Buried Ducts: The newest way to uncover savings.

Cost Effectiveness • Energy Efficiency • Structural Longevity

See why a vented attic with buried ducts is a better solution for you and your customers.

For builders, there's a new opportunity sitting right below the roof. New provisions in the 2018 International Energy Conservation Code (IECC) make vented attics with buried ducts a viable alternative to unvented attics insulated with spray foam insulation(SPF). The new provisions give builders the technical details needed to create effective and energy-efficient buried duct systems in vented attics -- and to sell homebuyers a safe, efficient and cost-effective option. Even if your area is not yet on the 2018 IECC, you can still employ this practice (check out our blog to learn how).

Cost savings. For you, and your customer.

Vented attics with buried ducts are:

1. Less expensive for homebuyers

The upfront cost of buried ducts in vented attics is thousands of dollars less than unvented attic systems using ccSPF[1].

2. Energy efficient

Can exceed that of SPF unvented attics. Buried ducts perform well in multiple climates.

3. Safe, easy and less costly for you to install fiberglass or mineral wool insulation

You don't have to evacuate other trades during installation, like you do with SPF, avoiding wasted time and wasted money and reducing jobsite health concerns.

Estimated Energy and Cost summary AHU indicates air handling unit ICS indicates inside conditioned space	Annual heat/cool site energy (KWhr)	Heat/cool site energy savings wrt baseline (4)	Annual heat/cool operating cost ($)	Incremental installed cost wrt baseline ($)	Annual heat/cool site energy (KWhr)	Heat/cool site energy savings wrt baseline (4)	Annual heat/cool operating cost ($)	Incremental installed cost wrt baseline ($)
Duct Design	**Jacksonville, FL (CZ-2A)**				**Baltimore, MD (CZ-4A)**			
Standard: attic ducts installed above ceiling, AHU attic (baseline)	9,229		$1,292		9,950		$1,393	
Deeply Buried Ducts, AHU attic	8,471	8.2	$1,186	$2,230	9,014	9.4	$1,262	$394
Deeply Buried, AHU ICS -OR- Deeply Buried, better sealed, AHU attic	8,021	13.1	$1,123	$2,731	8,579	13.8	$1,201	$895
Unvented (attic encapsulated w/ccSPF)	7,786	15.6	$1,090	$9,124	8,571	13.9	$1,200	$12,917
Deeply Buried ducts, AHU & return ICS	7,814	15.3	$1,094	$2,625	8,479	14.8	$1,187	$789
Compact Buried Ducts, AHU attic	7,729	16.3	$1,082	$1,472	8,264	16.9	$1,157	$725
Compact Buried Ducts, AHU & return ICS	7,629	17.3	$1,068	$1,945	8,186	17.7	$1,146	$697
Ducts ICS	6,757	26.8	$946	$3,511	7,186	27.8	$1,006	$3,511
Buried Ducts ICS				$2,791				$1,107
Compact buried ducts ICS, AHU ICS				$2,058				$913

Home Innovations Research Lab Tech Specs "HVAC Ducts Buried within Ceiling Insulation in a Vented Attic" January 6, 2017.
Cost data from the HIRL TechSpec, derived from residential cost data provided by RS Means, 2017.

Insulation Institute™
KNOWLEDGE. LEADERSHIP. CONFIDENCE.

1. Thousands of dollars refers to the incremental cost increase associated with an unvented attic encapsulated with ccSPF compared to the various buried duct options listed in the table.

A How-to on High Performance.

As with most building practices, success requires designing and installing it right to get the results you're after. To help sort through how to implement the new code language, Home Innovation Research Labs created a TechSpec, showing how to comply with the code. Details like the exact insulation levels needed by climate zone (shown to the right) are the kinds of details builders need. This TechSpec has you covered.

Duct	Duct location[1]	CZ 1: R30 ceiling insulation			CZ 2-3: R38 ceiling insulation			CZ 4-8: R49 ceiling insulation		
		Buried[2]	Deeply Buried[3]	ICS[4]	Buried[2]	Deeply Buried[3]	ICS[4]	Buried[2]	Deeply Buried[3]	ICS[4]
R8 duct	Ceiling	R19	R19	R22	R19	R19	R30	R19	R19	R41
	Truss, R11	R8	R11	R22	R8	R11	R30	R8	R11	R41
	Truss, R13	R6	R11	R22	R6	R11	R30	R6	R11	R41
R13 duct	Ceiling	R19	R19	R19	R19	R19	R25	n/a	n/a	n/a
	Truss, R11	R8	R11	R17	R8	R11	R25	n/a	n/a	n/a
	Truss, R13	R6	R11	R17	R6	R11	R25	n/a	n/a	n/a

1. Duct location: on ceiling or on 3.5" truss bottom chord with R11 loose insulation (at R-3.2/inch) or R13 batt insulation below the duct.
2. Buried ducts: minimum R-19 total ceiling insulation above/below the duct.
3. Deeply buried to comply with R-25 provision: minimum 3.5" ceiling insulation above duct, equivalent to R11 at R-3.2/in; must meet R-19 above/below.
4. In conditioned space (ICS): ceiling insulation value less duct insulation value; must still meet R-19 total above/below.

Keeps that roof over their head for a long, long time.

Not only do buried ducts in vented attics cost less and perform well, they also help maintain the integrity of the roof structure. By circulating air in and out of the space, vented attics are less prone to:

1. **Condensation**
   - A vented attic allows moisture to escape the attic, helping prevent condensation[1].
2. **Roof rot**
   - A vented attic can keep the roof from rotting during the winter when the source for attic moisture is the house itself[2].
3. **Ice-damming**
   - By allowing the roof to remain cold in the winter, vented attics help prevent the build up of ice dams[3].
4. **Reduced shingle life**
   - Shingles on unvented attic assemblies operate at slightly higher temperatures, which can reduce the service life of roof assemblies as much as 10%[4].

1. http://www.energyvanguard.com/blog/75042/Will-Open-Cell-Spray-Foam-Insulation-Really-Rot-Your-Roof
2. according to Joe Lstiburek, principal of Building Science Corporation
3. http://homeenergysaver.ning.com/group/attics-basements-garages/forum/topics/vented-vs-unvented-attics
4. https://buildingscience.com/documents/digests/bsd-102-understanding-attic-ventilation

"A buried duct system can provide an energy-efficient and durable air distribution system for all climate zones if constructed in accordance with the recently-approved provisions of the 2018 IECC. At our test houses, no condensation was measured or observed at buried ducts."
Dave Mallay,
Principal Researcher,
Home Innovation Research Labs

Uncover the benefits of buried ducts.

For more information on the benefits of buried ducts, the new IECC provisions and how to install buried ducts in a vented attic, consult our TechSpec or contact us at info@insulationinstitute.org.

NAIMA
11 CANAL CENTER PLAZA, SUITE 103 | ALEXANDRIA, VA 22314 | P: 703-684-0084 | F: 703-684-0427
PUB. NO. N087 7/17