

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 2: Change reset control variable to its minimum 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.

Step 3: Restore reset control variable to automatic control. Verify and document the following:

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

NA7.5.9 Hydronic System Variable Flow Controls

NA7.5.9.1 Construction Inspection

Prior to Functional Testing, verify and document the following:

- Pressure sensors are either factory or field calibrated.

NA7.5.9.2 Functional Testing

Step 1: Open control valves to increase water flow to a minimum of 90 percent design flow. Verify and document the following:

- Pump speed increases
- System pressure is either within ± 5 percent of current operating setpoint or the pressure is below the setpoint and the pumps are operating at 100% speed.
- System operation stabilizes within 5 minutes after test procedures are initiated.

Step 2: Modulate control valves to reduce water flow to 50 percent of the design flow or less, but not lower than the pump minimum flow. Verify and document the following:

- Pump speed decreases.
- Current operating setpoint has decreased (for systems with DDC to the zone level).
- Current operating setpoint has not increased (for all other systems).
- System pressure is within 5 percent of current operating setpoint.
- System operation stabilizes within 5 minutes after test procedures are initiated.

NA7.5.10 Automatic Demand Shed Control Acceptance

NA7.5.10.1 Construction Inspection

Prior to Acceptance Testing, verify and document the following:

- That the EMCS interface enables activation of the central demand shed controls.

NA7.5.10.2 Functional Testing

Step 1: Engage the global demand shed system. Verify and document the following:

- That the cooling setpoint in non-critical spaces increases by the proper amount.
- That the cooling setpoint in critical spaces do not change.

Step 2: Disengage the global demand shed system. Verify and document the following:

- That the cooling setpoint in non-critical spaces return to their original values.
- That the cooling setpoint in critical spaces do not change.

NA7.5.11 Fault Detection and Diagnostics (FDD) for Packaged Direct-Expansion Units

NA7.5.11.1 Construction Inspection

Verify FDD hardware is installed on equipment by the manufacturer and that equipment make and model include factory-installed FDD hardware that match the information indicated on copies of the manufacturer's cut sheets and on the plans and specifications.

Eligibility Criteria

A fault detection and diagnostics (FDD) system for direct-expansion packaged units shall contain the following features to be eligible for credit in the performance calculation method:

1. The unit shall include a factory-installed economizer and shall limit the economizer deadband to no more than 2°F.
2. The unit shall include direct-drive actuators on outside air and return air dampers.
3. The unit shall include an integrated economizer with either differential dry-bulb or differential enthalpy control.
4. The unit shall include a low temperature lockout on the compressor to prevent coil freeze-up or comfort problems.
5. Outside air and return air dampers shall have maximum leakage rates conforming to ASHRAE 90.1-2004.
6. The unit shall have an adjustable expansion control device such as a thermostatic expansion valve (TXV).
7. To improve the ability to troubleshoot charge and compressor operation, a high-pressure refrigerant port will be located on the liquid line. A low-pressure refrigerant port will be located on the suction line.
8. The following sensors should be permanently installed to monitor system operation and the controller should have the capability of displaying the value of each parameter:
 - Refrigerant suction pressure
 - Refrigerant suction temperature
 - Liquid line pressure
 - Liquid line temperature
 - Outside air temperature
 - Outside air relative humidity
 - Return air temperature
 - Return air relative humidity
 - Supply air temperature
 - Supply air relative humidity.

The controller will provide system status by indicating the following conditions:

- Compressor enabled
- Economizer enabled
- Free cooling available
- Mixed air low limit cycle active
- Heating enabled.