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Whole Building Air Leakage Testing and Building Performance Impacts

STP 1615

Editors:
Theresa Weston
Katherine Wissink
Keith Nelson



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Whole Building Air Leakage: Testing and Building Performance Impacts

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Memorial



This book of selected technical papers is dedicated to the memory of our great friend, colleague, leader, and mentor, Wagdy Anis. His leadership and support of building enclosure design and commissioning will long be remembered.

Foreword

THIS COMPILATION OF Selected Technical Papers, STP1615, *Whole Building Air Leakage: Testing and Building Performance Impacts*, contains peer-reviewed papers that were presented at a symposium held April 8–9, 2018, in San Diego, California, USA. The symposium was sponsored by ASTM International Committee E06 on Performance of Buildings and Subcommittee E06.41 on Air Leakage and Ventilation Performance.

Symposium Chairs and STP Editors:

Theresa Weston, PhD
DuPont Performance Building Solutions
Richmond, VA, USA

Katherine S. Wissink, P.E. (MA, CO, CT), LEED AP BD+C
Simpson Gumpertz & Heger
Waltham, MA, USA

Keith Nelson, NCARB, AIA, CDT, BCXP
ECS Mid-Atlantic, LLC
Richmond, VA, USA

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Overview

With the increased interest in constructing new, comfortable, energy efficient, and durable buildings and retrofitting existing buildings with similar goals, limiting air leakage through the building envelope is essential. Most building codes and a growing number of owners now require the inclusion of an air barrier in the exterior envelope and, in addition, a few require performance verification testing. While consultants and testing agencies have been performing whole building air leakage testing for decades, technical papers focused on the testing and building performance impacts of air leakage have not been compiled and as a publication of Selected Technical Papers (STPs) by ASTM Subcommittee E06.41 for over 20 years. As air leakage testing requirements continue to be adopted into the building codes and otherwise applied to buildings, this STP will provide an important reference for design and construction professionals to increase understanding of the benefits of increased air tightness in buildings and improved processes for measuring whole building air leakage. This STP provides a collection of sixteen technical papers written by architects, engineers, testing agencies, and contractors from around the world, as well as a code official from Seattle, WA, and a building owner from Manitoba, Canada. A symposium was held in San Diego, CA, in April 2018, and it included presentations of all the papers included in this STP.

Topics addressed within this STP range from benefits to building air tight buildings, to methods and techniques for testing whole building air leakage, to how the results are used in energy modeling. Many papers present case studies of testing a range of buildings: low-rise, high-rise, multizone, single-zone, educational, residential, commercial, specialty use buildings, new construction, and existing buildings. These papers illustrate the unique challenges presented applying test methods to different building types as well as techniques used to overcome the challenges.

As shown in the papers included in this STP, testing buildings for air leakage results in better detailing of the air barrier by the designer, better installation of the air barrier by the contractor, and better performance of the building for the owner. Furthermore, the case studies show that the air leakage requirements included in codes, references, and standards are more easily achievable than one may think with proper design and installation of the air barrier system.

The papers contained in this STP are a collaboration of individuals in the design, testing, and construction industries from around the world and represent an important step in increasing awareness of the importance of increased air

tightness in buildings to the industry and improving design and construction of building envelopes as they relate to air leakage. While this STP and symposium may be the first on whole building air leakage from this subcommittee, it will certainly not be the last as this group strives to support the goal of designing and constructing better performing building envelopes.

The editors would like to recognize the extraordinary help from others that made this publication possible including the unnamed blind peer-reviewers of each paper and efforts from ASTM International, particularly Kelly Dennison and Tessa Sulkes for their help organizing the symposium, and Alyssa Conaway and Sara Welliver for their persistence and countless emails that made this STP possible.

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