



# MASSACHUSETTS Energy Code Technical Support

## Residential Duct System Requirements

### Duct Sealing

The Massachusetts residential energy code (based on 2015 IECC) requires that all ducts be sealed no matter where they are located - even in conditioned space. All joints and seams on air handlers, filter boxes, plenums, trunks, take-offs, ducts, elbows, and boots must be sealed with an appropriate sealant. Acceptable sealants include UL listed tapes, mastics, liquid sealants, gasketing, and spray polyurethane foam. Usually, the seams on each piece of ductwork are sealed first, and then as the system is assembled each piece is sealed to other components. Note that many of these seams and joints are inaccessible or hidden under duct insulation after the duct system has been installed.



*Sealed Branch and Trunk*



*Sealed Register Boot*

### Duct Testing

If any part of a duct system is located outside the building's thermal envelope, the duct system will need to be tested to confirm that the duct sealing was effective. Areas outside the building thermal envelope include vented attic spaces, basements or crawlspaces without foundation wall insulation, garages, or any space that is either outside the building's air barrier or outside of the building's insulation.

Duct testing involves temporarily sealing off the supplies and returns, hooking up a portable fan to the duct system, and pressurizing the system to 25 Pascals (0.1 inches of water column). Per Massachusetts amendments, duct testing must be performed by an appropriately certified individual, such as a HERS rater, a HERS field inspector, or an applicable BPI-certified professional. The code does not prohibit the installing contractor from testing their own work, assuming they are properly certified as described above.

Duct testing can be performed at any point during construction as long as all the ducts have been fully installed. Testing at rough-in will allow problems to be easily located and repaired while all the ductwork is still easily accessed.



*Duct Blaster*



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If following the prescriptive path of the energy code, the maximum allowable total duct leakage is 4 CFM per 100 square feet if the air handler has been installed, and 3 CFM per 100 square feet if the air handler has not yet been installed. If following the Energy Rating Index path (R406) (as required for new construction in Stretch Energy Code communities), there is no specific duct leakage threshold, but with less duct leakage your Energy Rating Index will improve.

### Prescriptive Duct Leakage Requirements

Condition	Maximum Total Duct Leakage
Air handler installed	4.0 CFM per 100 square feet of conditioned floor area
Air handler not installed	3.0 CFM per 100 square feet of conditioned floor area
(No requirement if ducts are located completely inside the building thermal envelope)	

## Duct Insulation

If following the prescriptive path of the energy code, supply and return ducts located in attics need to be insulated to a minimum of R-8 if they are at least 3 inches in diameter. Ducts smaller than 3 inches located in attics need a minimum of R-6 insulation. Supply and return ducts located in any other unconditioned space, such as a basement or crawlspace outside the building thermal envelope or a garage, need a minimum of R-6 insulation if they are at least 3 inches in diameter, and R-4.2 if they are smaller than that. Be wary of thin duct insulation products like foil-faced bubble wrap that claim to meet these R-values through the use of radiant barriers and air spaces.

If following the Energy Rating Index path (R406) (as required for new construction in Stretch Energy Code communities), there is no specific duct insulation requirement, but with more duct insulation, your Energy Rating Index will improve.

Note that ductwork located inside the building thermal envelope does not need any insulation to meet the 2015 IECC energy code. Some insulation on supply ducts is recommended to prevent condensation if ductwork will be delivering air conditioning.

### Prescriptive Supply and Return Duct Insulation Requirements

Duct Location	Duct Diameter	Minimum Duct Insulation
Attic	3" or greater	R-8
	Less than 3"	R-6
Other unconditioned spaces	3" or greater	R-6
	Less than 3"	R-4.2