Mass Save Residential Turnkey Solutions Program Standard for Materials, Installation, Evaluations, and Conduct for Participation Contractors

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Version 4.0

This Standard applies to all services performed under the Mass Save Residential Turnkey Solutions Program **beginning June 8th, 2026.** Program Administrators may conduct a Quality Assurance Inspection to verify that services meet the requirements in this Standard. Proposed changes or additions to the Standard will be considered on a regular basis by the Program Administrators at their discretion.

By Program Administrators:

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1.0 PROGRAM DESCRIPTION:

a) The primary objective of the Mass Save Turnkey Solutions 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.

b) 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.

c) 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 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.

d) Lead Vendors ("LVs") are responsible for maintenance and enforcement of these standards as directed by the PAs.

e) The Program will coordinate with other Massachusetts programs to develop consistent standards across programs as well as to ensure consistent customer education and promotion of the house-as-a-system approach.

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

g) The PAs are supportive of more coordinated statewide training to ensure correct installation techniques for the Program. It is expected that training requirements will increase over time 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

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

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

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):

b) Weatherization CONTRACTORS are required to have MA Home Improvement Contractor's License, MA Construction Supervisor License, and MA Lead Safe Certificate. NOTE: This doesn't apply to Facilitated Service or Turnkey CONTRACTORS.

c) CONTRACTORS must also obtain any certification or other recognition required by individual PAs or LVs.

2.2 CONTRACTOR ON-SITE STANDARD:

a) All Home Energy Services Program representatives to follow. Before Arriving on Site

1. Vehicle Identification Requirement - The company name should be included on all company vehicles.

2. Provide confirmation to all customers before arriving on site. This could be an email, letter or phone call confirming the appointment.

2.3 LEAD TECHNICIAN REQUIRMENT:

a) Lead Technician should be the first and last interaction with the customer

b) Lead Technician should introduce himself/herself to the customer showing some form of identification: business card, ID badge or other identification that associates the Crew Lead as the Mass Save Participating Contractor.

c) Lead Technician should also provide an overview of the work that is going to be performed and where they will be doing work.

d) Lead Technician should conduct a walk-through of the home making sure the customer is satisfied with the cleanliness of the home.

e) Lead Technician should also provide a contact number for additional questions.

f) Lead Technician 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.

2.4 GENERAL CONTRACTOR CREW REQUIREMENTS:

a) 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. Smoking should never take place "**anywhere**" on the customer's property.

b) All cigarette waste should be properly disposed of and removed from the property each day.

c) Ask homeowners for permission before using the restroom facilities.

d) The crew should not eat food in the customer's home.

e) Phone usage inside the home should be limited to work-related calls only. Phone use should not interfere with their work or customer service.

f) 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 customer's property

2.5 CREW WORK CLOTHES:

a) All clothing and general appearance should be representative of the high standards of the Program.

b) Shirts are required to be always worn while on the work site.

c) Shirt will not contain vulgar or offensive language / pictures.

d) Wearing booties to eliminate tracking dirt into house when necessary.

e) Properly protect travel areas from foot traffic with tarps

2.6 CUSTOMER / CONDITION OF HOUSE

a) No trash will be left on the property (neither inside nor outside home)

b) Leave customer's property in the same condition as when the work started.

c) No graffiti will be permitted on the customer's property at any time.

d) Working Hours - Unless authorized by the customer, crews will work during normal business hours, and all crews must follow all local ordinances.

e) Customers should not be in the general area when work is being completed.

2.7 PERFORMANCE OF WORK:

a) 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 Building Performance Institute 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 LV and initial or sign-off of completion certificate by the Homeowners are required before any modifications to the original Work Order are made.

h) CONTRACTORS *should attempt* to make acceptable repairs for all accidental damage done to a customer's property at the contractor's expense within 10 business days. Both the customer and the lead vendor must be informed when damage occurs. The LV will make the final decision as to when acceptable repairs have been made.

i) CONTRACTORS will be responsible for maintaining BPI airflow standards when performing shell tightening measures. Any dwelling that falls below the 70% of the Building Airflow Standard guideline, after completing shell tightening measures will require the contractor at their expense to bring the dwelling back into compliance with either mechanical ventilation that follows ASHRE 62.2-2013 or removal of installed air sealing materials.

j) CONTRACTORS will treat homeowners and their property respectfully and professional manner by.

1. Conduct themselves in a courteous and professional manner and maintain appropriate on-site behavior.

2. Clearly communicate the scope of work, schedule, and any material impacts to the homeowner prior to commencing work.

3. Take all reasonable measures to protect the homeowner's property, including the use of drop cloths, protective coverings, and industry-

standard work practices.

4. Maintain a safe, orderly, and clean work area during the performance of work and restore the site to its pre-existing condition upon completion unless otherwise specified in the contract.

5. Refrain from unprofessional conduct, including inappropriate language or behavior, smoking or vaping on the property, or playing loud music, unless expressly permitted by the homeowner.

6. Wear clean, professional, and appropriate attire while on-site, which may include clothing that is identifiable as belonging to the Contractor's company or approved Mass Save–branded apparel. Contractors are prohibited from wearing attire bearing the name, logo, or branding of another participating contractor or program vendor, and from wearing any clothing that may reasonably be considered offensive, inappropriate, or unprofessional.

7. Use homeowner bathrooms, wet rooms, or other facilities only with the homeowner's prior permission, and leave any such facilities clean and in the condition in which they were found.

8. Comply with all applicable Program requirements, policies, safety standards, and local, state, and federal regulations while on the homeowner's property.

2.8 JOBSITE CLEAN UP:

a) CONTRACTORS are responsible for removal of all construction debris from the jobsite.

b) CONTRACTORS are responsible for restoring every job site to its pre-work condition at project completion.

c) CONTRACTORS are required to use drop clothes to protect homeowners' property/belongings

d) CONTRACTORS, at the conclusion of the project, will review site conditions with the homeowner and confirm that the work area has been left in an acceptable condition, and that any concerns related to cleanliness, damage, or restoration have been addressed to the homeowner's reasonable satisfaction.

2.9 DOCUMENTATION:

a) CONTRACTOR Documentation must conform to the requirements

detailed in their program participation agreement including, but not limited to:

1. Before Starting Work – Weatherization CONTRACTORS must document that a blower door test and combustion safety testing have been performed, (If Applicable), and it is safe to continue.
2. If tests cannot be performed (e.g., asbestos, fireplace operating, heating system inoperable, etc.) it must be noted in the paperwork and a call to your Lead Vendor to notify them of the situation is required.
3. After Work Completion - CONTRACTORS must submit a Certificate Of completion documentation (signed by customer and contractor), that the approved Scope of Work is complete.

2.10 COMPLETION DOCUMENTATION:

a) The following items should be included.

b) An itemized confirmation (Certificate of Completion) that confirms what measures were installed and any measures that were not.

c) An itemized list of each measure, with accurate sq ft measurements of installed measures and notes that give reasons for measures not installed.

d) Upon completion of a weatherization project, documentation that pre- and post-blower door testing and pre and post-combustion safety testing had been performed. All post-combustion testing must be completed on the day the installed weatherization measures are completed.

e) List of any approved Change Orders by the CUSTOMER and LV must be documented with a reason on the Certificate of Completion form. It is recommended that all change orders are signed, dated, and timestamped by the customer prior to the commencement of said changes.

2.11 CONTRACTOR COMMUNICATIONS WITH CUSTOMERS:

a) CONTRACTORS will always be courteous to CUSTOMERS.

b) CONTRACTORS shall make reasonable efforts to communicate effectively with customers in the customers' preferred language, when identified and feasible.

c) CONTRACTORS shall use reasonable methods to facilitate effective communication, which may include language interpretation services, or translation applications, where available.

d) CONTRACTORS shall ensure that critical information related to scope of work, safety, operation of installed materials or equipment, and post-installation responsibilities is communicated in a manner the homeowner can reasonably understand.

e) CONTRACTORS must notify CUSTOMERS and LV as soon as possible if an appointment must be rescheduled, according to the terms of the Contractor Participation Agreement, which may include email, software updates, or direct communication.

f) CONTRACTORS will clearly explain all work procedures, weatherization measures, change orders and items to be installed to the CUSTOMER'S home before, during and after the work process. A walk through the home with the customer before the start of the job and at the completion is the recommended approach.

g) CONTRACTORS will answer all CUSTOMER questions in an honest and straightforward manner. If the CONTRACTOR does not know the answer to a question they can refer the CUSTOMER to LV for an answer.

h) 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.

i) CONTRACTORS will ask CUSTOMERS for permission to use a household restroom.

j) CONTRACTORS will keep CUSTOMERS informed regarding estimated daily arrival, break, and departure times.

k) CONTRACTORS will document any problems and unusual situations as they occur and notify their LV.

l) CONTRACTORS shall provide clear and accurate education to homeowners regarding newly installed materials and equipment.

m) CONTRACTORS shall explain the purpose, function, and expected performance of all installed materials and equipment in plain, non-technical language.

n) CONTRACTORS shall review basic operation, maintenance requirements, and any homeowner responsibilities necessary to ensure proper performance and longevity of installed measures.

o) CONTRACTORS shall inform the homeowner of any changes to existing systems, home operation, or conditions resulting from the installed work (e.g., ventilation, moisture management, thermostat settings).

p) CONTRACTORS shall provide manufacturer documentation, warranties, and any required program materials, and identify who the homeowner should contact for questions, service, or warranty-related concerns.

q) CONTRACTORS shall respond to homeowner questions related to the installed work in a clear, professional, and timely manner.

2.12 CONTRACTOR COMMUNICATION WITH THE PROGRAM LEAD VENDORS:

a) CONTRACTORS will respond promptly and accurately to communications from program Lead Vendors.

b) CONTRACTORS will document problems and unusual situations and promptly report those to LVs.

c) CONTRACTORS will document any change to scheduled date promptly in the preferred manner by the LV, whether by phone call, email, or software update.

d) CONTRACTORS will respond promptly to address problems.

e) CONTRACTORS will promptly notify the LV if the Contractor is unable to complete new or previously assigned or scheduled work in a timely manner, or if circumstances arise that may reasonably be expected to delay completion and cooperate with the LV to determine appropriate next steps.

f) Failure to complete work in a timely manner or communicate delays may result in temporary pause of the Contractor's ability to bid on new work or receive new project allocations, at the LV's discretion.

g) CONTRACTORS will notify LV of any changes to staffing that affect authorization to work in the program (certifications, background checks etc.)

h) CONTRACTORS will maintain accurate and up-to-date contact and address information with the LV, including primary and secondary points of contact for operational, billing, and emergency matters.

i) CONTRACTORS will notify the LV in advance, when reasonably possible, of any extended absence (e.g., vacation, leave, or other prolonged unavailability) of key contractor personnel or designated points of contact that may impact communications, project scheduling, or program participation, and identify alternate contacts during such periods, if possible.

2.13 CONTRACTOR INFRACTIONS REQUIRING MASS SAVE ADJUDICATION:

a) All Contractors participating in the Program are expected to uphold the highest standards of integrity and professionalism. Any failure to meet these standards may result in disciplinary action and/or legal consequences, as deemed appropriate.

2.14 THEFT:

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

1. Charging for materials that are not installed or labor not incurred.
2. Inflating the actual cost for services provided.
3. Misrepresenting work performed, completed or data provided to the LV or PA.
4. Unauthorized removal of CUSTOMER personal property.

2.15 UANCCEPTABLE ACTIONS:

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

1. Charging clients for services while job is open.
2. Soliciting or performing work on a customer's home outside the scope or context of program- eligible weatherization work, for customers assigned to the CONTRACTOR through the program. (Note: If the CONTRACTOR brings the customer to the program as a 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.
3. Unauthorized employees on a work site and/or with access to program customer data.
4. Providing false information to Mass Save Program Administrator, LV, or the CUSTOMER concerning work requirements.

5. Failure to correct job deficiencies
6. Use of inferior materials.
7. Repeatedly missing timelines.
8. Consistently performing work of poor quality.
9. Leaving the customer's property in a potentially dangerous condition.

2.16 BUILDING PERMITS:

a) 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. **Contractors must provide building permits when requested by the LV.**

2.17 CONTRACTOR'S INSURANCE:

a) All Mass Save CONTRACTORS shall:

1. Provide insurance at the coverage amounts listed in the program participation agreements with respect to the work they perform within the Program.
2. Maintain this insurance at their own expense and in full force and effect for the full term of the contract.
3. List each Mass Save Program sponsor as "additionally insured" on insurance certificates.
4. Make sure All policies shall be issued by companies authorized to write that type of insurance under the laws of the Commonwealth of Massachusetts.
5. Provide minimum coverage with respect to the operations performed by any employee, subcontractor or supplier, as detailed in program participation agreements.

2.18 BACKGROUND CHECKS:

a) 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 GUIDENCE:

a) 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 service or install being provided. The requirements set forth in this standard provide only general guidelines for health and safety concerns.

b) 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.

c) 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.

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

e) Each property served under the Mass Save program must be individually assessed to determine the existence of potential hazards to CONTRACTORS or CUSTOMERS.

f) CONTRACTORS, their employees, 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.

g) 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.

h) A Program Energy Assessment or Direct Weatherization 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).

i) CONTRACTORS shall maintain a copy of their Health and Safety Policy and train all employees accordingly.

j) They shall supply Material Safety Data Sheets (MSDS) for products and materials used by their crews and have these documents available on all jobsites.

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

l) CONTRACTORS shall comply with all state and federal lead safe requirements.

m) CONTRACTORS shall fully document and communicate to the LV 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.

3.1 CONFIRM COMBUSTION APPLIANCE OPERATION:

a) Weatherization 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. Weatherization CONTRACTORS will be responsible for conducting this “test in” in accordance with the BPI 1200 Technical Standards.

b) Before leaving the site, the Weatherization CONTRACTOR shall perform combustion safety tests in accordance with the BPI 1200 Technical Standards, 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 the Weatherization CONTRACTOR to the program Lead Vendor.

e) If systems fail the combustion safety tests in the BPI 1200 Technical Standards, the Weatherization CONTRACTOR must immediately notify occupants and the program.

3.2 EXCEPTIONS:

NOTE: Tests are not required when / where the following exists.

a) On direct vent or power vented appliances. CO testing should still be done whenever the exhaust port is accessible.

b) Where equipment is in an isolated mechanical room, vented attic, or vented crawlspace with all combustion air from outside, **Note:** that all equipment in open basements must be tested.

c) 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.

d) 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.

4.0 MOLD LIKE SUBSTANCE IDENTIFICATION:

a) Complete a walkthrough of the home to identify any mold like substances before the installation of any weatherization measures

b) When a Mold-Like Substance has been identified,

1. Document the location and sq. ft. of the area affected.
2. Determine if this will present a roadblock for weatherization measures.
3. Notify the customer of its presence and location.

c) The homeowner will be educated on the following,

1. The moisture sources and air pathways that are contributing to the Mold Like Substance, in the location it was identified.

2. The customer will be provided with EPA information about how to better control the moisture sources and prevent mold in their home.

3. The EPA has two websites where information can be found.

www.epa.gov/mold/what-are-main-ways-control-moisture-your-home.
www.epa.gov/mold/brief-guide-mold-moisture-and-your-home

d) Mold-Like Substances that are identified as **100 sq. ft. or greater**

1. Will present a roadblock for the installation of weatherization measures.

2. Require the homeowner to have it evaluated and possibly remediate if it is determined to be mold, before any weatherization work can begin.

4.1 MOLD REMIDIEATION:

a) Certified Mold Remediation Contractors are responsible for following all OSHA, EPA and Program rules, required for remediating mold from residential buildings.

b) ANSI/IICRC S520: 2015 Standard for Professional Mold Remediation can be used as a resource document.

c) The remediation company shall provide a mold remediation WORK PLAN to the Program Lead Vendor before site preparation work begins.

d) The mold remediation WORK PLAN will be specific to each project that provides instructions for standard operating procedures on how a mold remediation project will be performed. The work plan will include the following:

1. Methods being used to remediate mold.

2. Product literature with Safety Data Sheet information for all chemicals being used.

3. Site controls / containment methods to keep customers and workers safe from cross contamination of mold particles.

4.2 MOLD REMEDIEATION METHODS:

a) Must describe how the remediator plans to remove the mold in the affected areas and what type of machinery/cleaning tools will be used in the process.

4.3 MOLD REMEDIATION PRODUCTS / CHEMICALS:

a) Disinfectants, biocides and antimicrobial coatings may be used only when approved by the Lead Vendor and if they are registered by the United States Environmental Protection Agency for the intended use and if the use is consistent with the manufacturer's labeling instructions. The use of any product must consider the potential for occupant sensitivity and possible adverse reactions to chemicals that have the potential to be off gassed.

b) Safety Data Sheets (SDS) must be available to the customer upon request.

4.4 SITE CONTROLS:

a) The containment, when constructed as described in the remediation work plan and under normal conditions of use, must prevent the spread of mold to areas outside the containment area. Any storage located in the area must either be removed or protected from cross-contamination of mold particles.

b) **Signs notifying occupants** that a mold remediation project is in progress and to keep out of the area, shall be displayed at all accessible entrances to the remediation area.

c) **Provide for the Safety and Health of Workers and Occupants.** When it has been determined that an indoor environment is contaminated with mold, remediation workers shall be protected from exposure. Engineering controls, administrative controls, and work practices are the primary means for preventing exposure.

d) Appropriate respiratory protection or other personal protective equipment (PPE) shall be used in conjunction with engineering controls to protect workers when engineering controls are insufficient, reasonable efforts should be made to inform occupants of and protect them from similar exposure because of investigation and remediation activities. Employers shall identify safety and health issues prior to commencing work.

4.5 MOLD POST- REMEDIATION AND CLEARANCE:

a) For a remediated project to achieve clearance, a mold evaluation shall be conducted by the remediation professional during post-remediation assessment. The post-remediation assessment shall confirm the following:

1. The work area is free from all visible molds.
2. All work has been completed in compliance with the remediation plan.
3. All contaminants have been removed and disposed of properly.
4. Photos showing the treated area after completion of the remediation.

5.0 ASBESTOS:

5.1 HEALTH & SAFETY:

a) 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).

b) 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."

5.2 SOURCES IN HOMES:

a) Until its use was strictly limited in the 1970s, asbestos was used in some building products. The most common applications that could involve interaction with weatherization personnel include:

1. Boiler insulation
2. Furnace insulation
3. Steam boiler insulation
4. Pipe insulation
5. Duct insulation
6. Asbestos cement sidewall shingles
7. Vermiculite insulation
8. Acoustic Floor tiles (9x9)

5.3 MINIMIZE EXPOSURE:

a) Learn to recognize suspected asbestos containing materials. (Joints look like a plaster cast.)

b) 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."

c) 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.

d) **This information provided in this document is 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 the 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 MATERIAL.**

https://www.mass.gov/doc/massdep-asbestos-information-resource-guide/download

5.4 ASBESTOS SHINGLE SIDE WALL REMOVAL & RE-INSTALLATION:

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

b) 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 the MASS SAVE 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.**

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

d) 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.**

e) 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 buildup 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 end of each workday.

f) <u>Packaging, Labeling, Disposal:</u>

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.

5.5 REMOVAL OF VERMICULITE INSULATION:

a) Licensed Asbestos Contractors are required to adhere to all relevant Program Rules, as well as OSHA, EPA, applicable state, federal and local building codes, concerning the abatement of suspected asbestos materials (vermiculite insulation).

b) Workers who are performing the removal of suspected asbestos materials (vermiculite insulation) must have a Certified Asbestos Supervisor on site and all other workers must hold an Asbestos Worker certification to ensure that all are knowledgeable about safe asbestos handling, removal and disposal.

5.6 MASS REGULATION:

a) 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.

5.7 BEFORE STARTING WORK:

a) Contractors must notify MassDEP on an **Asbestos Notification Form ANF-001** prior to commencement of Suspected Asbestos Material abatement work taking place.

b) Information about the Asbestos Notification Form can be found on MassDEP's website at: https://www.mass.gov/doc/massdep-asbestos-information-resource-guide/download

5.8 VERMICULITE REMOVAL WORK PLAN:

a) The certified asbestos abatement company, completing the removal of vermiculite insulation, shall provide a work plan to the Program Lead Vendor before site preparation begins.

b) A work plan that is specific to each project that provides instructions for standard operating procedures on how the vermiculite abatement project will be performed. The work plan will include the following:

1. **Methods:** How will the vermiculite be removed from the areas identified.
2. **Site Controls**: Containment methods to keep workers and customers safe from cross contamination of suspected asbestos material.
3. **Disposal:** The name of the disposal site certified to handle the waste of the suspected asbestos material (vermiculite).

5.9 REMOVAL METHODS:

a) Must describe how the abatement of suspected asbestos material (vermiculite insulation) will be abated in the affected areas, and what type of machinery/clearing tools will be used in the process.

5.10 SITE CONTROLS:

a) The containment, when constructed as described in the work plan and under normal conditions of use, must prevent the spread of contaminants to areas outside the containment area. Any storage located in the area must either be removed or protected from cross contamination during the removal process.

b) Signs notifying occupants that an asbestos abatement project is in progress shall be displayed at all accessible entrances to the remediation area. The signage should advise people who are not part of the removal process to keep out.

5.11 DISPOSAL:

a) It is understood that the contractor must properly package, label and dispose of the vermiculite insulation material at a site that is certified to handle the disposal of material suspected of having asbestos.

b) The suspected asbestos vermiculite insulation must be placed and sealed in leak-tight containers and properly labeled [see 310 CMR 7.15(1)(e)1. a], which ensures that the waste remains confined in a leak-tight state.

c) Uncontained vermiculite should never be bulk loaded into a truck, dumpster or trailer for transport to disposal.

d) Each container of asbestos waste must be clearly identified with an asbestos warning label in accordance with 310 CMR 7.15(1)(e)1.

e) **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.**

f) Asbestos-containing waste material, including suspected asbestos material (vermiculite insulation), are classified as a special waste under the provision of the Massachusetts solid waste regulations 310 CMR 19.061. Therefore, vermiculite insulation must be disposed of at a landfill that is specifically permitted to accept asbestos waste. The vermiculite insulation must be properly packaged and labeled during transport and delivery to the landfill. Vermiculite insulation must not be disposed at a transfer station, processing/recycling facility, or municipal waste combustion facility.

5.12 POST REMIEDIEATION:

a) **Only licensed Asbestos Project Monitors / Asbestos Analytical Services can perform post clearance assessment.**

5.13 ASBESTOS PROJECT MONITOR:

a) Certified by the Commonwealth pursuant to 453 CMR 6.07 are required to perform the following:

1. Collects environmental asbestos air samples for the purpose of assessing present or future potential for exposure to airborne asbestos.

2. Functions as the on-site representative of the facility owner or other persons by overseeing the activities of the asbestos contractor.

3. Works directly with **ASBESTOS ANALYTICAL SERVICES** certified by the Commonwealth pursuant to 453 CMR 6.08: Certification and Other Requirements for Asbestos Analytical

Services which include, but are not limited to, the counting or enumeration of asbestos fibers in the air (air monitoring analysis) and the identification and quantification of asbestos in materials (bulk sample analysis) in connection with any asbestos hazard assessment, facility inventory, exposure measurement, abatement activity or associated activity.

4. A Post Clearence Report will be generated by the ABESTOS ANALYTICAL SERVICES and provided to the Program Lead Vendors upon completion of the remediation project.

5. The post clearance report completed by ANALYTICAL SERVICES must indicate that the area remediated meets all requirements set forth in asbestos abatement laws of the Commonwealth of Mass.

6. The post clearance report must also indicate the waste site where suspected asbestos (vermiculite insulation) was disposed of. This waste site must be certified to handle the disposal of asbestos like materials.

6.0 LEAD:

6.1 HEALTH / SAFETY CONCERNS:

a) 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.

b) 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.

6.2 SOURCES IN THE HOME:

a) 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.

6.3 MINIMIZE LEAD RISK to CUSTOMERS and WEATHERIZATION WORKERS:

a) DO NOT DISTURB LEAD PAINT UNLESS ABSOLUTELY NECESSARY AND THEN ONLY BY INDIVUALS CERTIFIED TO COMPLETE WORK USING LEAD-SAFE PROTOCOLS.

b) CONTRACTORS should assume that any paint on windows and doors in homes built Before 1978 contains lead unless it has been verified otherwise.

c) 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.

6.4 WORKER PRODUCTION:

a) Detailed specifications regarding the health and safety of workers in the construction industry can be found in Construction Industry OSHA Safety and Health Standards (299CFR1926/1910) and the specific worker safety requirements in the EPA's "Lead; Renovation, Repair, and Painting Program" (LRRPP) Final Rule.

b) ALL CONTRACTORS WORKING IN THE MASS SAVE PROGRAM MUST RECEIVE LEAD-SAFE WEATHERIZATION TRAINING.

c) BECOME CERTIFIED PER USEPA REGULATIONS AND FOLLOW ALL RELEVANT AND ADMINISTRATIVE PROCEDURES pursuant to 40CFR Part 745.225.

d) LEAD SAFE WEATHERIZATION INFORMATION can be found on EPA and Massachusetts Division of Occupational Safety are the guiding authorities for Mass Save work.

6.5 LEAD-SAFE GUIDENCE:

a) Considered to be 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.

6.6 When Should Lead-Safe Practices be followed:

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

b) The dwelling was constructed before 1978

c) The dwelling has not been determined to be lead-based paint free, and 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.

6.7 Renovation Notice About Lead Safety:

a) 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.

b) Prior to the start of the renovation work a written notification of receipt from an adult resident of the home must be received.

c) 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.

6.8 Post Weatherization Cleanup:

a) Clearance testing is not a requirement for weatherization work.

b) Cleanup at the completion of **Lead-Safe Weatherization work requires the use of a HEPA vacuum,**

c) **(a HEPA filter in a standard vacuum is NOT an acceptable alternative)**

d) Wet cleaning methods, a visual inspection

e) Collection and disposition of any dust, debris or chips with the rest of the jobsite waste.

6.9 CERTIFICATION

a) All Weatherization Crew Leads must complete a MA 454 CMR 22 approved Lead Safety training certification prior to participating in the Mass Save program. Per USEPA requirements, a certified individual must be on site to ensure proper work.

7.0 WIRING SAFETY:

a) Common Safety Concerns

1. Electric shock while working around wiring in all areas of the home.
2. Fire resulting from arcing between loose wiring connections.
3. Fire resulting from lack of dissipation of heat due to insulation around heat producing sources (i.e. recessed light fixtures).

7.1 WIRING SAFETY GUIDENCE:

a) Minimize Risk:

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

8.0 INSTALLATION ROADBLOCKS:

a) 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.

b) 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.

c) Examples of such conditions include, but are not limited to;

1. Existing moisture problems
2. Mold or the appearance of mold-like substance
3. Structural concerns
4. Knob-and-tube wiring (sign-off by a licensed electrician will be needed to proceed to ensure knob-and-tube wiring is not active)
5. Existing conditions of specific building components
6. Combustion safety issues
7. Asbestos
8. Inaccessibility
9. Infestation

8.1 CORRECTING ROADBLOCKS:

a) Conditions (Roadblocks) 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.

b) Not every condition will be found before work. If any of the above is discovered during approved work, the CONTRACTOR must contact the LV prior to leaving the home 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

9.0 WEATHERIZATION MATERIALS:

a) All materials shall be installed according to manufacturers' instructions, the standards in this section and follow Massachusetts Building Code (780 CMR), and all other appropriate codes.

b) All materials supplied must meet applicable specifications. All materials must conform to catalog listing.

c) Material substitutions are not allowed without a written pre-approval by the LVs.

d) CONTRACTORS will keep a Safety Data Sheet on the job site for every material used.

9.1 IMPERMEABLE AIR BARRIER MATERIALS:

a) 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:

1. Plywood,
2. OSB
3. ½" gypsum board
4. Rigid foam boards meeting ASTM C578 and ICC ES AC12
5. Rigid fiberglass board with flame spread 25 FSK facing
6. Sheet metal flashing and aluminum coil stock
7. Foil faced bubble wrap
8. Peel-and-stick flashing membranes
9. Other air barrier materials as approved by LVs

9.2 SPRAY FOAM:

a) That meet ICC ES AC 377 including:

1. 2-part medium density closed cell spray polyurethane foam (2.0pcf)

9.3 SEALANTS:

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

b) Foam sealants that meet ICC ES 377 and ASTM C1642-07 such as:

1. One-part urethane foam, low CFC (e.g. Great stuff, Pur-fil, Insta-foam, or equivalent).
2. 1-part urethane fire-block foam rated for sealing gaps in wood fire blocking
3. 2-part urethane foam kits 1.75pcf density, 2-part Flame Spread 25 foam kits 1.75pcf

c) Siliconized latex sealants meeting ASTM C834,

d) 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)

e) Water based duct sealant meeting UL 181A-M, UL 181B-M ("RCD #6" or equivalent)

f) Sealants rated for contact with chimneys and combustion vents such as:

1. Non-combustible fire barrier caulk or furnace cement meeting ASTM E 136
2. Silicone high temp RTV listed for use on gas vents to 500 degrees F, meeting ASTM C920

9.4 WEATHERSTRIPPING:

a) All weatherstripping will be permanently installed with fasteners (tacks, staples, brads, etc.) and will make positive contact between surfaces to prevent air leakage.

b) The weatherstripping will form an airtight seal when the window is closed and latched. A small amount of caulking may be applied as necessary to prevent air leakage behind the weatherstripping.

c) The weatherstripping will not interfere with the smooth operation of the door or window.

d) Attic hatch or scuttle openings weatherstripping will be permanently affixed to hatch or framing. generally, “Q-lon with carrier” or equivalent is preferred

e) A positive closing mechanism will be installed on the hatch if needed.

f) Existing access to the attic will be maintained.

g) In the case of drop-down folding stairs, an airtight, insulated cap will be built over the opening.

h) Knee wall access doors will be treated like attic hatch doors whenever possible.

9.5 ACCESSORIES AND MATERIALS RELATED TO ATTIC PREP:

a) Glass or mineral fiber insulation as a backer for other sealants, meeting ASTM 665,

b) Backer rod (preformed closed cell foam rope) as a backer for other sealants,

c) 6 mil (0.150 mm) polyethylene sheet (used for ground cover or winter-warm side application only)

d) Moisture permeable air impermeable wrap material, flame spread 25 (cold side cover),

e) Foil scrim kraft (FSK) facing ignition barrier per IRC 2021 R316.5.3

f) Netting to hold blown insulation in open cavity,

g) FSK or vinyl faced duct wrap insulation R-8 nominal 3" meeting ASTM C1290, and C1136 (facing)

h) Soffit ventilation air chutes for 16- or 24-inch rafter spacing. Ventilation air chutes must extend above existing insulation by 1 inch or greater to prevent insulation from blocking opening.

i) Insulated flex duct 4- and 6-inch diameter for exhaust fans

9.6 INSULATION MATERIALS:

a) Cellulose (blown-in) loose fill insulation meeting ASTM C739, 16 CFR 1209, 1404,

b) Specific Cellulose ICC ES reports required for fire rated details (e.g. ESR-1996 US Greenfiber, ESR-2217 NuWool),

c) Mineral fiber batting and blanket insulation meeting ASTM 665,

d) Mineral fiber (blown-in) loose fill insulation meeting ASTM C764,

e) 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)

f) Rigid foam boards meeting ASTM C578, ICC ESAC12,Specific foam board ICC ES reports required for uncovered use (e.g. Energy Shield, JM CI Max, Thermax). Must be on program approved list.

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

10.0 WEATHERIZATION INSTALLATION GUIDELINES:

a) Sections 10.1 through 19.7 outline the specific installation requirements necessary to ensure program compliance, proper material utilization, and adherence to established standards."

10.1 AIRSEALING:

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

b) Prior to installation, test results shall be provided to LV 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 firestop 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.

10.2 PERFORMANCE CRITIRIA:

a) CONTRACTORS will clearly define where the pressure and thermal boundaries of the home are to be, and ensure 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.

b) 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 smoke device at a pressure difference of 50 Pascals.

10.3 CONDITION FOR MATERIAL USE:

a) Air impermeable barrier materials and sealants shall be used within their listing and installed in conformance with Massachusetts Building Code (780 CMR), and manufacturer 'spec's.

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.

1. Support shall be provided to prevent sagging.

2. Larger enclosures of rigid foam or fiberglass board barrier material for pipes, whole house fans, or fold downstairs shall be fastened and sealed at all edges with weatherstrip provided at operable joints and edges sealed to the substrate where fixed support shall be provided to prevent sagging.

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 without approval from the Lead Vendor.

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 these criteria. 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 also an acceptable practice.

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. **Exception: Single wall dryer vents will only require 3” clearance.**

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.

l) If the contractor provides the LV signed documentation by a licensed electrician, all recessed fixtures shall be treated as non-IC rated. (LVs that allow different treatment for IC rated fixtures will provide additional requirements for treatment and documentation).

1. **Exception:** LED type recessed lighting can have insulation in contact with the light provided that the current LED bulb can never be replaced with an incandescent light bulb and the manufacture has a UL rated for such contact.

10.4 DIMENSIONAL LIMITS:

a) Siliconized acrylic shall not be used in openings or cracks over 3/16" without backer and generally should not be used in openings or cracks more than 3/8".

b) Pure silicone shall not be used in openings or cracks over 3/8" without a backer generally, should not be used in openings or cracks more than ½".

c) Foam shall not be used to span gaps or openings more than 1 ½" without a backer material.

d) 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.

e) Foam sealants will not be used where they will be exposed to sunlight or other ultraviolet sources.

f) 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.

10.5 RECESSED LIGHT ENCLOUSURE:

a) If an airtight box is installed to limit air leakage, it shall be sized for 3” clearance from all points of the fixture, >1” taller than the adjacent insulation and made with Building Code-approved materials with a non-insulating moisture permeable top of gypsum Board or equivalent material.

b) The airtight box must be air sealed to the ceiling maintaining clearances If access does not allow installation of the box, 3” clearance from Insulation is still required with no insulation allowed above. The gap between the fixture and ceiling may be sealed with fire rated caulking.

c) 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.

10.6 TYPICAL AIR SEALING LOCATIONS:

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

b) These areas can include accessible attics, side attics, crawlspaces, attached garages, unconditioned basement ceilings, and leakage from semi-conditioned basements 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.

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

10.7 COMMON AIR LEAKAGE DETAILS:

a) Dropped soffits, dropped ceilings and ceiling height changes
b) Plumbing wet walls, duct chases, duct seams, joints and boot leaks
c) Chimney and combustion vent chases
d) Openings behind and under tubs, showers, and tub/shower enclosures
e) Wall tops open into attic, gaps between gypsum ceiling and wall plates
f) Annular space at wiring, pipe penetrations through plates, and at ceiling fixtures
g) Floors open under knee walls, walls open at level changes and gable ends
h) 2 nd story floors open to attached roofs over porches and additions or garages
i) Inside framing open into attic stairs and landings.
j) Pocket door framing open into floor above and exterior walls
k) Seams and openings in walls and ceilings between attached garages and house
l) Non-IC recessed light fixtures
m) Bath and kitchen fans venting into the attic
n) All joints, seams, and penetrations in surfaces without an air retarding membrane.
o) All openings allowing air between conditioned space and attic are sealed
p) Gaps in tongue in groove paneling where angles change at hips, valleys, and where walls meet slants and ceilings.
q) Acoustic tiles and suspended ceilings with no gypsum
r) Missing gypsum behind decorative ceiling light trays; built in cabinets in knee walls
s) Missing gypsum or open joints above decorative ceiling beams
t) Gaps below baseboard and behind carpet nailing strip at subfloor joint to exterior wall
u) Common wall openings between dwelling units
v) Attic access openings, operable doors and hatches without tight weatherstrip
w) Pull down attic access stair covers
x) Interior Ceiling mounted Whole House Fan
y) Rim joist junctions and gaps between sill and foundation.
z) Utility penetrations and direct openings through foundation walls
aa) Openings in gypsum boards above suspended ceiling and behind cabinets

bb) Openings between window and door assemblies and their respective jams and framing
cc) Recessed lighting fixtures not rated as airtight.

10.8 EFFECTIVE ATTIC AIR SEALING REQUIREMENT:

a) When air sealing an attic, all accessible air leakage pathways shall be air sealed. Air leakage pathways under floored areas may be effectively air sealed by dense packing the joist bays. If floored areas cannot be densely packed, the flooring shall be removed to air seal, at a minimum, all major bypasses such as chimney chases, plumbing chases, wet walls, dropped soffits, etc. Effective air sealing requires at a minimum 60% of the attic area to be air sealed along with all major bypasses.

10.9 CONFIRMATION OF AIR SEALING EFFECTIVENESS:

a) 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:

b) Visual inspection aided by a smoke device test during blower door operation,

c) Whole building air leakage test.

1. Whole building air leakage test results as specified by LV. 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,

d) Infrared inspection of the area aided by blower door operation.

1. When performed on a specified area or whole house, infrared inspection shall be done when there is at least an 18° inside to outside temperature difference in accordance with ASTM C1060 (1997) and air leakage pathways determined using ASTM E1186 (2009).

11.0 DUCT SEALING/ DUCT INSULATION:

a) Duct sealing and insulation improvements are currently approved measures through the Mass Save program. **See Appendix 16.5**.

11.1 DUCT SEALING GENERAL:

a) Duct sealing has many benefits including the potential for 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.

b) 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.

c) 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.

d) Existing duct insulation may be carefully pulled back to expose connections and joints that may then be sealed with duct mastic.

11.2 DUCT SEALING MATERIALS REQUIREMENTS:

a) 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 (only for use with metal duct work to plenum connections)
4. 2” roll mesh tape (for openings in the duct system greater than¼”)

11.3 DUCT SEALING INSTALLATION REQUIREMENTS:

a) 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.Any seam or hole in the duct system greater than ¼” will be sealed with approved duct sealing tape or backed with mesh tape and sealed with duct mastic.

b) 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 to should be sealed with duct mastic.

c) 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 then Aluminum tape should be used as a temporary blocker, and the customer should be notified to install a more permanent solution.

d) Boot to floor, wall or ceiling connections for supplies and returns should be treated as part of air sealing work scope.

e) 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.

f) Once they are located the insulation should be cut neatly and peeled back far enough to expose the joint for mastic application.

g) Once the ducts have been sealed, the duct insulation should be replaced back in its original location with no voids in insulation connections and joints that may then be sealed with duct mastic.

11.4 DUCT INSULATION MATERIALS REQUIREMENTS:

a) Duct wrap with an R-value of 8 will be used to insulate ducts located in unconditioned spaces.

b) Tape made specifically for use on duct insulation (e.g. FSK Facing Tape, Aluminum Foil/Fiberglass Scrim or Polyethylene Coated Kraft Paper).

c) Plier stapler and staples

d) 10-14” cable (zip) ties

11.5 DUCT INSULATION INSTALLATION REQUIRMENTS:

a) Duct insulation will be installed by wrapping insulation around ductwork and attaching neatly using a plier stapler.

b) 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.

c) Do not pull the insulation too tight as this will compress it and decrease its R-value. Seams should be stapled every two inches 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 or Polyethylene Coated Kraft Paper).

d) Flex duct insulation connections should be made with hard duct connectors, held in place with a vinyl tension strap.

e) No part of the duct system will be left un-insulated, including supply and return boots.

f) 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.

12.0 ATTIC INSULATION: (Cellulose Insulation)

a) 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, a mix of ammonium sulfate and boric acid or boric acid only (termed “borate only”). Mass Save currently accepts both grades.

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

c) Criteria for the installation of insulation must meet the program requirements.

12.1 ATTIC AIR SEALING CONFIRMATION:

a) Before insulating the attic, the CONTRACTOR will confirm that attic air sealing is complete per section 10.1 above. If these areas are not properly sealed, CONTRACTOR must notify program to determine next steps before proceeding.

b) Recessed light fixtures shall be protected from contact with insulation as referenced in section section 6.1.3. and have light box enclosures installed when possible.

12.2 ATTIC PREPERATION:

a) Confirm attic prep per ASTM C1015-06 including:

1. 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.

2. Clearance dams installed at attic access, bath fans, air handlers and between blown and storage areas.

3. 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 it will prevent insulation from falling into the living area, and that will allow safe access into the attic.

4. The dam shall be made of ½” thick or greater wood and be tightly sealed at the base and seams, or fiberglass batting laid flat on all four sides around the hatch, or other materials approved by the Program Administrators or Lead Vendors.

5. Insulation surrounding the dam must equal the R-value of the rest of the attic space.

6. Install vent chutes at all soffit vents and provide wind baffles with blockers under chutes that extend out past the exterior wall top plate to allow insulation to provide

proper coverage.

6. Ensure that all exhaust equipment ducting is terminated to the outside of the structure.
7. Provide insulation thickness markers 1/300 sq ft for open blow area.

13.0 ATTIC ACCESS DOORS:

a) Insulate and tightly weather-strip all attic access doors.

b) Fasten rigid insulation to access hatches. If infeasible, fiberglass batting may be used.

c) Provide minimum R-14 to hatches and walkup doors and R-10 enclosure at pull downstairs with air seal gasket, (e.g., insulated attic stair cover)

d) Rigid foam boards used shall be rated for exposed / uncovered use in attics on ICC ES report and meet Sections R-316.5.4 and 316.6 requirements of IRC 2024.

13.1 TEMPORARY ACCESS:

a) 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:

13.2 SURFACE OPENINGS:

a) Cut existing wallboard 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.

13.3 PLYWOOD OPENINGS:

a) Cut existing wall between two studs. Close opening with 1/2 plywood (G1S/AC) with four (4) or more 1 1/2" x 8 flat head wood screws secured into studs.

13.4 FINISH OPENINGS:

a) Cut existing ceilings. Head off opening. Install 2 ½" 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.

14.0 ATTIC VENTING:

a) All attics that receive attic insulation must follow the venting guidelines stated in section R806.1 of the International Residential Code 2024 (IRC) and adopted into Massachusetts Building Code book 780 CMR.

14.1 VENTILLATED ATTICS AND RAFTER SPACES:

a) Enclosed attics and enclosed rafter spaces formed where ceilings are applied directly to the underside of roof framing members shall have cross ventilation for each separate space by ventilate openings protected against the entrance of rain and snow.

b) Blocking and bridging shall be arranged so as not to interfere with the movement of air and air space of not less than one inch shall be provided between the insulation and the roof sheathing.

c) The net free ventilating area shall be not less than 1/150 of the area of the space ventilated. Ventilators shall be installed in accordance with manufacturers' installation instructions.

d) **EXCEPTION:** The net free cross ventilation area shall be permitted to be reduced to 1/300 provided both of the following conditions are met:

1. In climate zones 6,7 and 8 a class one or Class 2 vapor retarder installed on the warm, in winter side of the ceiling.

2. At least 40% and not more than 50% of the required venting area, is provided by ventilators located in the upper portion of the attic or rafter space.

3. Upper ventilators shall be located not more than four feet below the Ridge or highest point of the space, measured vertically, with the balance of the ventilation provided by eve or cornice vents.

4. Where the location of wall or roof framing members conflicts with the installation of opera ventilators, installation more than four feet below the Ridge or highest point of the space shall be permitted.

d) Do not install insulation in an attic space unless adequate and permanent ventilation is installed.

e) 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. Gable vents may be used as either high or low ventilation when trying to meet attic space ventilation requirements of 1/300.

f) 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.

g) 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.

h) Provide attic venting per code when the attic is being treated and ventilation is needed. Venting can provide access to inaccessible attics where feasible.

i) Follow all manufacturer's instructions and applicable codes for flash properly, seal and fasten to maintain roof and cladding drainage.

j) Roof Vents must be installed no more than 4 ft from the ridge and evenly spaced out.

k) CONTRACTOR shall provide documentation showing the manufacturer's net free air rating for any products used that have not already been approved by the programing prior to installation.

14.2 INSULATION BAFFLES:

a) 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 decking shall be provided in accordance with local building codes. Rigid 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.

b) Vent chutes should be installed per work scope. This should allow air to flow from soffit or knee wall 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 vent chutes may be used for very low pitch roof areas.

c) Baffles should be used to keep non air impermeable insulation from contacting the roof decking. Example: Batting insulation being used to insulate Knee Wall roof sloped areas would require baffles to be installed to keep batting from contacting the roof slope. Exception would be when dense packing is being recommended.

14.3 BATH FAN VENTING:

a) All unvented bath fans that terminate in unconditioned space, where work will be performed, must be vented to exterior.

b) Preferred termination point is shortest distance to the roof or gable

c) Use appropriately sized insulated hose or duct work to vent the fan

d) Hose must be secured to the bath fan and exterior termination points using zip ties

e) Any existing dampers located on the fan should be removed prior to installing insulated hose.

14.4 ROOF VENT / TURBINE GUIDANCE:

a) Roof vent should be placed no more than 4ft down from the ridge of the house away from valleys or close to other existing vents. Roof vents should not be installed below the 4ft rule without Lead Vendor approval.

b) Vents should be separated equally apart from each other

c) Installing a screw from the backside of the roof decking to mark where the vent will be installed is recommended to ensure proper placement.

d) The complete opening of the vent shall have no obstructions blocking the net free area.

e) When installing the vent on the roof a bead of roofing tar should be applied to the flange of the vent before installation. Flange shall be installed under shingles and secured with screws also installed under shingles to prevent leaks. Screws should also be sealed with roof sealant.

f) Roof vents should be placed at the back of the home unless unable and customer agrees to have vents installed in the front of the home.

g) Turbine vent should be installed so that it will be level with the pitch of the roof. The rotating Turbine head should always be level so it will operate as designed.

h) The Turbine should never be installed so that the rotating head is pitched sideways.

14.5 GABLE VENT GUIDANCE:

a) Install vents as close to the roof ridge as possible. For maximum efficiency, place them on opposite, opposing gables to encourage cross ventilation.

b) Trace the new vent’s shape using a template to ensure a precise, level fit.

c) Use a circular saw with a masonry blade for stucco, or a jigsaw for wood, to create the opening.

d) For vinyl siding, remove the siding to expose the wood sheathing, then cut the opening

e) Apply a generous, continuous bead of high-quality silicone caulk around the flange before securing the vent to prevent moisture from entering for cedar shingles, seal the cut edges of the wood heavily.

f) Secure the vent using screws or nails, but do not overtighten if installed on vinyl, as this allows for expansion and contraction.

14.6 SOFFIT VENT GUIDANCE:

a) Soffit vents should be installed on the front and back of the house when possible.

b) Soffits should be evenly spaced as much as possible.

c) The size of the soffit vent installed should fit in the soffit area easily.

d) Ensure soffits are installed straight by either snapping a caulk line or measure off the house the same amount for each soffit installed.

e) Ensure that the opening cut is big enough so none of the designed openings of the vent are blocked.

f) Secure vent in place with screws.

g) When vinal perforated soffit exists and installing a new conventional soffit vent is not possible, you may remove the perforated panel and cut out the size of the vent needed and install a properly fastened screen that covers the opening completely and reinstall the existing perforated soffit panel.

14.7 DAMMING CLEARENCES:

a) 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 these criteria. 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 also an acceptable practice.

b) 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.

c) **Exception: Single-wall GAS OR ELECTRIC dryer vents will only require 3” clearance.**

d) When batting insulation is used to keep blown insulation from storage areas and attic access points, the batting must be laid flat and be higher than the blown insulation being installed.

15.0 ATTIC INSULATION:

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

b) Install batt or blanket insulation to maintain 3” clearance from non-IC-rated lights and heat sources, none placed above.

c) Use the number of bags to meet the listed coverage per manufacturers ‘specifications.

d) Program recommends attic information card per ASTM C1015-06,16CFR 460 and Massachusetts Building Code 780 CMR Section R303.1.1. and be posted in an easily visible location (on the electrical panel or a framing member adjacent to the attic access) showing the following information:

1. Insulation material installed,
2. Installed thickness,
3. Coverage area,
4. Installed R-value,
5. Number of bags used, or pounds installed per FTC Rule 16 CFR 460 and Mass Building Code 780 CMR Section R303.1.1.

15.1 ATTIC SLOPE DENSE PACK CELLING INSULATION: (between knee wall and upper attic flat)

a) Sloped ceilings **(between knee wall and upper attic flat**) may be densely packed with cellulose Insulation. Batting or FIRE RATED foam board should be used for blocking the lower end of the attic slopes, to prevent insulation spillage and for a proper dense pack to take place

b) To be considered for dense-packed cellulose, at least the upper end of every cavity must be exposed to an open, fully vented attic. This is to allow the cavities to dry to the vented area; for example, an area of sloped roof with knee wall attic below and cap attic above as is typical in a Cape-style house, may be considered a candidate for this treatment.

c) The main attic area will be used for calculating net free ventilation and shall include the dense-packed sloped cavity area in those calculations. Any required ventilation will be installed in the upper attic.

d) In the case of low-slope roofs, flat roofs or cathedral ceiling roofs, dense pack application is not an option.

e) Cellulose shall be installed between any existing insulation and the roof sheathing (not between existing insulation and the plaster or drywall).

f) There must be a minimum space of 3” between the existing insulation and the roof sheathing to ensure adequate space for full dense pack.

g) The existing ceiling must be finished and in good shape, and able to support the weight of the cellulose: no cracks or gaps in the material, or materials that are too thin or improperly secured (such as wood paneling, homosote tiles, etc.).

h) Use the number of bags to meet listed dense pack coverage per manufacturers ‘specifications.

i) Program recommends attic information card per ASTM C1015-06,16CFR 460 and Massachusetts Building Code 780 CMR Section R303.1.1. and be posted in an easily visible location (on the electrical panel or a framing member adjacent to the attic access) showing the following information:

1. Insulation material installed,
2. Installed thickness,
3. Coverage area,
4. Installed R-value,
5. Number of bags used, or pounds installed per FTC Rule 16 CFR 460 and Mass Building Code 780 CMR Section R303.1.1

15.2 SLOPED DENSE PACK ROADBLOCKS

a) Unvented roof assemblies are considered too risky under the following circumstances:

1. If there are any known roof or flashing leaks, or visible evidence of leaks, signs of mold-like substance, these must be fixed before a contractor considers dense-packing.

2. If the length of the enclosed cavity to be dense packed **exceeds eight (8) feet, approval from the program Lead Vendor would be required to proceed.**

3. The existing ceiling must be finished and in good shape, and able to support the weight of the cellulose: no cracks or gaps in the material, or materials that are too thin or improperly secured (such as wood paneling, homosote tiles, etc.).

15.3 KNEE WALL SLOPED ROOF INSULATION: (Knee Wall Slopes: soffit to attic slope)

a) The following installation requirements:

b) Unfaced batt insulation should be the first choice for insulation material. Cellulose dense pack can be considered an alternative approach when faced with irregular framing dimensions.

c) Attic vent chutes should be installed from the soffit area all the way up until they meet the attic slope.This will keep batt insulation from contacting the roof sheathing, as building codes require.

d) Batt insulation thickness should be reduced so that both the batt and attic vent chutes can be installed without compression.

e) Knee wall slope insulation should be covered with program approved fire-rated foam board that provides an adequate air barrier for that assembly.

f) When dense-pack insulation is specified for attic slope applications and no access limitations are present, a fire-rated foam board shall be installed to seal the opening at the lower portion of the attic slope. If access limitations prevent proper installation, approved batt insulation may be used as an acceptable alternative.

g) When no dense pack is part of the attic slope work scope, the foam board should extend up to the attic slope, allowing the attic slope to still communicate with the knee wall slope

15.4 ENCLOSED FLOOR INSULATION:

a) Floor systems that are determined to be the thermal boundary will be insulated and air sealed in accordance with 10th addition of the Mass Building Code book 780 CMR.

b) 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.

c) Take steps to ensure 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.

d) Insulation should be blown into enclosed floors to capacity. 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.

e) When the drill and plug method is used on exterior floor overhangs, the holes must be plugged, flush with the exterior surface and finished with an exterior wood filler.

15.5 DENSE PACK FLOOR INSULATION:

a) At floored areas inaccessible to air sealing using barrier materials, CONTRACTOR shall dense pack to retard airflow. Acceptable materials include:

1. Cellulose insulation at 3.5 lbs./cu ft or greater density.

2. 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.

b) 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.

c) Flooring that has been removed for access to install insulation shall be re-installed to 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.

16.0 OPEN CAVITY INSULATION:

a) Install mineral fiber batting 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 filled with no voids, gaps or compressions.

c) Batt insulation, when installed as the first layer, MUST always be installed in full contact with the warm side air barrier and have an existing vapor barrier attached.

d) Batt insulation installed in walls MUST always have a solid air barrier on all six sides of the cavity when access allows.

e) 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.

16.1 FIRE RATED FOAM BOARD:

a) Where rigid foam board is installed over mineral fiber batt insulation or on another attic surface, use rigid foam board listed for uncovered use in attic.

b) Install a thermal barrier or prescriptive ignition barrier per IRC 2024 R316.5.3 and MA code.

c) Cover exposed foam core edges with tape rated for use in locations that will be exposed.

d) 1 part foam can be used to seal seams between foam boards.

e) Where present, the knee wall floor joist opening from the attic floor to conditioned space under the knee wall shall be blocked airtight with a barrier sealed in place below the interior face of the knee wall. If this isn't possible, dense pack insulation may be used as described in Section 18.0.

17.0 CLOSED SIDEWALL INSULATION:

17.1 PERFORMANCE CRITERIA:

a) In existing closed cavities where air sealing is not feasible, dense-pack 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.

17.2 PRE-WORK INSPECTION CRITERIA:

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

b) Inspect cavities for framing detail, wiring, piping or ductwork that will prevent dense pack.

c) Provide a sealed barrier continuous to adjacent airtight cavities or building element.

d) Provide wood or foam plugs for sheathing.

e) Repair openings made in weather barrier with house wrap tape or sheathing tape. If weather barrier is not present, seal plugs with caulk or cover plugs with house wrap tape or sheathing tape.

f) Replace and refasten siding with matching or larger fasteners. Touch up nail holes with weather resistant sealant.

g) 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.

17.3 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.

d) Contractors 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.

e) Dense pack requires at least 3.5 pounds per cubic foot or higher with a cavity depth no less than 3”.

f) Keep a record of the number of bags used to ensure the installed insulation conforms to the manufacturer's recommended coverage shown on the material label, 1 pound per square foot for 2x4 wall framing**.**

g) 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.

17.4 DRILL & PLUG (D&P) APPLICATIONS:

a) Exterior drill and plug applications on painted surfaces must be completed in the following manner:

b) 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

c) This procedure also applies to drill and plug applications on windowsills, frieze boards, and entrances. Note: drilling windowsills 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.

d) Exterior drill and plug applications on stained surfaces must be completed in the following manner:

e) After installation, insert a plug so that it sits flush with the original 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 original siding.

f) Interior drill and plug applications must be completed in the following manner:

1. After installation, insert a plug so that it is (1/8") recessed. Apply 1-2 coats of setting joint compound, or equal, patching material or a plaster repair product filling just flush to the existing surface.

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

17.5 WALL CAVITY DENSEPACK CONFIRMATION:

a) Confirm cavity pack is effective, and the machine adjustment is within limits by completing one of these tests.

1. Testing airflow at 50 pa with smoke at a completed but uncovered installation hole,

2. Testing airflow with smoke device at first application hole in completed cavity while blowing adjacent cavity.

3. Best Practice for Testing airflow is with a digital manometer to show that previously dense packed wall cavity does not exceed 1 pascal of air pressure when dense packing the adjacent wall cavity.

17.6 EXTERIOR WALL 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.

b) When instructed to do so by the Program inspector, the CONTRACTOR will contact the customer to correct job deficiencies within 14 days of notification.

18.0 ENCLOSED FLOOR INSULATION:

a) Floor systems that are determined to be the thermal boundary will be insulated and air sealed in accordance with Massachusetts Building Code.

b) 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.

c) Take steps to ensure 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.

d) Insulation should be blown into enclosed floors to capacity. 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.

e) When the drill and plug method is used on exterior floor overhangs, the holes must be plugged, flush with the exterior surface and finished with an exterior wood filler.

19.0 BASEMENT / CRAWL SPACE PERFORMANCE CRITERIA:

a) 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.

19.1 CRAWL SPACE PREPARATION:

a) Air sealing of a crawlspace or basement ceiling shall be performed per section 10.1 above.

b) Inspection before installation shall be made in conformance with ASTM C1320-09. Inspect the attic, crawlspace, or other area to be insulated, postpone installation until:

1. Potentially faulty wiring is corrected and confirmed by a licensed electrician.

2. Moisture damage and/or entry is corrected, and sources controlled.

3. Ground cover is in place over exposed soil that extends 1ft up the foundation wall in crawlspaces wherever accessible with interior seams sealed with approved tape. (ex. 3M 8087CW) Mastic or adhesive is acceptable. Foam is not acceptable.

4. Perimeter: Seal the GMB to the foundation with mastic, adhesive sealant or one-part foam Areas uncovered by the ground cover must be disclosed to customer.

c) **Exception: When a vapor barrier is not required on the dirt floor.**

1. If an accessible dirt floor area is vented to code to meet 1 /150 , a vapor barrier is not required.

2. If installing rigid foam board on a crawl space ceiling or existing closed cell foam (not open cell foam) is present and has no communication to the basement area.

3. If the entire crawl space is inaccessible with no existing moisture issues having been identified in any other area of the home.

4. If moisture issues are present, then a moisture evaluation must be completed to rule out the crawl space as a contributing source before continuing with work.

d) Confirm that caulk, gasket, or other sealant is installed at penetrations of the interior wall or floor including plumbing, electrical, heat registers, and grills.

19.2 DEFINITION OF INACCESSIBLE SPACE:

a) Less than 3ft of headroom across the entirety of the space.

b) Obstructions to the access point to the extent it makes the access impassable.

19.3 INSULATION INSTALLATION REQUIREMENTS:

a) Installation of mineral fiber batt or blanket insulation in open cavities shall be made in conformance with ASTM C 1320 and MA Building code.

b) Installation of cellulose or fiberglass blowing wool into closed cavities shall be made in conformance with attic floor insulation methods above 18.0 or wall insulation in 17.3.

c) 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.

d) Completely fill every cavity to required depth or more.

e) When double layers of batting insulation are installed over floors, cross the layers with no gaps.

f) When batting insulation contacts the sub-floor floor or ceiling below an attic space, the first layer of batting insulation will require a vapor barrier if one is not already in place

19.4 FIBERGLASS INSTALLED BELOW FLOOR:

a) insulation shall be in full contact with floor above using wire, screen, nylon mesh fastened in place.

b) Fit to length and placed snug to edges without gaps, voids or compressions.

c) Cut and fit around all cross-bracing, outlets, wiring, into narrow cavities.

d) No exposed facings rated higher than flame spread 25.

e) Vapor retarder must be in place and installed to warm-in-winter side.

f) Never place insulation between piping and the warm surface, to prevent freezing.

19.5 RIM JOIST INSULATION:

a) When approved within the scope of work, rim joist framing determined as the thermal boundary shall be insulated to a maximum of R-19 with 6-inch fiberglass batt and 1 part foam.

b) When limited shelf space prevents an R-19 batt insulation from being installed, 2-inch R-14 fire rated foam board can be installed as an alternative.

c) CONTRACTOR will confirm no insulation is placed between piping and the warm side of the rim joist framing to prevent freezing without proper sign off from the customer.

19.6 FOUNDATION INSULATION:

a) 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.

b) Prior to application, confirm that roof runoff, surface water, and ground water are drained properly.

19.7 PERFORMANCE CRITERIA:

a) Crawlspace can be brought inside the thermal/pressure boundary by installing FIRE RATED rigid foam board insulation at inside of foundation wall, sealed from subfloor to below grade.

19.8 PREPARATION:

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

19.9 INSTALLATION:

a) For crawlspaces attach minimum of R-14 or higher foam board rated for uncovered use in interior wall or floor including plumbing, electrical, heat registers, and grills.

20.0 HEATING SYSTEM REPLACEMENT:

a) Electric HEAT PUMPS are the recommended heating replacement for fossil fuel and electric baseboard systems. Heat Pumps that are installed must meet the minimum efficiency ratings set by the Mass Save program. Installation is to be completed in accordance with the manufacturer's instructions while following the State and Local Codes. Any eligibility questions should be communicated to the Program Lead Vendor.

21.0 AIR CONDITIONING SYSTEM MEASURES:

a) Electric HEAT PUMPS are the recommended replacement for conventional air conditioning systems that are less efficient. The installed Heat Pump replacement must meet the minimum energy ratings set by the Program. Installation is to be completed in accordance with the manufacturer's instructions while following the State and Local Codes. Any questions about eligibility should be communicated to the program Lead Vendor.

22.0 HEAT PUMP APPROVED INSTALL GUIDELINES:

22.1 CONDENSERS:

a) All outdoor condensers shall be placed on a level pad, where the ground beneath has been levelled, prepared, and tamped for the pad, gravel as needed. Pre-poured, custom poured concrete slab or vinyl pad is acceptable, however if pad during life of system becomes unlevel contractor is responsible for replacing and resetting pad.

b) Outdoor unit located to avoid refreezing meltwater on walkways or other areas where slip hazards could occur.

c) Outdoor units are at least 12" above ground.

d) Condenser to be secured to pad by at least 1 connection point per stand leg.

e) Wall-mounted brackets should be avoided unless being mounted on a poured foundation wall abutting unfinished space.

f) Condensers are placed away from impeding light through windows unless agreed upon with homeowner and the lead vendor when that is the only possible placement.

g) Condensers should not be located on ocean facing sides, when possible, to avoid salt wind corrosion.

h) Condensers shall be ordered with BluOn coating treated with coastal anti-corrosion coating for all jobs in coastal areas. If BluOn is not available, the condenser must be sprayed with BluOn coating at install.

i) Outdoor units must be specified according to the manufacturer's clearance requirements and code requirements. Vertically stacked units shed water properly. Outdoor fan outlet does not point directly at another unit or occupied space.

j) Outdoor unit is to be protected from roof runoff with gutter, rain cap, gable end, or overhang. If not possible, drip caps or shields approved by manufacturers are installed.

22.2 LINE SETS:

a) All exterior lines must be covered with Line-Hide. Line-Hide components must be constructed from weather-resistant PVC that's been treated with UV inhibitors.

b) Refrigerant line-sets shall use either non-PE insulation (e.g., elastomeric or EPDM) or PE insulation specifically rated by the manufacturer as corrosion-resistant, incorporating barrier layers, coatings, or treated copper. All insulation ends and seams must be fully sealed to prevent moisture intrusion.

c) Refrigerant line penetrations rodent-proofed with mastic or approved alternative. All penetrations sealed with insulating foam/sealant. Disturbed insulation restored to original

or better condition. All refrigerant line endings shall be taped or mastic sealed, including at condenser, no exposed copper at connections.

d) Any tears or gaps in refrigerant insulation are sealed and properly re-joined without air gaps. No exposed refrigerant lines to be left on exterior, all line runs must be covered in line hide. All line-hide must be properly affixed to the home. (all gaps foamed and or sealed)

e) Designs should avoid placing line-hide on the front of the home whenever possible, unless specified by the lead vendor.

f) Line-hide shall be used for refrigerant lines inside the home in any finished space, including closets. Penetrations on exterior being foamed properly and/or sealed with approved product.

g) Line set length must be within manufacturer specifications.

h) End caps and fittings shall be used as needed.

i) Flexible line set may be used where needed.

22.3 CONDENSATE:

a) Condensate lines from wall heads shall be cut to uniform length between 4–12" from ground level.

b) Condensate lines from ducted units shall be run in hard PVC, pitched correctly, and terminated to gutter or 4–12" from ground level.

c) Condensate drains shall not terminate on walkways, balconies, or entrance ways.

22.4 INDOOR UNITS:

a) When possible, ductless units are installed so that the air discharge is no higher than 8’ from the floor and no lower than 6' from the floor. 6" minimum clearance from ceilings is maintained. When deviating, follow manufacturer guidelines for clearance from floors and ceilings.

b) Designs that require condensate pumps should be avoided when possible. If a pump is required due to the head location, LV approval is required.

22.5 AIR HANDLERS:

a) Whenever possible, air handlers in attics shall be hung from threaded rod to minimize vibration and improve serviceability.

b) All HVAC air handlers are equipped with an emergency drain pan beneath the unit that is secure and at a level. The pan must include a water sensing shut off switch. The primary drain must be piped. It's best practice to pipe the secondary drain. Air handlers may be configured to utilize gravity drain or lift mechanism for condensate drainage.

c) Whenever possible and in flood-prone areas, all air handlers located in basements shall be placed on blocks putting unit at least 3" off floor. Code requirements followed for clearances.

22.6 DUCTWORK:

a) All supply and return placement must be approved by the lead vendor and the customer.

b) Central returns are not acceptable for bedroom clusters; each bedroom shall have a return unless otherwise approved by the lead vendor.

c) Avoid floor returns when possible. Senior and mobility-restricted customers shall have filters accessible from living space whenever possible.

d) All ductwork must be sized according to CFM requirements according to Manual J/Manual D calculation.

e) All ductwork, boots, grilles, etc. must be sized to cover the maximum required CFM as defined by load.

f) All ductwork shall be mastic-sealed, insulated, and taped leaving no exposed or uninsulated surfaces. Mastic or tape must be UL 181A or B rated, depending on the application.

g) All ductwork shall be zip-tied and foil taped at all supply take-offs.

h) All ductwork must be insulated to a minimum of R8.

i) Filters will be placed in attic return grills for all jobs unless there is clear and easy access for the homeowner.

j) Ductwork shall be properly affixed to trusses in attics or basements as needed to avoid ducts left hanging in areas of traffic in attics or basements.

k) Ductwork is free of kinks or sharp turns. Proper transitions and takeoffs are used.

l) Ductwork is free of kinks or sharp turns. Proper transitions and takeoffs are used.

22.7 ELECTRICAL:

a) Controls shall be mounted on an interior wall in a location that does not cause short cycling.

b) All indoor units shall receive a wall-mounted control, remote is acceptable, but wired control is preferred.

c) Wire molding is acceptable but must be reviewed and approved by the customer prior to installation.

d) If the thermostat is compatible, the reading for temperature purposes should be at the controller, not the unit.

e) Surge protection is required on all equipment. Whole home surge protection is sufficient. Follow industry standards for additional surge protection needed.

22.8 DECOMMISSIONING & EQUIPMENT REMOVAL:

a) For oil tanks: The outside fill pipe shall be removed, and the tank opening shall be capped or plugged, or the outside fill pipe shall be capped and filled with concrete, and all remaining piping, other than the vent line, shall be capped or sealed. The outside opening must be made weather tight. If disconnecting the fuel line, the fuel line must be safely capped.

b) Existing heating systems must be made inoperable. If disconnecting from the panel, the wire must be terminated outside of the electric panel and no longer energized. If disconnecting the thermostat, the wire must be disconnected at both the thermostat and system board.

c) Boiler/furnace removal should only be done when specified on the contract.

d) Contractor responsible for proper and timely removal and disposal of all displaced equipment that were contracted to be removed.

e) Chimney flue must be capped at the chimney flue opening when existing system is being removed.

f) Hydronic piping should be safely cut back, all water drained, and pipes capped.

g) Remove overhead emergency wiring and disconnect at breaker if applicable.

22.9 MISCELLANEOUS:

a) Permits are required for all heat pump projects and must be submitted to the lead vendor when invoicing.

b) Contractor to address any deficiencies found in a timely manner once the issue is reported.

c) Contractor to have tutorial with the customer once equipment is installed.

d) Contractor to go over the functions with the customer and explain maintenance requirements. Explain how to use it and what not to do. (Automatic mode, etc.)

22.10 HEAT PUMP WATER HEATERS:

a) Adequate clearance around unit (typically ≥750 ft³ unless ducted) Manufacturer guidelines followed.

b) Tank is level and secure.

c) Condensate line is connected and draining properly.

d) Hot water line insulated at least 6' from the top of the unit.

e) T&P discharge terminates with a minimum of 6 inches and a maximum of 24 inches above the floor or flood level. Copper or corrosion protected pipe used. Code requirements followed.

f) T&P discharge terminates with a minimum of 6 inches and a maximum of 24 inches above the floor or flood level. Copper or corrosion protected pipe used. Code requirements followed.

g) Contracted size and model number must match installed equipment.

h) The best practice is to install a drain pan and water sensor under the HPWH.

22.11 HEAT PUMP RATE ENROLLMENT (National Grid Only)

a) Inform National Grid Customers: Share the benefits of the Heat Pump Rate and confirm their eligibility.

b) Assist with Online Enrollment.

c) Guide customers through the online self-enrollment form, located here: https://www.nationalgridus.com/MA-Home/Rates/Heat-Pump-Rate-Form.

d) Customers will need to provide the following information:

1. Customer name, phone, and email address
2. National Grid electric account number **(Nat Grid Only)**
3. Service address
4. Date of installation
5. A clear photo of their heat pump's outdoor unit showing the model and serial number.

22.12 TRIPPLE EVACUATION PROCEDURE:

Required testing procedure			
Sequence	**Action**	**Pressure**	**Duration**
1	Flush with nitrogen to blast out any debris and to dry lines		
2	Pressurize with nitrogen	500-600 PSIG	20-60 min with no drop on pressure gauge
3	Evacuate system	4,000 microns of mercury	15 minutes
4	Break vacuum with nitrogen	2-3 PSIG	
5	Evacuate system	1,500 microns of mercury	20 minutes
6	Break vacuum with nitrogen	2-3 PSIG	
7	Evacuate system	500 microns of mercury	60 minutes

23.0 MECHANICAL VENTILATION:

a) Contractor is responsible for ensuring that the house meets ASHRAE 62.2 2022 standards for whole-house fresh air ventilation, if the home is below the 70% of BPI Building Air Flow standards.

24.0 LIGHTING MEASURES:

a) 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 manufacturer's instructions and fixture restrictions.

25.0 DOMESTIC HOT WATER MEASURES:

a) HEAT PUMP water heaters are the recommended choice when replacing the domestic hot water unit.

b) The HEAT PUMP water heater that is to be installed must meet the minimum energy efficiency ratings set by the Mass Save program. Installation is to be completed in accordance with manufacture's specifications, all local and state codes. All questions related to eligibility should be communicated to the PROGRAM Lead Vendor.

26.0 QUALITY ASSURANCE: (In-field Quality Assurance Inspections)

a) The program has the goal of performing on-site in-process and post installation quality assurance inspections where major measures have been installed. The following components will be part of the inspection.

1. Customer Satisfaction Discussion
2. Visual Inspections
3. Diagnostic Tests
4. Contractor Follow-up
5. Inspection Documentation

b) Any issues identified during on-site inspections will need to be successfully addressed the same day or within 14 days of notification from the program or customer. Failure to fix repairs may result in the release of CONTRACTOR payment.

27.0 CONTRACTOR EVALUATIONS:

a) 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.

b) Evaluations will be performed by Final Inspectors, Field Supervisors, Program Managers, and/or the Quality Control Department, using a standard evaluation format.

c) 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 LV.

d) CONTRACTORS who fail to improve after their probationary period are subject to suspension and/or termination as UTILITY Approved CONTRACTOR.

e) 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.

27.1 KNOB & TUBE EVALUATION:

a) When the Home Energy Assessment reveals evidence of Knob & Tube wiring in a home, a secondary evaluation will be required by the Mass Save Program to be completed by a licensed professional. The CONTRACTOR will evaluate the home for evidence of live Knob & Tube up to and including:

1. Using appropriate testing devices and methods as defined by local, state, and Facilitated Services Standards.

2. Removing and evaluating connections to receptacles, switches, circuit breakers, fuses, connections, or other customer accessible devices for controlling electricity.

3. All visible wiring.

4. Removal and replacement of accessible fiberglass batting from evaluation areas.

5. Removal and replacement of any accessible blown-in insulation from evaluation areas.

6. The CONTRACTOR will specifically review any areas identified on the Barrier Clearing Form (BCF) and provide results of their testing by marking these areas as “Live” or “Not Live”.

7. If the evaluation cannot be completed due to incomplete CRAs or previously unidentified barriers to work completion, CONTRACTOR must contact the LV within 2 business days.

27.2 RECESSED LIGHTING RATED FOR INSULATION CONTACT:

a) When a Home Energy Assessment reveals recessed lights that penetrate an area to be insulated in a home, a secondary evaluation may be required by the Mass Save Program to be completed by a licensed professional.

b) The CONTRATOR will evaluate the home to determine if the identified recessed lights meet the appropriate requirement to be in direct contact with insulation according to local, state, and national code.

c) If only certain lights meet the appropriate requirement the CONTRACTOR will specifically identify which recessed lights meet the requirement by utilizing the “Notes” field on the BCF.

d) If the evaluation cannot be completed due to incomplete CRAs or previously unidentified barriers to work completion, CONTRACTOR must contact the LV within 2 business days.

27.3 COMBUSTION SAFETY TEST FAILURE:

a) When a Home Energy Assessment reveals a failed Combustion Safety Test in a home according to Program Standards (i.e. low draft, high ambient CO, high operational CO), a secondary evaluation will be required by the Mass Save Program to be completed by a licensed professional.

b) The CONTRACTOR will perform a standard “service call” or “preventative maintenance call” and attempt to rectify the issue identified during the Home Energy Assessment to Program Standards.

c) The CONTRACTOR will identify on the BCF the results of final testing once the work is completed.

d) If the evaluation cannot be completed due to incomplete CRAs or previously unidentified barriers to work completion, CONTRACTOR must contact the LV within 2 business days.

e) Previously Unidentified Safety Concerns If the CONTRACTOR identifies areas of concern for insulation or air sealing work to be completed, that are in their area of licensure, the CONTRACTOR is required to notify the LV of these areas by utilizing the “Notes” field on the BCF.

f) These areas of concern include but are not limited too.

1. Open electrical junction boxes
2. Exposed wiring

28.0 PROGRAM SPONSERS:

- **BERKSHIRE GAS**
- **CAPE LIGHT COMPACT**
- **EVERSOURCE**
- **NATIONAL GRID**
- **UNITIL**
- **LIBERTY**

29.0 REFERENCE:

- Documents Published by the Canadian General Standards Board (CGSB) Place du Portage, III, 6B1Gatineau,Québec, K1A 1G6 Canada CAN/CGSB 51.71-2005 Depressurization Test.
- Documents Published by the National Fire Protection Association (NFPA) 1 Battery March Park Quincy, MA 30169-747 www.nfpa.org NFPA 54-2006.
- ANSI Z223.1-2024 National Fuel Gas Code.
- Documents Published by the International Code Council 500 New Jersey Avenue, NW, 6th Floor Washington, DC 20001 International Residential Code – 2024
- Massachusetts State Building Code -780 CMR. Massachusetts State Building Code - 780 CMR | Mass.gov
- Building Performance Institute. bpi.org/resources/
- ASHRE (International Society of Heating, Refrigerating and Air Conditioning Professionals). Standards and Guidelines