



HVAC Load Calculations - Manual J & S

To: All ODOC Agency Weatherization Program Service Providers - Executive Directors, Weatherization Program Managers

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Regulations: DOE Weatherization Program Notice 15.4;
CAA Implementation Manual, Requirement 307, Section III, 1.B(c); 2.B(c);
SWS 5.3001.1; IRC 2015 M1401.3; The Weatherization Assistant User's Manual Version 8.9

Purpose: To clarify HVAC load calculations and sizing protocols/procedures

REGULATORY BACKGROUND:

Since April 1, 2015, when all weatherization measures installed in a home were required to meet the National Renewable Energy Laboratory's (NREL) Standard Work Specifications (SWS), it has been required that all Heating and Cooling System replacements be sized according to Air Conditioning Contractors of America (ACCA) Manual J Standards. This has not changed. However, last year, (effective September 1, 2018) ODOC's Weatherization Health and Safety policies in Requirement 307 were updated. One of these updates included new language that all Heating and Cooling systems replacements must "Use proper sizing protocols (Manual J, State Approved sizing protocols, NEAT/MHEA outputs, etc.)". While technically this has always been the case (H&S measures must also comply with SWS), this DOE required inclusion of how Oklahoma ensures that both Energy Conservation Measures (ECM) and H&S measures will comply with ACCA Manual J standards has resulted in additional scrutiny of HVAC Load Calculations during Quality Assurance Inspections.

PROGRAM GUIDANCE

1. ACCA Manual J load calculations, in addition to manufacturer specifications, tell us how many BTUs will be required to heat or cool a home. Manual S uses those calculations to determine the best HVAC system for a home. Oklahoma does not have any state approved sizing protocols other than those calculated in accordance with ACCA Manual J/Manual S. Therefore, both Manual J (SWS 5.3001.1a) and Manual S (SWS 5.3001.b) are necessary and required in order to ensure that an HVAC system is correctly sized for a weatherized home.
2. Properly procured licensed HVAC installers must be held responsible and accountable for running Manual J and assuring agencies that proposed air conditioners and furnaces are sized properly.

However, HVAC installers also need information about the work plan in order to correctly calculate Manual J. Agencies must be communicating the following with HVAC contractors:

- a. Confirmation/Verification that Manual J/Manual S will be used, and that documentation of proper sizing calculations is part of the work scope.
 - b. Planned Weatherization Measures/Improvements to the home
 - c. Actual post or accurate post target blower door reading
3. All agencies are responsible for oversight and procurement of qualified HVAC installers. HVAC installers must be expected to provide documentation on how Manual J/Manual S sizing protocols were determined. Although not required, it might be helpful to keep this information in the client file, in case a question was raised during a monitoring visit. **A State QCI will make it a finding if heating or cooling systems appears to be oversized or undersized for a home and justifying HVAC documentation cannot be supplied.** Variables in a home can change between final local inspection and a state inspection, so detailed documentation and justification can minimize concerns.
 4. In the event an HVAC installer does not follow Manual J/Manual S, agencies are responsible for holding them accountable. Agencies can and should establish contracts and procedures with third party HVAC installers to require them to fix or replace over/under sized units at their cost if they fail to justify their sizing protocols. Otherwise, agencies will be required to payback funds for incorrectly sized heating or cooling systems.
 5. If an agency wishes to double check calculations made by an HVAC contractor, NEAT/MHEA outputs can be used to do so. Although this check is not required, it can be a possible useful tool. Both NEAT and MHEA calculate close approximations of Manual J. If an agency notices a significant variance between NEAT/MHEA outputs and the sizing of an HVAC systems installed heating or cooling system, an agency can use this information to question an HVAC installer's calculations and sizing determinations. See bottom of this page for excerpt from The Weatherization Assistant User's Manual regarding NEAT/MHEA calculations. You can also find more information in the User's Manual, pages 12-10 – 12-12.
 6. Keep in mind that no system is perfect; there may be some variance between NEAT/MHEA outputs and a HVAC installers calculations. However, as long as the HVAC contractor is following ACCA Manual J/Manual S and the manufacturer specifications, and can justify their calculations and sizing, then the replacement HVAC system is meeting requirements.
 7. Duct work in older homes is sometimes inaccessible. In this case, it is still necessary for Manual J /Manual S to be calculated for correct equipment sizing. Changes to the inaccessible portions of the ductwork are not necessary unless it is much too small. Please notify the Senior Energy Programs Manager if there are any special circumstances that raise questions on how to proceed on a home.

Should you have any questions or concerns about this Program Notice, please contact the Senior Energy Programs Manager or your agency's ODOC Liaison.

“The size of a home’s heating equipment should correspond to the peak heat loss of the house, normally expressed in thousand Btu per hour (kBtu/h). The Weatherization Assistant Version 8.9, NEAT, estimates these sizes both before and after weatherization using the building description information you provide and formulas taken with permission from tables published by the Air Conditioning Contractors of America (ACCA) in their Seventh Edition (1986) of Manual J, Load Calculation for Residential Winter and Summer Air Conditioning. MHEA’s peak heating load estimates are not based on published values. The program uses the same building component characteristics used in estimating the annual heating consumption and recommended measure savings. MHEA does not provide peak cooling load estimates. You should verify NEAT and MHEA’s sizing estimates with the results of an actual equipment sizing procedure for the types of building components common in your area before using them to guide the purchase of new replacement equipment”
– ***The Weatherization Assistant User’s Manual Version 8.9, p. 12-10***
