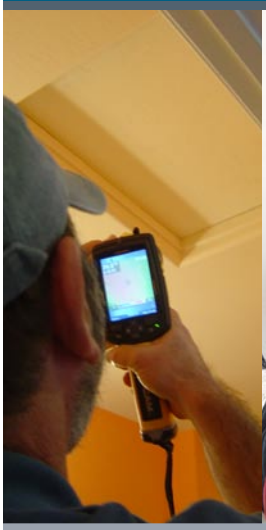
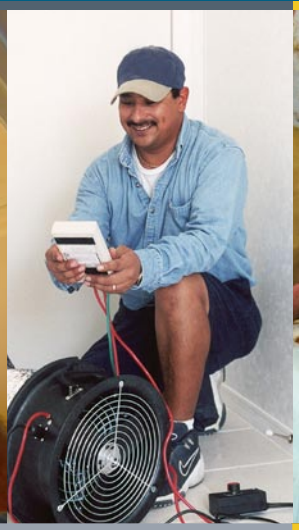
U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

BUILDING TECHNOLOGIES PROGRAM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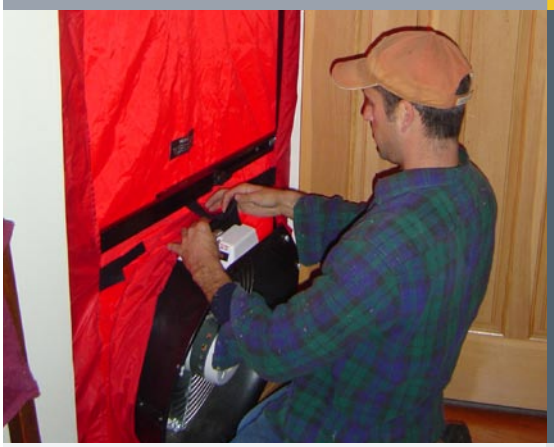
BUILDING AMERICA BEST PRACTICES SERIES



Retrofit Techniques & Technologies:

Air Sealing

A Guide for Contractors to Share with Homeowners

PREPARED BY

Pacific Northwest National Laboratory
& Oak Ridge National Laboratory

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Building AMERICA
U.S. Department of Energy
Research Toward Zero Energy Homes

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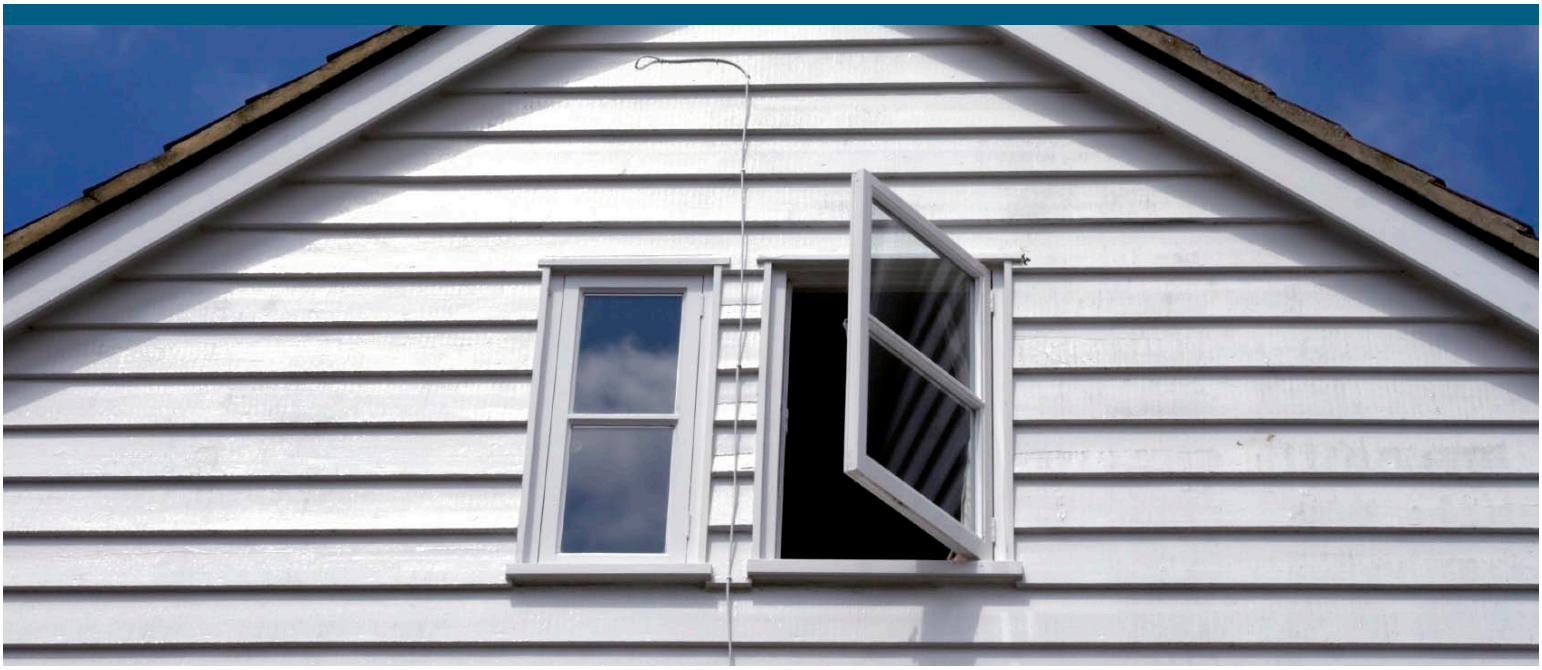
Preface

The U.S. Department of Energy recognizes the enormous potential that exists for improving the energy efficiency, safety, and comfort of existing American homes. This series of Retrofit Techniques and Technologies describes approaches for homeowners and builders working on existing homes. This guide will help homeowners identify ways to make their homes more comfortable, more energy efficient, and healthier to live in. It also identifies the steps to take, with the help of a qualified home performance contractor, to seal unwanted air leaks while ensuring healthy levels of ventilation and avoiding sources of indoor air pollution. Contractors can use this document to explain the value of these air sealing measures to their customers. The references in this document provide further explanation of air sealing techniques and technologies.

Studies show that the measures described in this guide can typically achieve whole-house energy savings of 10% to 20% over pre-retrofit energy usage. In older homes or homes with greater levels of air leaks, savings may be much higher.

These practices are based on the results of research and demonstration projects conducted by the U.S. Department of Energy's Building America and Home Performance with ENERGY STAR sponsored by the U.S. Environmental Protection Agency and DOE. Home Performance with ENERGY STAR offers a comprehensive, whole-house approach to improving the energy efficiency and comfort of existing homes and requires a test-in/test-out to test combustion products (www.energystar.gov/homeperformance).

DOE's Building America has worked with some of the nation's leading building scientists and more than 300 production builders on over 41,000 new homes. Building America's research applies building science to the goal of achieving efficient, comfortable, healthy, and durable homes.



Introduction

Imagine opening a window in your house and leaving it that way 24 hours a day, all year long. On balmy spring days, the breeze wouldn't be so bad. But, in the freezing cold of winter and the sticky heat of summer, with the furnace or air conditioner on, smart homeowners would recognize they might as well be throwing buckets of quarters out the window to pay for the escaping heated or cooled air.

Air leaks in most existing homes add up to an open window in your home. Air sealing is one of the least expensive and most cost-effective measures you can take to improve your home's comfort and energy efficiency. By sealing uncontrolled air leaks, you can expect to see savings of 10% to 20% on your heating and cooling bills, and even more if you have an older or especially leaky house. But, before you grab your caulk gun, there are some things you should consider.

Air Sealing vs Insulation

Why do I need to air seal? I thought all I needed to do was add more insulation.

Insulation is like a fuzzy wool sweater on a winter day. It will certainly keep you warm if the air is calm. But, if the wind picks up, you are going to need a windbreaker to keep the breeze from carrying away the heat. Air sealing is like adding the windbreaker. It keeps the conditioned air where it belongs.

Certified contractors are trained in building science principles to know the safest and most effective ways to improve your home's energy efficiency.

Finding a Contractor

There are two nationally recognized energy certifications for home energy auditors and contractors: the Building Performance Institute (BPI) Building Analyst certification and the Residential Energy Services Network (RESNET) HERS Rater certification. Historically, BPI certification has focused on understanding the building science of retrofitting *existing* homes and RESNET has focused on building science in *new* home construction.

BPI is a nonprofit organization that accredits auditors, contractors, and other building professionals. Auditors or building analysts specialize in evaluating building systems and potential energy savings in homes. The certified BPI Building Analyst energy auditor has passed both written and field exams, and must recertify every three years. Contractors learn about building systems and are trained to install energy-efficiency measures. For more information see www.BPI.org

Many local, state, and federal entities offer grants and tax credits for energy-efficient home improvements. Check with your local utility or city, or check the DOE-sponsored Database of State Incentives for Renewables and Efficiency (DSIRE) at www.dsireusa.org. This site is frequently updated and is a wealth of information, organized by state, on state, local, utility, and federal incentives, tax credits, and policies that promote renewable energy and energy efficiency.

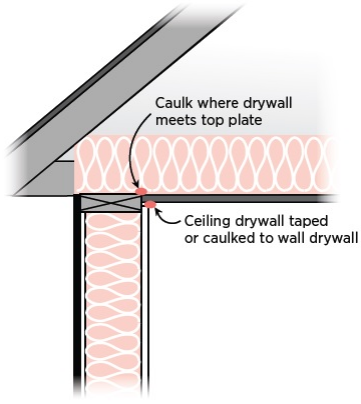
BUILDING PERFORMANCE INSTITUTE, INC. BPI ™ CERTIFIED PROFESSIONAL

HOME PERFORMANCE WITH ENERGY STAR

Attic Air Sealing

Top plates and wall-to-ceiling connections are sealed

Good air-sealing and a continuous air barrier between the attic and the home's conditioned (living) space are important not only to save energy and reduce fuel bills, but also to prevent moisture problems in the attic.



Seal the wall drywall to the top plate and ceiling drywall.