay for administrative and committee expenses, support material, and grants-in-aid projects.



Does ASHRAE acknowledge the receipt of contributions?

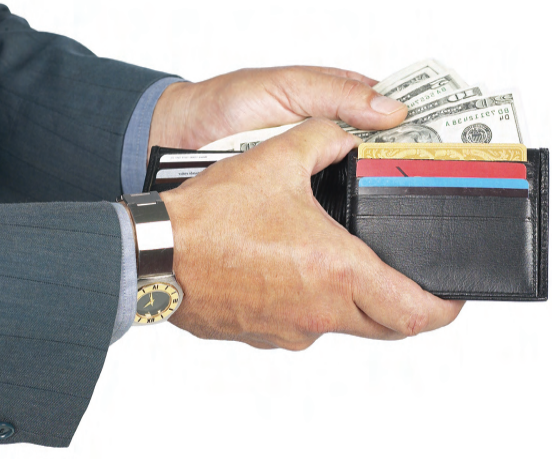
Absolutely! We are very thankful for the support of all of our donors and personalized letters are sent for every contribution, regardless of amount. Year-End tax letters with combined giving history are also available upon request.

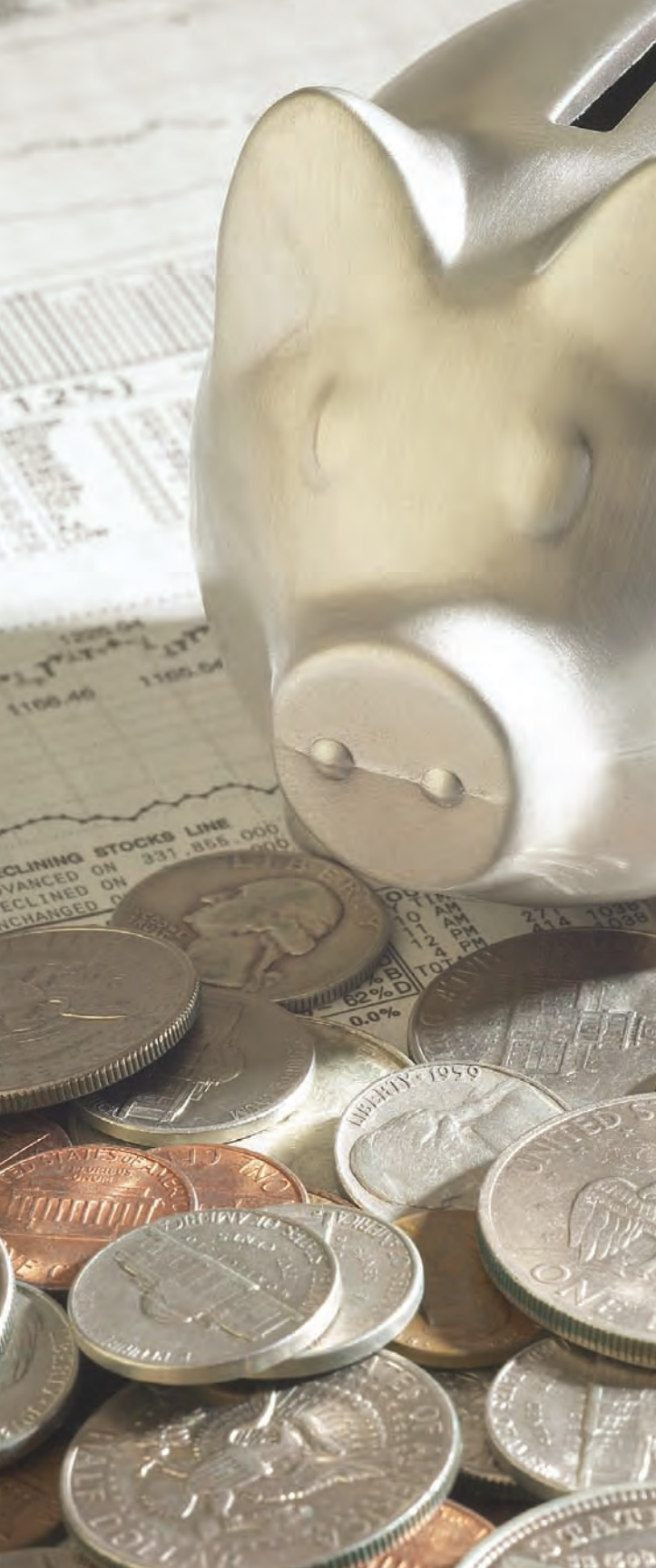
What is the range of contributions?

- Contributions range from a few dollars to more than $25,000
- 3% of investors contributed over $1,000 each
- 3% of investors contributed $500–$999 each
- 8% of investors contributed $250–$499 each
- 42% of investors contributed over $100 each
- 44% of investors contributed less than $100 each

Can contributions be endowed?

Yes, the ASHRAE Foundation accepts endowed contributions earmarked to support ASHRAE Research. Distributions are guaranteed into perpetuity at a set rate. Contact ASHRAE's Foundation manager (foundation@ashrae.org) to discuss the specifics for creating a personal research endowment fund.

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ASHRAE Research Development Process

An overview of the ASHRAE research development process

Each technical committee selects projects which it determines are most important in its area of interest and submits titles and brief abstracts of the projects. Society chapters, officers and members may also suggest research. The Research Administration Committee (RAC) then prioritizes suggested projects on a Society-wide basis. These projects comprise the ASHRAE Research Plan. Technical committees are then encouraged to prepare and submit work statements on the subjects of highest priority on the Research Plan.

For more specific information, please visit www.ashrae.org/research

A more detailed look at the ASHRAE research development process

Technical committees identify an area in which research is needed and documents the title, justification, and objective of their proposed research in a document known as a research topic acceptance request (RTAR) form. A limited literature search and an evaluation are also conducted to avoid duplication of previous work with key references documented on the RTAR.

The Research Administration Committee reviews the RTAR and determines if the proposed research topic is within the scope of the ASHRAE research program, is doable, and is important to ASHRAE, the industry and the public. The main guiding document for the ASHRAE research program is the ASHRAE Research Strategic Plan, which provides outcome-based goals so that projects solicited from technical committees meet broad performance goals.

The Society's Research Strategic Plan was developed collaboratively over a three-year period by ASHRAE's Research Advisory Panel, which reports to the Research Administration Committee. Input was provided by ASHRAE chapter members, technical committee members, research fund contributors and representatives from HVAC&R-related organizations via workshops, forums, e-mails and letters. The plan will be updated every five years following the same broad input collection process so that it remains pertinent in a rapidly changing HVAC&R research environment.

Where is ASHRAE Research conducted?

There are active research projects being conducted at various universities and private organizations around the world. All projects have an open bid process that any university or organization, regardless of location, can apply for.

Who supervises ASHRAE research?

The manager of research and technical services ensures that research progresses on schedule through communication with researchers and the cognizant technical committees. Technical committees periodically review the research projects for which they are responsible. The Board of Directors and Technology Council also advise and give direction to technical committees when appropriate.

What unique features do ASHRAE Research contracts have?

- ASHRAE issues only fixed-price contracts for research.
- The researcher is required to furnish quarterly progress reports and to report in person at least annually to the sponsoring technical committee on the status of the project.
- To encourage the completion of research projects on schedule, ASHRAE withholds 25% of the total cost of the project until the final report has been submitted. At that time 15% of the total is paid; the remaining 10% is paid upon receipt and acceptance of all deliverables. The initial 75% of the total is paid quarterly over the life of the contract.
- In return for its financial support, ASHRAE requires that the sponsored research be reported first at an ASHRAE meeting and published first in an ASHRAE publication.

More Information about ASHRAE Research

Does ASHRAE support researchers just getting started in their professional careers?

The ASHRAE New Investigator Award enhances the academic careers of recent Ph.D. recipients by providing support for research activities and promoting research and educational efforts related to the goals of ASHRAE in universities and colleges. The single annual award carries a potential total grant value of $45,000 spread over two years. For additional information, please visit www.ashrae.org/research

Does ASHRAE support student research?

Yes, through grants-in-aid to graduate students conducting research in subjects related to the HVAC&R industry. This is in an effort to stimulate interest in research and encourage students to prepare for service in the HVAC&R industry. Information on the grant-in-aid program is annually sent to universities with engineering programs. Applications are evaluated and competitively ranked by a committee of ASHRAE members. Approximately 25 grants of up to $7,500 each are awarded each year to graduate students.

Additional information is available at:www.ashrae.org/research.