

**NC Department of Insurance
Office of the State Fire Marshal - Engineering Division
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Heating and Cooling Load Calculations

Code: 2012 NC Mechanical Code

Date: March 15, 2019

Section: 312.1

Code: 2012 NC Residential Code

Date: March 15, 2019

Section: M1401.3

Question:

Section 312.1 requires equipment sizing and load calculations, but the last sentence of NCMC 312.1ⁱ limits the code official's authority for requiring one-and-two family load calculations. Does this mean a load calculation is not required to be performed at all?

Answer:

No.

During the 2012 code cycle, the following amendment was added to NCMC 312.1, and the language was rolled forward into the 2018 code:

For permitting, inspections, certificate of compliance or certificate of occupancy, verification of Calculations for HVAC Systems - ACCA Manual D, ACCA Manual J nor ACCA Manual S calculation submittals and review shall not be required.

The amendment stated the verification of the required calculations **shall not** be required in order **to obtain** a permit, perform an inspection, grant a certificate of compliance or certificate of occupancy. However, the load calculation is still a code requirement. During the proposal and public comment stage of this amendment to NCMC 312.1, it was communicated that the requirement is still in the code, but the intended entity that would enforce the proper adherence to it would be the State Board of Examiners of Plumbing, Heating, and Fire Sprinkler Contractorsⁱⁱ, in accordance with their applicable Board Rulesⁱⁱⁱ.

The State Board of Examiners of Plumbing, Heating, and Fire Sprinkler Contractors rules are not enforceable by code officials. As a result of inquiries, we commonly direct readers and callers to the Board rules. These rules can be found in:

21 NCAC 50 .0505 GENERAL SUPERVISION AND STANDARD OF
COMPETENCE

A link to these rules follows: <http://www.nclicensing.org/laws&rules.asp>

Any interpretation of said Board rules should be directed to the State Board of Examiners of Plumbing, Heating, and Fire Sprinkler Contractors. Complaints concerning issues surrounding

the performance of relevant equipment non-performance can be addressed by the State Board of Examiners of Plumbing, Heating, and Fire Sprinkler Contractors^{iv} and/or North Carolina Licensing Board for General Contractors^v. Please be aware that perceived performance issues may be due to a combination of root causes, so more than one contracting board may be involved in investigating the performance issues.

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ⁱ 312.1 Load calculations. (150609 Item B-5)

312.1 Load calculations. Heating and cooling system design loads for the purpose of sizing systems, appliances and equipment shall be determined in accordance with the procedures described in the ASHRAE/ACCA Standard 183. Alternatively, design loads shall be determined by an approved equivalent computation procedure, using the design parameters specified in Chapter 3 of the International Energy Conservation Code.

For one- and two-family dwellings and townhouses, heating and cooling equipment shall be sized in accordance with ACCA Manual S based on building loads calculated in accordance with ACCA Manual J, or other approved heating and cooling calculation methodologies.

For permitting, inspections, certificate of compliance or certificate of occupancy, verification of Calculations for HVAC Systems - ACCA Manual D, ACCA Manual J nor ACCA Manual S calculation submittals and review shall not be required.

The delayed effective date of this Rule is January 1, 2017.

The Statutory authority for Rule-making is G. S. 143-136; 143-138.

http://www.ncdoi.com/OSFM/Engineering_and_Codes/Documents/2012_NCBuildingCode_amendments/2012-2017ApprovedCumulativeTest1Format.pdf

ⁱⁱNCMC Section 101.5 Requirements of other State agencies, occupational licensing boards or commissions.

The North Carolina State Building Codes do not include all additional requirements for buildings and structures that may be imposed by other State agencies, occupational licensing boards and commissions. It shall be the responsibility of a permit holder, registered design professional, contractor or occupational license holder to determine whether any additional requirements exist.

ⁱⁱⁱ21 NCAC 50 .0505 GENERAL SUPERVISION AND STANDARD OF COMPETENCE

(a) The general supervision required by G.S. 87-26 is that degree of supervision which is necessary and sufficient to ensure that the contract is performed in a workmanlike manner and with the requisite skill and that the installation is made properly, safely and in accordance with applicable codes and rules. General supervision requires that review of the work done pursuant to the license be performed by a licensee of the firm while the work is in progress. If a Plumbing, Heating or Fuel Piping Contractor licensed by this Board employs a properly licensed Plumbing, Heating or Fuel Piping Technician, whose Technician license is listed under the name of that licensed contractor, then the licensed technician may review and supervise work in lieu of the licensed contractor as a means to assure that the contract is performed in a workmanlike manner and with the requisite skill and that the installation is made properly, safely and in accordance with applicable codes and rules.

(b) The provisions of the North Carolina Building Code, including the provisions of codes and standards incorporated by reference, and adopted by the Building Code Council of North Carolina are the minimum standard of competence applicable to contractors licensed by the Board. Licensees shall design and install systems which meet or exceed the minimum standards of the North Carolina State Building Code, manufacturer's specifications and installation instructions and standards prevailing in the industry.

(c) Work performed under Rule .0513, Rule .0514, and Rule .0515 shall be performed by the licensed technician pursuant to the license held by that person.

(d) Every newly installed residential heating system, air conditioning system or both shall be designed and installed to maintain a maximum temperature differential of four degrees Fahrenheit room-to-room and floor-to-floor. On multilevel structures, contractors shall either provide a separate HVAC system for each floor or to install

automatically controlled zoning equipment for each level with individual thermostats on each level to control the temperature for that level. The seasonal adjustment needed to maintain the four degrees Fahrenheit room-to-room and floor-to-floor maximum temperature differential shall not be accomplished through the use of manual dampers.

(e) All licensed HVAC contractors or licensed technicians shall perform a room-by-room load calculation for all newly installed residential structures prior to installing heating systems, air conditioning systems, or both, which calculations shall be specific to the location and orientation where the HVAC system or equipment is to be installed. A written record of the system and equipment sizing information shall be provided to the homeowner, owner or general contractor upon request and a copy shall be maintained in the job file of the licensee for a minimum of six years. Load calculations shall be performed by a licensee who holds the appropriate license from this Board, or a licensee may utilize a load calculation carried out for this particular structure and location by a North Carolina Licensed Professional Engineer.

(f) When either a furnace, condenser, package unit or air handler in an existing residential heating or air conditioning system is replaced, the licensed HVAC contractor or licensed technician is required to perform a minimum of a whole house block load calculation. When a furnace, condenser, package unit or air handler in a residential heating or air conditioning system is replaced, the licensee shall ensure that all systems and equipment are properly sized. The licensee may utilize industry standards, reference materials, evaluation of the structure, and load calculations. A written record of the system and equipment sizing information shall be provided to the homeowner, owner or general contractor upon request and a copy shall be maintained in the job file of the licensee for a minimum of six years. If a load calculation was not performed or if a load calculation was performed and it is later determined by the Board that the unit installed was undersized or oversized, the installation will be considered as evidence of incompetence. Load calculations shall be performed by a licensee who holds the appropriate license from this Board, or a licensee may utilize load calculations carried out for this particular structure and location by a North Carolina Licensed Professional Engineer.

^{iv} <http://www.nclicensing.org/> - State Board of Examiners of Plumbing, Heating, and Fire Sprinkler Contractors.

^v <http://www.nclbgc.org/index.html> - North Carolina Licensing Board for General Contractors