Mass Save®
Home Energy Services Program

INSULATION & AIR SEALING REFERENCE MANUAL

FIELD MANUAL

2022

CLEAResult®

mass save®
PARTNER

Sept 2016

This manual is intended as a guide to familiarize Independent Installation Contractors with the processes and requirements of CLEAResult's Residential Conservation Division. The information contained is only applicable to the Mass Save® Home Energy Services Program where CLEAResult serves as the Lead Vendor. Content is subject to change at any time.

Sept 2016

CLEAResult Contact List

Contractor Hotline: **855-821-2205**
Call the Hotline whenever you are onsite performing work, and you have a question about the work scope, changing the work order, program rules or combustion safety/roadblock issues.

Mass Save Home Energy Assessments: **866-527-7283**
Your customers should call this number to request a home energy assessment when you are submitting a PCR form. **Note:** Your customer should name you as their preferred contractor.

Mass Save Home Energy Inspection: 1-800-234-1307
Your customers should call this number to request an inspection from Mass Save

ContractorInbox@clearesult.com
Use this email address for all communications regarding work assignment, work scheduling, any questions you have about a work scope before you arrive to do the work, and questions about job scores and contractor rankings.

Contractorhotline@clearesult.com
Use this email address to supplement hotline calls when supporting pictures are needed.

InvoicesCOC@clearesult.com
Use this email address to send in your completion paperwork and invoices for non emPartner jobs.

Recommendations@clearesult.com
Use this email address to send in Participating Contractor Referrals.

Joe Lessard- Field Manager, Account Management: Joseph.Lessard@clearesult.com
Contact for questions relating to program guidelines, Contractor participation, work allocation and Contractor ranking.

Gerry Quigley- IIC Senior Account Manager: Gerald.Quigley@clearesult.com
Use as your first contact for questions relating to program guidelines, Contractor participation, work allocation and Contractor ranking.

Ron Litwin- IIC Account Manager: Ronald.Litwin@clearesult.com
Use as your first contact for questions relating to program guidelines, Contractor participation, work allocation and Contractor ranking.

Rick Giles – QA/QC Senior Manager: Rick.Giles@clearesult.com
Contact for questions relating to technical guidelines, installations, and quality control inspections.

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CONTRACT FOR PRODUCTS I SERVICE WORK

This service is brought to you through support from your local utility

This Agreement is made by and among _

and
CLEAResult
Attn: HES
50 Washington Street, Suite 3000
Westborough, MA 01581
Federal ID No. 222457170
(Mail completed contract to address above)

I. DESCRIPTION OF WORK TO BE PERFORMED

Contractor will perform or cause to be performed the following work on these "Premises" in a professional manner and in accordance withtile terms of this Contract, including tile attached recommendations/workorder describing the work in detail (the "Work") whichare incoll)orated herein by reference:

Description	Quantity	Location	
Pro2_avent 2' or 4'	102	Attic	$390.66
Vent bath fan to roof fla.e.e.er	2	Attic	$258.42
Dammin,	76	NIA	$166.44
Attic Floor 02_en Blow Cellulose 6"	1 048	Livi Space	$1540.56
		Sub Total:	$2,356.08
		Utility Incentive Share	$1,767.06
		Customer Contribution	$589.02

[!] J.

For office use only

Printed: 2/2/2016

II. PAYMENT

Customer agrees to pay Contractor for the Work, the Customer Share of the Contract Price as follows: Payment #1: $,_____ asaDeposit payable to CLEAResnlt upon signing the Contract (not to exceed 1/3 of the total retail costs). Mail check & contract to CLEAResult, Attn: HES, 50 Washington St., **Ste. 3000, Westborough, MA 01581.** Final Payment:$._____ **asth**f**ena**l payment fol" the Work shall be **payable to the Independent Installation Contractor ("IIC") upon satisfactory completion of the Work.** Customer understands that he/she will not be required to pay the Utility Incentive Share of the Contract price in the amount of$._____ .Changes to individual lineitems and/or previous incentives may increase or decrease the size of the Utility Incentive Share.

III. DISPUTE RESOLUTION

The TIC and Customer hel"eby mutually agree in advance thatin the eventthat theITChas a dispute conc-eming thisContract, the TIC may submit such dispute to a private arbitration se.rvicewhichhas been approved by theOffice of Consumer Affairn and Business Regulation and Customer shall be requiredto subrnit to sucharbitration as providedinM G.Lc 142A.

You may cancel this agreement if it has been signed by a party at a place other than an address of the seller, provided you notify the seller in writing by ordinary mail posted, by telegram sent or by delivery, not later than midnight of the third -b,usiness day following the signing of this agreement. DO NOT SIGN THIS CONTRACT IF THERE ARE ANY BLANK SPACES.

_____ _____ _____ _____
Customer Signature | Date | Indicate your selected IIC here, if applicable (OR) | Initial here if you want the Program to assign a Participating Contractor

_____ _____ _____
CLEAResult Signature | bate | Name of CLEAResult Representative (Printed)

TERMS AND CONDITIONS API"EAR ON THE REVERSE,

IV. ASSIGNMENT OF CONTRACT BY CLEAResult

Customer acknowledges that CLEAResult will, and Customer hereby requests CLEAResult to, assign this Contract to the !!Cto undertake the Work on the terms set forth in the Contract. After such assignment: (a) CLEAResult shall no longer be a party to this Contract; and (b) Customer shall have no recourse against CLEAResult for any of the performance, non-performance or deficient performance of the Work or any obligations under this Contract performed by, or on behalf of, the IIC. Notwithstanding the foregoing, Customer shall provide CLEAResu!t with (i) such information regarding the IIC's performance as CLEAResult may reasonably request; and (ii) reasonable access to the Premises as CLEAResult may request to permit CLEAResult to inspect IIC's work; and (c) Furthermore, Customer agrees that he/she/they {i) shall notify CLEAResult of any dispute between Customer and the IIC concerning the Contract; {ii) shall provide CLEAResult with such information regarding the dispute as CLEAResult may reasonably request; and (Hi) consent to CLEAResu!t's participation, at its sole election, in any arbitration or other dispute resolution proceeding between Customer and the IIC.

V. LIMITED TIME OFFER

The terms, prices, and any incentive offered in this Contract are valid for only thirty {30) days from the date of CLEAResult's presentation of this Contract to the Customer. In the event that Customer does not execute this Contract and return it to CLEAResult within such thirty {30) day period, the terms, prices and any incentive offered by CLEAResult is NULL and VOID.

VI. COMMENCEMENT AND COMPLETION

The IIC will not begin the Work or order the materials before the sixth {6th) day after the execution of this Contract by CLEAResult and Customer, whichever signs later (the "Contract Execution Date"). Subject to the availability of subcontractors/materials and to delays attributable to the weather or "acts of God", the !IC shall begin performing the Work as soon as practical after the Contract Execution Date, and the IIC shall substantially complete the Work no later than sixty (60) days after that Contract Execution Date, barring delay caused by circumstances beyond the IIC's control, including but not limited to any delay resulting from Customer's decision to wait for a particular IIC. Each of CLEAResult and the IIC reserve the right to advise the Customer of changes in the projected start and completion dates, based upon availability of materials and subcontractors. Upon completion of the Work, the IIC will leave the Premises in a neat and orderly condition but shall not be responsible t correct conditions outside the scope of its Work.

VII. MODIFICATION

Prior to CLEAResult's assignment of this Contract to the !IC set forth in Section IV (above), this Contract cannot be changed except by a writing signed by CLEAResult and the Customer. After CLEAResult's assignment of this Contract to the IIC set forth in Section IV (above), this Contract cannot be changed except by a writing signed by the !IC and the Customer that has been approved in writing by CLEAResult.

VIII. PERMITS

In connection with the Work to be performed at the Premises by the IIC Under Contract, the following permits may be required for this project depending upon the judgment of local inspectors: Electrical, Plumbing/Gas, Mechanical, Building. The IIC shall be responsible to, and shall, obtain any and all permits required for performance of the Work. The IIC shall inform the Customer of the permits required and any Customer co-pay or cost of the required permit acquisitions. If Customer chooses to secure her/his own work-related permits, and/or deal with an unregistered contractor, Customer wi!I be excluded from the Guaranty Fund provisions of M.G.L. c. 142A.

IX. CUSTOMER'S DUTY

Customer must prepare the Premises for the Work. Objects which obstruct areas of Work must be moved before the Work is to commence. Customer affirms that they have received no incentives (from the above-named Utility) during the last calendar year.

X. DISCLAIMER OF LIABILITY OF CLEAResult AND UTILITY

Customer understands and acknowledges that the !IC is not an agent, vendor or sub-vendor of the Utility or CLEAResult with respect to the installation of any energy efficiency measures. In the event of the failure of any energy conservation device to perform as expected, Customer agrees that Customer's sole recourse is to the llC and not to CLEAResult or the Utility. The Utility and its operating companies shall not maintain, remove or perform any work whatsoever on the energy conservation measures installed. Customer understands and acknowledges that its participation in the Mass Save Home Energy Services Program is voluntary and that it has consented for the IIC to install the proposed energy conservation measures. Customer agrees that it shall not hold CLEAResult, the Utility, their affiliates or operating companies liable for the IIC's failure to perform its obligations under this Contract, for failure of the energy conservation measures to function, for any damage to Customer's Premises caused by the IIC or for any and all damages to property or injury to persons caused by the energy conservation measures.

XI. ENERGY BENEFITS

The local sponsoring Utility is entitled to 100% of the energy benefits associated with all energy conservation measures, excluding the value of energy cost savings by the Customer, but including all rights to all associated ISO-NE Energy, Capacity and Reserves Products (as defined by ISO New England), and the IIC agrees to provide the Utility with such further documentation as the Utility may request to confirm the Utility's ownership of such benefits and Products.

XII. IIC REGISTRATION

The IIC and any subcontractors must be registered by the director and any inquiries about the l!C or any subcontractor relating to a registration should be directed to: Office of Consumer Affairs and Business Regulation, Home Improvement Contractor Registration, 10 Park Plaza, Room 5170, Boston, Massachusetts 02116, 617-973-8700.

XIII. !IC WARRANTIES

The IIC warrants as follows:

A. Materials and workmanship will meet or exceed the specifications in CLEAResult's Materials and Installation Standards.
B. The Work and the materials furnished by the llC will conform to the requirements of this Contract. If there be a defect in workmanship or materials, or any damage caused by its subcontractors or employees is discovered within one year after completion of the Work (including cleanup), the IIC will, at its own expense, at its optidn, remedy, repair, correct, replace, or cause to be remedied, repaired, corrected or replaced such defect or damage.

XIV. CUSTOMER RIGHTS UNDER M.G.L. C 142A

Customer has the following rights under M.G.L. c. 142A:

A. At the time of signing this Contract, the Customer shall be furnished with a copy of it. No Work shall begin prior to the signing of this Contract by the Customer and CLEAResult.
B. Any party may bring an action to enforce any provisions of Mass. G.L. c. 142A or to seek damages or the Customer may request that a dispute be decided under the terms of a private arbitration program approved by the Secretary of the Executive Office of Consumer Affairs and Business Regulations.
C. Customer may have the right to be compensated from the Residential Contractor's Guaranty Fund for actual losses incurred as a result of a registered contractor's or subcontractor's conduct found by a court to be work performed in a poor or unworkmanlike manner or which violates certain laws for the protection of consumers within 6 months after the Customer has obtained a judgment or arbitration award and has exhausted customary reasonable efforts to collect the judgment or award.

CLEAResult®

CONTRACT FOR PRODUCTS / SERVICE WORK

This service is brought to you through support from your local utility

This Agreement is made by and among

and
CLEAResult
Attn: HES
50 Washington Street, Suite 3000
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Federal ID No. 222457170
(Mail completed contract to address above)

I. DESCRIPTION OF WORK TO BE PERFORMED

Contractor will perform or cause to be performed the following work on these "Premises" in a professional manner and in accordance with the terms of this Contract, including the attached recommendations/work order describing the work in detail (the "Work") which are incorporated herein by reference:

II. PAYMENT

Customer agrees to pay Contractor for the Work, the Customer Share of the Contract Price as follows: Payment #1: $_____ as a Deposit **payable to CLEAResult upon signing the Contract** (not to exceed 1/3 of the total retail costs). **Mail check & contract to CLEAResult, Attn: HES, 50 Washington St., Ste. 3000, Westborough, MA 01581.** Final Payment: $_____ as the final payment for the Work shall be **payable to the Independent Installation Contractor ("IIC") upon satisfactory completion of the Work**. Customer understands that he/she will not be required to pay the Utility Incentive Share of the Contract price in the amount of $_____. Changes to individual line items and/or previous incentives may increase or decrease the size of the Utility Incentive Share.

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The IIC and Customer hereby mutually agree in advance that in the event that the IIC has a dispute concerning this Contract, the IIC may submit such dispute to a private arbitration service which has been approved by the Office of Consumer Affairs and Business Regulation and Customer shall be required to submit to such arbitration as provided in M.G.L. c 142A.

You may cancel this agreement if it has been signed by a party at a place other than an address of the seller, provided you notify the seller in writing by ordinary mail posted, by telegram sent or by delivery, not later than midnight of the third business day following the signing of this agreement. DO NOT SIGN THIS CONTRACT IF THERE ARE ANY BLANK SPACES.

Customer Signature	Date	Indicate your selected IIC here, if applicable	(OR)	Initial here if you want the Program to assign a Participating Contractor
CLEAResult Signature	Date	Name of CLEAResult Representative (Printed)		

TERMS AND CONDITIONS APPEAR ON THE REVERSE.

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The IIC warrants as follows:

A. Materials and workmanship will meet or exceed the specifications in CLEAResult's Materials and Installation Standards.
B. The Work and the materials furnished by the IIC will conform to the requirements of this Contract. If there be a defect in workmanship or materials, or any damage caused by its subcontractors or employees is discovered within one year after completion of the Work (including cleanup), the IIC will, at its own expense, at its option, remedy, repair, correct, replace, or cause to be remedied, repaired, corrected or replaced such defect or damage.

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A. At the time of signing this Contract, the Customer shall be furnished with a copy of it. No Work shall begin prior to the signing of this Contract by the Customer and CLEAResult.
B. Any party may bring an action to enforce any provisions of Mass. G.L. c. 142A or to seek damages or the Customer may request that a dispute be decided under the terms of a private arbitration program approved by the Secretary of the Executive Office of Consumer Affairs and Business Regulations.
C. Customer may have the right to be compensated from the Residential Contractor's Guaranty Fund for actual losses incurred as a result of a registered contractor's or subcontractor's conduct found by a court to be work performed in a poor or unworkmanlike manner or which violates certain laws for the protection of consumers within 6 months after the Customer has obtained a judgment or arbitration award and has exhausted customary reasonable efforts to collect the judgment or award.

CONTRACTOR WORK ORDER

CLEAResult

50 Washington St. Suite 3000
Westborough, MA 01581

Printed: 2/2/2016

Work Order Id:

Contractor Information	Customer/Site Details
	Email: **Phone (Eve):** **Phone (Day):** **Site ID:**

Total Installed Measures

Location	Description	Quantity	Unit $	Total $
	Exterior Door Weather Stripping	3	$27.59	$82.77
	Door Sweep	3	$23.18	$69.54
Living Space	Perform Air Sealing at Estimated 62.5 CFM50	8	$84.32	$674.56
Attic	Propavent 2' or 4'	51	$3.83	$195.33
Living Space	Attic Floor Open Blow Cellulose 5"	830	$1.40	$1,162.00
	Damming	132	$2.19	$289.08
			Installed Measures Total	**$2,473.28**

WorkOrder Notes

Payments

Incentive Payments

Weatherization Incentive	$1,234.81
Air Sealing Incentive	$826.87
Total Incentive Payments	**$2,061.68**

Customer Share

Total Customer Share	$411.60
Less Deposit Of	$411.60
Customer Share Balance (Due Contractor)	**$0.00**

CLEAResult

Residential Air Sealing Work Order

50 Washington St. Suite 3000
Westborough, MA 01581

Customer/Site Details

Phone (eve):
Phone (day):
Site ID:

Home Information

Heating Fuel: Natural Gas **Building Volume:** 33,600 **BAS cfm50:** 2,157
Distribution Type: Boiler - Baseboard

Road Blocks

Type: Asbestos **Status:** UNKNOWN **Notes:** converted steam
Type: Knob & Tube Wiring **Status:** FIXED **Notes:** Live knob and tube. In the process of removing 10/20 Rcvd eval & invoice, all K&T cleared. Lic # confirmed.

Existing Conditions

Existing Insulation: Fiberglass Batts **Depth:** 8.0
Truss Construction: **Can Blower Door Be Completed?** No

Area Notes

Attic

All Accessible Penetrations:	Yes
Therma-Dome:	No
w/carpentry:	No
WHF Box:	No

Additional Areas of Concern...

Basement/Crawlspace

Exterior Penetrations:	Yes
Ceiling Penetrations:	No
Exterior Door Weatherstrip:	No
Vapor Barrier (Sqft):	No

Additional Areas of Concern...

Garage

All Penetrations:	No
Weatherstrip Door to Living Space:	No

Additional Areas of Concern...

Living Space

Plumbing:	No
Weatherstrip Exterior Doors:	Yes

Additional Areas of Concern...

CLEAResult

Residential Air Sealing Work Order

50 Washington St. Suite 3000
Westborough, MA 01581

Customer/Site Details:

Contractor Notes	Job Information
_____	Start time: _____ Stop time: _____
_____	AS Techs: _____ / _____ / _____ / _____
_____	Pre CFM 50: _____ Post CFM 50: _____
_____	CFM 50 Reduction: _____
_____	Combustion Safety Test Completed? Yes No
_____	Pass or Fail?

CLEAResult

CERTIFICATE OF COMPLETION

50 Washington St. Suite 3000
Westborough, MA 01581

Phone (Eve):
Phone (Day):
E-Mail:

SiteID:

Combustion Safety Test Completed Y/N
Pre Blower Door # _____(If applicable)
Post Blower Door # _____(if applicable)

Contract ID: 20151229_ASEAL

Company:

Sub-contractor Work Order #: S32078P50566C105

Location	Description	Quantity	Installed
	Exterior Door Weather Stripping	3	
	Door Sweep	3	
Living Space	Perform Air Sealing at Estimated 62.5 CFM50 Per Hour	8	

Contract ID: 20151229_WORK

Sub-contractor Work Order #: S32078P50566C105

Location	Description	Quantity	Installed
Attic	Propavent 2' or 4'	51	
Living Space	Attic Floor Open Blow Cellulose 5"	830	
	Damming	132	

PLEASE NOTE: The Inspection of the house is for the purpose of finding out whether the Contractor completed the work.

CUSTOMER SHOULD NOT RELY ON THE INSPECTION FOR ASSURANCE THAT THE CONTRACTOR'S WORK NECESSARILY COMPLIES WITH ALL LAWS AND STANDARDS RELATED TO SAFETY.

It was the Contractor's sole responsibilty to assure that the measures were installed properly and safely. In addition, this Post-Installation Inspection does not replace inspections by licensed inspectors where required by state or local law. It is the duty of the Customer to obtain such required inspections.

CUSTOMER AUTHORIZATION OF CERTIFIED WORK

I confirm that the measures listed above have been completed to my satisfaction. I have received a copy of the Certificate of Completion and hereby authorize the release of any final payments to the Contractor. I understand that this Authorization of Completed Work does not in any manner void any warranties provided to me by the Contractor.

Contractor's Signature

Customer's Signature

Date

Date

CONTRACTOR WORK ORDER

CLEAResult

CHANGE ORDER

50 Washington St. Suite 3000
Westborough, MA 01581

Printed: 2/1/2016

Work Order Id:

Contractor Information	Customer/Site Details
	Email: **Phone (Eve):** **Phone (Day):** **Site ID:**

Total Installed Measures

Location	Description	Quantity	Unit $	Total $
Living Space	Perform Air Sealing at Estimated 62.5 CFM50	6	$84.32	$505.92
	Door Sweep	4	$23.18	$92.72
	Exterior Door Weather Stripping	4	$27.59	$110.36
Living Space	Install 6" Fiberglass Batting In Open Kneewall	40	$1.89	$75.60
Living Space	Install 2" Thermal Barrier Polyiso on Open Kne	40	$4.40	$176.00
Living Space	Kneewall Floor Enclosed Cellulose Dense Pac	72	$2.92	$210.24
Living Space	Install 3" Fiberglass Batting In Open Kneewall	140	$1.70	$238.00
Living Space	Install 2" Thermal Barrier Polyiso On Open Gab	16	$4.40	$70.40
Living Space	Install 3" Fiberglass Batts in Open Gable Wall	16	$1.70	$27.20
	Insulation Removal	56	$1.15	$64.40
	Damming	36	$2.19	$78.84
Living Space	Hatch: Thermal Barrier Polyiso 2 inch (Attic)	1	$41.71	$41.71
Living Space	Door: Thermal Barrier Polyiso 2" (Attic)	1	$81.37	$81.37
Living Space	Door: Thermal Barrier Polyiso 2" (Attic)	1	$81.37	$81.37
Living Space	Install 2" Thermal Barrier Polyiso On Kneewall	140	$4.40	$616.00
Living Space	Attic Slope Enclosed Cellulose Dense Pack 6"	84	$2.57	$215.88
Living Space	Kneewall Floor Enclosed Cellulose Dense Pac	16	$2.92	$46.72
Living Space	Attic Floor Open Blow Cellulose 7"	636	$1.53	$973.08
			Installed Measures Total	**$3,705.81**

Payments

Incentive Payments

Weatherization Incentive	$2,000.00
Air Sealing Incentive	$709.00
Total Incentive Payments	**$2,709.00**

Customer Share

Total Customer Share	$996.81
Less Deposit Of	$492.57
Customer Share Balance (Due Contractor)	**$504.24**

Certificate of Insulation and Air Sealing Work

Address of Residence:

(Customer Name

(**Customer Address**

Name and Address of Contractor:

(

(**Company Address**

Areas Insulated

WALLS				ATTIC/FLOOR				CEILING/SLOPES			
LOC	SQ FT	MATERIAL/ Bag Count	Added R-Value	LOC	SQ FT	MATERIAL/ Bag Count	Added R-Value		SQ FT	MATERIAL/ Bag Count	ADDED R-VALUE

Cellulose, loose fill: R-3.7 per inch **Cellulose, Dense Pack:** R-3.2 per inch **Fiber Glass Batt:** R-3.0 p/ inch
Poly-isocyanurate, Rigid Board: R-7.0 per inch

Air Sealing Completed

Attic

Basement

Living Space

☐ None

 # Attic Access Treated

Pull Down Stairs

Hatches

Full Size Doors

Blower Door Results

Pre Test _____

Post Test -

No Blower Door ____

Icertify that the residence identified above was insulated as specified, and theinstallation was conducted in accordance with Mass Save Home Energy Services Program standards and regulations.

, -C.r e w--:L;;;.e a d e r S i2.--n-at u r e

The Certificate must either be posted on or near the electrical service panel or immediately inside of an attic access, secured to a framing member.

Contractor Crew Lead

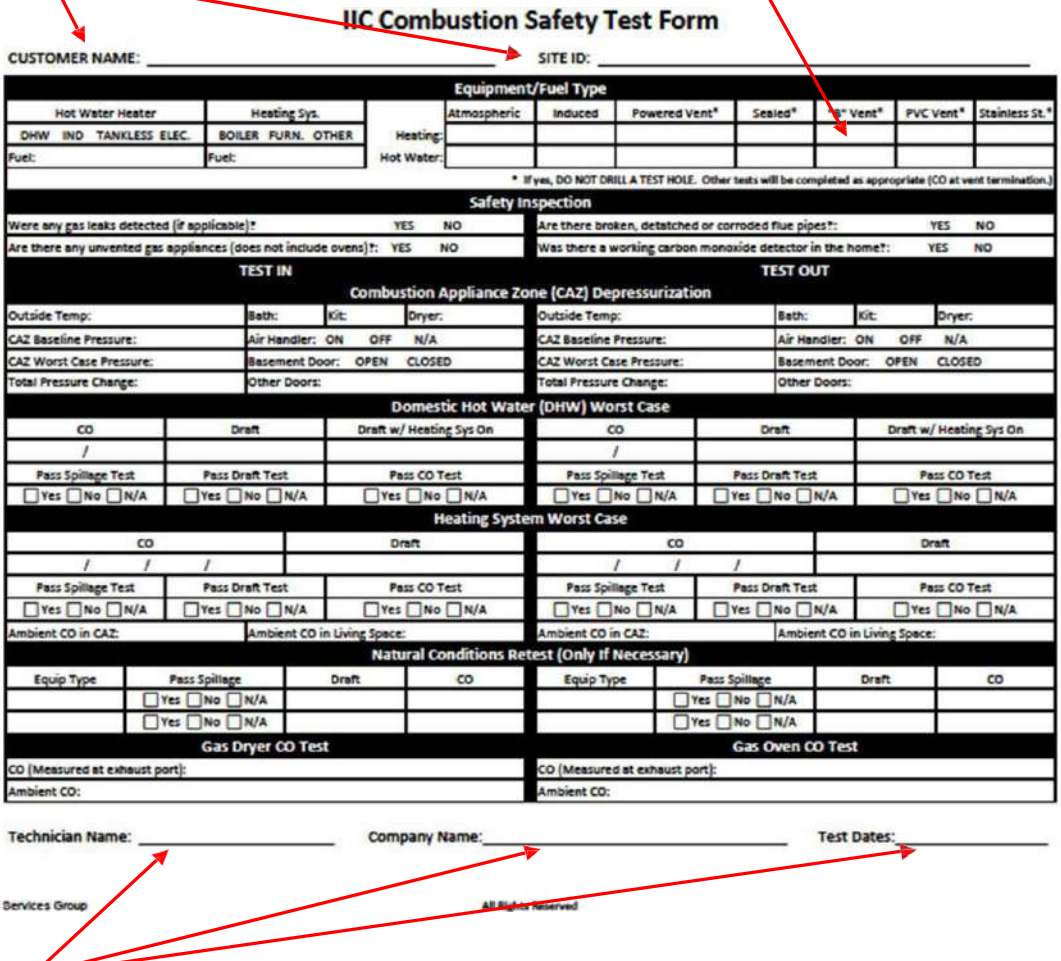
Date

All fields are required on this form (where applicable). But some fields deserve particular attention to make sure that your test is considered “complete.”

Customer Name and Site ID must be filled out in order for the form to be accepted by the Program

Note: Even if a flue pipe cannot be drilled into, CO readings must still be taken if the exhaust port is accessible outside the house.

Note: Each of the safety inspection points is a “Stop Work” if failed.



IIC Combustion Safety Test Form

CUSTOMER NAME: _____ SITE ID: _____

Equipment/Fuel Type

Hot Water Heater	Heating Sys.		Atmospheric	Induced	Powered Vent*	Sealed*	"B" Vent*	PVC Vent*	Stainless St.*
DHW IND TANKLESS ELEC.	BOILER FURN. OTHER	Heating:							
Fuel:	Fuel:	Hot Water:							

* If yes, DO NOT DRILL A TEST HOLE. Other tests will be completed as appropriate (CO at vent termination.)

Safety Inspection

Were any gas leaks detected (if applicable)?	YES NO	Are there broken, detatched or corroded flue pipes?:	YES NO
Are there any unvented gas appliances (does not include ovens)?:	YES NO	Was there a working carbon monoxide detector in the home?:	YES NO

Combustion Appliance Zone (CAZ) Depressurization

TEST IN				TEST OUT			
Outside Temp:	Bath:	Kit:	Dryer:	Outside Temp:	Bath:	Kit:	Dryer:
CAZ Baseline Pressure:	Air Handler: ON OFF N/A			CAZ Baseline Pressure:	Air Handler: ON OFF N/A		
CAZ Worst Case Pressure:	Basement Door: OPEN CLOSED			CAZ Worst Case Pressure:	Basement Door: OPEN CLOSED		
Total Pressure Change:	Other Doors:			Total Pressure Change:	Other Doors:		

Domestic Hot Water (DHW) Worst Case

CO	Draft	Draft w/ Heating Sys On	CO	Draft	Draft w/ Heating Sys On
/			/		
Pass Spillage Test	Pass Draft Test	Pass CO Test	Pass Spillage Test	Pass Draft Test	Pass CO Test
☐Yes ☐No ☐N/A	☐Yes ☐No ☐N/A	☐Yes ☐No ☐N/A	☐Yes ☐No ☐N/A	☐Yes ☐No ☐N/A	☐Yes ☐No ☐N/A

Heating System Worst Case

CO		Draft	CO		Draft
/ /			/ /		
Pass Spillage Test	Pass Draft Test	Pass CO Test	Pass Spillage Test	Pass Draft Test	Pass CO Test
☐Yes ☐No ☐N/A	☐Yes ☐No ☐N/A	☐Yes ☐No ☐N/A	☐Yes ☐No ☐N/A	☐Yes ☐No ☐N/A	☐Yes ☐No ☐N/A
Ambient CO in CAZ:	Ambient CO in Living Space:		Ambient CO in CAZ:	Ambient CO in Living Space:	

Natural Conditions Retest (Only If Necessary)

Equip Type	Pass Spillage	Draft	CO	Equip Type	Pass Spillage	Draft	CO
	☐Yes ☐No ☐N/A				☐Yes ☐No ☐N/A		
	☐Yes ☐No ☐N/A				☐Yes ☐No ☐N/A		

Gas Dryer CO Test	Gas Oven CO Test
CO (Measured at exhaust port):	CO (Measured at exhaust port):
Ambient CO:	Ambient CO:

Technician Name: _____ Company Name: _____ Test Dates: _____

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Technician Name, Company and Test Date must also be included for the form to be accepted.

If any test fails under worst case conditions, the test must be repeated under natural conditions

Combustion Safety Disclosure

In accordance with the protocols of the Building Performance Institute, combustion safety inspections must be conducted by The Contractor both prior to beginning the energy–saving improvements to your home and following completion of the work to identify potential health and safety concerns

The following conditions were noted at the time of the inspection:

The domestic hot water heater operated at insufficient draft under worst case depressurization. With 2 bath fans, one kitchen fan and the dryer running (basement door open), the draft in the flue of the dhw was -1.4 pascals. At 45 degrees the draft must be at least -1.63. No carbon monoxide was detected in the air of the basement or living space. When the kitchen fan was turned off, the draft passed at -2.4 pascals. Work can continue at the house, but we Recommend that the venting system be checked by a qualified Technician.

Contact a qualified service technician to further evaluate the noted concerns and correct the conditions as needed to ensure safe operation.

Building Owner: Mr. Smith Address: 132 Nowhere Street

Phone Number: 555-555-5555 City, St, Zip: Smithville, MA 00000

Signature: *John Smith* Date: 5/22/14

This notice does not constitute an endorsement or warranty regarding the presence or absence of other real or potential health and safety hazards that may exist at this address or on the premises.

Technician: Mr. Jones Date: 5/22/14

White: Customer Copy **Yellow: Contractor Copy** 02/12

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Lead Safe Rules When Insulating

In April of 2010 the EPA drafted new regulations for the safe handling of lead-based paints. In July of 2010, the Massachusetts Division of Occupational Safety took over administration of these rules. Following is a summary of the key provisions:

- Regulations apply to any housing constructed prior to 1978.
- Renovations must be performed by certified firms.
- A certified Lead Safe Renovation supervisor must be onsite at all times while work is being performed.
- Contractors must provide, and document provision of, lead-safety information pamphlet to occupant(s).
- Work area must be posted with warning signs, and the ground protected with impermeable materials that extends a minimum of 6 feet beyond the perimeter of interior surfaces undergoing renovation, and 10 feet beyond the perimeter of exterior surfaces.
- Impermeable ground cover may be reuseable tarps for outdoor work, but must be disposable plastic sheeting for indoor work.
- Windows and doors within the interior work area, and within 20 feet of the exterior work area, must be closed. Doors within the work area must be both closed and sealed.
- Machinery that is used to remove paint must be equipped with HEPA exhaust control.
- Dust and debris that result from renovation must be contained and enclosed in a manner which will prevent release.
- When removed, ground cover must be properly cleaned of all visible debris, or properly disposed of.
- Work area must be thoroughly cleaned using damp clothes, mops and a HEPA vacuum.

Note that these lead-safe practices may NOT be required for minor repair and maintenance work (6 square feet or less of paint disruption per room for interior surfaces; 20 square feet or less for exterior surfaces on the entire building). They are also not required when testing is used to verify that applicable building components are free of paint or other surface coatings that contain lead.

The Division of Occupational Safety maintains a hotline for contractors to get answers to lead regulation questions. The hotline is staffed during regular business hours. 617-969-7177

Lead Safe Rules When Insulating

Set It Up Safely

When you work on a job with lead-based paint, you should separate the work area from the rest of the home. The goal of proper setup of the work area is to keep dust in the work area and non-workers out.

The work area is the area that may become contaminated during the work. The size of the work area may vary depending on the method used to disturb lead-based paint and the amount of dust and debris that is generated as a result. Whenever lead-based paint is disturbed, the work area must be protected by impermeable sheeting applied to the floor, ground or other applicable surfaces to prevent contamination of the home or exterior, from dust generated by the work.

The Massachusetts Lead Safe Renovation and Repair Rule requires that the work area be protected by reuse-able tarps (if outdoors) or plastic sheeting that extends far enough from the location of paint disturbance so that all dust or debris generated by the work remains within the area protected by the sheeting (six feet indoors, 10 feet outdoors). The entire portion of the home or exterior that is protected by sheeting, however large, is the work area.

Unauthorized persons and pets must be prevented from entering the work area. This can be accomplished by posting warning signs and by establishing barriers around the work area such as barrier tape, fencing, plastic barriers in doorways, etc.

Shopping List

Here is a list of supplies and tools you will need to set up the work area safely. These items are available at hardware, paint or garden supply stores.

- Signs
- Barrier tape, rope or fencing
- Traffic cones
- Heavy duty plastic sheeting or reuse-able tarps
- Tape (masking, duct or painter's)
- Stapler
- Utility knife or scissors

Lead Safe Rules When Insulating

What To Do

To keep the dust in and people out of your work area, you will need to take the steps below for inside or outside jobs. Some jobs create more dust than others and, therefore, call for additional precautions.

For Inside Jobs

- Have occupants leave the room where the work will be done and have them stay outside of the work area until after the final cleanup.

- Place signs, barrier tape and/or cones to keep all non-workers, especially children, out of the work area. Keep pets out of the work area for their safety and to prevent them from tracking dust and debris throughout the home. Signs should be in the primary language of the occupants and should say “Do Not Enter – Authorized Personnel Only” and “No Eating, Drinking, or Smoking.”

- Remove furniture and belongings from the work area. These items may include: drapes, curtains, furniture, rugs, etc. If an item is too large to move, cover it with heavy plastic sheeting and tape the sheeting securely in place.

- Use heavy plastic sheeting to cover floors in the work area, to a minimum of 6 feet from the area of paint disturbance. Secure with tape.

- Close all doors in the work area, including closet and cabinet doors, and cover with plastic sheeting. When the work area boundary includes a door used to access the work area, cover the door with two layers of protective sheeting as described here. Cut and secure one layer of sheeting to the perimeter of the doorframe. Do not pull the sheeting taut. Rather, create a few folds to leave slack at the top and bottom of the door before taping or stapling.

- Cut a vertical slit in the middle of the sheeting leaving 6” uncut at the top and bottom. Reinforce with tape.

- Cut and secure a second, overlapping layer of sheeting to the top of the door.

- Close and cover air vents in the work area. This will keep dust from getting into vents and moving through the home. You may need to turn off your HVAC system to prevent damage to the system.

- Put all necessary tools and supplies on the protective sheeting before you begin work to avoid stepping off the protective sheeting before the work is complete.

Lead Safe Rules When Insulating

What To Do

To keep the dust in and people out of your work area, you will need to take the steps below for inside or outside jobs. Some jobs create more dust than others and, therefore, call for additional precautions.

For Outside Jobs

- Keep non-workers away from the work area by marking it off with signs, tape and/or cones.
- Cover the ground and plants with an impermeable barrier to catch debris. The covering should extend at least 10 feet out from the building. Secure the covering to the exterior wall with a wood strip and staples, or tape.
- Close windows and doors within 20 feet of the work area to keep dust and debris from getting into the home.
- Move or cover any play areas that are within 20 feet of the work area.
- When working on the 2nd story or above, extend the sheeting farther out from the base of the home and to each side of the area where paint is being disturbed.
- Vertical shrouding on scaffolding should be used if work is close to a sidewalk, street, or property boundary, or the building is more than three stories high.
- Avoid working in high winds if possible. The Rule does not specifically address wind speed, but when the wind is strong enough to move dust and debris, special precautions need to be taken to keep the work area contained. That may mean creating a wind screen of plastic at the edge of the ground-cover plastic to keep dust and debris from migrating. Ultimately, you are responsible for preventing dust and debris from leaving the work area, so take appropriate precautions when wind is a factor.
- Put all necessary tools and supplies on the protective sheeting before you begin work to avoid stepping off the protective sheeting before the work is complete.

Lead Safe Rules When Insulating

Leave the Work Area Clean

The work area should be left clean at the end of every day and especially at the end of the job. The area should be completely free of dust and debris.

What To Do

On a daily basis, renovators should:

- Pick up as you go. Put trash in heavy-duty plastic bags.
- Vacuum the work area with a HEPA vacuum cleaner frequently during the day and at the end of the day. **(Interior work)**
- Clean tools at the end of the day.
- Wash up each time you take a break and before you go home.
- Dispose of or clean off your personal protective equipment.
- Continue to separate the work area from the rest of the home and remind residents to stay out of the area.

When the job is complete, renovators should:

- Remove plastic sheeting carefully. Mist dust and debris on plastic sheeting with pump sprayer, fold it with the dirty side in, tape it shut, and dispose of it.
- Make sure all trash and debris, including building components, are disposed of properly.
- Vacuum all surfaces, including walls, with a HEPA vacuum cleaner. **(Interior work)**
- Mist and scrub the work area with a general-purpose cleaner on a wet rag or mop, changing the rinse water often until dust and debris are removed. **(Interior work)**
- Vacuum all surfaces again once they are dry. **(Interior work)**
- Visually inspect your work. Look around the home, both inside and out. You should not be able to see any dust, paint chips or debris.
- Re-clean the area thoroughly if you find dust or debris.

Lead Safe Rules When Insulating

Control the Waste

What to Do

Bag or wrap your waste at the work site and in the work area.

- Collect and control all your waste. This includes dust, debris, paint chips, protective sheeting, HEPA filters, dirty water, clothes, mop heads, wipes, protective clothing, respirators, gloves, architectural components and other waste.

- Use heavy plastic sheeting or bags to collect waste. Seal the bag securely with duct tape. Consider double bagging waste to prevent tears. Large components should be wrapped in protective sheeting and sealed with tape.

- Bag and seal all waste before removing it from the work area.

- Store all waste in a secure container or dumpster until disposal.

- Limit on-site storage time.

- Avoid transporting waste in an open truck or personal vehicle.

Dispose of waste water appropriately

- Water used for cleanup should be filtered and dumped in a toilet if local rules allow. If not, collect it in a drum and take it with you. Never dump this water down a sink or tub, down a storm drain, or on the ground. Always dispose of waste water in accordance with federal, state and local regulations.

- EPA's Web site has state information on solid and hazardous waste disposal. See the following link for further information:
  http://www.epa.gov/epawaste/wyl/stateprograms.htm.

Be aware of waste disposal rules.

- Because EPA considers most residential renovation and remodeling as "routine residential maintenance," most waste generated during these activities is classified as solid, non-hazardous waste, and should be taken to a licensed solid waste landfill. This is not the case for work done in commercial, public or other nonresidential child-occupied facilities, where waste may be considered hazardous and require special disposal methods. See the following link for further information:
  www.epa.gov/lead/pubs/fslbp.htm.

- Always check state and local requirements before disposing of waste. Some are more stringent than federal regulations.

Lead Safe Rules When Insulating

Verify Work Completion with the Cleaning Verification Procedure or Clearance

When all the work is complete, and before interior space is reoccupied, you need to determine whether it is a safe environment to live in.

For Regulated Renovators and Maintenance Personnel:
If the work was performed by a contractor or landlord, either cleaning verification or clearance testing is required by the RRP Rule. (If the housing receives federal assistance, clearance testing is required.) If the cleaning verification procedure is chosen, an EPA certified renovator must perform the cleaning verification procedure. If clearance is chosen, a certified lead inspector, certified lead risk assessor, or certified lead sampling technician must conduct clearance testing.

Cleaning Verification Procedure
After completion of cleaning, the cleaning verification procedure is performed by wiping all dust collection surfaces in the work area with a wet, disposable cleaning cloth and comparing that cloth visually to a cleaning verification card. Dust collection surfaces include window sills, countertops and other large horizontal surfaces such as fireplace mantles and built-in shelving, and floors. Cleaning verification cards are available from EPA by calling the **National Lead Information Center at 1-800-424-LEAD (5323).** Cleaning verification may only be performed by an EPA Certified Renovator if renovations covered by the Renovation, Repair and Painting rule were performed.

Note: For exterior work, only a visual inspection for dust, paint chips or debris is required.

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Mass Save Home Energy Services Program/CLEAResult Weatherization Program

Contractor's Responsibility Regarding the Removal and Reinstallation of Asbestos Cement Shingles

Background

The Massachusetts Department of Environmental Protection's (MassDEP) asbestos regulations (310 CMR 7.15) protect public health and environment by establishing safe handling practices for demolition or renovation activities involving asbestos. This document is intended to provide contractors, working under Conservations Services Group's MassSAVE Utility Program's Weatherization Program, guidance regarding MassDEP's asbestos regulations. The guidance applies specifically to removing and replacing intact asbestos cement shingles that are in good condition.

Before Starting Work

Contractors must notify MassDEP on an Asbestos Notification Form ANF-001 prior to commencement of asbestos cement shingle removal.

The Asbestos Notification Form is available on MassDEP's website at: http://www.mass.gov/dep/air/approvals/anf001.pdf. The easiest way to file the form is online via MassDEP's website. For additional information about online filing, go to www.mass.gov/dep/service/compliance/edeponlf.htm. You can visit MassDEP's website or call 617-348-4095 for additional information about online filing. A notification fee is required when filing an ANF-001. **However, owner-occupied residential properties with four or fewer units, cities, towns, counties, districts of the Commonwealth, municipal housing authorities and other state agencies do not have to pay notification fees.**

Handling Practices

If you plan to remove asbestos cement shingles that are in good condition you do not need to construct a sealed work area or use air cleaning provided you otherwise comply with MassDEP's asbestos regulations at 310 CMR 7.15 and you adhere to the following handling practices:

- The asbestos cement shingles should not be broken, sanded, sawed or drilled at any time during removal or subsequent handling.
- The asbestos cement shingles must be carefully lowered to the ground after removal to avoid breaking the shingles [see 310 CMR 7.15(1)(c)2.b.]
- A drop cloth should be used under the work area. Mass DEP recommends that the drop cloth should be a minimum of five feet wide for buildings up to ten feet in height (one story), and that an additional three feet in width be added to the drop cloth for each additional floor above the ten foot level. The drop cloth should be periodically cleaned during the removal of the shingles (i.e. pick up and properly package loose shingles.) to prevent build up of debris and overflow onto the ground.
- All doors and windows on the side of the building where the removal is taking place should be closed and locked.
- The asbestos cement shingles should be wetted just prior to removal to minimize the reseals of asbestos fibers into the air. MassDEP recommends a pup-up type sprayer (garden sprayer) to be used for this purpose. It will deliver a controlled amount of

water to prevent flooding; thereby minimizing slip hazards while working on ladders and drop cloths. A cup (8oz.) of automotive windshield wash, used as a surfactant or wetting agent, should be added to each gallon of water to assist in wetting the asbestos shingles.

- A bucket of warm soapy water should be maintained at the site for decontamination purposes. Workers hands and faces should be rinsed before any coffee or meal break. All tools should be rinsed off at the ends of each workday.

Packaging, Labeling, Disposal

It is understood that the contractor intends to re-apply the same shingle that was initially removed. However, in the event shingles are broken during the removal process and cannot be re-applied, the contractor must properly package, label and dispose of the broken asbestos cement shingle(s).

- The wetted broken shingle(s) must be placed and sealed in leak-tight containers and properly labeled [see 310 CMR 7.15(1)(e)1.a]. MassDEP strongly recommends using cardboard boxes wrapped in two layers of 6-mil poly and sealed with duct tape or fiber drums with locking lids, which ensures that the waste remains confined in a leak-tight state.
- Uncontained asbestos cement shingles should never be bulk loaded into a truck, dumpster or trailer for transport to disposal.
- Each container of asbestos waste must be clearly identified with an asbestos warning label in accordance with 310 CMR 7.15(1)(e)1. The label must state:

CAUTION
Contains asbestos
Avoid Opening or Breaking Container
Breathing Asbestos is Hazardous to your Health

The name of the property owner and address of the site of generation should also be on the label on the exterior of the container.

- Asbestos-containing waste material, including asbestos-cement shingles, are classified as a special waste under the provision of the Massachusetts solid waste regulations 310 CMR 19.061. Therefore, asbestos cement shingles must be disposed of at a landfill that is specifically permitted to accept asbestos waste. The best option is to hire a waste hauler or asbestos abatement contractor to transport the asbestos cement shingles to a disposal facility. Many waste haulers and asbestos contractors are familiar with various disposal facilities and frequently transport waste to out-of-state facilities permitted to accept asbestos waste. The asbestos shingles must be properly packaged and labeled during transport and delivery to the landfill. Asbestos shingles must not be disposed at a transfer station, processing/recycling facility, or municipal waste combustion facility.

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Diagnostic Tests

Pre and post blower door testing is required:

- *Whenever air sealing hours are specified unless prevented by a roadblock.*
- *Whenever your work order includes a separate "Blower Door" line item.*
- *No work can be done unless the test is completed. Incentives cannot be paid if a required blower door is not done.*

Pre and post combustion safety testing must be completed on <u>ALL</u> jobs.

Air Sealing

Air Sealing Work Hours

Work Hours	4	6	8	10	12	14	16	+2
Attic Square Footage	≤ 500	501 to 800	801 to 1,100	1,101 to 1,400	1,401 to 1,700	1,701 to 2,000	2,001 to 2,300	Every 300 Sqft.

If one or more of the following conditions exist, multiply the square footage of the attic by 1.25 and then pick the appropriate number of Work Hours:			
≥ 6" loose insulation	Cross batt insulation	≥ 6" mix of batt and loose insulation	Truss Construction

The following exceptions allow for less than 4 hours of air sealing:	
1-2 hours	For basement rim joist or basement ceiling *only if* rim joist or basement ceiling fiberglass is specified, *and* there is no other air sealing being done in the home.
1-2 hours	For a chimney chase *only if* there is a floored attic being insulated with dense pack cellulose, *and* a sheathing access is specified for access.
1-2 hours	To physically block kneewall transitions *only if* there is no other air sealing being done in the attic *and* the transition is completely exposed and accessible.

Specialty Air Sealing Measures	
Attic Stair Cover Whole House Fan Box Vapor Barrier	These items can be added to an air sealing contract as a sponsored measure whenever air sealing hours are specified in the home.
Door Kits and Sweeps	These items can only be added to an air sealing contract, they cannot be put on a thermal contract.

Attic Air Sealing

Top plates must be sealed on all sides, along their entire length. Be sure to seal where the top plate crosses joists and strapping. Exterior wall plates at soffits and gables should be also sealed if accessible. ***Note the electrical penetration that also needs sealing in the left hand photo.***

The plumbing wall or wet wall leaks large amounts of warm, moist air, and should always be sealed.

All plumbing, stack pipe and electrical penetrations must be sealed.

All masonry chimneys, metal flues, and heat sources must be sealed using fireproof caulking and metal flashing. Combustible materials must maintain proper clearance. This includes kitchen fan ducts. ***Note that the bottom of the joist next to the chimney is sealed with foam at a proper clearance.***

Bath fans, AC boots, and any other mechanical penetrations must also be sealed.

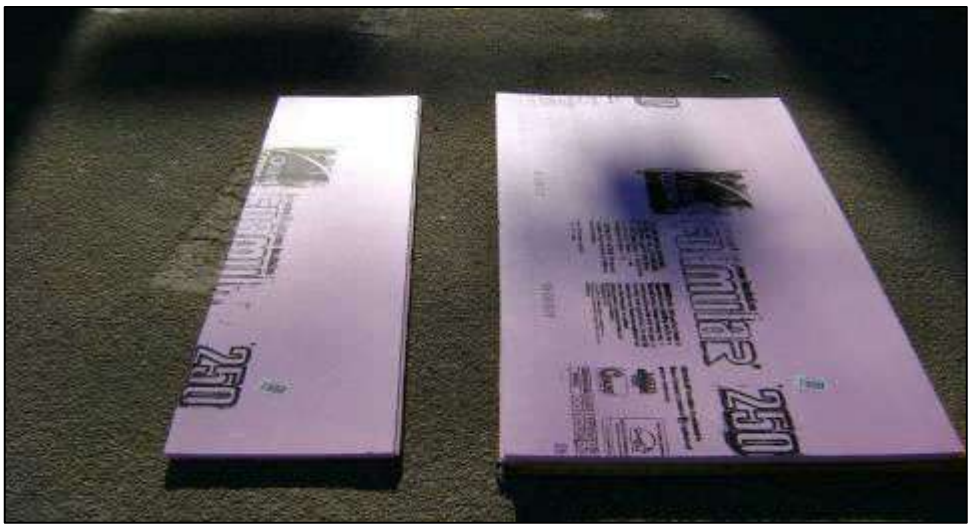
All access door and hatches, including kneewall accesses, must be weather-stripped with q-lon, securely stapled, and backed with a bead of clear caulk.

Recessed Lights

Recessed lights boxes are not part of standard air sealing. *But if circumstances ever require them, follow these steps to construct a program-approved air-tight box.*

Boxes must conform to several program and code requirements:

- *The box must maintain 3" clearance from the light fixture on all sides including the top.*
- *The top of the box must be non-combustible, non-insulation (sheetrock).*
- *The top of the box should be made higher than surrounding insulation levels to prevent insulation from covering the top.*
- *The sides of the box must be made with program-approved materials.*
- *Boxes cannot be covered with any insulating material without an IC rated sign-off.*



Cut the box sides to the right dimensions, then assemble and secure them with several nails or screws inserted into the sides and corners. The nails will hold the box's shape while it is carried into the attic.

The edges can be strengthened with metal tape over the nail heads. Be sure to check your dimensions –the inside of the box should be 3" away from any part of the light fixture, and higher than any insulation that will be added.

The last part of the box to be placed is the top –which must be made of sheetrock.

Before installing the light box, move all insulation away from the recessed light. The inside of the light box should be free of any insulation. If joists are in the way of the light box, notches can be cut so that that box will fit.

After placing the box over the light fixture, check your measurements again to verify 3" clearance.

Once the box has been fitted, seal the bottom and sides with foam, inside and out. Lastly, lay a bead of foam along the top edge and place the top onto the box.

Note: The top of the box can have no thermal properties. Insulation cannot be installed over the box unless lights are IC rated as confirmed by a licensed electrician sign-off.

Whole House Fans

Whole house fans are large sources of air leakage, and you may be asked to build an insulated, airtight box over the fan. The following instructions are what CLEAResult has found to be most effective and practical.

Measure the fan in the attic and cut rigid fire rated foam insulation board for the sides of the box. ***Make sure your sides are tall enough to fit above the fan.***

Apply liquid nails to the edges of the sides to create an airtight seal, and join all sides together with 2-inch screws. After the sides are joined, cover the corners with metal tape. ***Exposed ends of the fire rated rigid insulation board cannot be left uncovered.***

The top of the box can now be cut, slightly larger than the box sides so that it can be gripped and lifted off when finished.

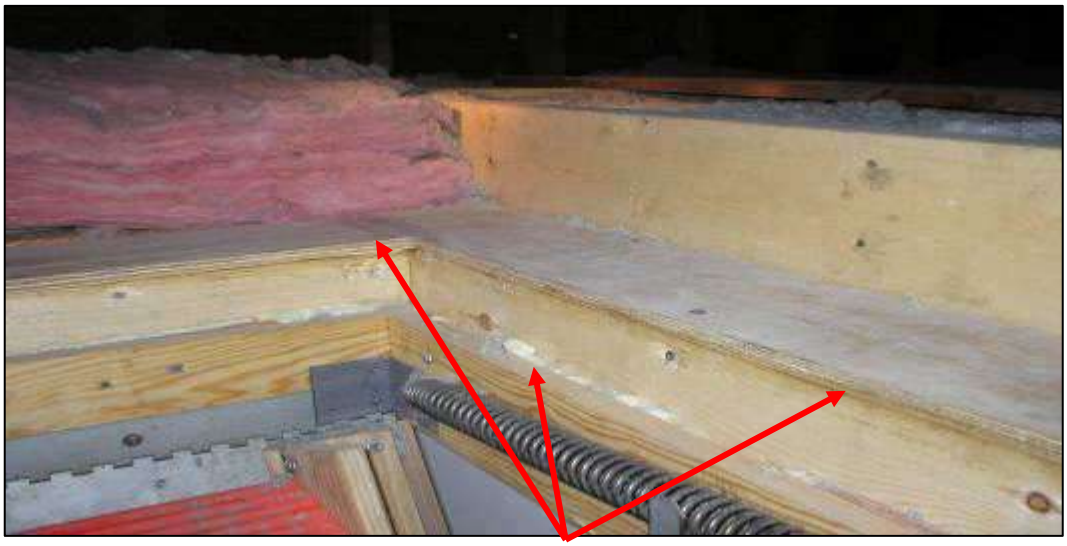
Cut four strips about 3-4 inches wide so that they will tightly fit inside the perimeter of the box.

Once the box has been placed over the fan, the inside edges of the box should be foamed, and the bottom of the box should be foamed to the attic floor.

Secure the strips to the top of the box with liquid nails, metal tape, and screws with fender washers. The strips should be installed so that the bottom of the cover fits snuggly onto the box. The homeowner can then remove the cover when they want to use the fan. All boxes to be built in an attic space must be fire rated.

Attic Stairway Covers

Pull-down stairs should be treated with airtight fire rated insulated boxes. Boxes must sit flush over the opening to maintain an air tight seal. They must also include a gasket on the bottom perimeter, a strap or latch closure so the box can be tightened down, and be a minimum of R-13. All gaps and cracks in the framing must also be sealed.



Seal all edges of the pull-down with foam or caulk, and all edges of the added carpentry with latex or silicone caulk.

Let the foam and caulking dry before setting the attic stair cover down.

Dropped Soffits

Dropped soffits, usually found in bathrooms or kitchens, are often open in the attic, and may contain recessed lights.

Openings should be sealed with approved materials, applied securely enough to support the weight of any added insulation. Strapping may be required for any gaps wider than 24" apart. ***Note: recessed lights can be covered in this case. Proper clearance must be maintained over and around all heat sources within the dropped soffit area.***

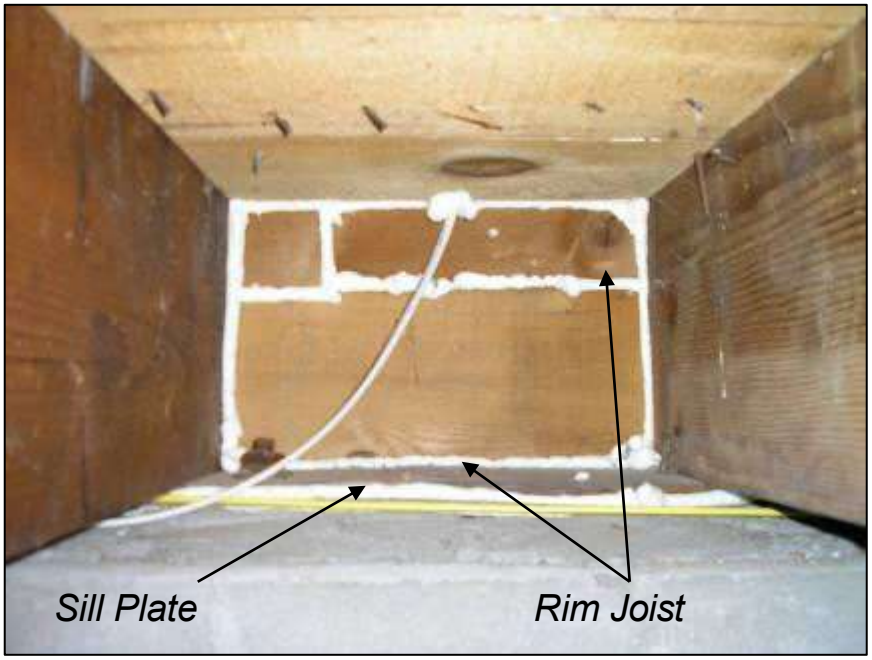
Kneewall Air Sealing

Be aware of air sealing opportunities in kneewalls. Bath fans, wet walls, top plates, chimney chases and other penetrations should be sealed if accessible.

If the kneewall transition is exposed and accessible, it should be sealed with rigid foam board, reflectix or another approved air-sealing material. ***Cardboard is not approved.***

As with attic hatches, all kneewall hatches must be weather-stripped as part of air sealing or hatch treatment unless the kneewall is inside the thermal envelope.

Basement Air Sealing



Unless otherwise noted on the Air sealing Work Order, highest priority should be given to the sill plate and rim joist area, where air leaks in from outside.

All other accessible exterior penetrations should be sealed, such as oil intake pipes and electrical penetrations.

If the thermal and pressure boundary are determined to be at the basement ceiling, major leakage areas including plumbing penetrations, tub cut-outs, heating registers, open wall plates and electrical penetrations should be sealed.

Crawlspace Air Sealing

All accessible dirt floors in crawlspaces must be covered with a 6 mil vapor barrier before any other work gets done. Seams should overlap, and the barrier should extend one foot up all side walls. Seams and edges should be sealed.

Overhangs

You may need to block an overhang that leaks air directly into the living space.

Openings should be blocked with approved materials, and be able to support dense-packing.

Garage Air Sealing

Any accessible areas where the garage ceiling or partition wall borders living space must be air sealed.

Note: All doors connecting attached garages to living space must receive weather-stripping and door sweeps. This is a safety requirement.

Living Space Air Sealing

Areas where plumbing penetrates exterior walls and should be sealed if time allows.

Weather-Stripping Exterior Doors

Weather-stripping for exterior doors –, will be included as separate line items on your Work Order. The contractor will verify if door kits & sweeps are needed when completing Blower Door testing as part of Air Sealing.

Note: Contractors can add additional qualifying door kits & sweeps to the work order without calling the Hotline for approval, providing the total number installed in the home is 3 or less. More than 3 Door kits & sweeps installed in the home would require the contractor to call the hotline for approval.

Attic Insulation

Blown cellulose must be level throughout the attic. Final settled depth must match the depth on the Work Order.

Attic fiberglass must be cross-batted, perpendicular to any existing batts, with no air gaps between layers or double vapor barriers.

Floored attics that have air sealing opportunities located underneath must be dense packed. Any flooring removed must be securely fastened back in place, and if holes are drilled, they must be plugged with wood plugs (below).

Damming

Damming must be provided around all heat sources, storage platforms, accesses etc. Damming must be at least as high as the surrounding insulation and must permanently maintain proper clearance from heat sources.

The following must be dammed:

- *Storage Areas*
- *Floored walk-ways*
- *Bath fans*
- *Drip pans*
- *Access hatches*
- *Chimneys/flues*
- *Recessed lights*
- *Whole house fans*
- *Air handlers*
- *Other mech. equip.*

When using fiberglass for damming, batts must be laid flat –not on edge where it might fall, and placed without gaps that may let cellulose through.

Damming heat sources: 3" clearance is required around all heat sources including recessed lights, bath fans, and chimneys and double walled metal flues. 6" is required for single walled flues, and kitchen exhaust ducts. ***Insulation cannot be blown over any types of recessed light.***

Pre-existing insulation inside the clearance area should also be removed when damming the fixture.

Air Handlers and other mechanical equipment must be carefully dammed to prevent any cellulose from coming into contact with the unit. ***Be sure to clean out AC condensate drip pans.***

Damming material can be fiberglass batts, metal flashing, carpentry or rigid insulation. Rigid damming must be securely fastened to framing members to prevent it from falling over. ***Attic access hatches must be dammed with fiberglass. No rigid material is allowed for safety reasons.***

Pipe Tenting

Pipes in attic spaces will be tented when possible to prevent the pipes from being cut off from the heated area and freezing.

Clean out any insulation under the pipes. Build up fiberglass beside the pipe, and lay a batt down over the pipe. Insulation can then be blown over the tent. ***Call CLEAResult whenever pipes are discovered that are not addressed in a Pipe Disclaimer.***

Kneewalls

3.5" fiberglass batts are normally recommended for kneewalls. This area is also often treated with rigid insulation board with a thermal barrier (below) when possible.

All seams with framing and between boards including tops and bottoms of the foam boards must be sealed.

Kneewall Floors

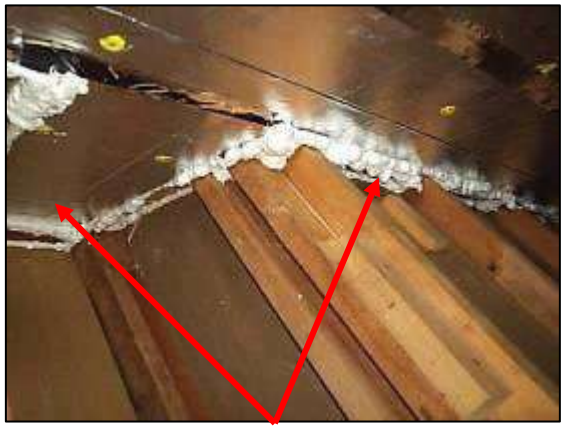
Kneewall floors are filled to capacity. If airsealing opportunities exist under the flooring, densepacking will be called for. Otherwise, the enclosed space should be filled, but densepack is not required.

Kneewall Slopes

The knee wall slope and gable end wall can be insulated with fiberglass before rigid insulation board is added, or dense cellulose can be blown in. Fiberglass insulation left exposed must be un-faced.

2" rigid insulation board with a thermal barrier rated for use in kneewall spaces is used to cover the fiberglass or enclose the cavity for cellulose. It should be attached with 2 ½" screws and fender washers. All seams should be ***foamed*** *or taped with* ***metal tape****.*

The rigid insulation board can be drilled through after installation and cellulose densepacked behind it when recommended.



When the knee wall slope is called to be brought inside the thermal envelope, the insulation board should be brought all the way down if possible to block the soffit area (left), and all the way up to block the attic slope area (right).

Net and Blow

Sometimes a knee wall or slope area cannot be insulated with fiberglass or thermal barrier board due to irregular framing or space limitations. In these cases you may be asked to insulate with a net and blow application and cover with approved FSK ignition barrier covering.

Netting: is installed on the surface and supported by strapping or furring strips spaced every 24 inches to prevent sagging over time. A fill tube is inserted through cuts in the netting and the cavity is dense packed.

FSK Ignition Barrier Covering: is installed by completely covering the Net & Blow so that the FSK material overlaps 3 inches over itself. No taping or sealing of the seams is required.

Kneewall Transitions

Kneewall floor transitions get dense packed if they cannot be physically air sealed. Contracts will specify 2 sqft of cellulose to account for lost material under the floor.

If kneewall slopes are being insulated, and the outside or perimeter transition can't be physically air sealed, you will dense pack to block the soffits and exterior wall plates from the kneewall space.

Built-in Drawers

Built-in drawers should be boxed with rigid foam insulation board when they are being put outside the thermal boundary.

Attic Slopes

Unvented attic slopes will be dense packed either from the attic or kneewall, or by interior drill and blow if the slope is too long to be effectively insulated from those areas.

The slope must have at least four inches of space between the roof sheathing and any existing insulation in order to be dense packed. A fiberglass batt will be used to block the opening at the kneewall to prevent cellulose from spilling out.

Accesses

Attic and kneewall accesses are treated with weather stripping and 2" rigid foam insulation board with thermal barrier. The foam board should be screwed into the hatch, with fender washers to hold the board in place, and exposed edges taped with metal tape. ***All hatched and doors to unconditioned areas must be weather stripped and made air tight as part of any thermal measure.***

Temporary accesses must be repaired using sheetrock of the same thickness as the surrounding wall, and be patched with a single coat of joint compound.

Cut and finish accesses must be installed with mitered joints, ½ plywood for the hatch, and q-lon weather stripping. Seams and screw holes should be neatly caulked and prepared for surface finishing.

Wood sheathing can be cut to gain access to non-communicating attic sections or fixtures under flooring that need to be treated. Sheathing accesses are not intended to be repaired or finished. ***If a sheathing access is cut to access fixtures under attic flooring, the top should be left open once the fixtures have been sealed and dammed to prevent heat from building up.***

Ventilation

Whenever contracted ventilation cannot be installed, you must notify CLEAResult before insulating the attic. Ventilation cannot be changed without authorization from CLEAResult.

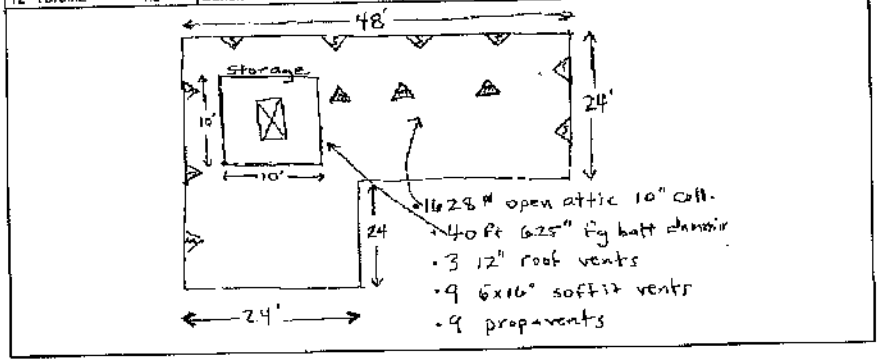
CALCULATING REQUIRED ATTIC VENTILATION

CLEAResult and the MassSave Program require all attics treated with insulation be ventilated properly. The amount and locations of the ventilation are determined by industry-wide standards:

- For every 300 square feet of attic floor separated from the living space by a continuous vapor barrier, 1 square foot of free ventilation is required.
- For every 150 square feet of attic without a vapor barrier, 1 square foot of free ventilation is required.
- Venting should be divided equally between the peak (either gable or ridge vent) and the soffit when possible.
- One layer of latex paint meets requirements for a vapor barrier.
- CLEAResult bases all attic vent calculations on the 1/300 rule.

Once the required ventilation is determined, that number is applied to a list of vent types with known net free air values.

Roof Vents		Soffit		Gable		Misc	
8" Roof	.35	8" x 16"	.44	16" x 24"	1.5	Airated Drip Edge	.06
12" Roof	1.0	6" x 16"	.33	12" x 18"	.75	2" Pop Vent	.01
Ridge Vent	.13/ft	4" x 16"	.22	12" x 12"	.5		
12" Turbine	4.0	Continuous	.12/ft				



1728sqft / 300 = 5.76 sqft of net free air ventilation.

12" roof vents (x3) = 3.0

6 x 16 soffit (x9) = 2.97

5.97 sqft of net free air ventilation

Roof vents should never be installed on the front of the house. Vents should be evenly spaced across non-visible areas of the roof, within 4 feet of the ridge. ***Never at the bottom of the roof slope.***

12" roof vent providing 1 sqft of ventilation.

All vents should be properly cut so that the full-sized opening is clear. Vents should never straddle roof rafters. ***Vents that are installed incorrectly will not be eligible for payment.***

8" roof vent providing .35 sqft of ventilation

Soffit Vents

Soffit vents openings must be cut to the full, correct size before the aluminum vent is put on. Louvers should face into the house (above).

Vent Chutes must be installed for all open soffits for the full width of the rafter bay (24" on center will need two vent chutes per bay.) Fiberglass blockers (wind baffles) will be installed at the bottom of each vent chute to prevent wind wash and insulation from blocking the soffit vents.

Insulation should be blown to the same level all the way out to the exterior wall top plate. Tapering is not allowed.

Gable Vents

Bath Fans

Bath fan vented to roof flapper

Insulated hose must be used at all times, and secured to the roof jack with a zip tie. Note: a loop or trap is recommended to be left at the bottom of the insulated hose to help prevent any water from running back into the fan.

If venting a bath fan through the roof is not practical, CLEAResult may ask you to vent it to a gable wall flapper or to the soffit.

Note: If a bath fan can't be vented, you cannot insulate. Contact the contractor hotline whenever this is encountered.

Wall Insulation

Exterior

Preparation

The site should be prepared with Lead Safe Precautions

You may be asked to block balloon framing. This can be done by stuffing a fiberglass batt into the wall cavity, or blocking the area with reflectix.

Siding Removal

Wood shingles are scored at the top and snapped off with a pry bar.

Clapboard and shingle are scored at a 45 degree angle at the top and removed in one piece whenever possible.

Vinyl and aluminum siding should be carefully unzipped, the nails at the top of a course removed, and the entire piece taken off. Bending the course upwards risks unnecessary breakage. If any face nailing will be required to secure these types of siding, the customer must be notified beforehand.

Drilling

Holes will be drilled between all studs, cross-braces and fire-stops.

Lead safe rules must be followed. Painted siding must be removed, or HEPA vacuum attachments must be used to drill through painted surfaces.

Insulating

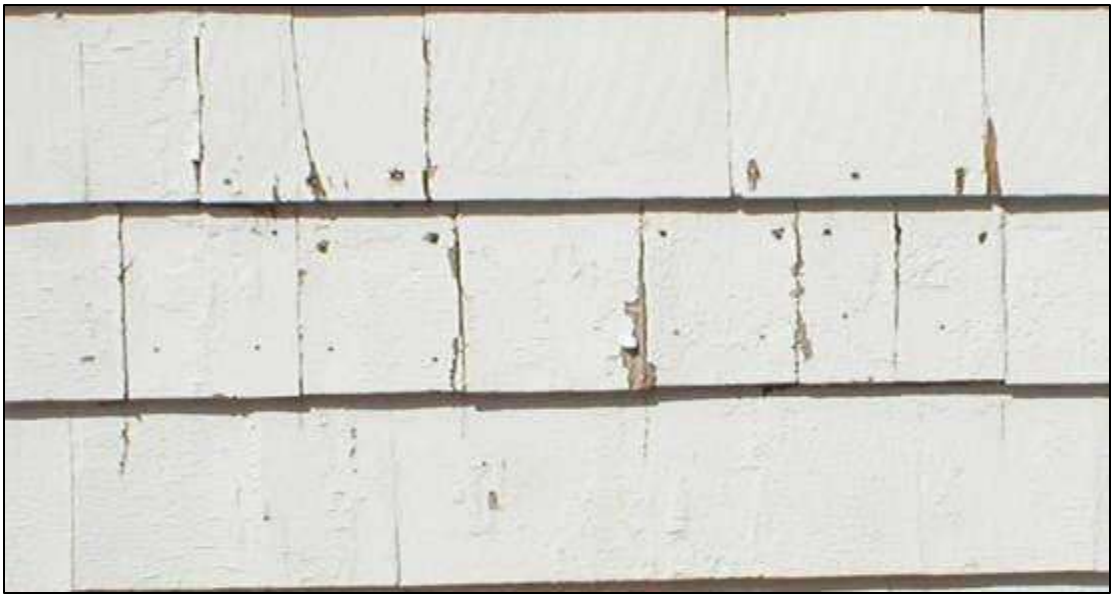
The preferred method of dense packing is to use a fill tube.

Repairing/Replacing Siding

Holes must be plugged with foam or wooden plugs, and any other weather barriers (Tyvek) repaired.

Siding must be replaced with a minimum of damage. Shingles and clapboard are tapped back into place and secured with appropriate nails

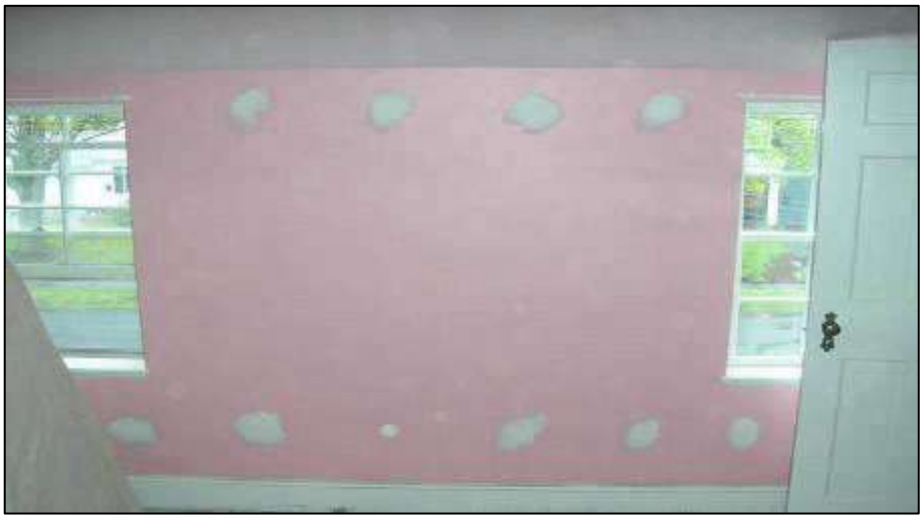
Nail holes and cracks or splits should be caulked. If splitting or cracking cannot be repaired, replacement siding should be installed.



Some splitting, cracking and paint chipping WILL occur, but attempts must be made to repair damaged siding. Be sure that the customer understands what is reasonable to expect from the repaired siding.

Interior Drill and Blow

Lead Safe practices must be followed when drilling painted interior surfaces.



All holes need to be filled with a Styrofoam plug slightly recessed into the wall, and sealed with an initial coat of spackling.

Ceilings

Open Basements/Crawlspaces

Ceiling insulation should fit snuggly between floor joists with no gaps or compression, and should be in contact with the warm surface above. Insulation rods should be spaced regularly to support the batt ***and should be bowed downward to avoid compression of the batt.***

Note that if basement insulation is being done, all ceiling penetrations must be air sealed.

Crawlspaces

Fire rated rigid foam insulation board can be used on crawl space ceilings. All seams should be sealed with foam or metal tape.

Rim Joist

Insulation should be in contact with the cold surface and inserted neatly in place. ***FG batting must be un-faced. The Rim joist must be air sealed prior to installation of the insulation.***

Garage Ceiling

Garage ceilings will be dense packed by drilling holes in the ceiling. Holes should be plugged with Styrofoam or wood plugs and sit flush with the ceiling. One coat of joint compound is also required.

Overhangs

All wood surfaces that are drilled into must be plugged with a wooden plug inserted flush with the surface and treated with one coat of wood compound.

Safety Hazards

Multiple conditions can affect your work scope, may need to be documented onsite, and may even prevent you from doing any work. If you find any of the conditions noted below, and feel they may affect your work scope, call CLEAResult immediately.

Moisture Issues

Mold on the underside of roof sheathing, water staining on roof members are all signs of a significant moisture problem that must be addressed before proceeding with work.

Asbestos

Asbestos-like material should never be disturbed. Work should not continue in the immediate areas, and a blower door test should not be done.

Vermiculite may contain asbestos and should not be disturbed. Blower doors, air-sealing and blown insulation cannot be done.

Knob and Tube Wiring

Thermal work in the area of the home with knob and tube wiring cannot be done until a licensed electrician has certified that it is not active. If you encounter any knob and tube wiring that you believe has not been cleared by CLEAResult, contact the contractor hotline. Air sealing may be completed upon discretion of the contractor.

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Duct Sealing & Insulation

Materials and Equipment

True Flow Plate, Manometer, Pressure Probe (with hose), Mastic, Gloves, Utility Knife, FSK Tape, Duct Sealing Tape, Drill (with bit to drill duct), Zip Ties, Flashlight (or Headlamp) and trash bags are the basics needed

Device to measure temperatures in duct work for Temp Rise test.

the program approved material to be installed on rigid duct work.

Flow Testing

Determine System Tonnage. *On the outside compressor unit, listed on the manufacture plate you will find the model number. This is where you will determine the system tonnage. 1 Ton is equal to 12000 BTU. Example #'s you will see 12 (1.0 ton) 18 (1.5 tons), 24 (2 tons), 30 (2.5 tons), 36 (3 tons), 42 (3.5 tons), 48 (4 tons). Program standards require 300 CFM per ton in order to qualify for duct sealing.*

Test for NSOP (Normal Supply Operating Pressure)

Drill a test hole into the nearest supply location when testing NSOP at the air handler or tape nearest supply vent, if testing from return grill located inside the home. Insert pressure probe into the direction of the airflow. Make sure digital manometer "mode" is set on AH.

Flow Testing

Installing Flow Plate

Flow plate should be built to fit the size of either (A) the central return located inside the home or (B) The filter slot located at the air handler. Remove the filter and install the flow plate in place of it. Placement of the flow plate is important. Air should flow against the front of the flow plate.

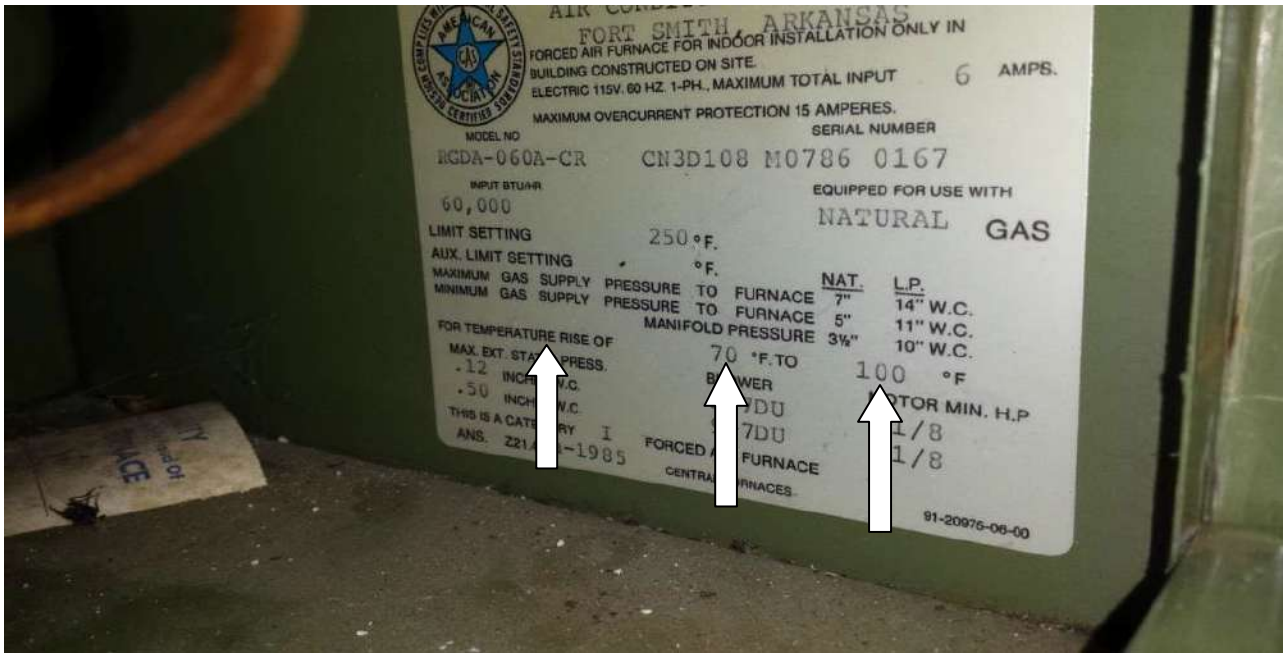
TFSOP: ***True Flow Supply Operating Pressure***

TFSOP hose set-up

Hoses from TrueFlow plate are both inserted on channel B, while Pressure Probe is in the Input side of channel A. Set manometer "device" to read "TF" for true flow test. Change CONFIG to match Flow Plate being used. Options for selection are 14 & 20. Make sure to choose according to the flow plate used.

Example shown: 914 CFM meets program requirement of 300 CFM per ton for a 3 ton system

Temperature Rise Testing



Manufacturer's Temperature Rise can sometimes be found on manufacturer's name plate which is located on the air handler. If no information is found than program default of 80 degrees will be used.

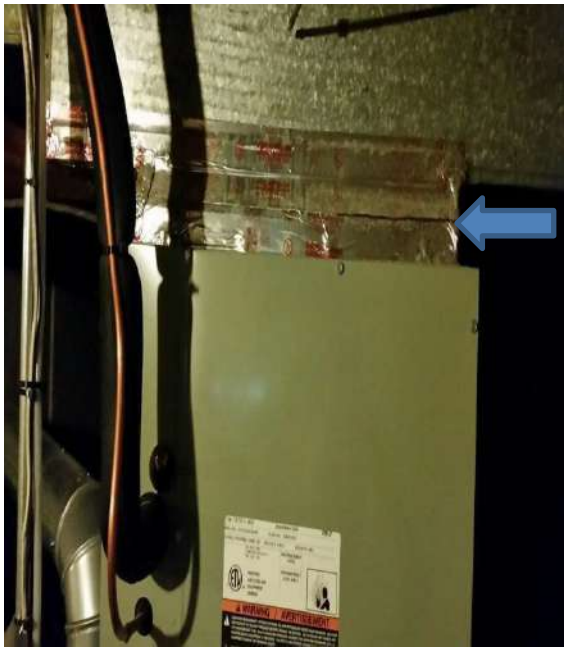
Measure supply and return temperatures. Subtract the supply from the return to come up with the temperature difference. Compare to manufacture plate temp rise, if no plate information available use program default of 80 degrees to determine if it is ok to duct seal.

Any temperature difference between supply and return that is less than 80 degrees meets program guidelines. Above 80 degrees is considered low air flow.

Duct Sealing

Using your hands to feel for joints under the duct insulation, in the main duct run, locate all connection seams/joints in the duct work as well as take offs. Using a sharp utility knife, cut the insulation and fold the insulation back exposing the seam fully for easy access during duct sealing. With full access to all seams and take-offs, apply mastic to all areas.

Duct Sealing



Use aluminum tape when sealing connections between air handlers and duct work. Make sure to seal the filter slot when no cover is present. Make sure surface has been wiped clean of dust and debris before installing tape.
Aluminum foil tape is meant as a temporary seal as air handler may be replaced and filter slot needs to be accessible.

Duct Sealing

**Note that if ducts are not insulated or if specification is to remove existing insulation, contractor will then be responsible to seal all seams going the entire length of the ducts.*

Specifying Duct Sealing Hours

Duct sealing man hours will be determined based on liner footage of existing ridged duct work and existing duct insulation.

- 4 Man Hours (un-insulated rigid ducts less than 200 linear feet)
- 6 Man Hours (un-insulated rigid ducts greater than 200 linear feet)
- 8 Man Hours (insulated rigid ducts less than 200 linear feet)
- 12 Man Hours (insulated rigid ducts greater than 200 linear feet)

Duct Insulation

Re-installation of existing duct insulation

After the insulation is removed to gain access to duct connections and duct sealing is completed, insulation is put back in place with program approved foil faced FSK duct insulation tape. Zip ties are also used when needed to add support to prevent insulation from falling off over time or to re-attach flex duct insulation.

Installing new R-8 duct insulation

New R-8 Fiberglass duct insulation should be installed with no gaps, seams or compression.

Using program approved materials; all seams in duct wrap should be stapled and taped leaving no areas un-insulated or exposed.

Duct Sealing Approval Verification

Customer Name: John Doe **Address:** 1234 Main St., Boston MA

Energy Specialist: RTL 000

During your Home Energy Assessment, the Energy Specialist determined that your duct work located in un-condition space would benefit from Duct Sealing. The process of sealing the connections (Air Leakage Points) on your ducts will require that your contractor have access to seams that connect the duct work together, so that they can apply Duct Mastic to eliminate the air leaks.

In order to access the connections points on your duct work it will require that some areas of insulation be removed by cutting back the existing insulation to expose connection points. Once all leaks have been sealed with duct mastic the insulation will be put back to its original location using program approved materials. When insulation cannot be put back in place and securely fastened a new piece of insulation can be installed in its place.

In the event that your existing insulation cannot be removed without damage due to a deteriorated condi tion you will be notified by your contractor. Your Energy Specialist or contractor can speak with you about rebates towards new duct insulation as an option.

Dirty insulation around joints and seems Is evidence of air leakage at duct connections. Duct mastic is applied to seal the leaks and insulation is re-installed.

Example of insulation being cut back to to expose duct connection that will be sealed with duct mastic.

Example of completed duct seal with duct insulation put back in place using program approved materials.

Energy Specialist Evaluation

Duct Sealing will take place in the following areas:

- [x] Open Attic
- [ ] Knee wall floor
- [ ] Crawl Space

Existing Duct Insulation:

- [ ] Foil Faced FSK
- [x] Vinyl
- [ ] Other

If Other Please Describe: _____

Customer Signature: John Doe **Date:** 01/01/2016

This document acknowledges that the customer has been explained the process of cutting some existing duct insulation in order to access leakage points and that all insulation will be put back and secured in its original location.

***Please note that this sign-off is necessary in order to move forward with program eligible Duct Sealing work.**

Duct Sealing
Low Flow Sign-Off Form

During your Home Energy Assessment the Energy Specialist identified duct work that would benefit from Duct Sealing. Testing of your system's air flow was also completed as part of the assessment to determine eligibility. Maintaining proper manufacture air flow is very important in achieving the maximum system efficiencies and equipment life expectancy.

Results of the air flow test determined that your system did not meet the program required minimum air flow standard. If you wish to proceed with the Energy Specialist recommended Duct Seal, we would require a qualified HVAC contractor to further evaluate your system to deem it safe to duct seal.

Customer Information

Customer Name: John Doe

Address: 1234 Main St Phone: 508-555-5555

City: Boston Zip: 00000

Email: john.doe@abc.com

Please have your HVAC contractor complete the Contractor Information section below, then mail or email this completed form to [LEAD VENDOR]. A representative will contact you within 7 days of receipt of this form to discuss next steps for your duct seal project.

Details

☐ Program minimum air flow requirements for your system 900 CFM (300 CFM Per Ton). Air Flow measured with Flow Plate 718 CFM. By signing below, I (contractor) have determined that the flow on the system to be duct sealed is adequate and that Duct Sealing can be done safely.

☐ Temperature Heat Rise method was used to determine air flow requirements for your system. According to your manufacture Temperature Rise 70 Deg F. to 100 Deg F. or program default _____ Deg F. The system has been determined to have low flow. By signing below, I (contractor) have determined that the flow on the system to be Duct Sealed is adequate and that Duct Sealing can be done safely.

Contractor

Contractor Name: HVAC Contractor

Address: 100 State St. Phone: 508-555-0123

City: Boston Zip: 00000

Signature: Contractor

CustomerSignature: John Doe **Date:** 01/01/2016

EnergySpecialist: RTL 000 **Phone:** 508-555-1111 **Email:** energy.specialist@abc.com

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CLEAResult

IC Rated Recessed Light Verification

Site ID: _____ Customer: _____ Address: _____

During your Home Energy Assessment indications of recessed lighting was observed. It is beyond the scope of a routine Home Energy Assessment to determine the precise type of lighting fixtures installed and whether or not any specific fixture may or may not be covered or in contact with any insulating materials. If it is the homeowner's intention to have any lighting fixtures covered or made in contact with any insulating materials, the Mass Save Home Energy Services Program requires that you have the home checked by a **Massachusetts licensed electrician** and certified that all lighting fixtures located in the areas indicated below are **Insulated Contact(IC) Rated.** Due to the liability involved with signing this type of form, we suggest you show or describe this form to your Massachusetts licensed electrician prior to hiring him/her to inspect your home to be sure he/she is willing to sign it. CLEAResult and the Mass Save Home Energy Services program will rely on the licensed electrician's determination and certification below and will not be liable if inaccurate.

Energy Specialist Evaluation

IC Rated recessed light verification is needed in the following areas:

☐ Open Attic ☐ Enclosed Floor Cavity ☐ Enclosed Interior Slope ☐ All Recessed Lights are IC Rated

Notes: _____

_____

*Insulation is not permitted to come in contact with recessed lighting without this form being signed by a licensed electrician and approved by the Mass Save program

Electrician's Certification

Company Name & Address: _____

Electrician's Name: _____ License #: _____

I have performed an inspection of the lighting fixtures and have verified that all recessed lights are IC Rated in the following areas:

Open Attic	Enclosed Floor Cavity	Enclosed Interior Slopes	All Recessed Lights
☐ Yes	☐ Yes	☐ Yes	☐ Yes
☐ *No	☐ *No	☐ *No	☐ *No

*If NO is checked for any areas, the licensed electrician is responsible for properly identifying the specific locations of all IC rated and non IC Rated lighting in the area being insulated. Failure to do so will make the Recessed Light Verification form invalid.

Notes: _____

_____

Electrician's Signature: _____ **Date:** _____

Next Steps:

Please email the completed form to CLEAResult for processing: **CustomerContact@CLEAResult.com**

If the Massachusetts electrician's license is valid and the form is completed, damming can be removed from the work scope as determined by your Energy Specialist. ***Please note that this sign-off is not necessary in order to move forward with most program eligible work. It only needs to be completed if home owner would like insulation to be blown over and in contact with existing recessed lighting fixtures in the areas designated above by the Energy Specialist.**

Energy Specialist: _____ **Phone:** _____ **Email:** _____

mass save
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EVERSOURCE

nationalgrid
HERE WITH YOU. HERE FOR YOU.

MASS SAVE® PRE-WEATHERIZATION BARRIER INCENTIVE CONTRACTOR EVALUATION REPORT

[redacted]

Phone: _____
Email: _____

Rebate Recipient (if different): _____

Mailing Address (if different): _____

City: _____ State: __ Zip: ____ Phone: _____

SiteID
Project :
Customer ID:
Energy Specialist [redacted]

ENERGY SPECIALIST EVALUATION (Completed by Energy Specialist)

KNOB & TUBE WIRING

[RI Contractor is to evaluate the selected locations where weatherization recommendations have been made to determine if active knob & tube wiring exists:

☐ Attic D Exterior Walls ☐ Basement D Attic Floor D Knee Wall Floor D Attic Slopes

MECHANICAL SYSTEM, HIGH CARBON MONOXIDE EVALUATION

D Contractor is to evaluate the selected mechanical system(s) below and provide service, if possible, to reduce high carbon monoxide levels as measured in the undiluted flue gas to below 100 ppm:

D Heating System D Hot Water System | D Other:

DRYER VENT EVALUATION

D Contractor is to evaluate the dryer vent and provide service to properly exhaust the vent to the exterior.

CONTRACTOR EVALUATIONS (Completed by Contractor)

KNOB & TUBE WIRING

D Upon completion of my inspection I have found that there is no active knob & tube wiring in the area(s) checked off below:

☐Attic D Exterior Walls D Basement D Attic Floor D Knee Wall Floor D Attic Slopes

CONTRACTOR INFORMATION

Company Name-:= .....

Address: _____ City: _____ State: ___ Zip: ___ _

Contractor Name: _____ License#: _____ Federal ID#: _____ __

D I have read, and agree to, the Terms & Conditions of the Pre-Weatherization Barrier Incentive.

Contractor Signature: Date: _____

MECHANICAL SYSTEM, HIGH CARBON MONOXIDE EVALUATION

D The selected mechanical system has been evaluated and serviced. Testing results of carbon monoxide in the undiluted flue gas are as follows:

D Heating System ___ CO ppm | D Hot Water System _____CO ppml ☐ Other: _ COppm

DRYER VENT EVALUATION

D The dryer vent has been exhausted to the exterior.

CONTRACTOR INFORMATION

CompanyName:----------

Address: _____ City: _____ State: ___ Zip: ___ _

Contractor Name: _____ License#: _____ Federal ID#: _____ __

D I have read, and agree to, the Terms & Conditions of the Pre-Weatherization Barrier Incentive.

Contractor Signature: Date: _____

CUSTOMER INSTRUCTIONS

Submit signed and completed copies of this **Contractor Evaluation Report** and a copy of the **paid Contractor Invoice** to:
Pre-WX Barrier Incentive, C/0 CLEAResult, 50 Washington Street, Ste 3000, Westborough, MA 01581: or email to PreWxOffer@clearesult.com

Customer Signature: _____ Date: _____

Mass Save® Customer Disclosure & Preparation Requirements

CLEAResult

Site ID: _____ Customer: _____ Address: _____

At your Home Energy Assessment your Energy Specialist has reviewed and identified applicable cost-effective opportunities, potential health and safety concerns as well as any customer required actions to facilitate improvements in your home.

The following conditions were noted at the time of the Home Energy Assessment:

Combustion Safety

This Space Intentionally Left Blank

Initial Here

Combustion Appliances

This Space Intentionally Left Blank

Initial Here

Pipe Disclaimer

This Space Intentionally Left Blank

Initial Here

Moisture Concerns

This Space Intentionally Left Blank

Initial Here

CUSTOMER PREPARATION REQUIREMENTS

☐ Storage Removal ☐ Platform Buildup ☐ CO Detector ☐ Flooring Removal

Customers are responsible to complete any noted required actions in order to be eligible for program weatherization work at their home. The participating Contractor will be confirming the completion of these required actions prior to scheduling an installation date:

Initial Here

This notice does not constitute an endorsement or warranty regarding the presence or absence of other real or potential health and safety hazards that may exist at this address or premises. If you have questions regarding this information, or to schedule a follow-up inspection after the noted conditions have been corrected, please call our Customer Service at 800-480-7472.

Customer Signature: _____ Date: _____

For Office Use Only

Energy Specialist: _____ **Phone:** _____ **Email:** _____

Enclosed Cavity Insulation Fact Sheet

CLEAResult

Site ID: _____ Customer: _____ Address: _____

At the time of your Home Energy Assessment the Energy Specialist determined that your home would benefit from insulation and evaluated the current condition of your exterior siding and interior materials. It has been determined that the process of removing certain areas of your siding, drilling holes and blowing in the insulation could result in some damage to the siding or to the esthetics of the paint. Prior to the start of the insulation job, the contractor will demonstrate to the homeowner a sample of the siding removal and reinstallation. **A copy of this signed fact sheet must be returned with a signed contract or the scheduling of the insulation work will be delayed.**

For more information please visit the interactive house web site at: http://www.masssave.com/flash/masssave_content.html

ALUMINUM SIDING

Denting is one of the problems that can occur when working with this type of siding. Painted aluminum might need to be touched up by the homeowner after the walls have been insulated and the siding reinstalled. Fingerprints are sometimes visible on Aluminum Siding after work has been completed, these can be removed by washing down with a hose. Note: When denting occurs to aluminum siding while the contractor is removing it or reinstalling it then every effort will be made to try and smooth out the dents so they are not visible. When repair is impossible, the contractor can move the damaged piece to an area not readily visible. It is not possible to order a new piece of aluminum siding because it is no longer made. Customer is responsible for any cleaning of fingerprints that may be left on the siding.

GARAGE CEILING

Garage ceiling densepack requires holes to be drilled from the inside of the garage and can be a very intrusive and dusty process. In order for this job to go smoothly, the homeowner must make sure that all items and storage located in the garage must be moved away from the area and/or covered with plastic prior to commencement of the job for that day. Once the insulation is blown in, the contractor's responsibility will be to plug the access holes and treat the surface with an initial application of spackle/filler. Note: The homeowner is responsible for any additional work to the treated areas, including cleaning, dusting and painting to achieve the desired finish conditions.

ASBESTOS SIDING

This type of siding can present the biggest challenge to remove and reinstall without damaging the shingle. Asbestos siding cannot be cut or drilled because the siding contains Asbestos fibers. The contractor will evaluate whether they can remove the siding with limited damage. If it cannot be removed safely or without damaging the siding, the contractor will notify the customer and CLEAResult that the job can't be done safely. If damage occurs the contractor will reinstall the Asbestos shingle so the split or cracked areas butt up tight together. The homeowner would be responsible for repainting damaged shingles if needed. Note: Asbestos shingles are no longer made. They do make a replacement shingle that looks like some types of asbestos shingles. If you have extra shingles let the contractor know so he can use those if a shingle breaks or chips while trying to remove. If your siding is the type they make a replacement shingle for, then the contractor can install a replacement if the shingle is damaged to the point that it can not be reinstalled.

For Office Use Only

Customer Signature: _____ **Date:** _____

Energy Specialist: #N/A **Phone:** #N/A **Email:** #N/A

Enclosed Cavity Insulation Fact Sheet

CLEAResult

Site ID: _____ Customer: _____ Address: _____

At the time of your Home Energy Assessment the Energy Specialist determined that your home would benefit from insulation and evaluated the current condition of your exterior siding and interior materials. It has been determined that the process of removing certain areas of your siding, drilling holes and blowing in the insulation could result in some damage to the siding or to the esthetics of the paint. Prior to the start of the insulation job, the contractor will demonstrate to the homeowner a sample of the siding removal and reinstallation. **A copy of this signed fact sheet must be returned with a signed contract or the scheduling of the insulation work will be delayed.**

For more information please visit the interactive house web site at: http://www.masssave.com/flash/masssave_content.html

ASBESTOS SIDING

This type of siding can present the biggest challenge to remove and reinstall without damaging the shingle. Asbestos siding cannot be cut or drilled because the siding contains Asbestos fibers. The contractor will evaluate whether they can remove the siding with limited damage. If it cannot be removed safely or without damaging the siding, the contractor will notify the customer and CLEAResult that the job can't be done safely. If damage occurs the contractor will reinstall the Asbestos shingle so the split or cracked areas butt up tight together. The homeowner would be responsible for repainting damaged shingles if needed. Note: Asbestos shingles are no longer made. They do make a replacement shingle that looks like some types of asbestos shingles. If you have extra shingles let the contractor know so he can use those if a shingle breaks or chips while trying to remove. If your siding is the type they make a replacement shingle for, then the contractor can install a replacement if the shingle is damaged to the point that it can not be reinstalled.

ASPHALT SIDING

The contractor must evaluate the condition of this type of siding before trying to remove it. This type of siding becomes brittle over time and can be difficult to remove without damaging it. At the start of the job the contractor will remove a sample to demonstrate how the siding will look after being handled and to obtain homeowner's approval to proceed with the work. Note: It is not possible to order a new piece of asphalt siding if damaged because it is no longer made. The customer is responsible for repairs or siding replacement.

INTERIOR DRILL & BLOW

Interior drill and blow requires holes to be drilled from the inside of the living space or garage and can be a very intrusive and dusty process. In order for this job to go smoothly, the homeowner must make sure that all furniture and any clothing located in adjacent areas to the exterior walls, garage ceiling or slopes (that are being treated) must be moved away from those areas and covered with plastic prior to commencement of the job for that day. Once the insulation is blown in, the contractor's responsibility will be to plug the access holes and treat the surface with an initial application of spackle/filler. Note: The homeowner is responsible for any additional work to the treated areas, including cleaning, dusting and painting to achieve the desired finish conditions.

For Office Use Only

Customer Signature: _____ **Date:** _____

Energy Specialist: #N/A **Phone:** #N/A **Email:** #N/A

Enclosed Cavity Insulation Fact Sheet

CLEAResult

Site ID: _____ Customer: _____ Address: _____

At the time of your Home Energy Assessment the Energy Specialist determined that your home would benefit from insulation and evaluated the current condition of your exterior siding and interior materials. It has been determined that the process of removing certain areas of your siding, drilling holes and blowing in the insulation could result in some damage to the siding or to the esthetics of the paint. Prior to the start of the insulation job, the contractor will demonstrate to the homeowner a sample of the siding removal and reinstallation. **A copy of this signed fact sheet must be returned with a signed contract or the scheduling of the insulation work will be delayed.**

For more information please visit the interactive house web site at: http://www.masssave.com/flash/masssave_content.html

INTERIOR PANELING

This process requires holes to be drilled from the inside of the wall through the paneling, which will leave an area which cannot subsequently be patched or sealed. The holes will be visible with a Styrofoam plug inserted. The contractor can show you an example of what the hole will look like and you may decide at any time during the process to stop the work. Also, please make sure on the day of the insulation you remove all items either mounted on the walls or in the vicinity of the walls. Note: The homeowner is responsible for any repairs or additional work needed to get the paneling back to it's original condition.

INTERIOR PANELING

This process requires holes to be drilled from the inside of the wall through the paneling, which will leave an area which cannot subsequently be patched or sealed. The holes will be visible with a Styrofoam plug inserted. The contractor can show you an example of what the hole will look like and you may decide at any time during the process to stop the work. Also, please make sure on the day of the insulation you remove all items either mounted on the walls or in the vicinity of the walls. Note: The homeowner is responsible for any repairs or additional work needed to get the paneling back to it's original condition.

OVERHANG

The process requires holes to be drilled through the underside of the overhang since we are unable to remove the sheathing. Exposed wooden overhangs will be drilled between each floor joist so that densepacked cellulose can be blown into the cavity. Contractors will repair these holes by inserting a tight fitting wood plug into the hole, and applying an initial coat of appropriate wood patching compound. The customer will be responsible for any sanding and painting. If the overhang is covered with vinyl siding, that siding can be removed and replaced similarly to the siding on other exterior walls of the home, and are susceptible to the same risks of cracking. The contractor will still plug and patch their drill holes before replacing the vinyl. Once the insulation is blown in, the contractor's responsibility will be to plug the access holes and treat the surface with an initial application of spackle/filler. Note: The homeowner is responsible for any additional work to the treated areas, including painting to achieve the desired finished conditions. The contractor can show you an example of what the hole will look like and you may decide at any time during the process to stop the work.

For Office Use Only

Customer Signature: _____ **Date:** _____

Energy Specialist: #N/A **Phone:** #N/A **Email:** #N/A

Enclosed Cavity Insulation Fact Sheet

CLEAResult

Site ID: _____ Customer: _____ Address: _____

At the time of your Home Energy Assessment the Energy Specialist determined that your home would benefit from insulation and evaluated the current condition of your exterior siding and interior materials. It has been determined that the process of removing certain areas of your siding, drilling holes and blowing in the insulation could result in some damage to the siding or to the esthetics of the paint. Prior to the start of the insulation job, the contractor will demonstrate to the homeowner a sample of the siding removal and reinstallation. **A copy of this signed fact sheet must be returned with a signed contract or the scheduling of the insulation work will be delayed.**

For more information please visit the interactive house web site at: http://www.masssave.com/flash/masssave_content.html

SHEATHING ACCESS

A sheathing access is used to access areas that are to be treated that currently have no access. The contractor will cut an access panel through roof, gable wall or floor sheathing to access additional attic areas or items located under attic/kneewall floors including but not limited to recessed lights, bath fans and chimneys. Note: The sheathing will remain open and the areas accessed will remain exposed upon the completion of work.

TEMPORARY ACCESS

A temporary access is used to access areas that are to be treated that currently have no access. The contractor will cut an access hole into the area and upon completion of work patch seal the area. Once the area is treated, the contractor's responsibility will be to close the access hole and treat the surface with an initial application of spackle/filler. Note: The homeowner is responsible for any additional work to the treated areas, including cleaning, dusting and painting to achieve the desired finish conditions.

VERTICAL (T111)

The process requires holes to be drilled through this siding since we are unable to remove vertical siding. Once the insulation is blown in, the contractor's responsibility will be to plug the access holes and treat the surface with an initial application of spackle/filler. Note: The homeowner is responsible for any additional work to the treated areas, including painting to achieve the desired finished conditions. The contractor can show you an example of what the hole will look like and you may decide at any time during the process to stop the work.

For Office Use Only

Customer Signature: _____ **Date:** _____

Energy Specialist: #N/A **Phone:** #N/A **Email:** #N/A

Enclosed Cavity Insulation Fact Sheet

CLEAResult

Site ID: _____ Customer: _____ Address: _____

At the time of your Home Energy Assessment the Energy Specialist determined that your home would benefit from insulation and evaluated the current condition of your exterior siding and interior materials. It has been determined that the process of removing certain areas of your siding, drilling holes and blowing in the insulation could result in some damage to the siding or to the esthetics of the paint. Prior to the start of the insulation job, the contractor will demonstrate to the homeowner a sample of the siding removal and reinstallation. **A copy of this signed fact sheet must be returned with a signed contract or the scheduling of the insulation work will be delayed.**

For more information please visit the interactive house web site at: http://www.masssave.com/flash/masssave_content.html

VINYL SIDING

This type of siding can crack or break during removal or reinstallation. Older siding that has square channels interlocking the panels is harder to remove and reinstall than newer siding with rounded channels. Cold weather can also be a factor. When removing and reinstalling the siding in cold temperatures (below 32 degrees) there is a greater risk of cracking. The contractor assigned to install your insulation will notify the homeowner and CLEAResult if there are any problems or issues, which may result due to the air temperature on the day of installation or the type of channels contained on the siding. Note: When damage has occurred to vinyl siding every effort will be made to repair the damaged area. When repair is impossible, the contractor can move the damaged piece to an area not readily visible or a new piece of siding that closely matches the existing siding can be installed. It is very difficult to order a new piece of siding that will match exactly, because of fading that happens to siding when it has been exposed to the climate and older styles that may no longer be in production. Customer is responsible for cleaning of fingerprints that may be left on the siding.

WOOD CLAPBOARD & SHINGLE SIDING

The present condition and age of the exterior shingle or clapboard plays an important part as to how easily the siding can be removed and reinstalled. Older siding that has been exposed to the elements and has numerous layers of paint or stain has a greater risk of being split or cracked in the removal process. Under these conditions a shingle or clapboard may crack in half when trying to remove it. When this occurs the contractor will try to reinstall the shingle or clapboard so the split or cracked areas butt up tight together. When it is not possible to reinstall a cracked shingle or clapboard, because the split or cracked areas will not butt up tight together, the contractor can repair the crack with exterior wood patch or as a last option replace the damaged area with a similar type of shingle or clapboard. Note: It is the homeowner's responsibility (if needed) to touch up paint or stain on shingles or clapboards that have been removed.

For Office Use Only

Customer Signature: _____ **Date:** _____

Energy Specialist: #N/A **Phone:** #N/A **Email:** #N/A

Permit Authorization Form

Site ID: _____ Customer: _____

I, _____, owner of the property located at:
(Owner's Name, printed)

_____
(Property Street Address) (City)

hereby authorize the Mass Save Home Energy Services Program assigned Participating Contractor listed below to act on my behalf and obtain a building permit to perform insulation and/or weatherization work on my property.

Owner's Signature: _____

Date: _____

FOR CLEAResult OFFICE USE ONLY

CLEAResult has assigned the following Mass Save Home Energy Services Participating Contractor to the above referenced project:

_____ _____
Participating Contractor Date

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Mass Save Home Energy Services Program Standard for Materials, Installation, and Conduct For Energy Efficiency Measure Installation Contractors

Initial Publication Date: May 13, 2010

Revision Date: January 25, 2012

Updated: September 29, 2016

Version 2.0

This Standard applies to all work performed under the Mass Save Home Energy Services Program for customer contracts entered into **beginning October 1, 2016**. Program Administrators will be establishing a Quality Assurance program to verify that work meets the requirements in this Standard. Proposed changes or additions to the Standard will be considered on a regular basis by the Program Administrators or their designee.

By Program Administrators:

TABLE OF CONTENTS

1.0 PROGRAM DESCRIPTION

The primary objective of the Mass Save Program (the Program) is to provide residential customers with energy efficiency recommendations that enable them to identify and initiate the process of installing cost-effective energy efficiency upgrades. The Mass Save Program makes it easy, clear, and compelling for customers to participate in all comprehensive energy efficiency programs by providing information through bold outreach mechanisms, incentives, and multiple financing options.

The Program promotes a house-as-a-system approach and focuses on the home's thermal envelope (shell insulation and air leakage conditions), mechanical systems (HVAC & DHW), and lighting and appliances to identify cost effective energy efficiency improvement and/or replacement opportunities.

This systematic approach to home improvement that addresses all aspects of building systems requires clear standards to maximize energy savings and assure customer satisfaction. It is important to note that the Mass Save Standard for Materials, Installation, and Conduct (the Standards) is primarily focused on traditional weatherization materials and strategies. The Program Administrators ("PAs") view these Standards as a "living document" that will be updated periodically as the Program continues to evolve.

The Program will coordinate with other Massachusetts programs such as GasNetworks and COOL SMART to develop consistent standards across programs as well as to assure consistent customer education and promotion of the house-as-a-system approach.

Future revisions of the Standards may include alternative/new technologies and approaches for new measures (e.g., spray foam in attics).

The PAs are supportive of more coordinated statewide training as a means to ensure correct installation techniques for the Program. It is expected that training requirements will increase over time in order for contractors to retain their status as an authorized program contractor. The goal is to have a sustainable and experienced workforce that is focused on achievable maximum energy savings ready and able to meet customer demand.

2.0 CONTRACTOR QUALIFICATIONS AND RESPONSIBILITIES

The term "Contractor" as used in this document applies to any individual or company performing covered work that is being performed within the Mass Save program. This applies equally to vendors working directly for the PAs and to independent contractors doing work for homeowners.

The purpose of these guidelines and associated information is to codify the requirements of weatherization contractors who participate in the Mass Save Program. They are intended as *minimum* standards for participation in the program.

2.1 LICENSES and CERTIFICATIONS

a. CONTRACTORS must have all licenses and registrations required for their area of work by the Massachusetts Department of Public Safety. Appropriate documentation must be supplied to The Program upon request. Licenses include (but are not limited to): MA Home Improvement Contractor's License, MA Construction Supervisor License, and MA Lead Safe Certificate
b. CONTRACTORS must also obtain any certifications or other recognitions required by individual PAs.

2.2 MATERIALS

a. All materials supplied must meet applicable specifications.
b. All materials must conform to catalog listing.
c. Material substitutions are not allowed without a written pre-approval by the PAs.
d. CONTRACTORS will keep a SDS on the job site for every material used.

2.3 PERFORMANCE OF WORK

a. All labor to be performed in a workmanlike manner.
b. All work must be performed in a lead-safe manner according to all State and/or Federal Requirements in force at the time of the work.
c. All work must be performed in conformance with all applicable OSHA requirements and other governmental standards.
d. All weatherization work must be performed in conformance with applicable BPI standards or other standards as identified by Mass Save.
e. All work must be performed in compliance with all applicable state and local codes.
f. All measures installed must be in conformance with the Work Order.
g. Pre-Approved written Change Orders by the PA vendor and initial or sign-off of completion certificate by the homeowner are required before any modifications to the original Work Order are made.
h. CONTRACTORS *should attempt* to make acceptable repairs for all accidental damages made to a customer's property at the contractor's expense within 10 business days. Both the customer and the PA vendor must be informed when damages occur. The PA vendor will make the final decision as to when acceptable repairs have been made.
i. CONTRACTORS will treat homeowners and their property in a respectful and professional manner.

2.4 JOBSITE CLEAN UP

a. CONTRACTORS are responsible to remove all construction debris from the jobsite.
b. CONTRACTORS are responsible to restore every jobsite to its pre-work condition at project completion.
c. CONTRACTORS are strongly urged to use drop cloths for an additional measure to protect homeowners property/belongings

2.5 DOCUMENTATION

CONTRACTOR Documentation must conform to the requirements detailed in their program participation agreement including, but not limited to:

a. Before Starting Work - CONTRACTORS must document that a blower door test and combustion safety testing have been performed and an Order to Proceed has been issued. If tests are not able to be performed (e.g., electric heat,

asbestos, etc.) it must be noted in the paperwork.

b. After Work Completion - CONTRACTORS must submit documentation (signed by customer and contractor) that the approved Scope of Work is complete.

c. The Completion document must include:
   - An itemized confirmation that the Program Audit recommendations were addressed.
   - An itemized list of each measure, area, R-value, etc., installed.
   - Upon project completion, document that post-blower door testing and post-combustion safety testing has been performed. Must be done on the day of completion.
   - Proof of approved Change Orders by CUSTOMER and PA Vendor.

2.6 COMMUNICATIONS

2.6.2 CONTRACTOR communications with CUSTOMER

a. CONTRACTORS will be courteous to CUSTOMERS at all times.
b. CUSTOMERS and PA vendor must be notified as soon as possible if an appointment must be rescheduled, according to the terms of the Contractor Participation Agreement.
c. CONTRACTORS will clearly explain all work procedures and items to be installed to the CUSTOMERS home before and during the work process. *Program Specifications & Customer Guidance* form must be signed by the customer.
d. CONTRACTORS will answer all CUSTOMER questions in an honest and straightforward manner. If the CONTRACTOR does not know the answer to a question they will refer the CUSTOMER to PA vendor for an answer.
e. CONTRACTORS will inform CUSTOMERS of any fragile items in the work area and request that the CUSTOMER move those items to a safe location prior to start of work.
f. CONTRACTORS will ask CUSTOMERS for permission to use a household restroom.
g. CONTRACTORS will keep CUSTOMERS informed regarding estimated daily arrival, break, and departure times.
h. CONTRACTORS will document any problems and unusual situations as they occur.

2.6.2 CONTRACTOR communications with Mass Save

a. CONTRACTORS will respond promptly and accurately to communications from Mass Save and PA vendors.
b. CONTRACTORS will document problems and unusual situations and promptly report those to PA vendors.
c. CONTRACTORS will respond promptly to address problems as they occur.
d. CONTRACTORS will notify PA vendor of any changes to staffing that affect authorization to work in the program (certifications, background checks etc.)

2.7 CONTRACTOR ACTIONS REQUIRING Mass Save RESPONSE

2.7.1 Theft

Theft may result in immediate cancellation or suspension as a Mass Save Approved CONTRACTOR and full legal remedies including but not limited to prosecution. Theft includes but is not limited to:

a. Charging for materials not installed or labor not incurred.
b. Inflating the actual cost for services provided.
c. Unauthorized removal of CUSTOMER personal property.

2.7.2 Other Unacceptable Actions

The following CONTRACTOR actions, as examples but not limited to, may result in immediate cancellation or suspension as a Mass Save Approved CONTRACTOR. Additional training may be required before reinstatement as a Mass Save Approved CONTRACTOR.

a. Charging clients for services while job is open (one year period).
b. Soliciting or performing work on a customer's home outside the scope or context of rebateable weatherization work, for customers assigned to the CONTRACTOR through the program. (Note: If the CONTRACTOR brings the customer to the program as an IIC referral or through HPC customer acquisition then this clause would not apply but additional services would be required to be on a separate non- program contract with the customer.)
c. Providing false information to Mass Save, PA vendor, or the CUSTOMER concerning work requirements.
d. Failure to correct job deficiencies.
e. Use of inferior materials.
f. Repeatedly missing timelines.
g. Repeatedly performing work of poor quality.
h. Leaving the customer's property in a potentially dangerous condition.

2.8 BUILDING PERMITS

CONTRACTORS are required to obtain and to pay for all applicable permits, certificates of inspection, and license fees related to work performed through the Mass Save program.

2.9 CONTRACTOR'S INSURANCE

All Mass Save CONTRACTORS shall:

a. Provide insurance at the coverage amounts listed in the program participation agreements with respect to the work they perform within the Program;
b. Maintain this insurance at their own expense and in full force and effect for the full term of the contract;
c. List each Mass Save Program sponsor as "additionally insured" on insurance certificates.

All policies shall be issued by companies authorized to write that type of insurance under the laws of the Commonwealth of Massachusetts.

CONTRACTORS shall provide minimum coverage with respect to the operations performed by any employee, subcontractor or supplier, as detailed in program participation agreements.

2.10 BACKGROUND CHECKS

CONTRACTORS must comply with all background check policies required by the individual PA for which the CONTRACTOR is approved to do work. Contractors must check with each LV on specific requirements

3.0 HEALTH AND SAFETY

3.1 OVERVIEW

The health and safety of CUSTOMERS, PROGRAM staff and CONTRACTORS is of primary concern to the Mass Save Program. It is important that all personnel maintain a high level of awareness concerning the potential hazards associated with the weatherization process. The requirements set forth in this standard provide only general guidelines for health and safety concerns.

CONTRACTORS must familiarize themselves with all the health and safety issues associated with weatherization. More specific information concerning indoor air quality problems can be obtained through the U.S. Environmental Protection Agency (EPA) and the U.S. Consumer Product Safety Commission.

Detailed specifications regarding the health and safety of workers in the construction industry can be found in Construction Industry OSHA Safety and Health Standards (29 CFR 1926/1910) that is available from the U. S. Department of Labor.

https://www.osha.gov/pls/oshaweb/owastand.display_standard_group?p_toc_level=1&p_part_number=1926

The above standards are applicable to all CONTRACTORS, their employee's, associated workers, and all SUB-CONTRACTORS providing services using funding under the Mass Save program.

Each home weatherized under the Mass Save program must be individually assessed to determine the existence of potential hazards to CONTRACTORS or CUSTOMERS.

If unsafe conditions exist that would endanger the health or safety of the CUSTOMERS or weatherization CONTRACTOR, and those conditions cannot be corrected, no Mass Save work may be started on that home.

A Mass Save energy assessment must be completed prior to CONTRACTOR'S work. It is the CONTRACTOR'S responsibility to complete Combustion Safety Testing in accordance with the Building Performance Institute (BPI) Technical Standards for the Building Analyst Professional both prior to the work commencing and after the work is completed (test in and test out).

CONTRACTORS, their employee's, associated workers, and all SUB-CONTRACTORS are required to take all reasonable precautions against performing work on homes that will subject occupants to health and safety risks.

CONTRACTORS shall maintain a copy of their Health and Safety Policy, and train all employees accordingly. They shall supply Material Safety Data Sheets (MSDS) for products and materials used by their crews and have these documents available on all jobsites.

Adherence to worker health and safety and applicable OSHA standards are required for all jobs performed by CONTRACTORS their employee's, associated workers, and all SUB-CONTRACTORS.

CONTRACTORS shall comply with all state and federal lead safe work policies and practices. (See Appendix 16.1)

CONTRACTORS shall fully document and communicate to the PA vendor all health/safety related problems and concerns that might inhibit the installation of specified measures to program standards or could result in injury or property damage.

3.2 CONFIRM COMBUSTION APPLIANCE OPERATION

A. CONTRACTORS must confirm through documentation that a Carbon Monoxide test and complete combustion appliance inspection was performed before beginning work, and that a working CO alarm is in place. CONTRACTORS will be responsible for conducting this "test in" in accordance with the BPI Technical Standards for the Building Analyst Professional and providing the documentation.

B. Before leaving the site, the CONTRACTOR shall perform combustion safety tests in accordance with the BPI Technical Standards for the Building Analyst Professional and provide appropriate documentation.

C. Individuals performing these tests shall either hold the appropriate BPI certification, as determined by the Program Administrator, shall be an employee of a BPI Accredited company, or shall have other credentials approved by Mass Save such as a combustion safety module supplementing Boot Camp Authorization.

D. Results of these tests must be reported by CONTRACTOR in the completion documentation.

E. If systems fail the combustion safety tests in the BPI Technical Standards for the Building Analyst Professional, CONTRACTOR must immediately notify occupants and the Program.

Exceptions:
Tests are not required:

1) On direct vent or power vented appliances. CO testing should still be done whenever the exhaust port is accessible.
2) Where equipment is located in an isolated mechanical room with all combustion air from outside including from a vented attic or crawlspace. Note that all equipment in open basements must be tested.
3) When residents in a multi-unit dwelling are not being served by the Program, equipment belonging to those units does not need to be tested. However, visual inspection of that equipment should be made to identify potential health and safety concerns. If any potential concerns are noted, or if the results for the equipment that is tested may be adversely affected by including the other equipment, disclosures must be made to the customer and the building owner.

4.1 MEASURE INSTALLATION GUIDELINES

Through the Mass Save program, thermal shell improvements may be installed only after a comprehensive whole house assessment is conducted by a program-approved entity and an approved Scope of Work has been developed.

It is only through a whole house assessment that site-specific appropriate recommendations can be made. While a home may benefit from thermal shell improvements in theory, there may be existing conditions that would preclude safe implementation of the possible energy saving improvements.

Examples of such conditions include, but are not necessarily limited to

- Existing moisture problems
- Mold or the appearance of mold like substance
- Structural concerns
- Active knob-and-tube wiring (sign-off by a licensed electrician will be needed to proceed to ensure knob-and-tube wiring is not active)
- Existing conditions of specific building components
- Combustion safety issues
- Asbestos
- Inaccessibility
- Infestation
- Recessed lights verified by licensed electrician

Correcting these conditions is outside the scope of the Mass Save program.

Conditions precluding implementation of thermal shell improvements must be documented and explained to the individual customer. If the customer corrects the noted concerns at their own expense, then the recommended thermal improvements may be able to be implemented. Such corrections must be made prior to program work, and must be documented in writing to the satisfaction of the program.

Not every condition will be found before work. If any of the above is discovered during the course of approved work, the CONTRACTOR must contact the PA vendor for instructions to:

1. Disclose and leave specific areas unaltered
2. Disclose and suspend work until alterations are made by others
3. Disclose conditions to homeowner and proceed with work
4. Disclose and alter the work scope to account for conditions

5.0 MATERIALS

All materials shall be installed according to manufacturers' instructions and the standards in this section.

5.1 IMPERMEABLE AIR BARRIER MATERIALS

Materials must be durable, and restrict airflow through the material to no greater than 0.004 CFM_{75} per square foot as tested in accordance with ASTM E283 or E2178. Such materials include:

- Plywood,
- OSB,
- ½" gypsum board,
- Rigid closed cell foam boards meeting ASTM C578 and ICC ES AC12,
- Rigid fiberglass board with flame spread 25 FSK facing,
- Sheet metal flashing and aluminum coil stock,
- Foil faced bubble wrap,

- Peel-and-stick flashing membranes,
- Other air barrier materials as listed in Canada Mortgage and Housing Corporation Research Highlights Technical Series 98-109, "Air Permeance of Building Materials" (http://www.cmhc-schl.gc.ca/publications/en/rh-pr/tech/98109.htm)
- Spray applied foams that meet ICC ES AC 377 including:
    - 2-part open cell polyurethane foam (0.5pcf),
    - 2-part medium density closed cell spray polyurethane foam (2.0pcf)

5.2. SEALANTS

All caulking materials must be rated for a minimum 20-year life. Acceptable sealants used to join materials and block airflow include:

- Foam sealants that meet ICC ES 377 and ASTM C1642-07 such as:
    - 1-part urethane foam, low CFC (e.g. Great stuff, Pur-fil, Insta-foam, or equivalent)
    - 1-part urethane fire-block foam rated for sealing gaps in wood fire blocking
    - 2-part urethane foam kits 1.75pcf density, 2-part Flame Spread 25 foam kits 1.75pcf
- Siliconized latex sealants meeting ASTM C834,
- Silicone, 1-part gun grade urethane and other elastomeric sealants meeting ASTM C 920, (“Silicone” refers to 100% silicone caulk, clear or pigmented—not acrylic)
- Water based duct sealant meeting UL 181A-M, UL 181B-M ("RCD #6" or equivalent)
- Sealants rated for contact with chimneys and combustion vents such as:
    - Non-combustible fire barrier caulk or furnace cement meeting ASTM E 136
    - Silicone high temp RTV listed for use on gas vents to 500 degrees F, meeting ASTM C920

5.3 WEATHERSTRIPPING

- Door, interior: Schlegel "Q-lon" strips, or equivalent other product approved by PA vendor.)
- Doors, exterior: Schlegel "Q-lon with carrier" or equivalent other product approved by PA vendor.
- Door sweeps will be aluminum & vinyl
- Weatherstripping will have a deflection range of at least 1/4". Weather-stripping will remain compliant in cold weather

5.4 ACCESSORIES AND MATERIALS RELATED TO ATTIC PREP

- Glass or mineral fiber insulation as a backer for other sealants, meeting ASTM 665,
- Backer rod (preformed closed cell foam rope) as a backer for other sealants,
- 6 mil (0.l50 mm) polyethylene sheet (used for ground cover or winter-warm side application only)
- Moisture permeable air impermeable wrap material, flame spread 25 (cold side cover),
- Foil/scrim/kraft facing ignition barrier per IRC 2009 R316.5.3
- Netting to hold blown insulation in open cavity,
- FSK or vinyl faced duct wrap insulation R-8 nominal 3” meeting ASTM C1290, and C1136 (facing)
- Soffit ventilation air chutes for 16 or 24 inch rafter spacing ventilation air chutes must extend over existing insulation,
- Insulated flex duct 4 and 6 inch diameter for exhaust fans (no tape, use 4 zip ties)

5.5 INSULATION MATERIALS

- Cellulose (blown-in) loose fill insulation meeting ASTM C739, 16 CFR 1209, 1404,
- Specific Cellulose ICC ES reports required for fire rated details (e.g. ESR-1996 US Greenfiber, ESR-2217 NuWool),
- Mineral fiber batt and blanket insulation meeting ASTM 665,
- Mineral fiber (blown-in) loose fill insulation meeting ASTM C764,
- Fiberglass wool engineered for resisting airflow to less than 3.5cfm/sq ft @50pa, and tested to ASTM C522 (e.g. JM Spider, Knauf Perimeter Plus)
- Rigid closed cell foam boards meeting ASTM C578, ICC ES AC12,
- Specific foam board ICC ES reports required for uncovered use (e.g. NER-681 Thermax,

Rigid Fiberglass faced insulation boards meeting ASTM C553, C612, and C 1136 for facing

6.0 INSTALLATION

6.1 AIRSEALING

Installation of air sealing materials shall follow the manufacturers' instructions, Massachusetts Building Code (780 CMR), and all other appropriate codes.

Prior to installation, test results shall be provided to PA vendor in ICC ES reports or UL listed detail where specific testing is required by code for a specific use. (For example, low density foam left exposed in an unoccupied attic space, cellulose fiber installed as an air retarder and fire-stop in a rated wall between units.) Approval by the local code authority having jurisdiction must be obtained in writing prior to installation for uses beyond the specific listing.

6.1.1 Performance Criteria

CONTRACTORS will clearly define where the pressure and thermal boundaries of the home are to be, and insure that access hatches, framing voids and chimney, plumbing and wiring chases between the conditioned space and unconditioned attics, knee walls and other buffer zones are tightly sealed.

Air sealing measures at all openings between intact building materials shall be continuous, durable, able to support all expected loads and impermeable to airflow as indicated by chemical smoke at a pressure difference of 50 Pascals.

6.1.2 Conditions for Materials Use

a. Air impermeable barrier materials and sealants shall be used within their listing and installed in conformance with all applicable codes and manufacturer’s recommendations.
b. Sealant materials applied to exposed joints in interior or exterior finish shall meet all performance requirements, blend in with adjacent materials, and be acceptable to the owner.
c. Backing shall be provided for any sealant installed in gaps wider than 3/8” whether exposed or covered and all joints shall be tooled.
d. Rigid barriers shall be cut to friction fit openings with gaps not more than 1” for foam sealant and extra material on edges for fasteners.
    I. Support shall be provided to prevent sagging.
    II. Larger enclosures of rigid foam or fiberglass board barrier material for pipes,

whole house fans, or fold down stairs shall be fastened and sealed at all edges with weatherstrip provided at operable joints and edges sealed to the substrate where fixed.

e. Only non-combustible rigid barriers such as sheet metal or cement board shall be used to bridge the clearance space to heat sources such as chimneys and metal combustion vents. Rock wool may NOT be used.
f. Only non-combustible sealants such as furnace cement or E 136 rated caulk shall contact solid fuel chimneys or oil vents; for gas vents high temp (500 F, 600F) silicone RTV approved for gas vents may be used to seal the gap between the rigid barrier and heat source.
g. In addition to the airtight non-combustible barrier and seal at the opening, a clearance dam is required to maintain 3” or greater clearance around the chimney or vent for the full height of the insulation. Unfaced mineral fiber meets this criteria but a folded metal collar 2-4” taller than the final height of the insulation, folded into the vent to close the top space and fastened at the bottom and vertical seam is recommended.
h. A minimum 6" clearance to single walled metal flue pipes shall be maintained to comply with BPI standards and code requirements. This includes kitchen exhaust ducts.
i. 1 part sealant foam is listed for sealing gaps and annular spaces around penetrations of up to 1-5/16” in width and 1.5” full depth of wood plate for firestop. *Firestop foam is combustible and not allowed for use in contact with heat sources.*
j. 2-part sealant foam requires backing for openings from 2” to 4” wide and infill of rigid barrier material for openings wider than 4”
k. Insulation must be kept 3” or more away from the sides of a non-IC rated recessed light fixture (including any wiring box or ballast) and no insulation is allowed above the fixture. Unless contractor provides the PA vendor signed documentation by a licensed electrician, all recessed fixtures shall be treated as non-IC rated. (PA vendors that allow different treatment for IC rated fixtures will provide additional requirements for treatment and documentation.)
    i. If an air tight box is installed to limit air leakage, it shall be sized for clearance from the fixture, taller than the adjacent insulation and with a non-insulating moisture permeable top of gypsum board or equivalent material.
    ii. If access does not allow installation of the box, 3” clearance from insulation is still required with no insulation allowed above.
    iii. The gap between the fixture and ceiling may be sealed with fire rated caulking.
    iv. For air tightness and insulation continuity, replacement with an airtight IC rated fixture or infill of the opening and replacement with a flush mount fixture are preferred recommendations.
l. Dimensional limits:
    i. Siliconized acrylic shall not be used in openings or cracks over 3/16" without a backer, and generally should not be used in openings or cracks more than 3/8".
    ii. Pure silicone shall not be used in openings or cracks over 3/8" without a backer, and generally should not be used in openings or cracks more than ½".
    iii. Foam shall not be used to span gaps or openings more than 1 ½" without a backer material.
m. Flexible air barrier or other sheeting materials approved for air sealing use shall not span gaps larger than 24” without the use of framing for support.
n. Foam sealant will not be used where exposed to sunlight or other ultraviolet sources. It will not be used near any heat producing device unless a clearance of 3” can be

maintained for double walled flue pipes and masonry chimneys, and 6" for single walled flue pipes.

6.1.3 Typical Air Sealing Locations

In every specified work area: locate, uncover and seal all building air leakage pathways between conditioned and unconditioned areas, as defined by each PA vendor.

These areas can include accessible attics, side attics, crawlspaces, unconditioned basements, attached garages, and leakage from basement to outside; gaps, penetrations and fixture openings that allow interior air into inaccessible roofs, slants and outside wall cavities; and major direct openings between conditioned space and outside.

Basements are typically semi-conditioned spaces. Air sealing between the basement and the living space is not warranted in the scope of work when basement has been determined to be outside the conditioned space.

6.1.4 Common air leakage details include but are not limited to:

- Dropped soffits, dropped ceilings and ceiling height changes
- Plumbing wet walls, duct chases, duct seams, joints and boot leaks
- Chimney and combustion vent chases
- Openings behind and under tubs, showers, and tub/shower enclosures
- Wall tops open into attic, gaps between gypsum ceiling and wall plates
- Annular space at wiring, pipe penetrations through plates, and at ceiling fixtures
- Floors open under kneewalls, walls open at level changes and gable ends
- 2nd story floors open to attached roofs over porches and additions or garages
- Inside framing open into attic stairs and landings,
- Pocket door framing open into floor above and exterior walls
- Seams and openings in walls and ceilings between attached garages and house
- Non-IC recessed light fixtures
- Bath and kitchen fans venting into the attic
- All joints seams and penetrations in surfaces without an air retarding membrane
- Gaps in tongue in groove paneling where angles change at hips, valleys, and where walls meet slants and ceilings.
- Acoustical tile and suspended ceilings with no gypsum
- Missing gypsum behind decorative ceiling light trays; built in cabinets in kneewalls
- Missing gypsum or open joints above decorative ceiling beams
- Gaps below baseboard and behind carpet nailing strip at subfloor joint to exterior wall
- Common wall openings between dwelling units
- Attic access openings, operable doors and hatches without tight weatherstrip
- Pull down attic access stair covers
- Rim joist junctions and gaps between sill and foundation.
- Utility penetrations and direct openings through foundation walls
- Openings in gypsum board above suspended ceiling and behind cabinets
- Openings between window and door assemblies and their respective jambs and framing

6.1.5 Confirmation of Air Sealing Effectiveness

Confirmation that air sealing is continuous across all openings in a specified area shall be

performed by visual inspection of air leakage locations, and one of the following methods:

- Visual inspection aided by a chemical smoke test during blower door operation,
- Whole building air leakage test.
    - Whole building air leakage test results as specified by PA vendor. The air leakage test shall be made following equipment manufacturer's instructions and in conformance to Standard CAN/CGSB 149.10-1986, ASTM E-1827-07, or ASTM E-779-03,or
- Infrared inspection of the area aided by blower door operation.
    - When performed on a specified area or whole house, infrared inspection shall be done when there is a 18° inside to outside temperature difference in accordance with ASTM C1060 (1997) and air leakage pathways determined using ASTM E1186 (2009).

6.2 DUCT SEALING/ DUCT INSULATION

Duct sealing and insulation improvements are currently approved measures through the Mass Save program. **See Appendix 16.5 for airflow testing guidelines**.

6.2.1 General

Duct sealing has many benefits including the potential to improved comfort, indoor air quality and better humidity control. Unlike a house or building, there is no lower boundary of air tightness for a duct system. When sealing ducts, it makes the most sense to seal leaks close to the air handler where the pressure is greatest first and then work to the extremities of the system. Any un-insulated section of the duct system located in unconditioned space should be insulated to current code requirements. Ducts should be sealed before being insulated. Existing duct insulation may be carefully pulled back using the procedure described in section 6.2.6 #6 to expose connections and joints that may then be sealed with duct mastic.

6.2.2 Locations and Use

For energy savings, only duct systems 50% or more in unconditioned space (measured by linear feet of ducts) should be evaluated for duct sealing and insulation. When assessing existing duct systems, ducts located in semi conditioned spaces like basements have proven to have marginal payback. Therefore it makes the most sense to seal ducts that are located in ventilated spaces such as attics and open crawl spaces, once the decision is made to seal a duct segment, all the openings in the duct system should be sealed using program approved materials.

6.2.3 Duct Sealing Materials Requirements

The following materials are approved for duct sealing:

1. Water based (latex) mastic conforming to UL-181A-M
2. Tapes listed and labeled in accordance with UL-181A-P for pressure sensitive or UL-181A-H for heat sensitive tape UL-181B-M.(Example: BUTYL mastic tape)
3. Aluminum Foil Tape (for use with metal duct work to plenum connections).
4. 2” roll mesh tape.(For openings in the duct system greater than ¼”)

6.2.4 Duct Sealing Installation Requirements

1. All joints, **seams** and connections should be sealed with duct mastic or approved duct sealing tape when no duct Insulation is present or will be removed and replaced as part of the work scope.
2. All connection points and joints should be sealed when insulation is present. **Seams located along the edges of the duct work will not be required to be**

sealed due to existing insulation barrier.

3. Any seam or hole in the duct system greater than ¼" will be backed with mesh tape and sealed with duct mastic.
4. Flex duct connections should be made with hard duct connectors, held in place with a vinyl tension strap. The connection between the inner liner and the hard duct it is connected too should be sealed with duct mastic.
5. Filter Slot door, should have an operable door that closes securely and is reasonably tight. If present filter slot does not have a door or one that will close properly than Aluminum tape should be used as a temporary blocker and the customer should be notified to install a more permanent solution.
6. Boot to floor, wall or ceiling connections for supplies and returns should be treated as part of air sealing work scope.

6.2.5 Duct Insulation Materials Requirements

1. Duct wrap with an R-value of 8 will be used to insulate ducts located in unconditioned spaces.
2. Tape made specifically for use on duct insulation (e.g. FSK Facing Tape, Aluminum Foil/Fiberglass Scrim on Polyethylene Coated Kraft Paper).
4. Plier stapler and staples
5. 10-14" cable (zip) ties

6.2.6 Duct Insulation Installation Requirements

1. Duct insulation will be installed by wrapping insulation around ductwork and attaching neatly using a plier stapler. Two inches should be added to the width of the duct wrap to provide the excess wrap needed to create a neat tight seam that can be stapled without compressing the insulation. Do not pull the insulation too tight as this will compress it and decrease its R-value. Seams should be stapled every two inches at most
2. No fiberglass will be left exposed. All seams and tears in the vinyl vapor retarder will be sealed using program approved tape (FSK Facing Tape, Material Aluminum Foil/Fiberglass Scrim on Polyethylene Coated Kraft Paper).
3. Flex duct insulation connections should be made with hard duct connectors, held in place with a vinyl tension strap.
4. No part of the duct system will be left un-insulated, including supply and return boots.
5. Floor joist bays used as return ducts will have duct insulation wrapped around 3 sides and secured near the top of each joist or to the subfloor on each side. Duct insulation must be in substantial contact with all sides of duct area.
6. **Systems with existing insulation** should have the insulation peeled back to expose connections and joints only. Joints and or connections occur wherever two pieces of duct were connected by installers. Joints and or connections in straight duct can be located by compressing the duct insulation until joints are felt. Once they are located the insulation should be cut neatly and peeled back far enough to expose the joint for mastic application. Once the ducts have been sealed, the duct insulation should be replaced back in its original location with no voids in insulation coverage. All insulation that was cut should be put back in place using approved tape to seal area that was opened to expose the connections or joints. If insulation was removed completely to better access joints and connections then additional materials such as cable (zip) ties or staples should be used to additionally support insulation to prevent insulation from becoming disengaged from ducts.

6.3 ATTIC INSULATION

Installation must meet or exceed the Massachusetts State and Local Building Codes.

Criteria for the installation of insulation include but are not limited to the additional standards set forth below.

6.3.1 Attic Air Sealing Confirmation

Before insulating the attic, the CONTRACTOR will confirm that all bypasses at chimneys, soil stacks, perimeter walls, dropped ceilings, kneewall floors and wall openings, non-IC recessed light enclosures, other attic air sealing is complete per section 6.1 above. If these areas are not properly sealed, CONTRACTOR must notify program to determine next steps before proceeding.

Recessed light fixtures shall be protected from contact with insulation as noted in section 6.1.2.k.

6.3.2 Attic Preparation

Confirm attic prep per ASTM C1015-06 and MA Basic Insulation Authorization including:

a. Clearance dams that maintain 3" space confirmed installed at all masonry or double walled metal combustion venting systems. Clearance dams must maintain 6" space confirmed installed at all single wall pipe combustion venting systems.
b. Clearance dams installed at attic access, bath fans, air handlers and between blown and storage areas.
c. Permanent damming shall be installed around all attic hatch covers in a manner that will not interfere with the opening of the hatch cover, and that when opened will prevent insulation from falling into the living area, and that will allow safe access into the attic.
    i. The dam shall be made of ½" thick or greater wood and be tightly sealed at the base and seams, or fiberglass batt laid flat on all four sides around the hatch, or other materials approved by PA designee.
    ii. Insulation surrounding the dam must equal the R-value of the rest of the attic space;
    iii. Insulation should not taper to the damming or be less because of the height of the dam.
d. Install vent chutes at all soffit vents and provide wind baffles or block under chutes,
e. Ensure that all exhaust equipment ducting is terminated to the outside of the structure.
f. Provide insulation thickness markers 1/300 sq ft for open blow area.

6.3.3 Attic Access Doors

a. Insulate and tightly weather-strip all attic access doors.
b. Fasten rigid insulation to access hatches. If infeasible, fiberglass batts may be used.
c. Provide minimum R-14 to hatches and R-10 enclosure at pull down stairs (with air seal gasket, (e.g., insulated attic stair cover) and behind walkup doors.
d. Rigid foam used shall be rated for exposed use in attics on ICC ES report, and meet Sections R-316.5.4 and 316.6 requirements of IRC 2009.
e. Provide latch, hook fastener, or other mechanical closure on vertical access doors to keep them tight against weatherstrip when closed.

6.3.4 Attic Venting

a. Provide attic venting per code if included in the approved Scope of Work.
b. Provide access openings to inaccessible attics where feasible.

6.3.5 Flat Attic Insulation

a. Blow in attic insulation level over entire area specified at the depth required to give the required settled R-value.

b. Use the number of bags to meet listed coverage per manufacturers' specifications.
c. Provide attic information card per ASTM C1015-06 and 16CFR 460 requirements.
d. The program will provide a form which the installer must sign, date and post in an easily visible location (on the electrical panel or a framing member adjacent to the attic access) showing the following information:
    i. Insulation material installed,
    ii. Installed thickness,
    iii. Coverage area,
    iv. Installed R-value,
    v. Number of bags used or pounds installed per FTC Rule 16 CFR 460.

6.3.6 Sloped Ceiling Insulation

Sloped ceilings (between kneewall and upper attic flat) may be dense packed per section 6.5.3 using cellulose.

6.3.7 Open Cavity Insulation

a. Install mineral fiber batt or blanket insulation in all open wall cavities or open floors to R- value in work scope.
b. Installation of blanket or batt insulation shall conform to ASTM C1320 with cavities completely filled with no voids, gaps or compressions.
c. Batt insulation MUST always be installed in full contact with the warm side air barrier.
d. Batt insulation installed in walls MUST always have a solid air barrier on all six sides of the cavity when access allows.
e. Batt insulation with a kraft or foil covering must be "face stapled" to the framing or friction fit.
f. Loose fill insulation (cellulose or mineral fiber) is allowed in open walls, floors open to below, when sprayed in or blown behind netting, rigid foam, drywall, or other barriers.

6.3.8 Rigid Foam Board

Where rigid foam board is installed over mineral fiber batt insulation or on another attic surface, use foam board listed for uncovered use in attic. As an alternative, install a thermal barrier or prescriptive ignition barrier per IRC 2009 R316.5.3 and MA code. In all cases follow manufacturer's installation requirements.

6.3.9 Floor Blocking

Where present, the kneewall floor joist opening from the attic floor to conditioned space under the kneewall shall be blocked airtight with a barrier sealed in place below the interior face of the kneewall.

6.3.10 Dense Pack Floor Insulation

At floored areas inaccessible to air sealing using barrier materials, CONTRACTOR shall densepack to retard airflow. Acceptable materials include:

a. Cellulose insulation at 3.5 lbs/cu ft or greater density;
b. Fiberglass wool tested for air resistance at 2.2 lbs/cu ft or greater density. If fiberglass wool is used, a product information cut-out from the bag must be included with the certificate to verify that material was tested to ASTM C522.

Methods can include lifting one floorboard to gain access to each cavity and inserting a 2 to 2-1/2" insulation hose into the floor for faster production. Material use shall be confirmed to

match bags used per unit area to achieve density targets.

Flooring that has been removed for access to install insulation shall be replaced to match original site condition. Flooring that has been drilled shall be repaired with wooden plug matching the hole diameter and set flush to the top of the floor.

6.4 ATTIC VENTING

6.4.1 Provide attic venting per code with roof, soffit, gable, ridge vent or a combination.

6.4.2 Follow all manufacturer's instructions and applicable codes. Flash properly, seal and fasten to maintain roof and cladding drainage.

6.4.3 CONTRACTOR shall provide documentation showing the manufacturer's net free air rating for any products used.

6.5 CLOSED SIDEWALL INSULATION

6.5.1 Performance criteria

In existing closed cavities where air sealing is not feasible, densepack insulation into every cavity to prevent settling with no voids or escape routes for heat and get an extra benefit of reduced hidden airflow and protection that wraps around the whole house and connects to the airtight attic.

6.5.2 Pre-Work Inspection Criteria

Pre inspections are to be performed in compliance with ASTM C 1015 and MA Insulation Authorization. Inspect all walls for pre-existing hazards including:

- Moisture entry and buildup,
- Weak or damaged interior finish materials,
- Hazardous wiring
- Potential heat sources in or adjacent to wall cavities.

Confirm that cavities are intact and openings into the house are blocked.

6.5.3 Wall Insulation Procedure

a. Gain access to every wall cavity.
b. Pack insulation uniformly into all corners.
c. Confirm the number of bags and pounds of material used for a specified area of 4" wall cavities is consistent with:
    i. 3.5 lbs/cu ft (1lb/sq ft) for cellulose, or
    ii. 2.2lbs/cu ft (0.6lb/sq ft) for fiberglass wool tested for airflow resistance per ASTM C 522.
d. Repair holes that have been drilled.
    i. Interior holes shall be plugged and an initial coat of suitable patching material shall be applied.
    ii. Exposed exterior holes in wood siding shall be made weather tight with a wooden plug and patched with exterior grade filler.
    iii. Hidden holes (beneath siding) shall be plugged and covered to make the existing drainage plane and other weather barriers complete.

6.5.4 Wall Cavity Confirmation

Confirm cavity pack is effective and the machine adjustment is within limits by:

a. Testing airflow at 50 pa with smoke at a completed but uncovered installation hole, or
b. Testing airflow with chemical smoke at first application hole in completed cavity while blowing adjacent cavity.

6.5.5 Inspection

a. Void areas greater than 10 sq. ft. per 1000 sq. ft. of achievable wall area, as determined by Program quality assurance procedures, shall be filled by the CONTRACTOR at no additional cost to the homeowner or the program. When instructed to do so by the Program inspector, the CONTRACTOR will contact the customer to correct job deficiencies within 14 days of notification.

6.6 FLOOR INSULATION

Floor systems that are determined to be the thermal boundary will be insulated and air sealed in accordance with Massachusetts Building Code and Mass Save Application Details.

6.6.1 Performance criteria

An air barrier shall be created across subfloor by sealing large gaps and openings including any ducts in unconditioned space. Floor insulation shall cover all exposed subfloor to level specified for as continuous a thermal barrier as possible.

6.6.2 Preparation

a. Air sealing of a crawlspace or basement ceiling shall be performed per section 6.1 above and the MA Basic Air sealing Authorization.
b. Inspection before installation shall be made in conformance with ASTM C1320-09.
    i. Inspect the attic, crawlspace, or other area to be insulated, postpone installation until:
        - Potentially faulty wiring is corrected and confirmed OK by a licensed electrician
        - Moisture damage and/or entry is corrected and sources controlled
        - Ground cover is in place over exposed soil in crawlspaces wherever accessible. Uncovered conditions must be disclosed to customer.
            - If an accessible dirt floor area is vented per code, a vapor barrier is still recommended.
            - If a dirt floor area is deemed inaccessible AND insufficiently vented, then sufficient ventilation must be added OR the crawlspace must be made accessible, UNLESS the exposed dirt floor comprises less than 10% of the total footprint of the building.
        - All openings allowing air between conditioned space and attic are sealed
c. Confirm that caulk, gasket, or other sealant is installed at penetrations of the interior wall or floor including plumbing, electrical, heat registers, and grills.

6.6.3 Installation

a. Installation of mineral fiber batt or blanket insulation in open cavities shall be made in conformance with ASTM C 1320 and MA code. Exception, facing if any shall be in direct and complete contact with interior surface - no inset stapling allowed in floor.
b. Installation of cellulose or fiberglass blowing wool into closed cavities shall be made in conformance with attic floor insulation methods above 6.3.11 or wall insulation in 6.5.
    - Access shall be gained into every cavity with least damage possible and lead

safe process in place for painted surfaces in homes built prior to 1978.
- material use per unit area shall match weight required to give target densities of 3.5lbs/cu. ft. for cellulose and 2.2lbs/cu. ft. for fiberglass wool tested for airflow resistance

c. Install batt or blanket insulation to:
   - Maintain 3" clearance from non-IC rated lights and heat sources, none placed above
   - Completely fill every cavity to required depth or more
   - Where double layers are installed over floors, cross the layers with no gaps between layers

d. Where batt fiberglass is installed beneath floors, insulation shall be in full contact with floor above using wire, screen, nylon mesh fastened in place
   - Fit to length and placed snug to edges without gaps, voids or compressions
   - Cut and fit around all cross-bracing, outlets, wiring, into narrow cavities
   - No exposed facings rated higher than flame spread 25 left
   - Where vapor retarder is installed, place to warm-in-winter side
   - Never place insulation between piping and the warm surface, to prevent freezing.

6.6.4 Rim Joist Insulation

a. When approved within the scope of work, rim joist framing determined as the thermal boundary shall be insulated to a minimum of R-10 with spray polyurethane foam or rigid foam board and be sealed as defined in the air sealing section of this document. Where spray foam or rigid board are infeasible, other insulation materials may be used, such as 1-part foam with fiberglass batt.
b. CONTRACTOR will confirm no insulation is placed between piping and the warm side of the rim joist framing to prevent freezing.

6.7 FOUNDATION INSULATION

When approved within the scope of work, foundation walls that are determined as the thermal boundary may be insulated to a minimum of R-10 and be sealed as defined in the air sealing section of this document. Prior to application, confirm that roof runoff, surface water, and ground water are drained properly.

6.7.1 Performance criteria

Basement or crawlspace shall be brought inside the thermal/pressure boundary by installing rigid insulation at inside of foundation wall, sealed from subfloor to below grade.

6.7.2 Preparation

Primary air leakage shall be substantially reduced by sealing gaps at the rim joist, sill and surface of the foundation wall.

6.7.3 Installation

a. For basements attach R-5 or higher foil faced isocyanurate board listed for uncovered use to foundation wall, full height; and cut pieces to fit into rim joist and across sill. Seal gaps in foam board edges at rim and sill; and tape seams in foam board on wall
b. For crawlspaces attach R-5 or higher XPS rated for uncovered use in crawlspaces to

foundation wall, to 24 inches below grade; and cut and fit pieces to fit into rim and across sill. Seal gaps in foam board edges at rim and sill and tape seams in foam board on wall.

c. If XPS foam board is installed in a basement beyond the listing for uncovered use, follow a. and cover foam with thermal barrier

6.8 WEATHERSTRIPPING

Approved window weatherstripping shall be attached as per manufacturers' instructions to meeting rail, sill & sash channels. (Note: if applicable, PF-524-AB may be stapled to the sash itself instead of sill & sash channels.) Door weatherstripping installed on interior of doors will be stapled to top and both sides of door. Approved door sweeps shall be attached as per manufacturers' instructions to bottom of door.

7.0 WINDOW REPLACEMENT

Windows shall be installed according to manufacturer's instructions to assure proper operation and moisture protection. Rough openings shall be air sealed to be air tight prior to installation of casings and sills. Newly installed windows shall be inspected and verified for proper operation of all hardware and locking mechanisms.

Refer to EPA guidelines and local codes for requirements for retrofit window installations in locations where lead and/or asbestos may be present.

8.0 HEATING SYSTEM REPLACEMENT

The furnace or boiler that is to be installed must meet the minimum AFUE ratings set by the Mass Save program. Installation is to be completed in accordance with the manufacturers' instructions while following the State and Local Codes. Any questions should be communicated with the PROGRAM and/or Authority Having Jurisdiction.

9.0 AIR CONDITIONING SYSTEM MEASURES

The air conditioning system that is to be installed must meet the minimum energy ratings set by the Mass Save program. Installation is to be completed in accordance with the manufacturers' instructions while following the State and Local Codes. Any questions should be communicated to the PA vendor and/or Authority Having Jurisdiction.

10.0 MECHANICAL VENTILATION

Contractor is responsible for ensuring that the house meets BPI standards for fresh air ventilation.

11.0 LIGHTING MEASURES

The lighting unit that is to be installed must meet the maximum energy use set by the Mass Save program. Installation is to be completed in accordance with the manufacturers' instructions and fixture restrictions.

12.0 DOMESTIC HOT WATER MEASURES

The domestic hot water unit that is to be installed must meet the minimum Energy Factor ratings or energy efficiency ratings set by the Mass Save program. Installation is to be completed in accordance with the manufacturers' instructions while following the State and Local Codes. Any questions should be communicated with the PROGRAM and/or Authority Having Jurisdiction.

13.0 QUALITY ASSURANCE

Quality Assurance (In-field Quality Assurance Inspections)

Customer Discussion
Visual Inspections and Diagnostic Tests
Inspection Documentation
Contractor Follow-up

The program has the goal of performing on-site in-process and post installation quality assurance inspections where major measures have been installed.

Any issues identified during on-site inspections will need to be successfully addressed prior to release of CONTRACTOR payment.

Contractor Evaluation

CONTRACTORS will be evaluated on an ongoing basis throughout the Program Year based on work quality, customer service, and quality of program documentation. CONTRACTORS should expect random and unannounced quality control evaluations on a minimum of 10% of their jobs. This is in addition to the standard Final Inspections performed on all work. Evaluations will be performed by Final Inspectors, Field Supervisors, Program Managers, and/or the Quality Control Department, using a standard evaluation format (see Evaluation Form Attachment).

CONTRACTORS who repeatedly perform poorly on evaluations, and CONTRACTORS who repeatedly receive fails (excluding Assessor fails) on jobs, are subject to probationary actions and additional training as determined by the PA Vendor. CONTRACTORS who fail to improve after their probationary period are subject to suspension and/or termination as UTILITY Approved CONTRACTOR.

In addition, CONTRACTORS who repeatedly fail to meet timelines, generate an undue number of CUSTOMER complaints, and fail to adequately fulfill warranty obligations are eligible for suspension and/or termination.

14.0 Program Sponsors

Berkshire Gas
Cape Light Compact
Columbia Gas of Massachusetts
Eversource
Liberty Utilities
National Grid
Unitil

15.0 REFERENCES:

Documents Published by the Canadian General Standards Board (CGSB)
Place du Portage, III, 6B1Gatineau,
Québec, K1A 1G6 Canada
Telephone: (819) 956-0425; Fax: (819) 956-5740; www.pwgsc.gc.ca/cgsb
CAN/CGSB 51.71-2005 Depressurization Test

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NFPA 54-2006, ANSI Z223.1-2006 National Fuel Gas Code

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International Residential Code - 2006

16.0 INFORMATIVE APPENDICES

16.1 Health and Safety Guidance
16.2 Contractor Performance Standard
16.3 K &T Form 2008
16.4 Application Details
16.5 Duct Sealing and Duct Insulation Guidance

These Appendices provides general information about safety issues for the Contractor and homeowner, as well as sample documentation that contractors may use.

APPENDIX 16.1
HEALTH AND SAFETY GUIDANCE

ASBESTOS

Health/Safety Concerns: The US Environmental Protection Agency's description is: "The most dangerous asbestos fibers are too small to be visible. After they are inhaled, they can remain and accumulate in the lungs. Asbestos can cause lung cancer, mesothelioma (a cancer of the chest and abdominal linings), and asbestosis (irreversible lung scarring that can be fatal).
Symptoms of these diseases do not show up until many years after exposure began. Most people with asbestos-related diseases were exposed to elevated concentrations on the job; some developed disease from exposure to clothing and equipment brought home from job sites."

Sources in Homes: Until its use was strictly limited in the 1970s asbestos was used in a large number of building products. The most common applications that could involve interaction with weatherization personnel include:

- Boiler insulation
- Furnace insulation
- Steam boiler insulation
- Pipe insulation
- Duct insulation
- Asbestos cement sidewall shingles
- Vermiculite insulation
- Floor tiles (9x9)
- Acoustical

materials To

minimize exposure:

- Learn to recognize suspected asbestos containing materials. (Joints look like a plaster cast.)
- Avoid disturbance of possible asbestos containing material that is friable. Friable asbestos is "any material containing greater than one percent asbestos by weight or volume that hand pressure can crumble, pulverize or reduce to powder when dry, or any asbestos containing materials that can reasonably be expected, as a result of the demolition or renovation to be undertaken, to become pulverized through breaking, chipping, crumbling, crushing, or other means of rendering fibers available to the ambient air."
- DO NOT CONDUCT A BLOWER DOOR TEST ON A BUILDING WHERE **FRIABLE** MATERIALS SUSPECTED OF CONTAINING ASBESTOS IS PRESENT. In the case of Steam boilers with radiators, asbestos may still be in wall cavities.
- When Asbestos Cement sidewall shingles are removed and reinstalled as part of a wall insulation procedure, the CONTRACTOR must complete the work in compliance with the requirements of the Massachusetts Department of Environmental Protection.

This information is a general program guidance for Weatherization personnel and does not provide the detailed specifications for the proper handling of possible asbestos

containing material. State law concerning asbestos abatement can be found in Commonwealth of Massachusetts Department of Public Health Asbestos Abatement Regulation; CMR 410.353 and 453 CMR 6.00, THE REMOVAL, CONTAINMENT OR ENCAPSULATION OF ASBESTOS
(http://www.alewife.org/asbestos/453cmr6.txt)

LEAD

Health/Safety Concerns: Ingestion or absorption of lead into the blood stream is a serious health hazard causing brain damage over a period of time. This can be a particularly serious problem with small children, who may ingest paint chips or flakes, or dust contaminated with lead products.
Serious learning disabilities can result from excessive lead levels in the bloodstream. Workers can be contaminated in the same way as children, but are most likely to be exposed by breathing dust contaminated by sanding or planning surfaces that contain lead based paints.

Sources in Homes: Lead paint is the primary source of lead in a home that was built prior to 1978, when lead became prohibited as an ingredient in paints. Contamination occurs when lead paint is disturbed by drilling, sanding, chipping, or flaking. Lead is also present in the solder used in plumbing pipe joints. Lead can leach into potable water, particularly when water is stagnant in the pipes for a length of time. To a lesser degree, lead contamination can result from inks used in newspapers and magazines.

To minimize risks to CUSTOMERS and Weatherization personnel:

DO NOT DISTURB LEAD PAINT UNLESS ABSOLUTELY NECESSARY AND THEN ONLY BY INDIVUALS CERTIFIED TO COMPLETE WORK USING LEAD-SAFE PROTOCOLS.
CONTRACTORS should assume that any paint on windows and doors in homes built before 1978 contains lead unless it has been verified otherwise. **WHEN THERE IS A POSSIBILITY OF DISTURBING LEAD DURING THE WEATHERIZATION PROCESS, CONTRACTORS MUST COMPLETE THE WORK IN A LEAD-SAFE MANNER IN ACCORDANCE WITH EPA AND MASSACHUSETTS DIVISION OF OCCUPATIONAL SAFETY REGULATIONS.**

Worker Protection: Detailed specifications regarding the health and safety of workers in the construction industry can be found in Construction Industry OSHA Safety and Health Standards (299CFR 1926/1910) and the specific worker safety requirements in the EPA's "Lead; Renovation, Repair, and Painting Program" (LRRPP) Final Rule. **Also refer to Section 5.13 Lead- Safe Weatherization within the Northeast Weatherization Field Guide.**

ALL CONTRACTORS WORKING IN THE MASS SAVE PROGRAM MUST RECEIVE LEAD- SAFE WEATHERIZATION TRAINING, BECOME CERTIFIED PER USEPA REGULATIONS, AND FOLLOW ALL RELEVANT TECHNCIAL AND ADMINISTRATIVE PROCEDURES
pursuant to 40CFR Part 745.225.

LEAD SAFE WEATHERIZATION INFORMATION

EPA and Massachusetts Division of Occupational Safety are the guiding authorities for Mass Save work.

When Should Lead-Safe Practices be followed?

According to the U.S. EPA, Lead-Safe practices shall be followed when all three components of the following set of criteria are met:

1. The dwelling was constructed before 1978
2. The dwelling has not been determined to be lead-based paint free, and
3. Either, the amount of disturbed lead-based painted surface exceeds six square feet per room of interior surface or twenty square feet of exterior surface.

Renovation Notice About Lead Safety

Federal law requires that owners and occupants of a house or apartment built before 1978 receive the EPA pamphlet, “Renovate Right Important Lead Hazard Information for Families, Child Care Providers and Schools”, prior to the start of the renovation work. A written notification of receipt from an adult resident of the home must be received. If this receipt cannot be obtained, this requirement can be satisfied by sending the occupant the pamphlet by certified mail with the receipt included in the client file.

Post Weatherization Cleanup

Clearance testing is not a requirement for weatherization work and is not an allowable expenditure of DOE funds. Cleanup at the completion of Lead-Safe Weatherization work requires the use of a HEPA vacuum, (a HEPA filter in a standard vacuum is NOT an acceptable alternative) wet cleaning methods, a visual inspection and the collection and disposition of any dust, debris or chips with the rest of the jobsite waste.

Certification

All Weatherization Contractors must complete an EPA approved Lead- Safety RRP training and certification prior to participating in the Mass Save program. Per USEPA requirements, a certified individual must be on site to ensure proper work.

Pollution Occurrence Insurance Coverage

The following is DOE’s most recent guidance concerning Lead-Safe Weatherization. While many of the mandatory regulatory requirements do not begin until April 1, 2010, DOE considers this guidance a “Best Practice” for Lead-Safe Weatherization work and the techniques outlined must be used as a guideline for working safely in homes that may contain lead.

WIRING

Safety Concerns:

- Electric shock while working around wiring in all areas of homes.
- Fire resulting from arcing between loose wiring connections.
- Fire resulting from lack of dissipation of heat due to insulation around heat producing sources (i.e. recessed light fixtures).
- Integrity and safety of knob and tube wiring.

To Minimize Risk:

- Workers must demonstrate caution when working around wiring.
- Verify proper wiring connections and proper fusing.
- Verify proper blocking out of insulation around heat producing sources.

APPENDIX 16.2
CONTRACTOR PERFORMANCE STANDARD

The Performance Standards Subcommittee has developed a list of prerequisites that the group is proposing as a set of requirements for all Home Energy Services Program representatives to follow.

- Before Arriving On Site
    - Vehicle Identification Requirement - The company name should be included on all company vehicles.
    - Provide a confirmation to all customers before arriving on site. This could be an email, letter or phone call confirming the appointment.
- Crew Chief Requirements - Crew Chief should be the first and last interactions with the customer
    - Crew Chief should introduce himself/herself to the customer showing some form of identification: business card, ID badge or other identification that associates the Crew Chief as the Mass Save Participating Contractor. The Crew Chief should also be providing an overview of the work that is going to be performed and where they will be doing work.
    - At the end of each day, the Crew Chief should conduct a walk-through of the home making sure the customer is satisfied with the cleanliness of the home and to review the work completed. The Crew Chief should also provide a contact number for additional questions.
    - Crew Chiefs should inform the customer that they may request an Inspection of the work and may be contacted to participate in surveys or inspections following the completion of the work.
- General Contractor Crew Requirements
    - Smoking - Contractor should be out of direct sight of the customers. This could include smoking in the company vehicle, personal vehicle or across the street.
        - All cigarette waste should be properly disposed of and removed from the property each day.
    - Crew Clothing - Shirt and pants are required to be worn at all times while on site.
        - Shirt will not contain vulgar or offensive language/pictures.

- All clothing and general appearance should be representative of the high standards of the Mass Save Home Energy Services Program.

- Shoes

- Always comply with OSHA requirements for footwear.
- Follow customer's expectations for wearing footwear in the home, including:
  - Wearing booties to eliminate tracking dirt into house when necessary.
  - Properly protect travel areas from foot traffic.

- Ask homeowner for permission before using the restroom facilities.
- The crew should not eat food in the customer's home. The crew may eat in the driveway/truck and should clean up after themselves.
- Phone usage inside the home should be limited to work related calls only. Each company is responsible for maintaining their own employee requirements regarding phone use, but should not interfere with their work or customer service.
- Each member of the crew is expected to refrain from any language or actions that could be construed as offensive, harassing, intimidating, and/or demeaning while at a customers' property.

- Customer/Condition of House
  - No trash will be left on property (neither inside nor outside home)
  - Leave customer's property in the same condition as when the work started.
  - No graffiti will be permitted on the customer's property at any time.
  - Working Hours - Unless authorized by the customer, crews will work during normal business hours and all crews must follow all local ordinances
  - Customers should not be in the general area when work is being completed.

APPENDIX 16.3
KNOB & TUBE WIRING

During the Energy Survey of your home, indications of "knob and tube" wiring were found. This old style of wiring involves individual wires that are run through walls and ceilings in a house, with ceramic "knobs" and "tubes" to prevent contact with wood framing. The knob and tube wiring that has been noted *may or may not appear to be active*. Even if the observed wiring appears to be inactive, there may still be active knob and tube circuits hidden inside walls or other inaccessible areas of the house.

Program guidelines require that you have the home checked by a licensed electrician and certified as being ***free of all active knob & tube wiring***, before insulation and/or air sealing work can be done. Your electrician should fill out and submit a copy of this document to Program Designee in order to verify the absence or inactivity of the knob and tube wiring in the areas of your home where we are proposing insulation to be installed. **Due to the liability involved in signing such a form, we suggest you show or describe this form to your electrician before hiring him to inspect your home to be sure he/she is willing to sign it.** Your home could benefit from insulation and/or air sealing in the:

- ☐ **Attic**
- ☐ **Walls**
- ☐ **Basement**

**** Only after this certification is received by Program Designee can a Contract be issued for energy saving insulation and/or air sealing work. ****

Electrician's Certification
(This form is invalid when any qualifications or alterations are added.)

Company Name & Address _____

_____

Electrician's Name _____ License # _____

I have performed an inspection of the wiring at the home of:

_____ at _____ in _____
(Owner's Name) (Street Address) (City)

Upon completion of my inspection I have found that there is no active knob and tube wiring in the area(s) noted below.

☐ Attic ☐ Walls ☐ Basement

Electrician's Signature _____ Date _____

APPENDIX 16.4

APPLICATION GUIDANCE

This Appendix is provided for additional guidance to the Contractor, and offers general information about materials and installation procedures. It is provided for informational purposes.

Caulks and Sealants

1. Locations and use of caulks and sealants are governed by cost-effectiveness standards and procedures. The proper caulk will be matched to the location where it is applied. Consideration will be given to durability, paintability, adherence, color, toxicity, flammability, etc.
   i. Siliconized acrylics will generally only be used in interior locations or where paintability is important. When used in visible areas, customer must approve the application, and see a sample before continuing. Clear acrylics, due to their shiny appearance, must be used only where appropriate, and should be approved by the customer prior to use in visible areas. Clear acrylics should be avoided where possible due to greater shrinkage.
   ii. Pure silicone will generally be used in exterior applications, unless paintability is needed. Pure silicone will be used anywhere that sealants are needed between wood and metal, wood and concrete, or other materials with differential expansion as moisture and temperature vary, or where greater flexibility is needed.
2. Caulking is performed on the interior of the dwelling for general air leakage and to prevent moisture penetration into wall cavities.
3. Caulking is performed on the exterior of the dwelling to prevent bulk moisture from entering the envelope of the building and to seal areas of air leakage.
4. When appropriate, windows will be caulked along the full perimeter of the interior (or exterior), including sill area, side stops, apron, and casings.
5. When appropriate, doors will be caulked along the interior (or exterior) casings and door jambs/stops.

Cellulose Insulation

1. Cellulose insulation from most manufacturers is available in at least two grades that are characterized by the fire retardant added to the insulation. The fire retardants are usually 1) a mix of ammonium sulfate and boric acid or 2) boric acid only (termed “borate only”). Mass Save currently accepts both grades.

Insulation Baffles

1. When soffit vents are installed or existing, baffles shall be installed in the space connected to the soffit vents in such a way that the top plate can be insulated. Where possible, a clearance of 2" from the top of the baffle to the underside of the roof sheathing shall be provided in accordance with local building codes. Blocking should be permanent, mechanically fastened at sides and at bottom, and ensure the free movement of air through soffit vents into the attic, but not allow the air to "wind wash" the insulation and reduce its effectiveness. It should be rigid enough to restrain loose-fill insulation from congesting the soffit vents at the eaves and obstructing ventilation.
2. Baffles should be installed per work scope. These should allow air to flow from soffit or kneewall area into peak. Baffles must be mechanically fastened at sides and at bottom

and be carefully fit with insulation packed in place at the bottom to prevent wind intrusion into or under insulation. Flexible Styrofoam baffles may be used for very low pitch roof areas.

Attic Access

1. When ready access to the attic is not available through an existing opening, access to attic areas should be gained from the exterior through attic vent openings when possible. If this is not feasible, then the following criteria shall be used for access openings:
   a. Surface Openings: Cut existing wall board halfway on two studs (preferably through a closet). When closing the opening, the new materials must be flush with existing wall material and taped and covered with one coat of joint compound.
   b. Plywood Openings: Cut existing wall between two studs. Close opening with 1/2 plywood (G1S/AC) with four (4) 1 1/2" x 8 flat head wood screws secured into studs.
   c. Finish Openings: Cut existing ceilings. Head off opening. Install 2 1/2 casing around rough opening. Allow a 3/8" reveal into opening to receive 1/2" plywood (G1S-AC) to complete opening. Plywood cover to be weather-stripped and insulated. Casing to be mitered neatly.

2. In attics with existing fiberglass batts, remove the batt in the last joist bay on any gable end or other perimeter configuration that runs perpendicular to strapping ends. This space should be dense packed with blown-in cellulose or fiberglass wool tested for air resistance to reduce cavity air movement at the inaccessible floor wall joint.

Attic Ventilation

1. Do not install insulation in an attic space unless adequate and permanent ventilation is installed.
2. Adequate cross-ventilation shall be maintained above all attic insulation by providing both low and high vents or gable end vents where possible. One square foot of net-free vent area (NFA) shall be provided for every 300 ft2 of attic area with 50 to 60% of the vent area located near the roof ridge and 40 to 50% located near the eaves. One level of venting may be used provided that adequate cross ventilation can be maintained.

NOTE: Although the use of window vents is allowed, the vents must be permanently fixed and must meet the minimum requirements for free vent area as noted above.

3. Ventilation should be improved wherever reasonable and practical to meet current code requirements when attic insulation is installed. The details of the types of vents and where they may be practically installed on each specific house varies. Consideration should be given to the type and location of vents to provide as much cross ventilation as possible for the specific application depending on existing conditions and retrofit options.

Sidewall Insulation

1. Pre-Installation Requirements: Prior to starting a job, an interior and exterior inspection must be conducted by Contractor to determine any potential problem areas. These problem areas must be identified and addressed prior to working on that area. Examples of some problem areas are recessed radiators, duct work in wall cavities, recessed bookshelves, stairways on exterior walls, loose or cracked plaster on walls, poor siding, pocket doors, chimneys, etc. Check wall areas for wall hangings that should be removed

prior to working on walls. The process and the work that is to be performed should be explained to the CUSTOMER. Any potential problems discovered should be discussed with a CUSTOMER before commencing work.

2. Inspect cavity or framing detail for wiring, piping or ductwork. Do not densepack ductwork or space containing unsealed ductwork, or isolate plumbing from house – provide a sealed barrier continuous to adjacent airtight cavities or building element. Provide wood or foam plugs in sheathing. Repair openings made in weather barrier, replace siding and refasten with matching or larger fasteners. Touch up nail holes with silicone based sealant.
3. Installation Procedures
    a. All wall insulation shall be installed through holes with minimum diameters of 2 1/8" or greater, i.e. large enough to accommodate a fill tube. Exception: wall cavities less than 12" in height.
    b. Use of a fill tube to ensure consistent insulation coverage and density is strongly encouraged. Usually one hole is required per cavity, located to allow the fill to reach both ends of the cavity, with additional holes required if there are obstructions in the wall cavity.
    c. Contractor shall only use equipment compatible with the insulation material used or an all fiber machine. Contractor shall follow the manufacturer's recommendations for air pressure and density to achieve dense pack standards. Most small airlock machines are suitable if designed and maintained to provide at least 80 inches of water column or 2.9 PSI static air pressure when operated at full air with the outlet blocked and no feed. Dense pack requires at least 3.5 pounds per cubic foot or higher with a cavity depth over 4".
    d. Keep a record of the number of bags used to insure the installed insulation conforms to the manufacturer's recommended coverage shown on the material label, 1 pound per square foot for 2x4 wall framing**.** Certificate of Insulation that lists the bag counts for each area that was insulated must be posted upon completion of work.
    e. Do not leave open holes in wall overnight. Any holes must be plugged before Contractor leaves work site. All drilled wood surfaces must be plugged with a wooden plug. Other drilled holes may be plugged with Styrofoam plugs.
4. Drill and Plug (D&P) Applications.
    a. Exterior drill and plug applications on painted surfaces must be completed in the following manner:
        i. After installation, a plug must be inserted so it is flush or slightly (1/16") recessed. At edge irregularities apply one or two coats of an exterior rated filler (Durham Rock Hard wood putty, DAP exterior vinyl spackling or equivalent.)
        ii. This procedure also applies to drill and plug applications on windowsills, frieze boards, and entrances. Note: drilling window sills creates a serious water intrusion risk if not made watertight and should not be performed where a pan flashing or sill wrap is in place. Do not drill sills on homes built since 1990. Foam or urethane sealant below the surface plug may reduce water entry but cannot return integrity of pan flashing.
    b. Exterior drill and plug applications on stained surfaces must be completed in the following manner:
        a. After installation, insert a plug so that is it flush with the existing siding. The plug should be installed by placing a block of wood over the plug and tapping it until the plug is flush with the siding.
    c. Interior drill and plug applications must be completed in the following manner:
        a. After installation, insert a plug so that it is (3/8") recessed. Apply 1-2 coats

of setting joint compound, Durabond 90 or equal, patching material or a plaster repair product filling just flush to the existing surface.

b. Some examples of this application would be exterior walls (not done from the outside), stairway walls, garage ceilings, and slopes.

Post-Installation Procedures

The Contractor shall review the entire job to ensure that all aspects of the job are completed. Before leaving the work site, the Contractor shall assure:

1. All the siding repaired and/or reinstalled
2. Shutters are reinstalled
3. The outside work area and yard are cleaned up to pre-existing conditions
4. The basement/house is cleaned of all debris
5. The client is satisfied with the quality of the work
6. The Program incentive application is complete with all documentation attached
7.

Weatherstripping

1. All weatherstripping will be permanently installed with fasteners (tacks, staples, brads, etc.) and will make positive contact between surfaces to prevent air leakage.
2. Window weatherstripping
    a. "Three-sided:" LOWER sash channels, & sill; or, if window has spring loaded channels: top, bottom and meeting rail.
    b. "Four-sided:" LOWER sash channels, meeting rail & sill
    c. "Seven-sided:" UPPER & LOWER sash channels, meeting rail, sill & head jamb
3. The weatherstripping will form an air tight seal when the window is closed and latched. A small bead of caulk will be applied as necessary to prevent air leakage behind the weatherstripping
4. The weatherstripping will not interfere with the smooth operation of the door or window.
5. Attic hatch or scuttle openings
    a. Weatherstripping will be permanently affixed to hatch or framing. Generally "Q-lon with carrier" or equivalent is preferred.
    b. A positive closing mechanism will be installed on the hatch if needed.
    c. Existing access to the attic will be maintained.
    d. In the case of drop down folding stairs, an air tight, insulated cap will be built over the opening.
    e. Kneewall access doors will be treated like attic hatch doors whenever possible.

Floor Insulation

1. Locate and note the pathways that plumbing, wiring, heat runs, air return runs and gas lines take through the enclosed floors. Also note any recessed light fixtures in these floors or in nearby floor areas which share the same joist cavities. Take steps to assure that the installation of insulation will not damage or in any way hinder the normal function of those services. In some cases, cavities or groups of cavities may have to be left uninsulated.
2. Insulation should be blown into enclosed floors to capacity.
3. When the drill and plug method is used on garage ceiling, the holes must be plugged and finished with a spackle type compound flush with the ceiling.
4. When the drill and plug method is used on exterior floor overhangs, the holes must be plugged and finished with an exterior wood filler flush with the exterior surface.

APPENDIX 16.5

DUCT SEALING AND DUCT INSULATION GUIDANCE

16.5.1 DUCTED AIR DISTRIBUTION

The forced-air system consists of an air handler (furnace, heat pump, air conditioner) with its heat exchanger along with attached ducts. The annual system efficiency of forced-air heating and air-conditioning systems depends on the following issues.

- Duct leakage
- System airflow
- Blower operation
- Balance between supply and return air
- Duct insulation levels
- System location

16.5.2 Duct Sealing Eligibility Sequence of Operations

The evaluation and improvement of ducts has a logical sequence of steps.

- **Determine whether more than 30% of the ducts are located outside of the conditioned space**
    - Only duct systems located more than 30% outside of conditioned space are eligible for duct sealing
    - To determine if a duct system is more than 30% outside of the conditioned space, the total length of the duct system and the length of the system in conditioned space should be measured with a tape. If the length of duct in conditioned space is less than half of the total length, the duct system is eligible for duct sealing

- **Evaluate the ducts visually for air leakage/condition and decide whether duct-sealing is needed.**
    - Only duct systems with an evaluated leakage category of “some observable leaks” or “significant leaks” are eligible for duct sealing. These terms are defined in Section 16.5.3.
    - Only duct work that has properly attached connections and whose air flow has not been compromised due to crushed ducts.

NOTE: If the duct system has ducts that are crushed or improperly attached/disconnected to the point that the Energy Specialist believes that the system cannot be adequately sealed without first fixing ductwork, then refer the

customer to a program approved list of HVAC contractors to evaluate the duct systems condition.

- **Determine if the system airflow meets program requirements for proper flow.**
    - *Only* systems with airflow CFM falling within program recommended airflow rates are eligible for duct sealing.
    - *Only* Duct systems with accessible filter slots or single return grilles will have its' airflow measured using the True Flow Plates
    - Duct airflow can be assessed using the **Temperature Rise** method provided that the system is **HEATING ONLY**. All systems with **COOLING** must have a TRUE-FLOW test in order to qualify to be duct sealed.
    - See section 16.5.4 for details on performing airflow measurements with True Flow Plates or the temperature rise method.

Additional duct systems that should not be evaluated for duct sealing opportunities are as follows:

- Duct board systems are not eligible for duct sealing under this program
- High velocity systems are not eligible for duct sealing under this program
- Systems insulated with radiant bubble wrap are not eligible for duct sealing under this program, unless the bubble wrap is deemed by the energy specialist to have an effective R-value of under R-3. In which case, the bubble wrap would be removed and the ducts would be insulated to R-8.
- Any repair work requiring the use of HVAC industry tools and materials other than a cable tie (Zip Tie) tensioner will be referred to program approved list of HVAC contractors

16.5.2.1 Determine the Distribution System Efficiency (DSE) by visually evaluating the three duct characteristics below. Use the Building Performance Institute's 'Distribution Efficiency Look-Up Table' and the results of the duct system evaluation below to lookup the DSE. Alternately, enter inputs required by the program-approved energy modeling software, then the software will evaluate the system's distribution system efficiency and energy savings from any duct weatherization.

1. Percentage of duct work located outside of the conditioned space
2. Duct leakage evaluation
3. Duct insulation evaluation

The DSE should be determined before duct sealing and insulation, and after duct sealing and insulation. The increase in DSE due to duct weatherization will be used to calculate the energy savings as outlined in the ENERGY SAVING CALCULATIONS section 16.5.5 below.

16.5.3 Evaluating Duct Air Leakage

Duct leakage is a major energy-waster in homes where the ducts are located outside the home's thermal boundary in a crawl space, attic, attached garage. When these intermediate zones remain outside the thermal boundary, duct sealing is usually cost-effective.

Ducts in unconditioned space with ***some observable leakage*** will be eligible for duct sealing.

- ***Some observable leakage****:* Joints are not sealed with an approved sealant and there are gaps at most of the seams. Duct insulation shows discoloration at most field joints.

NOTE: Duct leakage within the thermal boundary or in Semi Conditioned Spaces like basements will not qualify to be duct sealed.

16.5.4 Specifying Duct Sealing Hours.

Duct sealing man hours will be determined based on liner footage of existing ridged duct work and existing duct insulation.

- 4 Man Hrs. (un-insulated rigid ducts less than 200 liner feet.)
- 6 Man Hrs. (un-insulated rigid ducts greater than 200 liner feet.)
- 8 Man Hrs. (insulated rigid ducts less than 200 liner feet.)
- 12 Man Hrs. (insulated rigid ducts greater than 200 liner feet.)

16.5.5 Airflow Measurement Tests

In order to be eligible for duct sealing in the program, duct systems must meet the following airflow rates for the equipment they serve.

- For systems with cooling, **CFM per ton** must be at or **above 300**.
- For fossil fuel/Electric Furnace only heating systems, the measured Heat Rise must be within manufacturer's recommended range. Program default maximum temperature rise 80 deg F. will be used when manufacture data is not available.

Duct System air handlers must meet program airflow requirement to be eligible for sealing. The two airflow tests described below are the only tests approved in the program at this time. Any new testing methods must meet program approval. Remember when properly testing system airflow that all zone, register and balancing dampers must be in their fully open position. All duct systems that have cooling will require a True flow test. If one cannot be done than duct sealing cannot take place.

NOTE: When completing Flow test on cooling equipment the thermostat should be set on cooling mode for the most accurate air flow results. When outside temperatures are below 60 deg. F. cooling equipment should not be turned on, use fan only mode.

1. Duct systems with accessible filter slot at the air handler or accessible single return

filter grille will use True Flow Plates to measure system airflow. Instructions for installing the True Flow Plates and correctly measuring system airflow can be found here: http://dev.energyconservatory.com/wp-content/uploads/2014/07/TrueFlow-Manual-DG700.pdf

2. Heating only systems will use the Temperature Rise method to assess system airflow. This method is described here:

a. Drill a ¼ inch hole in a straight section of the **supply plenum** or trunk. Be sure the hole is around at least one duct bend. The temperature probe should not have direct "line of sight" with the heat exchanger.

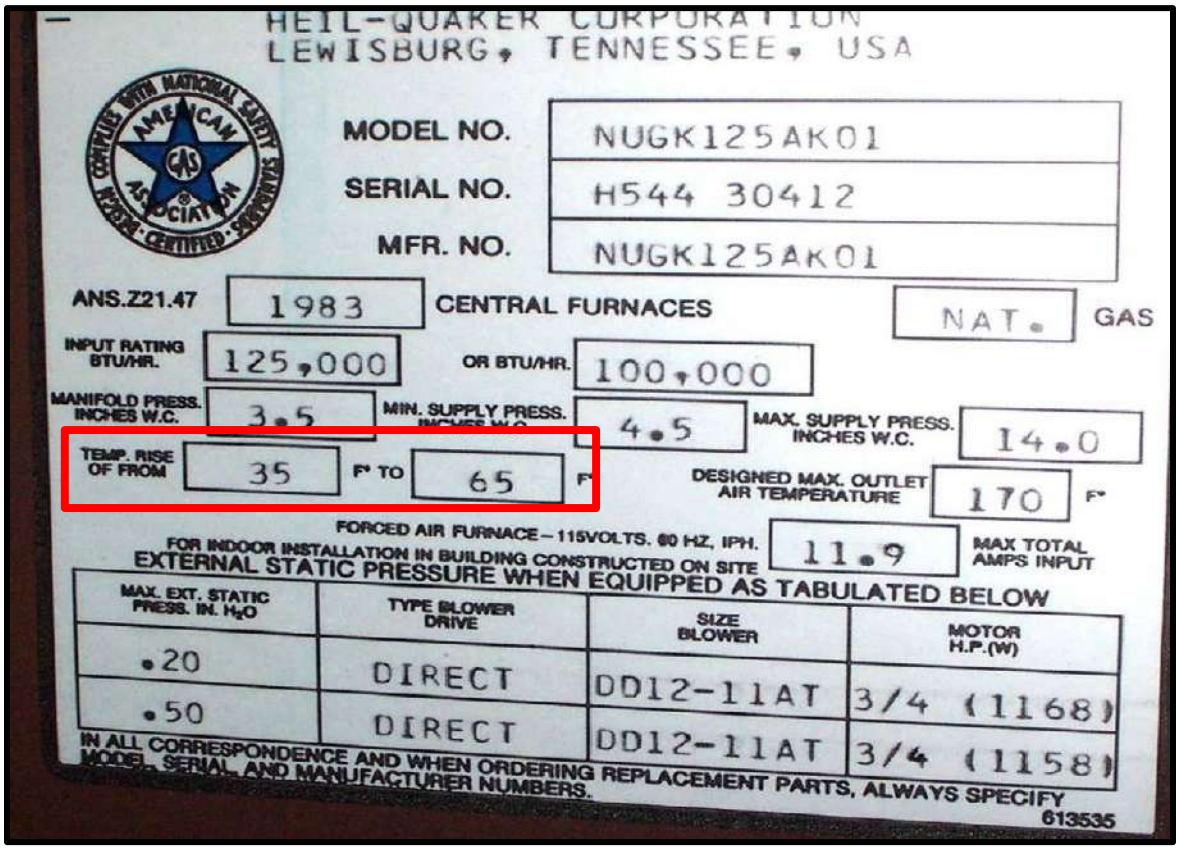
b. Drill a ¼ inch hole in a straight section of **return plenum** or trunk.

c. Insert a temperature probe into each drill hole in the Return and Supply. Be sure the probe extends into the middle of the duct and not along the sides.

d. Turn the system on and allow it to run for 10 minutes or until the supply and return side temperatures stabilize.

e. Read and record the supply and return side temperatures. Subtract the return side temperature from the supply side temperature. This is the systems' temperature heat rise.

f. Compare the measured heat rise from steps a-e to the manufacturer's acceptable heat rise range for the system data plate (red box).



g. If the measured heat rise falls within the manufacturer's projected range the airflow is acceptable and the system can be sealed.

Example: A 60, 000 btu/HR. output furnace has a supply side temperature of 120 degrees and the return side of 70 degrees. The difference between the two measurements is 50 degrees. The acceptable temperature rise as read from the data plate is 35-65 degrees. 50 degrees falls between 30-60 degrees and passes the heat rise test and so the system can be sealed. Systems that fail the test with a heat rise higher than manufacturer's projections have low air flow and should not be sealed.

16.5.6 Evaluating Existing Duct Insulation

Duct systems with an **effective** R-value of 3 or greater are not eligible to be insulated. When determining the effective R-value of existing duct insulation to be upgraded to R-8 take the following into consideration.

- Effective R-value of 2 or less regardless of install quality is eligible.
- Duct insulation with compression of insulation to less than 1 inch is eligible
- Ducts that have poorly installed insulation that is falling off or not properly fastened with multiple exposed ducts.
- Existing Duct insulation that will be compromised during duct sealing to the point that it will not be able to be re-installed due to its poor deteriorated condition.

NOTE: Duct insulation can only be recommended when Duct Sealing will be part of the work scope.

16.5.7 ENERGY SAVING CALCULATIONS

16.5.7.1 Evaluation of Distribution Efficiency – this methodology requires the evaluation of three duct characteristics below:

1. Percentage of duct work found within the conditioned space
2. Duct leakage evaluation
3. Duct insulation evaluation

These three characteristics which should have been determined using the guidance from Section 16.5.1-16.5.4 will be used to determine the distribution efficiency by using the Building Performance Institutes 'Distribution Efficiency Look-Up Table' located below Section 16.5.5.2, or calculated using program approved energy modeling software. Distribution system efficiency will be evaluated in the two conditions defined below.

Definition of Baseline Condition

The existing baseline condition is leaky duct work within the unconditioned space in the home.

Definition of Efficient Condition

The efficient condition is sealed duct work throughout the unconditioned space in the home.

16.5.7.2 Evaluation of Appliance Efficiency: Determining appliance efficiency for use in the Energy Savings Calculations will be accomplished using the following methods:

1. Fossil Fuel Appliances:

If the yellow Energy Guide efficiency sticker is still attached, use that value.
If the yellow Energy Guide sticker is no longer attached to the appliance, use program default.

Efficiency Ratings

Default Oil Furnace Efficiencies	AFUE
Condensing unit Direct Vent	0.90
Induce Draft	0.80
Natural Draft	0.72

Default Gas/ Propane furnace Efficiencies	AFUE
Condensing unit Direct Vent	0.90
Induce Draft	0.82
Natural Draft	0.78

2. Air Source Heat Pump

If the yellow Energy Guide efficiency sticker is still attached, use that value.
If the yellow Energy Guide sticker is not available use the following tables to estimate appliance efficiency.

Heat Pump (Air Source-heating) Efficiencies	HSPF
Energy Star Sept 2015 to present	8.5
Energy Star Sept 2006 - Aug 2015	8.2
2015 or newer	8
2006 to 2014	7.7
1992 to 2005	7.1
Before 1992	6.6

3. Cooling Appliances:

If the yellow Energy Guide efficiency sticker is still attached, use that value. If the yellow Energy Guide sticker is not available use the following tables to estimate appliance efficiency.

Default Air Conditioning/Heat Pump Efficiencies	**SEER**
2015 and newer Energy Star	15
2006 - 2014 Energy Star	14.5
2015 and newer **NOT** Energy Star	14
2006 - 2014 **NOT** Energy Star	13
1992 - 2005	10
Before 1992	9

This table is also located at: http://www.bpi.org/files/pdf/DistributionEfficiencyTable-BlueSheet.pdf

DISTRIBUTION EFFICIENCY LOOK-UP TABLE

Distribution Efficiency Table

System Charateristics (there are 3 questions you need to answer about the distribution system)

1 What percentage of the ducts are located within the conditioned space
2 How well are the connections on the duct system sealed
3 What is the insulation value on the ducts for the portion outside the conditioned space

	1. % within conditioned space			2. Duct leakage Charateristics					3. Duct insulation value		
Distribution Efficiency	90% or more inside envelope	50% or more inside envelope	less than 50% inside envelope	Connections sealed w/mastic	No observable leaks	Some observable leaks	Significant leaks	Catastrophic leaks	Ducts outside envelope R-8 or greater	Ducts outside envelope R-4 - R-7	Ducts outside envelope < R-4
95%	XXX			XXX					XXX		
94%	XXX			XXX						XXX	
93%	XXX			XXX							XXX
94%	XXX				XXX				XXX		
93%	XXX				XXX					XXX	
92%	XXX				XXX						XXX
90%	XXX					XXX			XXX		
89%	XXX					XXX				XXX	
88%	XXX					XXX					XXX
85%	XXX						XXX		XXX		
84%	XXX						XXX			XXX	
83%	XXX						XXX				XXX
80%	XXX							XXX	XXX		
79%	XXX							XXX		XXX	
78%	XXX							XXX			XXX
90%		XXX		XXX					XXX		
89%		XXX		XXX						XXX	
88%		XXX		XXX							XXX
84%		XXX			XXX				XXX		
83%		XXX			XXX					XXX	
82%		XXX			XXX						XXX
80%		XXX				XXX			XXX		
79%		XXX				XXX				XXX	
78%		XXX				XXX					XXX
75%		XXX					XXX		XXX		
74%		XXX					XXX			XXX	
73%		XXX					XXX				XXX
70%		XXX						XXX	XXX		
69%		XXX						XXX		XXX	
68%		XXX						XXX			XXX
80%			XXX	XXX					XXX		
79%			XXX	XXX						XXX	
78%			XXX	XXX							XXX
74%			XXX		XXX				XXX		
73%			XXX		XXX					XXX	
72%			XXX		XXX						XXX
70%			XXX			XXX			XXX		
69%			XXX			XXX				XXX	
68%			XXX			XXX					XXX
65%			XXX				XXX		XXX		
64%			XXX				XXX			XXX	
63%			XXX				XXX				XXX
60%			XXX					XXX	XXX		
59%			XXX					XXX		XXX	
58%			XXX					XXX			XXX

Example: If you have a system with more than 90% inside the conditioned space (i.e. in a heated basement) and the system is sealed with mastic and the portion of the duct system that is not in the heated space has an R-value of R-4, the distribution efficiency of the system is 94%.

The annual energy savings from duct weatherization will be determined using one of the following methods:

1. Using approved energy modeling software to determine modeled energy savings. This method will use complex algorithms to consider how duct weatherization will interact with other energy efficiency measures installed in the home, and how that will affect energy savings.
2. Use the formulas below to calculate energy savings from duct weatherization.

ANNUAL ENERGY SAVING ALGORITHMS:
Determine Distribution Efficiency by evaluating duct system before and after duct sealing using Building Performance Institute "Distribution Efficiency Look-Up Table"

Cooling savings from reduction in Air Conditioning Load:
ΔkWh cooling = ((((DEafter – DEbefore)/ DEafter)) * FLHcool * BtuH) / 1,000 / ηCool

Where:
DEafter = Distribution Efficiency after duct sealing
DEbefore = Distribution Efficiency before duct sealing
*FLHcool = Full Load Cooling Hours**
BtuH = Size of equipment in Btuh (note 1 ton = 12,000Btuh)
ηCool = Efficiency in SEER of Air Conditioning equipment= actual. If not available use:

Heating savings for homes with electric heat (Heat Pump of resistance):
kWh = (((((DEafter – DEbefore)/ DEafter)) * FLHheat * BtuH) / 1,000,000 / ηHeat) * 293.1

Where:
*FLHheat = Full Load Heating Hours***
BtuH = *Size of equipment in Btuh (note 1 ton = 12,000Btuh)*
ηHeat = Efficiency in COP of Heating equipment (HSPF)

For homes with Fossil Fuel Heating:
ΔMMBTUfossil fuel = ((((DEafter – DEbefore)/ DEafter)) * FLHheat * BtuH) / 1,000,000 / ηHeat

Where:
DEafter = Distribution Efficiency after duct sealing
DEbefore = Distribution Efficiency before duct sealing
*FLHheat = Full Load Heating Hours***
BtuH = Capacity of Heating System
ηHeat = Efficiency of Heating equipment

The MA TRM sets 360 hours as the full load cooling hours for MA and 1200 heating hours as the full load heating hours for MA.

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IIC Combustion Safety Test Form

CUSTOMER NAME: _____ SITE ID: _____

Equipment/Fuel Type

Hot Water Heater	Heating Sys.		Atmospheric	Induced	Powered Vent*	Sealed*	"B" Vent*	PVC Vent*	Stainless St.*
DHW IND TANKLESS ELEC.	BOILER FURN. OTHER	Heating:							
Fuel:	Fuel:	Hot Water:							

* If yes, DO NOT DRILL A TEST HOLE. Other tests will be completed as appropriate (CO at vent termination.)

Safety Inspection

Were any gas leaks detected (if applicable)? YES NO	Are there broken, detatched or corroded flue pipes?: YES NO
Are there any unvented gas appliances (does not include ovens)?: YES NO	Was there a working carbon monoxide detector in the home?: YES NO

Combustion Appliance Zone (CAZ) Depressurization

TEST IN				TEST OUT			
Outside Temp:	Bath:	Kit:	Dryer:	Outside Temp:	Bath:	Kit:	Dryer:
CAZ Baseline Pressure:	Air Handler: ON OFF N/A			CAZ Baseline Pressure:	Air Handler: ON OFF N/A		
CAZ Worst Case Pressure:	Basement Door: OPEN CLOSED			CAZ Worst Case Pressure:	Basement Door: OPEN CLOSED		
Total Pressure Change:	Other Doors:			Total Pressure Change:	Other Doors:		

Domestic Hot Water (DHW) Worst Case

CO	Draft	Draft w/ Heating Sys On	CO	Draft	Draft w/ Heating Sys On
/			/		
Pass Spillage Test	Pass Draft Test	Pass CO Test	Pass Spillage Test	Pass Draft Test	Pass CO Test
D Yes D No D N/A	D Yes D No D N/A	D Yes D No D N/A	D Yes D No D N/A	D Yes D No D N/A	D Yes D No D N/A

Heating System Worst Case

CO	Draft		CO	Draft	
/ / /			/ / /		
Pass Spillage Test	Pass Draft Test	Pass CO Test	Pass Spillage Test	Pass Draft Test	Pass CO Test
D Yes D No D N/A	D Yes D No D N/A	D Yes D No D N/A	D Yes D No D N/A	D Yes D No D N/A	D Yes D No D N/A
Ambient CO in CAZ:	Ambient CO in Living Space:		Ambient CO in CAZ:	Ambient CO in Living Space:	

Natural Conditions Retest (Only If Necessary)

Equip Type	Pass Spillage	Draft	CO	Equip Type	Pass Spillage	Draft	CO
	D Yes D No D N/A				D Yes D No D N/A		
	D Yes D No D N/A				D Yes D No D N/A		

Gas Dryer CO Test

CO (Measured at exhaust port):
Ambient CO:

Gas Oven CO Test

CO (Measured at exhaust port):
Ambient CO:

Technician Name: _____ Company Name: _____ Test Dates: _____

Certificate of Insulation and Air Sealing Work

Address of Residence:

_____

_____

Name and Address of Contractor:

_____

_____

Areas Insulated

WALLS				ATTIC/FLOOR				CEILING/SLOPES			
LOC	SQ FT	MATERIAL/ Bag Count	Added R-Value	LOC	SQ FT	MATERIAL/ Bag Count	Added R-Value	LOC	SQ FT	MATERIAL/ Bag Count	ADDED R-VALUE

Cellulose, loose fill: R-3.7 per inch **Cellulose, Dense Pack**: R-3.2 per inch **Fiber Glass Batt:** R-3.0 p/ inch
Poly-isocyanurate, Rigid Board: R-7.0 per inch

Air Sealing Completed

- ☐ Attic
- ☐ Basement
- ☐ Living Space
- ☐ None

 # Attic Access Treated

- ☐ Pull Down Stairs
- ☐ Hatches
- ☐ Full Size Doors

Blower Door Results

Pre Test _____

Post Test _____

No Blower Door _____

I certify that the residence identified above was insulated as specified, and the installation was conducted in accordance with Mass Save Home Energy Services Program standards and regulations.

_____
Contractor Crew Lead

_____
Date

Combustion Safety Disclosure

In accordance with the protocols of the Building Performance Institute, combustion safety inspections must be conducted by The Contractor both prior to beginning the energy–saving improvements to your home and following completion of the work to identify potential health and safety concerns

The following conditions were noted at the time of the inspection:

Contact a qualified service technician to further evaluate the noted concerns and correct the conditions as needed to ensure safe operation.

Building Owner: _____ Address: _____

Phone Number: _____ City, St, Zip: _____

Signature: _____ Date: _____

This notice does not constitute an endorsement or warranty regarding the presence or absence of other real or potential health and safety hazards that may exist at this address or on the premises.

Technician: _____ Date: _____

White: Customer Copy **Yellow: Contractor Copy**

PARTS CATEGORY & DESCRIPTION	UNITS	Unit Cost