

Nonresidential Appendix NA7 – 2008

Appendix NA7-2008 – Acceptance Requirements for Nonresidential Buildings

NA7.1 Purpose and Scope

This appendix defines acceptance procedures that must be completed on certain controls and equipment before the installation is deemed to be in compliance with the Standards. These requirements apply to all newly installed equipment for which there are acceptance requirements in new and existing buildings. The procedures apply to nonresidential, high-rise residential and hotel/motel buildings as defined by the California Energy Commission's Energy Efficiency Standards for Nonresidential Buildings.

The purpose of the acceptance tests is to assure:

1. The presence of equipment or building components according to the specifications in the compliance documents.
2. Installation quality and proper functioning of the controls and equipment to meet the intent of the design and the Standards.

NA7.2 Introduction

Acceptance requirements are defined as implementation of targeted inspection checks and functional and performance testing to determine whether specific building components, equipment, systems, and interfaces between systems conform to the criteria set forth in the Standards and to related construction documents (plans or specifications). Acceptance requirements improve code compliance effectiveness and help meet the expected level of performance.

Prior to signing a Certificate of Acceptance the installing contractor, engineer of record or owners agent shall be responsible for reviewing the plans and specifications to assure they conform to the acceptance requirements. Persons eligible to sign the Certificate of Acceptance are those responsible for its preparation; and licensed in the State of California as a civil engineer, mechanical engineer, licensed architect or a licensed contractor performing the applicable work or a person managing work on a structure or type of work described pursuant to Business and Professions Code sections 5537, 5538, and 6737.1.

NA7.3 Responsible Party

The installing responsible party shall certify compliance with the acceptance requirements. They shall be responsible for performing data analysis, calculation of performance indices, and crosschecking results with the requirements of the Standard. They shall be responsible for issuing a Certificate of Acceptance as well as copies of all measurement and monitoring results for individual test procedures to the enforcement agency. The enforcement agency shall not release a final Certificate of Occupancy until a Certificate of Acceptance, and all applicable acceptance requirements for code compliance forms, are approved and submitted by the responsible party. A responsible party who is licensed shall record their State of California contractor's license number or their State of California professional registration license number on each Certificate of Acceptance that they issue.

Step 4: Simulate a heating demand and set the economizer so that it is capable of operating (i.e. actual outdoor air conditions are below lockout setpoint). Verify the following:

- The economizer is at minimum position

Step 5: Restore demand control ventilation systems (if applicable) and remove all system overrides initiated during the test.

NA7.5.5 Demand Control Ventilation (DCV) Systems

NA7.5.5.1 Construction Inspection

Prior to Functional Testing, verify and document the following:

- Carbon dioxide control sensor is factory calibrated or field-calibrated per §121(c)4.
- The sensor is located in the high density space between 3ft and 6 ft above the floor or at the anticipated level of the occupants' heads.
- DCV control setpoint is at or below the CO₂ concentration permitted by §121(c)4C.

NA7.5.5.2 Functional Testing

Step 1: Disable economizer controls

Step 2: Simulate a signal at or slightly above the CO₂ concentration setpoint required by §121(c)4C. Verify and document the following:

- For single zone units, outdoor air damper modulates open to satisfy the total ventilation air called for in the Certificate of Compliance.
- For multiple zone units, either outdoor air damper or zone damper modulate open to satisfy the zone ventilation requirements.

Step 3: Simulate signal well below the CO₂ setpoint. Verify and document the following:

- For single zone units, outdoor air damper modulates to the design minimum value.
- For multiple zone units, either outdoor air damper or zone damper modulate to satisfy the reduced zone ventilation requirements.

Step 4: Restore economizer controls and remove all system overrides initiated during the test.

Step 5: With all controls restored, apply CO₂ calibration gas at a concentration slightly above the setpoint to the sensor. Verify that the outdoor air damper modulates open to satisfy the total ventilation air called for in the Certificate of Compliance.

NA7.5.6 Supply Fan Variable Flow Controls

NA7.5.6.1 Construction Inspection

Prior to Functional Testing, verify and document the following:

- Discharge static pressure sensors are either factory calibrated or field-calibrated.

The static pressure location, setpoint, and reset control meets the requirements of § 144(c)2C and §144(c)2D.

NA7.5.6.2 Functional Testing

Step 1: Simulate demand for design airflow. Verify and document the following:

- Supply fan controls modulate to increase capacity.
- Supply fan maintains discharge static pressure within +/-10 percent of the current operating set point.

- Supply fan controls stabilize within a 5 minute period.

Step 2: Simulate demand for minimum airflow. Verify and document the following:

- Supply fan controls modulate to decrease capacity.
- Current operating setpoint has decreased (for systems with DDC to the zone level).
- Supply fan maintains discharge static pressure within +/-10 percent of the current operating setpoint.
- Supply fan controls stabilize within a 5 minute period.

Step 3: Restore system to correct operating conditions

NA7.5.7 Valve Leakage Test

NA7.5.7.1 Construction Inspection

Prior to Functional Testing, verify and document the following:

- Valve and piping arrangements were installed per the design drawings.

NA7.5.7.2 Functional Testing

Step 1: For each of the pumps serving the distribution system, dead head the pumps using the discharge isolation valves at the pumps. Document the following:

- Record the differential pressure across the pumps
- Verify that this is within 5 percent of the submittal data for the pump

Step 2: Reopen the pump discharge isolation valves. Automatically close all valves on the systems being tested. If 3-way valves are present, close off the bypass line. Verify and document the following:

- The valves automatically close.
- Record the pressure differential across the pump
- Verify that the pressure differential is within 5 percent of the reading from Step 1 for the pump that is operating during the valve test.

Step 3: Restore system to correct operating conditions

NA7.5.8 Supply Water Temperature Reset Controls

NA7.5.8.1 Construction Inspection

Prior to Functional Testing, verify and document the following:

- Supply water temperature sensors have been either factory or field calibrated.

NA7.5.8.2 Functional Testing

Step 1: Change reset control variable to its maximum value. Verify and document the following:

- Chilled or hot water temperature setpoint is reset to appropriate value.
- Actual supply temperature changes to meet setpoint.
- Verify that supply temperature is within 2 percent of the control setpoint.