Energy - Docket Optical System

From: Tom Meyer [tom@nebb.org]
Sent: Friday, May 24, 2013 12:05 PM
To: Energy - Docket Optical System
Cc: Olvera, Chris@Energy
Subject: 12-BSTD-05 NEBB Comments on 2013 Nonresidential Acceptance Forms
Attachments: 2013-NRCA-MCH-11-A-AutomaticDemandShedControl.pdf; 2013-NRCA-MCH-12-A-FDD-A-Packaged Direct-ExpansionUnits.pdf; 2013-NRCA-MCH-13-A-FDD-AirHandlingUnitsAndZoneTerminalUnits.pdf; 2013-NRCA-MCH-14-A-DistributedEnergyStorageDX-AC-Systems.pdf; 2013-NRCA-MCH-02-A-Outdoor Air.pdf; 2013-NRCA-MCH-03-A-Functional Test for Constant Volume Single Zone.pdf; 2013-NRCA-MCH-04-A-Air Distribution Systems Acceptance.pdf; 2013-NRCA-MCH-05-A-Air Economizer Controls Acceptance (Marked up).pdf; 2013-NRCA-MCH-05-A-Air Economizer Controls Acceptance.pdf; 2013-NRCA-MCH-06-A-DemandControlVentilation.pdf; 2013-NRCA-MCH-07-A-Supply Fan VFD Acceptance (Marked up).pdf; 2013-NRCA-MCH-07-A-Supply Fan VFD Acceptance.pdf; 2013-NRCA-MCH-08-A-ValveLeakage.pdf; 2013-NRCA-MCH-09-A-Supply Water Temperature Reset Controls.pdf; 2013-NRCA-MCH-10-A-Hydronic System Variable Flow Control.pdf; 2013-NRCA-MCH-09-A-Supply Water Temperature Reset Controls - RAG Comments.pdf; 2013-NRCA-MCH-18-A for EMCS - RAG Comments.pdf; 2013-NRCA-MCH-02-A-Outdoor Air - RAG Comments.pdf; 2013-NRCA-MCH-13-A-FDD-AirHandlingUnitsAndZoneTerminalUnits.pdf; 2013-NRCA-MCH-14-A-DistributedEnergyStorageDX-AC-Systems.pdf; 2013-NRCA-MCH-15-A-Thermal Energy Storage.pdf; 2013-NRCA-MCH-16-A-Supply Air Temperature Reset Controls.pdf; 2013-NRCA-MCH-17-A-Condenser Water Supply.pdf; 2013-NRCA-MCH-18-A for EMCS.pdf; T24 Forms Comments - Patrick Drayton.pdf; 2013-NRCA-MCH-02-A-Outdoor Air.pdf; 2013-NRCA-MCH-03-A-Functional Test for Constant Volume Single Zone.pdf; 2013-NRCA-MCH-04-A-Air Distribution Systems Acceptance.pdf; 2013-NRCA-MCH-05-A-Air Economizer Controls Acceptance (Marked up).pdf; 2013-NRCA-MCH-05-A-Air Economizer Controls Acceptance.pdf; 2013-NRCA-MCH-06-A-DemandControlVentilation.pdf; 2013-NRCA-MCH-07-A-Supply Fan VFD Acceptance (Marked up).pdf; 2013-NRCA-MCH-07-A-Supply Fan VFD Acceptance.pdf; 2013-NRCA-MCH-08-A-ValveLeakage.pdf; 2013-NRCA-MCH-09-A-Supply Water Temperature Reset Controls.pdf; 2013-NRCA-MCH-10-A-Hydronic System Variable Flow Control.pdf; 2013-NRCA-MCH-11-A-AutomaticDemandShedControl.pdf; 2013-NRCA-MCH-12-A-FDD-A-Packaged Direct-ExpansionUnits.pdf

Categories: Waiting for Reply

NEBB Comments on 2013 Non-residential Acceptance Forms.

You may have received these in a previous email, but since it didn't go through to Chris Olvera, I'm sending it again to you, just in case.

If you have any questions, please feel free to contact me.

Tom

Tom Meyer
Director, Technical Programs
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Tom Meyer

From: April Yungen <airmgmt@tstonramp.com>
Sent: Friday, April 12, 2013 9:34 AM
To: Tom Meyer
Subject: RE: T24 Forms Review and Comment

The following are comments from Patrick Drayton:

1. If a third party was to adjust anything that I would have completed in the testing, adjusting and balancing, it would be an automatic void of warranty.
2. The acceptance testing they are considering is more stringent than some of the building systems commissioning scopes I see on many projects.
3. I do feel that they should leave these forms as is. This is a very thorough test and covers everything that should be covered, that being said, it should be integrated with the TAB and/or commissioning of the mechanical systems. Depending on the project, I would like to see this as part of the TAB or Commissioning scope.
4. The benefits of having T-24 Mechanical Acceptance test as part of commissioning and/or scope:
    a. Project budget friendly
    b. Speeds up process for final inspection
    c. Truly qualified and trained labor force to become certified and perform test
    d. Avoids third party altering/affecting a finished building (could cause finger pointing or legal problems)
5. It could also help in the commissioning scope by improving the standards of NEBB

April Yungen
Air Management Industries
8351 Elm Ave #102
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Office: (909)945-0041
Fax: (909)945-9994

From: Tom Meyer [mailto:tom@nebb.org]
Sent: Wednesday, April 10, 2013 3:45 PM
To: Dan Moore; Amber Ryman; April Yungen ; Eric Dlugajczyk; Jim Rosier; John Eddings; Mike Taylor; Patrick Drayton; Randy Silva; Roger Gedminas; Steve Wiggins; Vic Congi; Young Shin
Subject: T24 Forms Review and Comment

Good afternoon all.

Today, I had a conversation with CEC. They are very interested in our comments and suggested changes to the Mechanical Acceptance Test forms. From our conversation on Monday, there may be a lot of room for improvement.

They would like to have our comments at the end of the week. (Remember, everyone was going to send their comments to me by Friday.) Our working group will be working directly with CEC to improve the forms. Let's make the most of this opportunity.

Please send your comments by Friday.

Tom Meyer
Director, Technical Programs

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CERTIFICATE OF ACCEPTANCE	NRCA-MCH-18-A
Energy Management Control System Acceptance	**Page 1 of 2**

Project Name/Address:	
System Name or Identification/Tag:	System Location or Area Served:

Enforcement Agency:	Permit Number:
Note: Submit one Certificate of Acceptance for each system that must demonstrate compliance.	Enforcement Agency Use: Checked by/Date:

Documentation Author's Declaration Statement

- **I certify that this Certificate of Acceptance documentation is accurate and complete.**

Name:	Signature:
Company :	Date:
Address:	If Applicable ☐ CEA or ☐ CEPE (Certification #):
City/State/Zip:	Phone:

FIELD TECHNICIAN'S DECLARATION STATEMENT

- I certify under penalty of perjury, under the laws of the State of California, the information provided on this form is true and correct.
- I am the person who performed the acceptance requirements verification reported on this Certificate of Acceptance (Field Technician).
- I certify that the construction/installation identified on this form complies with the acceptance requirements indicated in the plans and specifications approved by the enforcement agency, and conforms to the applicable acceptance requirements and procedures specified in Reference Nonresidential Appendix NA7.
- I have confirmed that the Installation Certificate(s) for the construction/installation identified on this form has been completed and is posted or made available with the building permit(s) issued for the building.

Company Name:	
Field Technician's Name:	Field Technician's Signature:
Date Signed:	Position With Company (Title):

RESPONSIBLE PERSON'S DECLARATION STATEMENT

- I certify under penalty of perjury, under the laws of the State of California, that I am the Field Technician, or the Field Technician is acting on my behalf as my employee or my agent and I have reviewed the information provided on this form.
- I am a licensed contractor, architect, or engineer, who is eligible under Division 3 of the Business and Professions Code, in the applicable classification, to take responsibility for the scope of work specified on this document and attest to the declarations in this statement (responsible person).
- I certify that the information provided on this form substantiates that the construction/installation identified on this form complies with the acceptance requirements indicated in the plans and specifications approved by the enforcement agency, and conforms to the applicable acceptance requirements and procedures specified in Reference Nonresidential Appendix NA7.
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Company Name:		Phone:
Responsible Person's Name:		Responsible Person's Signature:
License:	Date Signed:	Position With Company (Title):

Intent: *The purpose of this acceptance test is to help ensure the central control system, when installed, is properly installed and configured and capable of meeting the applicable requirements of Title 24 Part 6. The EMCS is a complex, highly customized control system with many opportunities for installation and programming problems. Obviously it is important to identify, diagnose, and resolve these problems. This acceptance test can help assist with this effort.*

A. Construction Inspection

Prior to functional testing and conducting other acceptance tests that rely on the EMCS:

- ☐ Factory start-up and check-out completed
- ☐ Point-to-point verification completed
- ☐ I/O point lists available
- ☐ Sequence of operations of each system are programmed
- ☐ Written sequences are available
- ☐ Input sensors are calibrated

B. Functional Testing	Results
Conduct the following verification checks to validate the functionality of the EMCS:	
1. Verify the control graphics represent the system configuration	Y / N
2. Verify control points are properly mapped to the graphics screen	Y / N
3. Raise and lower a sampling of space temperature setpoints in the software and verify the system responds appropriately	Y / N
4. Verify the time-of-day start-up and shut-down function initiates a proper system response	Y / N
5. Verify trending capabilities by establishing trend logs for a sampling of control points	Y / N
6. Verify alarm conditions are monitored	Y / N
7. Verify the EMCS panel is installed on an emergency power circuit or has adequate battery back-up	Y / N

C. Testing Results	PASS	FAIL
Test passes if all **Construction Inspection** boxes are checked and all **Functional Testing** results are 'Y'	☐	☐

CERTIFICATE OF ACCEPTANCE	NRCA-MCH-18-A
Energy Management Control System Acceptance	**Page 1 of 2**

Project Name/Address:	
System Name or Identification/Tag:	System Location or Area Served:

Enforcement Agency:	Permit Number:
Note: Submit one Certificate of Acceptance for each system that must demonstrate compliance.	Enforcement Agency Use: Checked by/Date:

Documentation Author's Declaration Statement

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Name:	Signature:
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City/State/Zip:	Phone:

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Field Technician's Name:	Field Technician's Signature:
Date Signed:	Position With Company (Title):

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- I am a licensed contractor, architect, or engineer, who is eligible under Division 3 of the Business and Professions Code, in the applicable classification, to take responsibility for the scope of work specified on this document and attest to the declarations in this statement (responsible person).
- I certify that the information provided on this form substantiates that the construction/installation identified on this form complies with the acceptance requirements indicated in the plans and specifications approved by the enforcement agency, and conforms to the applicable acceptance requirements and procedures specified in Reference Nonresidential Appendix NA7.
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Company Name:		Phone:
Responsible Person's Name:		Responsible Person's Signature:
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"... many variations and aspects requiring verification.

Intent: *The purpose of this acceptance test is to help ensure the central control system, when installed, is properly installed and configured and capable of meeting the applicable requirements of Title 24 Part 6. The EMCS is a complex, highly customized control system with many ~~opportunities for installation and programming problems~~. Obviously it is important to identify, diagnose, and resolve these problems. This acceptance test can help assist with this effort.*

Resolve? How could the tester allocate the time to resolve unknown issues?

Is it the intent for the tester to help or to test?

Effort? Is this a pass / no pass test or 'an effort'?

A. Construction Inspection

Prior to functional testing and conducting other acce

- ☐ Factory start-up and check-out completed
- ☐ Point-to-point verification completed
- ☐ I/O point lists available
- ☐ Sequence of operations of each system are programmed
- ☐ Written sequences are available
- ☐ Input sensors are calibrated

How many samples?

Subjective

1,000's of points. This could be weeks of work

B. Functional Testing

Conduct the following verification checks to validate the functionality of the EMCS.

1.	Verify the control graphics represent the system configuration	Y / N
2.	Verify control points are properly mapped to the graphics screen	Y / N
3.	Raise and lower a sampling of space temperature setpoints in the software and verify the system responds appropriately	Y / N
4.	Verify the time-of-day start-up and shut-down function initiates a proper system response	Y / N
5.	Verify trending capabilities by establishing trend logs for a sampling of control points	Y / N
6.	Verify alarm conditions are monitored	Y / N
7.	Verify the EMCS panel is installed on an emergency power circuit or has adequate battery back-up	Y / N

No pass / no pass criteria

C. Testing Results

	PASS	FAIL
Test passes if all **Construction Inspection** boxes are checked and all **Functional Testing** results are 'Y'	☐	☐

Capabilities? What if they are limited? What is the pass / no pass criteria?

What if this was not specified? Does this constitute a fail?

CERTIFICATE OF ACCEPTANCE	NRCA-MCH-17-A
NA7.5.16 Condenser Water Supply Temperature Reset Controls Acceptance	**(Page 1 of 3)**

Enforcement Agency:	Permit Number:
Note: Submit one Certificate of Acceptance for each system that must demonstrate compliance.	Enforcement Agency Use: Checked by/Date

Documentation Author's Declaration Statement	
• **I certify that this Certificate of Acceptance documentation is accurate and complete.**	
Name:	Signature:
Company :	Date:
Address:	If Applicable ☐ CEA or ☐ CEPE (Certification #):
City/State/Zip:	Phone:

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Company Name:	
Field Technician's Name:	Field Technician's Signature:
Date Signed:	Position With Company (Title):

RESPONSIBLE PERSON'S DECLARATION STATEMENT

- I certify under penalty of perjury, under the laws of the State of California, that I am the Field Technician, or the Field Technician is acting on my behalf as my employee or my agent and I have reviewed the information provided on this form.
- I am a licensed professional who is eligible under Division 3 of the Business and Professions Code, in the applicable classification, to take responsibility for the scope of work specified on this document and attest to the declarations in this statement (responsible person).
- I certify that the information provided on this form substantiates that the construction/installation identified on this form complies with the acceptance requirements indicated in the plans and specifications approved by the enforcement agency, and conforms to the applicable acceptance requirements and procedures specified in Reference Nonresidential Appendix NA7.
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Company Name:	Phone:
Responsible Person's Name:	Responsible Person's Signature:

License #:	Date Signed:	Position With Company (Title):

Intent:	***Ensure that the condenser water supply temperature is automatically reset as indicated in the control sequence(s).***

Construction Inspection

1. Supporting documentation needed to perform test may include, but is not limited to:

a. As-built and/or Design Documents, including Mechanical Equipment Schedules and control schedules.

b. 2013 Building Energy Efficiency Standards Nonresidential Compliance Manual *(NA7.5.65 Condenser Water Supply Temperature Reset Controls Acceptance At-A-Glance)*.

c. Building Energy Efficiency Standards Nonresidential Appendix (Section NA7).

2. Instrumentation to perform test includes, but is not limited to:

a. Hand-held temperature sensor

_____*Date of calibration (must be within 1 year)*

b. Hand-held relative humidity or wet-bulb temperature sensor / psychrometer

_____*Date of calibration (must be within 1 year)*

3. Installation Verification:

☐ Check if the condenser water supply system and control system are installed per the system design, as documented on the building plans or as-builts.

☐ Check if condenser water supply temperature control sequence, including condenser water supply high and low limits, are available and documented in the building documents.

☐ Check if all cooling tower fan motors are operational, and cooling tower fan speed controls (e.g. VSDs) are installed, operational, and connected to cooling tower fan motors per OEM start-up manuals and sequence of operation.

☐ Check if cooling tower fan control sequence, including tower design wetbulb temperature and approach, are available and documented in the building documents.

☐ Check if the following temperature sensors are installed per plans: outdoor air drybulb and wetbulb, entering condenser water, and leaving chilled water. Note any discrepancies:

4. Document that all system temperature and relative humidity sensors are factory or field calibrated or perform field check (check one of the following):

☐ Sensors are calibrated by others.
Factory calibrated, or Field-calibrated by TAB technician, commissioning agent, or other.
Calibration complete, all sensors within 2% of calibrated reference sensor (provide supporting documentation, i.e. a copy of TAB calibration results).

☐ I have performed a field check using a calibrated temperature standard (i.e. device that has been calibrated within the last 12 months).
Check complete, all sensors within 2% of calibrated reference sensor (provide supporting documentation, including results from system sensors and calibrated reference standard).

5. From the control system, or using temperature sensors, document the following:

Outdoor air drybulb temperature _____ ° F	Outdoor air wetbulb temperature _____ ° F
Entering condenser water temperature _____ ° F	Leaving chilled water temperature _____ ° F

A. Functional Testing

The system cooling load must be sufficiently high to run the test. If necessary, artificially increase the cooling / evaporator load to perform the functional tests. If necessary, reverse Steps 1 & 2 in the test based on atmospheric conditions and building loads.

EXEMPTION: If the control sequence differs significantly from that implied by the tests, and / or has already been tested during the building commissioning process, attach a description of the control sequence, a description of the tests that were done to verify the system operates according to the sequence, the test results, and a plot of any associated trend data.

Reset control parameter is (circle one): Outside air wet-bulb temperature, Load signal from chiller, Condenser water & chilled water temperatures, or Other _____.

Step 1: Adjust the reset control parameter to decrease the condenser water temperature (toward the lower supply temperature limit).		
a.	Condenser water temperature controls modulate as intended.	Y / N
b.	Actual condenser water supply temperature decreases to meet new set point within + / - 2°F.	Y / N
c.	Cooling tower fan(s) stage properly and/or adjust speed accordingly to meet lower set point.	Y / N
d.	Chiller load amps decrease.	Y / N
Step 2: Adjust the reset control parameter to increase the condenser water temperature (toward the upper supply temperature limit).		
a.	Condenser water temperature controls modulate as intended.	Y / N
b.	Actual condenser water supply temperature increases to meet new set point within + / - 2°F.	Y / N
c.	Cooling tower fan(s) stage properly and/or adjust speed accordingly to meet upper set point.	Y / N
d.	Chiller load amps increase.	Y / N
Step 3: Restore reset control parameter to automatic control.		
a.	Condenser water temperature controls modulate as intended.	Y / N
b.	Actual condenser water supply temperature changes to meet new set point within + / - 2°F.	Y / N
c.	Cooling tower fan(s) stage properly and/or adjust speed accordingly to meet set point.	Y / N

B. Evaluation:

☐	**PASS**: All **Construction Inspection** responses are complete and **Functional Testing Results** are all circled **YES**.

Notes:

Enforcement Agency:	Permit Number:
Note: Submit one Certificate of Acceptance for each system that must demonstrate compliance.	Enforcement Agency Use: Checked by/Date

Documentation Author's Declaration Statement	
• **I certify that this Certificate of Acceptance documentation is accurate and complete.**	
Name:	Signature:
Company :	Date:
Address:	If Applicable ☐ CEA or ☐ CEPE (Certification #):
City/State/Zip:	Phone:

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Company Name:	
Field Technician's Name:	Field Technician's Signature:
Date Signed:	Position With Company (Title):

RESPONSIBLE PERSON'S DECLARATION STATEMENT

- I certify under penalty of perjury, under the laws of the State of California, that I am the Field Technician, or the Field Technician is acting on my behalf as my employee or my agent and I have reviewed the information provided on this form.
- I am a licensed professional who is eligible under Division 3 of the Business and Professions Code, in the applicable classification, to take responsibility for the scope of work specified on this document and attest to the declarations in this statement (responsible person).
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Company Name:		Phone:
Responsible Person's Name:		Responsible Person's Signature:
License #:	Date Signed:	Position With Company (Title):

Intent:	***Verify that the supply air temperature modulates to meet system temperature setpoint(s).***

Construction Inspection

1. Supporting documentation needed to perform test may include, but is not limited to:

a. As-built and/or Design Documents, including Mechanical Equipment Schedules and control schedules.

b. 2013 Building Energy Efficiency Standards Nonresidential Compliance Manual *(NA7.5.15 Supply Air Temperature Reset Controls Acceptance At-A-Glance)*.

c. 2013 Building Energy Efficiency Standards Nonresidential Appendix (Section NA7).

2. Instrumentation to perform test includes, but is not limited to:

a. Hand-held temperature sensor Date of calibration:_____ (*must be within one year*)

3. Installation:

Check the appropriate box:

☐ The supply air temperature reset controls are installed per the requirements of the 2013 Building Energy Efficiency Standards section 140.4(f): Multi-zone systems shall include controls that automatically reset supply-air temperatures:

(1) In response to representative building loads or to outdoor air temperature; and

(2) By at least 25 percent of the difference between the design supply-air temperature and the design room air temperature.

☐ An exception is taken to this requirement (one of the following must be true; acceptance test is not needed):

Zones served by space-conditioning systems in which at least 75 percent of the energy for reheating, or providing warm air in mixing systems, is provided from a site-recovered or site-solar energy source.

Where supply-air temperature reset would increase overall building energy use.

Zones in which specific humidity levels are required to satisfy exempt process loads. Computer rooms or spaces with only IT equipment are not exempt process loads.

Zones with a peak supply air quantity of 300 cfm or less.

The system has controls to prevent reheat, recool, and simultaneous cooling and heating.

4. Document that all system air temperature sensors are factory or field calibrated or perform field check (check a or b):

a. Factory calibrated, or Field-calibrated by TAB technician, commissioning agent, or other.

□ Calibration complete, all sensors within 2% of calibrated reference sensor (provide supporting documentation, e.g. a copy of TAB calibration results).

b. I have performed a field check using a calibrated temperature standard (i.e. device that has been calibrated within the last 12 months).

□ Check complete, all air temperature sensors within 2% of calibrated reference sensor (provide supporting documentation, including results from system air sensors and calibrated reference standard).

5. Document current supply air temperature: _____ °F

Notes:

A. Functional Testing

Check to make sure that chilled / hot water coils, if used, are not already fully open and calling for maximum cooling / heating. If this is the case, reverse Steps 1 and 2 and/or change the set point range as necessary to conduct this test.

Reset control parameter is (circle one): Outside air temperature, Zone or return air temperature, Zones calling for heating or cooling, or Other _____.

Step 1: During occupied mode, adjust the reset control parameter to decrease the supply air temperature (to the lower supply temperature limit).		
a.	Supply air temperature controls modulate as intended.	Y / N
b.	Actual supply air temperature decreases to meet the new set point within +/- 2°F.	Y / N
c.	Supply air temperature stabilizes within 15 minutes.	Y / N
	Supply air temperature set point: _____ ° F Actual supply air temperature: _____ ° F	
Step 2: During occupied mode, adjust the reset control parameter to increase the supply air temperature (to the upper supply temperature limit).		
a.	Supply air temperature controls modulate as intended.	Y / N
b.	Actual supply air temperature increases to meet the new set point within +/- 2°F.	Y / N
c.	Supply air temperature stabilizes within 15 minutes.	Y / N
	Supply air temperature set point: _____ ° F Actual supply air temperature: _____ ° F	
Step 3: Restore reset control parameter to automatic control.		
a.	Supply air temperature controls modulate as intended.	Y / N
b.	Actual supply air temperature changes to meet the new set point within +/- 2°F.	Y / N
c.	Supply air temperature stabilizes within 15 minutes.	Y / N
	Supply air temperature set point: _____ ° F Actual supply air temperature: _____ ° F	

B. Evaluation :

☐	**PASS**: All **Construction Inspection** responses are complete and **Functional Testing Results** are all circled **YES**.

Notes:

CERTIFICATE OF ACCEPTANCE	NRCA-MCH-15-A
NA7.5.14 Thermal Energy Storage (TES) System Acceptance	**(Page 1 of 3)**

Project Name/Address:	
System Name or Identification/Tag:	System Location or Area Served:

Enforcement Agency:	Permit Number:
Note: Submit one Certificate of Acceptance for each system that must demonstrate compliance.	Enforcement Agency Use: Checked by/Date

Documentation Author's Declaration Statement

- **I certify that this Certificate of Acceptance documentation is accurate and complete.**

Name:	Signature:
Company :	Date:
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- I have confirmed that the Installation Certificate(s) for the construction/installation identified on this form has been completed and is posted or made available with the building permit(s) issued for the building.

Company Name:		
Field Technician's Name:		Field Technician's Signature:
	Date Signed:	Position With Company (Title):

RESPONSIBLE PERSON'S DECLARATION STATEMENT

- I certify under penalty of perjury, under the laws of the State of California, that I am the Field Technician, or the Field Technician is acting on my behalf as my employee or my agent and I have reviewed the information provided on this form.
- I am a licensed contractor, architect, or engineer, who is eligible under Division 3 of the Business and Professions Code, in the applicable classification, to take responsibility for the scope of work specified on this document and attest to the declarations in this statement (responsible person).
- I certify that the information provided on this form substantiates that the construction/installation identified on this form complies with the acceptance requirements indicated in the plans and specifications approved by the enforcement agency, and conforms to the applicable acceptance requirements and procedures specified in Reference Nonresidential Appendix NA7.
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Company Name:		Phone:
Responsible Person's Name:		Responsible Person's Signature:
License:	Date Signed:	Position With Company (Title):

Project Name/Address:	
System Name or Identification/Tag:	System Location or Area Served:

Intent: *Verify proper operation of distributed energy storage TES systems.*

Construction Inspection

1. Instrumentation to perform test includes, but not limited to:
   a No special instrumentation is required for the acceptance tests.

A. Certificate of Compliance Information

The following Certificate of Compliance information for both the chiller and the storage tank shall be provided on the plans to document the key TES System parameters and allow plan check comparison to the inputs used in the DOE-2 simulation. DOE-2 keywords are shown in ALL CAPITALS in parentheses.

a.	Chiller	Brand and Model:			
		Type (Centrifugal, Reciprocating, etc):			
		Capacity (tons): (Size)			
		Starting Efficiency (kW/ton): (at beginning of ice production) (COMP-KW/TON-START)			
		Ending Efficiency (kW/ton): (at end of ice production) (COMP-KW/TON-END)			
		Capacity Reduction (% / F): (PER-COMP-REDUCT/F)			
b.	Storage Tank	Storage Type (Check): (TES-TYPE)	☐ Chilled Water Storage	☐ Ice-on-Coil	☐ CHS
			☐ Ice Harvester	☐ Brine	
			☐ Ice-Slurry	☐Eutectic Salt	
		Number of tanks (SIZE)			
		Storage Capacity per Tank (ton-hours)			
		Storage Rate (tons): (COOL-STORE-RATE)			
		Discharge Rate (tons): (COOL-SUPPLY-RATE)			
		Auxiliary Power (watts): (PUMP+AUX-KW)			
		Tank Area (sq ft): (CTANK-LOSS-COEFF)			
		Tank Insulation (R-Value): (CTANK-LOSS-COEFF)			

Project Name/Address:	
System Name or Identification/Tag:	System Location or Area Served:

B. Functional Testing	Results
Step 1: TES System Design Verification	
a. In the TES System Design Verification part, the installing contractor shall certify the following information, which verifies proper installation of the TES System consistent with system design expectations:	Y / N

☐ The TES system is one of the above eligible systems ☐ Initial discharge rate of the storage tanks (tons) ☐ Discharge test time (hrs).

☐ Initial charge rate of the storage tanks (tons) ☐ Final discharge rate of the storage tank (tons) ☐ Tank storage capacity after charge (ton-hrs)

☐ Final charge rate of the storage tank (tons) ☐ Charge test time (hrs) ☐ Tank storage capacity after discharge (ton-hrs)

☐ Tank standby storage losses (UA) ☐ Initial chiller efficiency (kW/ton) during charging ☐ Final chiller efficiency (kW/ton) during charging

Step 2: TES System Controls and Operation Verification	
a. The TES system and the chilled water plant is controlled and monitored by an EMS.	☐ Pass ☐ Fail
b. Force the time between 9:00 p.m. and 9:00 a.m. and simulate a partial or no charge of the tank and simulate no cooling load by setting the indoor temperature setpoint higher than the ambient temperature. Verify that the TES system starts charging (storing energy).	☐ Pass ☐ Fail
c. Force the time to be between 6:00 p.m. and 9:00 p.m. and simulate a partial charge on the tank and simulate a cooling load by setting the indoor temperature set point lower than the ambient temperature. Verify that the TES system starts discharging.	☐ Pass ☐ Fail
d. Force the time to be between noon and 6:00 p.m. and simulate a cooling load by lowering the indoor air temperature set point below the ambient temperature. Verify that the tank starts discharging and the compressor is off. For systems designed to meet partial loads the system should be run until the TES storage is fully depleted. The number of hours of operation must meet or exceed the designed operational hours for the system.	☐ Pass ☐ Fail
e. Force the time to be between 9:00 a.m. to noon, and simulate a cooling load by lowering the indoor air temperature set point below the ambient temperature. Verify that the tank does not discharge and the cooling load is met by the compressor only.	☐ Pass ☐ Fail
f. Force the time to be between 9:00 p.m. and 9:00 a.m. and simulate a full tank charge by changing the output of the sensor to the EMS. Verify that the tank charging is stopped.	☐ Pass ☐ Fail
g. Force the time to be between noon and 6:00 p.m. and simulate no cooling load by setting the indoor temperature set point above the ambient temperature. Verify that the tank does not discharge and the compressor is off.	☐ Pass ☐ Fail

C. Evaluation (check one):	
☐	PASS: Construction Inspection responses are complete and all tests in step 2 pass.

CERTIFICATE OF ACCEPTANCE	NRCA-MCH-14-A
NA7.5.13 Distributed Energy Storage DX AC Systems Acceptance	**(Page 1 of 3)**

Project Name/Address:	
System Name or Identification/Tag:	System Location or Area Served:

Enforcement Agency:	Permit Number:
Note: Submit one Certificate of Acceptance for each system that must demonstrate compliance.	Enforcement Agency Use: Checked by/Date

Documentation Author's Declaration Statement

- **I certify that this Certificate of Acceptance documentation is accurate and complete.**

Name:	Signature:
Company :	Date:
Address:	If Applicable ☐ CEA or ☐ CEPE (Certification #):
City/State/Zip:	Phone:

FIELD TECHNICIAN'S DECLARATION STATEMENT

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Company Name:		
Field Technician's Name:		Field Technician's Signature:
	Date Signed:	Position With Company (Title):

RESPONSIBLE PERSON'S DECLARATION STATEMENT

- I certify under penalty of perjury, under the laws of the State of California, that I am the Field Technician, or the Field Technician is acting on my behalf as my employee or my agent and I have reviewed the information provided on this form.
- I am a licensed contractor, architect, or engineer, who is eligible under Division 3 of the Business and Professions Code, in the applicable classification, to take responsibility for the scope of work specified on this document and attest to the declarations in this statement (responsible person).
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Company Name:		Phone:
Responsible Person's Name:		Responsible Person's Signature:
License:	Date Signed:	Position With Company (Title):

Project Name/Address:	
System Name or Identification/Tag:	System Location or Area Served:

Intent: *Verify proper operation of distributed energy storage DX systems.*

Construction Inspection

1 Instrumentation to perform test includes, but not limited to:

a. No special instrumentation is required to perform these tests.

2 Installation

Prior to Performance Testing, verify and document the following:

- ☐ The water tank is filled to the proper level
- ☐ The water tank is sitting on a foundation with adequate structural strength
- ☐ The water tank is insulated and the top cover is in place
- ☐ The DES/DXAC is installed correctly (refrigerant piping, etc.)
- ☐ Verify that the correct model number is installed and configured

Is the acceptance tester supposed to be a structural engineer?

A. Functional Testing	Results
Step 1: Simulate no cooling load during a nighttime period by setting system time to between 9PM and 6AM. Raise the space temperature setpoint above the current space temperature. Verify and document the following:	
a. The system charges the tank.	Y / N
b. The system does not provide cooling to the building.	Y / N
Step 2: Simulate cooling load during daytime period (e.g. by setting time schedule to include actual time and placing thermostat cooling set-point below actual temperature). Verify and document the following:	
a. Supply fan operates continually during occupied hours.	Y / N
b. If the DES/DXAC has cooling capacity, DES/DXAC runs to meet the cooling demand (in ice melt mode)	Y / N / NA
c. If the DES/DXAC has no ice and there is a call for cooling, the DES/DXAC runs in direct cooling mode	Y / N / NA
Step 3: Simulate no cooling load during daytime condition. Verify and document the following:	
a. Supply fan operates as per the facility thermostat or control system	Y / N
b. The DES/DXAC and the condensing unit do not run	Y / N
Step 4: Simulate no cooling load during morning shoulder time period. Verify and document the following:	
a. The DES/DXAC is idle (the condensing unit and the refrigerant pumps remain off).	Y / N
Step 5: Simulate a cooling load during morning shoulder time period. Verify and document the following:	
a. The DES/DXAC runs in direct cooling mode (the compressor operates to cool the space).	Y / N
B. Calibrating Controls	**Results**
a. Verify that you are able to set the proper time and date, as per manufacturer's installation manual for approved installers	Y / N

C. Testing Results	PASS / FAIL	
Test passes if all answers are yes under **Functional Testing** and **Calibrating Controls**.	☐	☐

Project Name/Address:	
System Name or Identification/Tag:	System Location or Area Served:

☐	PASS: All **Construction Inspection** responses are complete and all **Testing Results** responses are "Pass"

CERTIFICATE OF ACCEPTANCE	NRCA-MCH-14-A
NA7.5.13 Distributed Energy Storage DX AC Systems Acceptance	**(Page 1 of 3)**

Project Name/Address:	
System Name or Identification/Tag:	System Location or Area Served:

Enforcement Agency:	Permit Number:
Note: Submit one Certificate of Acceptance for each system that must demonstrate compliance.	Enforcement Agency Use: Checked by/Date

Documentation Author's Declaration Statement

- **I certify that this Certificate of Acceptance documentation is accurate and complete.**

Name:	Signature:
Company :	Date:
Address:	If Applicable ☐ CEA or ☐ CEPE (Certification #):
City/State/Zip:	Phone:

FIELD TECHNICIAN'S DECLARATION STATEMENT

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Company Name:		
Field Technician's Name:		Field Technician's Signature:
	Date Signed:	Position With Company (Title):

RESPONSIBLE PERSON'S DECLARATION STATEMENT

- I certify under penalty of perjury, under the laws of the State of California, that I am the Field Technician, or the Field Technician is acting on my behalf as my employee or my agent and I have reviewed the information provided on this form.
- I am a licensed contractor, architect, or engineer, who is eligible under Division 3 of the Business and Professions Code, in the applicable classification, to take responsibility for the scope of work specified on this document and attest to the declarations in this statement (responsible person).
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Company Name:		Phone:
Responsible Person's Name:		Responsible Person's Signature:
License:	Date Signed:	Position With Company (Title):

Project Name/Address:	
System Name or Identification/Tag:	System Location or Area Served:

Intent: *Verify proper operation of distributed energy storage DX systems.*

Construction Inspection

1 Instrumentation to perform test includes, but not limited to:

a. No special instrumentation is required to perform these tests.

2 Installation

Prior to Performance Testing, verify and document the following:

- ☐ The water tank is filled to the proper level
- ☐ The water tank is sitting on a foundation with adequate structural strength
- ☐ The water tank is insulated and the top cover is in place
- ☐ The DES/DXAC is installed correctly (refrigerant piping, etc.)
- ☐ Verify that the correct model number is installed and configured

A. Functional Testing	Results
Step 1: Simulate no cooling load during a nighttime period by setting system time to between 9PM and 6AM. Raise the space temperature setpoint above the current space temperature. Verify and document the following:	
a. The system charges the tank.	Y / N
b. The system does not provide cooling to the building.	Y / N
Step 2: Simulate cooling load during daytime period (e.g. by setting time schedule to include actual time and placing thermostat cooling set-point below actual temperature). Verify and document the following:	
a. Supply fan operates continually during occupied hours.	Y / N
b. If the DES/DXAC has cooling capacity, DES/DXAC runs to meet the cooling demand (in ice melt mode)	Y / N / NA
c. If the DES/DXAC has no ice and there is a call for cooling, the DES/DXAC runs in direct cooling mode	Y / N / NA
Step 3: Simulate no cooling load during daytime condition. Verify and document the following:	
a. Supply fan operates as per the facility thermostat or control system	Y / N
b. The DES/DXAC and the condensing unit do not run	Y / N
Step 4: Simulate no cooling load during morning shoulder time period. Verify and document the following:	
a. The DES/DXAC is idle (the condensing unit and the refrigerant pumps remain off).	Y / N
Step 5: Simulate a cooling load during morning shoulder time period. Verify and document the following:	
a. The DES/DXAC runs in direct cooling mode (the compressor operates to cool the space).	Y / N
B. Calibrating Controls	**Results**
a. Verify that you are able to set the proper time and date, as per manufacturer's installation manual for approved installers	Y / N

C. Testing Results	PASS	FAIL
Test passes if all answers are yes under **Functional Testing** and **Calibrating Controls**.	☐	☐

Project Name/Address:	
System Name or Identification/Tag:	System Location or Area Served:

☐	PASS: All **Construction Inspection** responses are complete and all **Testing Results** responses are "Pass"

CERTIFICATE OF ACCEPTANCE	NRCA-MCH-13-A
NA7.5.12 Automatic Fault Detection and Diagnostics (FDD) for Air Handling Units and Zone Terminal Units Acceptance	**(Page 1 of 4)**

Project Name/Address:	
System Name or Identification/Tag:	System Location or Area Served:

Enforcement Agency:	Permit Number:
Note: Submit one Certificate of Acceptance for each system that must demonstrate compliance.	Enforcement Agency Use: Checked by/Date

Documentation Author's Declaration Statement

- **I certify that this Certificate of Acceptance documentation is accurate and complete.**

Name:	Signature:
Company :	Date:
Address:	If Applicable ☐ CEA or ☐ CEPE (Certification #):
City/State/Zip:	Phone:

FIELD TECHNICIAN'S DECLARATION STATEMENT

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Company Name:		
Field Technician's Name:		Field Technician's Signature:
	Date Signed:	Position With Company (Title):

RESPONSIBLE PERSON'S DECLARATION STATEMENT

- I certify under penalty of perjury, under the laws of the State of California, that I am the Field Technician, or the Field Technician is acting on my behalf as my employee or my agent and I have reviewed the information provided on this form.
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Company Name:		Phone:
Responsible Person's Name:		Responsible Person's Signature:
License:	Date Signed:	Position With Company (Title):

Project Name/Address:	
System Name or Identification/Tag:	System Location or Area Served:

Intent: *Verify that the system detects common faults in air handling units and zone terminal units.*

Construction Inspection

1 Instrumentation to perform test includes, but not limited to:

a. No instrumentation is required – changes are implemented at the building automation system control station.

2 Installation

a. The functional testing verifies proper installation of the controls for FDD for air handling units and zone terminal units. No additional installation checks are required.

Tests in this section need to be reviewed for proper intent, description and process.

A. Functional Testing for Air Handling Units **Testing of each AHU with FDD controls shall include the following tests:**	**Results**
Step 1: Sensor Drift/Failure	
a. Disconnect outside air temperature sensor from unit controller	Y / N
b. Verify that the FDD system reports a fault	Y / N
c. Connect OAT sensor to the unit controller	Y / N
d. Verify that FDD indicates normal system operation	Y / N
Step 2: Damper/Actuator Fault	
a. From the control system workstation, command th	Y / N
b. Disconnect power to the actuator and verify that a fault is reported at the control workstation	Y / N
c. Reconnect power to the actuator and command the mixing box dampers to full open	Y / N
d. Verify that the control system does not report a fault	Y / N
e. From the control system workstation, command the mixing box dampers to a full-closed position (0% outdoor air)	Y / N
f. Disconnect power to the actuator and verify that a fault is reported at the control workstation	Y / N
g. Reconnect power to the actuator and command the dampers closed	Y / N
h. Verify that the control system does not report a fault during normal operation	Y / N
Step 3: Valve/actuator fault	
a. From the control system workstation, command the heating and cooling coil valves to full open or closed, then disconnect power to the actuator and verify that a fault is reported at the control workstation	Y / N
Step 4: Inappropriate simultaneous heating, mechanical cooling, and/or economizing	
a. From the control system workstation, override the heating coil valve and verify that a fault is reported at the control workstation	Y / N
b. From the control system workstation, override the cooling coil valve and verify that a fault is reported at the control workstation	Y / N
c. From the control system workstation, override the mixing box dampers and verify that a fault is reported at the control workstation	Y / N

This only works if the actual is spring return and there are end switches. Are they required in the standard?

Project Name/Address:	
System Name or Identification/Tag:	System Location or Area Served:

B. Functional Testing for Zone Terminal Units		Results
Testing shall be performed on one of each type of terminal unit (VAV box) in the project. A minimum of 5% of the terminal boxes shall be tested.		
Step 1: Sensor drift/failure		
a.	Disconnect the tubing to the differential pressure sensor of the VAV box	Y / N
b.	Verify that control system detects and reports the fault	Y / N
c.	Reconnect the sensor and verify proper sensor operation	Y / N
d.	Verify that the control system does not report a fault	Y / N
Step 2: Damper/actuator fault		
If the Damper is stuck open:		
a.	Command the damper to be fully open (room temperature above setpoint)	Y / N
b.	Disconnect the actuator to the damper	Y / N
c.	Adjust the cooling setpoint so that the room temperature is below the cooling setpoint to command the damper to the minimum position. Verify that the control system reports a fault	Y / N
d.	Reconnect the actuator and restore to normal operation	Y / N
If the Damper is stuck Closed:		
a.	Set the damper to the minimum position	Y / N
b.	Disconnect the actuator to the damper	Y / N
c.	Set the cooling setpoint below the room temperature to simulate a call for cooling. Verify that the control system reports a fault	Y / N
d.	Reconnect the actuator and restore to normal operation	Y / N
Step 3: Valve/actuator fault (For systems with hydronic reheat)		
a.	Command the reheat coil valve to (full) open	Y / N
b.	Disconnect power to the actuator. Set the heating setpoint temperature to be lower than the current space temperature, to command the valve closed. Verify that the fault is reported at the control workstation	Y / N
c.	Reconnect the actuator and restore normal operation	Y / N
Step 4: Feedback loop tuning fault (unstable airflow)		
a.	Set the integral coefficient of the box controller to a value 50 times the current value. Lower the space cooling setpoint to simulate a call for cooling.	
b.	The damper cycles continuously and airflow is unstable. Verify that the control system detects and reports the fault	Y / N
c.	Reset the integral coefficient of the controller to the original value to restore normal operation	Y / N
Step 5: Disconnected inlet duct		
a.	From the control system workstation, command the damper to full closed, then disconnect power to the actuator and verify that a fault is reported at the control workstation	Y / N

Project Name/Address:	
System Name or Identification/Tag:	System Location or Area Served:

C. Testing Results	**PASS**	**FAIL**
Test passes if all applicable answers are yes under **Functional Testing Sections**.	☐	☐

D. Evaluation :	
☐	PASS: All **Construction Inspection** responses are complete and all **Testing Results** responses are "Pass"

CERTIFICATE OF ACCEPTANCE	NRCA-MCH-13-A
NA7.5.12 Automatic Fault Detection and Diagnostics (FDD) for Air Handling Units and Zone Terminal Units Acceptance	**(Page 1 of 4)**

Project Name/Address:	
System Name or Identification/Tag:	System Location or Area Served:

Enforcement Agency:	Permit Number:
Note: Submit one Certificate of Acceptance for each system that must demonstrate compliance.	Enforcement Agency Use: Checked by/Date

Documentation Author's Declaration Statement

- **I certify that this Certificate of Acceptance documentation is accurate and complete.**

Name:	Signature:
Company :	Date:
Address:	If Applicable ☐ CEA or ☐ CEPE (Certification #):
City/State/Zip:	Phone:

FIELD TECHNICIAN'S DECLARATION STATEMENT

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Company Name:		
Field Technician's Name:		Field Technician's Signature:
	Date Signed:	Position With Company (Title):

RESPONSIBLE PERSON'S DECLARATION STATEMENT

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Company Name:		Phone:
Responsible Person's Name:		Responsible Person's Signature:
License:	Date Signed:	Position With Company (Title):

NA7.5.12 Automatic Fault Detection and Diagnostics (FDD) for Air Handling Units and Zone Terminal Units Acceptance

Project Name/Address:	
System Name or Identification/Tag:	System Location or Area Served:

Intent: *Verify that the system detects common faults in air handling units and zone terminal units.*

Construction Inspection

1 Instrumentation to perform test includes, but not limited to:

a. No instrumentation is required – changes are implemented at the building automation system control station.

2 Installation

a. The functional testing verifies proper installation of the controls for FDD for air handling units and zone terminal units. No additional installation checks are required.

A. Functional Testing for Air Handling Units **Testing of each AHU with FDD controls shall include the following tests:**	**Results**
Step 1: Sensor Drift/Failure	
a. Disconnect outside air temperature sensor from unit controller	Y / N
b. Verify that the FDD system reports a fault	Y / N
c. Connect OAT sensor to the unit controller	Y / N
d. Verify that FDD indicates normal system operation	Y / N
Step 2: Damper/Actuator Fault	
a. From the control system workstation, command the mixing box dampers to full open (100% outdoor air)	Y / N
b. Disconnect power to the actuator and verify that a fault is reported at the control workstation	Y / N
c. Reconnect power to the actuator and command the mixing box dampers to full open	Y / N
d. Verify that the control system does not report a fault	Y / N
e. From the control system workstation, command the mixing box dampers to a full-closed position (0% outdoor air)	Y / N
f. Disconnect power to the actuator and verify that a fault is reported at the control workstation	Y / N
g. Reconnect power to the actuator and command the dampers closed	Y / N
h. Verify that the control system does not report a fault during normal operation	Y / N
Step 3: Valve/actuator fault	
a. From the control system workstation, command the heating and cooling coil valves to full open or closed, then disconnect power to the actuator and verify that a fault is reported at the control workstation	Y / N
Step 4: Inappropriate simultaneous heating, mechanical cooling, and/or economizing	
a. From the control system workstation, override the heating coil valve and verify that a fault is reported at the control workstation	Y / N
b. From the control system workstation, override the cooling coil valve and verify that a fault is reported at the control workstation	Y / N
c. From the control system workstation, override the mixing box dampers and verify that a fault is reported at the control workstation	Y / N

Project Name/Address:	
System Name or Identification/Tag:	System Location or Area Served:

B. Functional Testing for Zone Terminal Units		Results
Testing shall be performed on one of each type of terminal unit (VAV box) in the project. A minimum of 5% of the terminal boxes shall be tested.		
Step 1: Sensor drift/failure		
a.	Disconnect the tubing to the differential pressure sensor of the VAV box	Y / N
b.	Verify that control system detects and reports the fault	Y / N
c.	Reconnect the sensor and verify proper sensor operation	Y / N
d.	Verify that the control system does not report a fault	Y / N
Step 2: Damper/actuator fault		
If the Damper is stuck open:		
a.	Command the damper to be fully open (room temperature above setpoint)	Y / N
b.	Disconnect the actuator to the damper	Y / N
c.	Adjust the cooling setpoint so that the room temperature is below the cooling setpoint to command the damper to the minimum position. Verify that the control system reports a fault	Y / N
d.	Reconnect the actuator and restore to normal operation	Y / N
If the Damper is stuck Closed:		
a.	Set the damper to the minimum position	Y / N
b.	Disconnect the actuator to the damper	Y / N
c.	Set the cooling setpoint below the room temperature to simulate a call for cooling. Verify that the control system reports a fault	Y / N
d.	Reconnect the actuator and restore to normal operation	Y / N
Step 3: Valve/actuator fault (For systems with hydronic reheat)		
a.	Command the reheat coil valve to (full) open	Y / N
b.	Disconnect power to the actuator. Set the heating setpoint temperature to be lower than the current space temperature, to command the valve closed. Verify that the fault is reported at the control workstation	Y / N
c.	Reconnect the actuator and restore normal operation	Y / N
Step 4: Feedback loop tuning fault (unstable airflow)		
a.	Set the integral coefficient of the box controller to a value 50 times the current value. Lower the space cooling setpoint to simulate a call for cooling.	
b.	The damper cycles continuously and airflow is unstable. Verify that the control system detects and reports the fault	Y / N
c.	Reset the integral coefficient of the controller to the original value to restore normal operation	Y / N
Step 5: Disconnected inlet duct		
a.	From the control system workstation, command the damper to full closed, then disconnect power to the actuator and verify that a fault is reported at the control workstation	Y / N

Project Name/Address:	
System Name or Identification/Tag:	System Location or Area Served:

C. Testing Results	**PASS**	**FAIL**
Test passes if all applicable answers are yes under **Functional Testing Sections**.	☐	☐

D. Evaluation :	
☐	PASS: All **Construction Inspection** responses are complete and all **Testing Results** responses are "Pass"

CERTIFICATE OF ACCEPTANCE	NRCA-MCH-12-A
NA7.5.11 Fault Detection and Diagnostics (FDD) for Packaged Direct-Expansion Units	**(Page 1 of 3)**

Project Name/Address:	
System Name or Identification/Tag:	System Location or Area Served:

Enforcement Agency:	Permit Number:
Note: Submit one Certificate of Acceptance for each system that must demonstrate compliance.	Enforcement Agency Use: Checked by/Date

Documentation Author's Declaration Statement

- **I certify that this Certificate of Acceptance documentation is accurate and complete.**

Name:	Signature:
Company :	Date:
Address:	If Applicable: ☐ CEA or ☐ CEPE (Certification #):
City/State/Zip:	Phone:

FIELD TECHNICIAN'S DECLARATION STATEMENT

- I certify under penalty of perjury, under the laws of the State of California, the information provided on this form is true and correct.
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Company Name:		
Field Technician's Name:		Field Technician's Signature:
	Date Signed:	Position With Company (Title):

RESPONSIBLE PERSON'S DECLARATION STATEMENT

- I certify under penalty of perjury, under the laws of the State of California, that I am the Field Technician, or the Field Technician is acting on my behalf as my employee or my agent and I have reviewed the information provided on this form.
- I am a licensed contractor, architect, or engineer, who is eligible under Division 3 of the Business and Professions Code, in the applicable classification, to take responsibility for the scope of work specified on this document and attest to the declarations in this statement (responsible person).
- I certify that the information provided on this form substantiates that the construction/installation identified on this form complies with the acceptance requirements indicated in the plans and specifications approved by the enforcement agency, and conforms to the applicable acceptance requirements and procedures specified in Reference Nonresidential Appendix NA7.
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Company Name:		Phone:
Responsible Person's Name:		Responsible Person's Signature:
License:	Date Signed:	Position With Company (Title):

Project Name/Address:	
System Name or Identification/Tag:	System Location or Area Served:

Intent: *The purpose of this test is to verify proper fault detection and reporting for automated fault detection and diagnostics systems for packaged units.*

Construction Inspection

1 Instrumentation to perform test includes, but not limited to:

a List of instrumentation may be needed or included.

2 Installation

Verify that FDD hardware is installed on equipment by the manufacturer and that equipment make and model include

☐ factory-installed FDD hardware that matches the information indicated on copies of the manufacturer's cut sheets and on the plans and specifications.

A	Eligibility Criteria	Results
a.	A fault detection and diagnostics (FDD) system for direct-expansion packaged units contain the following features to be eligible for credit in the performance calculation method:	
b.	The unit includes a factory-installed economizer WITH A deadband to no more than 2°F	Y / N
c.	The unit includes direct-drive actuators on the outside air and return air dampers	Y / N
d.	The unit includes an integrated economizer with either differential dry-bulb or differential enthalpy control	Y / N
e.	The unit includes a low temperature lockout on the compressor to prevent coil freeze-up or comfort problems	Y / N
f.	Outside air and return air dampers have maximum leakage rates conforming to ASHRAE 90.1- 2004	Y / N
g.	The unit includes an adjustable expansion control device such as a thermostatic expansion valve (TXV)	Y / N
h.	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	Y / N
i.	The following sensors are permanently installed to monitor system operation and the controller and haves the capability of displaying the value of each parameter: ☐ Refrigerant suction pressure ☐ Supply air relative humidity ☐ Return air temp. ☐ Supply air relative humidity. ☐ Refrigerant suction temp. ☐ Outside air relative humidity ☐ Supply air temp. ☐ Liquid line pressure ☐ Return air relative humidity ☐ Outside air temp.	Y / N
j.	The controller provides system status by indicating the following conditions: ☐ Compressor enabled ☐ Economizer enabled ☐ Free cooling available ☐ Heating enabled ☐ Mixed air low limit cycle active	Y / N
k.	The unit controller has the capability to manually initiate each operating mode so that the operation of compressors, economizers, fans, and heating system can be independently tested and verified.	Y / N

Project Name/Address:	
System Name or Identification/Tag:	System Location or Area Served:

B Functional Testing		Results
Step 1: Low Airflow Test		
a.	Test low airflow condition by replacing the existing filter with a dirty filter or appropriate obstruction	
b.	Verify that the fault detection and diagnostics system reports the fault	Y / N
c.	Verify that the system is able to verify the correct refrigerant charge	Y / N
d.	Verify that you are able to calibrate the following:	Y / N
	☐ Outside Air Temp. Sensor ☐ Return Air Temp. Sensors ☐ Supply Air. Temp Sensors	

C Testing Results	PASS / FAIL	
Test passes if all answers are yes under **Eligibility Criteria** and **Functional Testing**.	☐	☐

☐	PASS: All **Construction Inspection** responses are complete and all **Testing Results** responses are "Pass"

CERTIFICATE OF ACCEPTANCE	NRCA-MCH-12-A
NA7.5.11 Fault Detection and Diagnostics (FDD) for Packaged Direct-Expansion Units	**(Page 1 of 3)**

Project Name/Address:	
System Name or Identification/Tag:	System Location or Area Served:

Enforcement Agency:	Permit Number:
Note: Submit one Certificate of Acceptance for each system that must demonstrate compliance.	Enforcement Agency Use: Checked by/Date

Documentation Author's Declaration Statement

- **I certify that this Certificate of Acceptance documentation is accurate and complete.**

Name:	Signature:
Company :	Date:
Address:	If Applicable: ☐ CEA or ☐ CEPE (Certification #):
City/State/Zip:	Phone:

FIELD TECHNICIAN'S DECLARATION STATEMENT

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Company Name:		
Field Technician's Name:		Field Technician's Signature:
	Date Signed:	Position With Company (Title):

RESPONSIBLE PERSON'S DECLARATION STATEMENT

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- I am a licensed contractor, architect, or engineer, who is eligible under Division 3 of the Business and Professions Code, in the applicable classification, to take responsibility for the scope of work specified on this document and attest to the declarations in this statement (responsible person).
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Company Name:		Phone:
Responsible Person's Name:		Responsible Person's Signature:
License:	Date Signed:	Position With Company (Title):

Project Name/Address:	
System Name or Identification/Tag:	System Location or Area Served:

Intent: *The purpose of this test is to verify proper fault detection and reporting for automated fault detection and diagnostics systems for packaged units.*

Construction Inspection

1 Instrumentation to perform test includes, but not limited to:

a List of instrumentation may be needed or included.

2 Installation

Verify that FDD hardware is installed on equipment by the manufacturer and that equipment make and model include

☐ factory-installed FDD hardware that matches the information indicated on copies of the manufacturer's cut sheets and on the plans and specifications.

A	Eligibility Criteria	Results
a.	A fault detection and diagnostics (FDD) system for direct-expansion packaged units contain the following features to be eligible for credit in the performance calculation method:	
b.	The unit includes a factory-installed economizer WITH A deadband to no more than 2°F	Y / N
c.	The unit includes direct-drive actuators on the outside air and return air dampers	Y / N
d.	The unit includes an integrated economizer with either differential dry-bulb or differential enthalpy control	Y / N
e.	The unit includes a low temperature lockout on the compressor to prevent coil freeze-up or comfort problems	Y / N
f.	Outside air and return air dampers have maximum leakage rates conforming to ASHRAE 90.1- 2004	Y / N
g.	The unit includes an adjustable expansion control device such as a thermostatic expansion valve (TXV)	Y / N
h.	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	Y / N
i.	The following sensors are permanently installed to monitor system operation and the controller and haves the capability of displaying the value of each parameter: ☐ Refrigerant suction pressure ☐ Supply air relative humidity ☐ Return air temp. ☐ Supply air relative humidity. ☐ Refrigerant suction temp. ☐ Outside air relative humidity ☐ Supply air temp. ☐ Liquid line pressure ☐ Return air relative humidity ☐ Outside air temp.	Y / N
j.	The controller provides system status by indicating the following conditions: ☐ Compressor enabled ☐ Economizer enabled ☐ Free cooling available ☐ Heating enabled ☐ Mixed air low limit cycle active	Y / N
k.	The unit controller has the capability to manually initiate each operating mode so that the operation of compressors, economizers, fans, and heating system can be independently tested and verified.	Y / N

Project Name/Address:	
System Name or Identification/Tag:	System Location or Area Served:

B Functional Testing		Results
Step 1: Low Airflow Test		
a.	Test low airflow condition by replacing the existing filter with a dirty filter or appropriate obstruction	
b.	Verify that the fault detection and diagnostics system reports the fault	Y / N
c.	Verify that the system is able to verify the correct refrigerant charge	Y / N
d.	Verify that you are able to calibrate the following:	Y / N
	☐ Outside Air Temp. Sensor ☐ Return Air Temp. Sensors ☐ Supply Air. Temp Sensors	

C Testing Results	PASS / FAIL	
Test passes if all answers are yes under **Eligibility Criteria** and **Functional Testing**.	☐	☐

☐	PASS: All **Construction Inspection** responses are complete and all **Testing Results** responses are "Pass"

CERTIFICATE OF ACCEPTANCE	NRCA-MCH-11-A
Automatic Demand Shed Control Acceptance	**(Page 1 of 2)**

Project Name/Address:	
System Name or Identification/Tag:	System Location or Area Served:

Enforcement Agency:	Permit Number:
Note: Submit one Certificate of Acceptance for each system that must demonstrate compliance.	Enforcement Agency Use: Checked by/Date

Documentation Author's Declaration Statement

- **I certify that this Certificate of Acceptance documentation is accurate and complete.**

Name:	Signature:
Company :	Date:
Address:	If Applicable ☐ CEA or ☐ CEPE (Certification #):
City/State/Zip:	Phone:

FIELD TECHNICIAN'S DECLARATION STATEMENT

- I certify under penalty of perjury, under the laws of the State of California, the information provided on this form is true and correct.
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Company Name:		
Field Technician's Name:		Field Technician's Signature:
	Date Signed:	Position With Company (Title):

RESPONSIBLE PERSON'S DECLARATION STATEMENT

- I certify under penalty of perjury, under the laws of the State of California, that I am the Field Technician, or the Field Technician is acting on my behalf as my employee or my agent and I have reviewed the information provided on this form.
- I am a licensed contractor, architect, or engineer, who is eligible under Division 3 of the Business and Professions Code, in the applicable classification, to take responsibility for the scope of work specified on this document and attest to the declarations in this statement (responsible person).
- I certify that the information provided on this form substantiates that the construction/installation identified on this form complies with the acceptance requirements indicated in the plans and specifications approved by the enforcement agency, and conforms to the applicable acceptance requirements and procedures specified in Reference Nonresidential Appendix NA7.
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Company Name:		Phone:
Responsible Person's Name:		Responsible Person's Signature:
License:	Date Signed:	Position With Company (Title):

Project Name/Address:	
System Name or Identification/Tag:	System Location or Area Served:

Intent: *Ensure that the central demand shed sequences have been properly programmed into the DDC system*

Construction Inspection

1 Instrumentation to perform test includes, but not limited to:

a. None

2 Installation

☐ The EMCS front end interface enables activation of the central demand shed controls

A	**Functional Testing**	
Step 1: Engage the demand shed controls		
a.	Engage the central demand shed control signal	Y / N
b.	Verify that the current operating temperature setpoint in a sample of non-critical spaces increases by the proper amount.	Y / N
c.	Verify that the current operating temperature setpoint in a sample of critical spaces does not change.	Y / N
Step 2: Disengage the demand shed controls		
a.	Disengage the central demand shed control signal	Y / N
b.	Verify that the current operating temperature setpoint in the sample of non-critical spaces returns to their original value.	Y / N
c.	Verify that the current operating temperature setpoint in the sample of critical spaces does not change.	Y / N
Step 3: System returned to initial operating conditions		Y / N

B	**Testing Results**	**PASS**	**FAIL**
Test passes if all answers are yes in Step 1 and Step 2		☐	☐

C	**Evaluation :**
☐	PASS: All **Construction Inspection** responses are complete and all **Testing Results** responses are "Pass"

CERTIFICATE OF ACCEPTANCE	NRCA-MCH-11-A
Automatic Demand Shed Control Acceptance	**(Page 1 of 2)**

Project Name/Address:	
System Name or Identification/Tag:	System Location or Area Served:

Enforcement Agency:	Permit Number:
Note: Submit one Certificate of Acceptance for each system that must demonstrate compliance.	Enforcement Agency Use: Checked by/Date

Documentation Author's Declaration Statement

- **I certify that this Certificate of Acceptance documentation is accurate and complete.**

Name:	Signature:
Company :	Date:
Address:	If Applicable ☐ CEA or ☐ CEPE (Certification #):
City/State/Zip:	Phone:

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Company Name:		
Field Technician's Name:		Field Technician's Signature:
	Date Signed:	Position With Company (Title):

RESPONSIBLE PERSON'S DECLARATION STATEMENT

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Company Name:		Phone:
Responsible Person's Name:		Responsible Person's Signature:
License:	Date Signed:	Position With Company (Title):

Project Name/Address:	
System Name or Identification/Tag:	System Location or Area Served:

Intent: *Ensure that the central demand shed sequences have been properly programmed into the DDC system*

Construction Inspection

1 Instrumentation to perform test includes, but not limited to:

a. None

2 Installation

☐ The EMCS front end interface enables activation of the central demand shed controls

A	**Functional Testing**	
Step 1: Engage the demand shed controls		
a.	Engage the central demand shed control signal	Y / N
b.	Verify that the current operating temperature setpoint in a sample of non-critical spaces increases by the proper amount.	Y / N
c.	Verify that the current operating temperature setpoint in a sample of critical spaces does not change.	Y / N
Step 2: Disengage the demand shed controls		
a.	Disengage the central demand shed control signal	Y / N
b.	Verify that the current operating temperature setpoint in the sample of non-critical spaces returns to their original value.	Y / N
c.	Verify that the current operating temperature setpoint in the sample of critical spaces does not change.	Y / N
Step 3: System returned to initial operating conditions		Y / N

B	**Testing Results**	**PASS**	**FAIL**
Test passes if all answers are yes in Step 1 and Step 2		☐	☐

C	**Evaluation :**
☐	PASS: All **Construction Inspection** responses are complete and all **Testing Results** responses are "Pass"

CERTIFICATE OF ACCEPTANCE	NRCA-MCH-10-A
NA7.5.9 Hydronic System Variable Flow Control Acceptance	**(Page 1 of 3)**

Project Name/Address:	
System Name or Identification/Tag:	System Location or Area Served:

Enforcement Agency:	Permit Number:
Note: Submit one Certificate of Acceptance for each system that must demonstrate compliance.	Enforcement Agency Use: Checked by/Date

Documentation Author's Declaration Statement

- **I certify that this Certificate of Acceptance documentation is accurate and complete.**

Name:	Signature:
Company :	Date:
Address:	If Applicable ☐ CEA or ☐ CEPE (Certification #):
City/State/Zip:	Phone:

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Company Name:		
Field Technician's Name:		Field Technician's Signature:
	Date Signed:	Position With Company (Title):

RESPONSIBLE PERSON'S DECLARATION STATEMENT

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Company Name:		Phone:
Responsible Person's Name:		Responsible Person's Signature:
License:	Date Signed:	Position With Company (Title):

Intent:	*Ensure that hydronic pump speed varies with building heating and cooling loads.*

Construction Inspection

1. Supporting documentation needed to perform test includes, but not limited to:
   a. As-built and/or Design Documents including Mechanical Equipment Schedules.
   b. 2013 Building Energy Efficiency Standards Nonresidential Compliance Manual *(NA7.5.9 Hydronic System Variable Flow Control Acceptance At-A-Glance).*
   c. 2013 Building Energy Efficiency Standards.
2. Instrumentation to perform test includes, but not limited to:
   a. Calibrated differential pressure gauge (hydronic manometer)
3. Installation:
   ☐ Pressure sensor location, setpoint, and reset control meets the requirements of 2013 Building Energy Efficiency Standards section 140.4(j) 6B.
      ☐ For systems without direct digital control of individual coils reporting to the central control panel, differential pressure is measured at or near the most remote heat exchanger or the heat exchanger requiring the greatest differential pressure.
      ☐ For systems with direct digital control of individual coils with central control panel, the static pressure set point is reset based on the valve requiring the most pressure, and the setpoint is no less than 80 percent open.
      ☐ Exception taken. (Heating hot water system or Condenser water system serving only water-cooled chillers).
4. Document that all control pressure sensors are field calibrated (check one of the following):
   ☐ Field calibrated by TAB contractor or other.
      ☐ Calibration complete. All pressure sensors within 10% of calibrated reference sensor. (Provide supporting documentation).
   ☐ Performed field calibration using calibrated differential pressure gauge (hydronic manometer).
      ☐ Calibration complete. All pressure sensors within 10% of calibrated reference sensor. (Provide supporting documentation).

A. Functional Testing		Results
Step 1: Minimum / Low flow test		
a. Close coil control valves to achieve a maximum of 50% of design flow		☐
b. Verify that the operating speed decreases (for systems with DDC to the zone level)		Y / N
c. Verify that the current operating speed has not increased (for all other systems that are not DDC)		Y / N
d. Record the system pressure as measured at the control sensor (*either ft. w.c. or psig*)	ft w.c.	
Note: 2.31 ft w.c. = 1.0 psig	psig	
e. Record the system pressure setpoint (*either ft. w.c. or psig*)	ft w.c.	
	psig	
f. Is the pressure reading on line 1.d. within 5% of pressure setpoint on line 1.e.?		Y / N
g. Did the system operation stabilize within 5 minutes after completion of step 1.a.?		Y / N
Notes:		

Step 2: Maximum/Design flow test		
a. Open control valves to achieve a minimum of 90% of design flow		☐
b. Verify that the pump speed increases.		Y / N
c. Are the pumps operating at 100% speed?		Y / N
d. Record the system pressure as measured at the control sensor (*either ft. w.c. or psig*)	ft. w.c.	
	psig	
e. Record the system pressure setpoint (*either ft. w.c. or psig*)	ft. w.c.	
	psig	
f. Is the setpoint in 1.e. less than the setpoint in 2.e.?		Y / N
g. Is the pressure reading 2.d. within 5% of pressure setpoint 2.e.?		Y / N
h. Did the system operation stabilize within 5 minutes after completion of step 2.a.?		Y / N
Step 3: System returned to initial operating conditions		Y / N
Notes:		

B. Testing Results	**PASS**	**FAIL**
Step 1: Select pass if Step 1b, 1f, and 1g are true (Y).	☐	☐
Step 2: Select pass if Steps 2b, 2c, 2f, 2g and 2h are true (Y).	☐	☐

C. Evaluation:	
☐	PASS: All **Construction Inspection** responses are complete and all **Testing Results** responses are "Pass"
Notes:	

CERTIFICATE OF ACCEPTANCE	NRCA-MCH-10-A
NA7.5.9 Hydronic System Variable Flow Control Acceptance	**(Page 1 of 3)**

Project Name/Address:	
System Name or Identification/Tag:	System Location or Area Served:

Enforcement Agency:	Permit Number:
Note: Submit one Certificate of Acceptance for each system that must demonstrate compliance.	Enforcement Agency Use: Checked by/Date

Documentation Author's Declaration Statement

- **I certify that this Certificate of Acceptance documentation is accurate and complete.**

Name:	Signature:
Company :	Date:
Address:	If Applicable ☐ CEA or ☐ CEPE (Certification #):
City/State/Zip:	Phone:

FIELD TECHNICIAN'S DECLARATION STATEMENT

- I certify under penalty of perjury, under the laws of the State of California, the information provided on this form is true and correct.
- I am the person who performed the acceptance requirements verification reported on this Certificate of Acceptance (Field Technician).
- I certify that the construction/installation identified on this form complies with the acceptance requirements indicated in the plans and specifications approved by the enforcement agency, and conforms to the applicable acceptance requirements and procedures specified in Reference Nonresidential Appendix NA7.
- I have confirmed that the Installation Certificate(s) for the construction/installation identified on this form has been completed and is posted or made available with the building permit(s) issued for the building.

Company Name:		
Field Technician's Name:		Field Technician's Signature:
	Date Signed:	Position With Company (Title):

RESPONSIBLE PERSON'S DECLARATION STATEMENT

- I certify under penalty of perjury, under the laws of the State of California, that I am the Field Technician, or the Field Technician is acting on my behalf as my employee or my agent and I have reviewed the information provided on this form.
- I am a licensed contractor, engineer, or architect who is eligible under Division 3 of the Business and Professions Code, in the applicable classification, to take responsibility for the scope of work specified on this document and attest to the declarations in this statement (responsible person).
- I certify that the information provided on this form substantiates that the construction/installation identified on this form complies with the acceptance requirements indicated in the plans and specifications approved by the enforcement agency, and conforms to the applicable acceptance requirements and procedures specified in Reference Nonresidential Appendix NA7.
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- I will ensure that a completed, signed copy of this Certificate of Acceptance shall be posted, or made available with the building permit(s) issued for the building, and made available to the enforcement agency for all applicable inspections. I understand that a signed copy of this Certificate of Acceptance is required to be included with the documentation the builder provides to the building owner at occupancy.

Company Name:		Phone:
Responsible Person's Name:		Responsible Person's Signature:
License:	Date Signed:	Position With Company (Title):

Intent:	*Ensure that hydronic pump speed varies with building heating and cooling loads.*

Construction Inspection

1. Supporting documentation needed to perform test includes, but not limited to:
   a. As-built and/or Design Documents including Mechanical Equipment Schedules.
   b. 2013 Building Energy Efficiency Standards Nonresidential Compliance Manual *(NA7.5.9 Hydronic System Variable Flow Control Acceptance At-A-Glance).*
   c. 2013 Building Energy Efficiency Standards.
2. Instrumentation to perform test includes, but not limited to:
   a. Calibrated differential pressure gauge (hydronic manometer)
3. Installation:
   ☐ Pressure sensor location, setpoint, and reset control meets the requirements of 2013 Building Energy Efficiency Standards section 140.4(j) 6B.
      ☐ For systems without direct digital control of individual coils reporting to the central control panel, differential pressure is measured at or near the most remote heat exchanger or the heat exchanger requiring the greatest differential pressure.
      ☐ For systems with direct digital control of individual coils with central control panel, the static pressure set point is reset based on the valve requiring the most pressure, and the setpoint is no less than 80 percent open.
      ☐ Exception taken. (Heating hot water system or Condenser water system serving only water-cooled chillers).
4. Document that all control pressure sensors are field calibrated (check one of the following):
   ☐ Field calibrated by TAB contractor or other.
      ☐ Calibration complete. All pressure sensors within 10% of calibrated reference sensor. (Provide supporting documentation).
   ☐ Performed field calibration using calibrated differential pressure gauge (hydronic manometer).
      ☐ Calibration complete. All pressure sensors within 10% of calibrated reference sensor. (Provide supporting documentation).

A. Functional Testing		Results
Step 1: Minimum / Low flow test		
a. Close coil control valves to achieve a maximum of 50% of design flow		☐
b. Verify that the operating speed decreases (for systems with DDC to the zone level)		Y / N
c. Verify that the current operating speed has not increased (for all other systems that are not DDC)		Y / N
d. Record the system pressure as measured at the control sensor (*either ft. w.c. or psig*)	ft w.c.	
Note: 2.31 ft w.c. = 1.0 psig	psig	
e. Record the system pressure setpoint (*either ft. w.c. or psig*)	ft w.c.	
	psig	
f. Is the pressure reading on line 1.d. within 5% of pressure setpoint on line 1.e.?		Y / N
g. Did the system operation stabilize within 5 minutes after completion of step 1.a.?		Y / N
Notes:		

Step 2: Maximum/Design flow test		
a. Open control valves to achieve a minimum of 90% of design flow		☐
b. Verify that the pump speed increases.		Y / N
c. Are the pumps operating at 100% speed?		Y / N
d. Record the system pressure as measured at the control sensor (*either ft. w.c. or psig*)	ft. w.c.	
	psig	
e. Record the system pressure setpoint (*either ft. w.c. or psig*)	ft. w.c.	
	psig	
f. Is the setpoint in 1.e. less than the setpoint in 2.e.?		Y / N
g. Is the pressure reading 2.d. within 5% of pressure setpoint 2.e.?		Y / N
h. Did the system operation stabilize within 5 minutes after completion of step 2.a.?		Y / N
Step 3: System returned to initial operating conditions		Y / N
Notes:		

B. Testing Results	**PASS**	**FAIL**
Step 1: Select pass if Step 1b, 1f, and 1g are true (Y).	☐	☐
Step 2: Select pass if Steps 2b, 2c, 2f, 2g and 2h are true (Y).	☐	☐

C. Evaluation:	
☐	PASS: All **Construction Inspection** responses are complete and all **Testing Results** responses are "Pass"
Notes:	

CERTIFICATE OF ACCEPTANCE	NRCA-MCH-09-A
NA7.5.8 Supply Water Temperature Reset Controls Acceptance	**(Page 1 of 3)**

Project Name/Address:	
System Name or Identification/Tag:	System Location or Area Served:

Enforcement Agency:	Permit Number:
Note: Submit one Certificate of Acceptance for each system that must demonstrate compliance.	Enforcement Agency Use: Checked by/Date

Documentation Author's Declaration Statement

- **I certify that this Certificate of Acceptance documentation is accurate and complete.**

Name:	Signature:
Company :	Date:
Address:	If Applicable ☐ CEA or ☐ CEPE (Certification #):
City/State/Zip:	Phone:

FIELD TECHNICIAN'S DECLARATION STATEMENT

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Company Name:	
Field Technician's Name:	Field Technician's Signature:
Date Signed:	Position With Company (Title):

RESPONSIBLE PERSON'S DECLARATION STATEMENT

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Company Name:		Phone:
Responsible Person's Name:		Responsible Person's Signature:
License:	Date Signed:	Position With Company (Title):

Intent:	***Ensure that both the chilled water and hot water supply temperatures are automatically reset based on either building loads or outdoor air temperature, as indicated in the control sequences.***

Construction Inspection

1. Supporting documentation needed to perform test includes, but not limited to:
   a. 2013 Building Energy Efficiency Standards Nonresidential Compliance Manual (*NA7.5.8 Supply Water Temperature Reset Controls Acceptance At-A-Glance)*
2. Instrumentation to perform test includes, but is not limited to:
   a. Calibrated reference temperature sensor, icewater, or drywell bath.
      1. Calibration Date: _____ (must be within last year).
3. Document that hydronic system supply temperature sensor(s) have been field calibrated: (check the following that apply):
   ☐ Field-calibrated by TAB contractor or other.
      ☐ Calibration complete, hydronic system supply temperature sensors within 1% of calibrated reference sensor, icewater or drywell bath.
      ☐ Provide supporting documentation.
   ☐ Performed field-calibration using calibrated reference temperature sensor or drywell bath.
      ☐ Calibration complete, hydronic system supply temperature sensors within 1% of calibrated reference sensor, icewater or drywell bath. (Provide supporting documentation).

A. Functional Testing	Results
Step 1: Test Maximum Reset Value	
a. Change reset control variable to its maximum value. This can be accomplished by any one of the following (check method):	☐
☐ Commanding at least one coil valve to 100% open	
☐ Adjust discharge air temperature or zone temperature setpoints to drive a valve into a 100% open.	
☐ Override actual outdoor air sensor to exceed maximum water temperature boundary value.	
b. Verify that chilled or hot water temperature setpoint is reset to appropriate value.	Y / N
c. Verify that actual system temperature changes to within 2% of the new setpoint.	Y / N
Step 2: Test Minimum Reset Value	
a. Change reset control variable to its minimum value	☐
b. Verify that chilled or hot water temperature setpoint is reset to appropriate value	Y / N
c. Verify that actual system temperature changes to within 2% of the new setpoint	Y / N
Step 3: Test Automatic Control of Reset Control Variable.	
a. Restore reset control variable to automatic control	☐
b. Verify that chilled or hot water temperature setpoint is reset to appropriate value	Y / N
c. Verify that actual supply temperature changes to meet setpoint	Y / N
d. Verify that actual supply temperature changes to within 2% of the new setpoint	Y / N

B. Testing Results	PASS / FAIL	
System passes criteria in 1c, 2c and 3d	☐	☐

C. **Evaluation :**
☐ PASS: All **Construction Inspection** responses are complete and all **Testing Results** responses are "Pass"
Notes:

CERTIFICATE OF ACCEPTANCE	NRCA-MCH-09-A
NA7.5.8 Supply Water Temperature Reset Controls Acceptance	**(Page 1 of 3)**

Project Name/Address:	
System Name or Identification/Tag:	System Location or Area Served:

Enforcement Agency:	Permit Number:
Note: Submit one Certificate of Acceptance for each system that must demonstrate compliance.	Enforcement Agency Use: Checked by/Date

Documentation Author's Declaration Statement

- **I certify that this Certificate of Acceptance documentation is accurate and complete.**

Name:	Signature:
Company :	Date:
Address:	If Applicable ☐ CEA or ☐ CEPE (Certification #):
City/State/Zip:	Phone:

FIELD TECHNICIAN'S DECLARATION STATEMENT

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Company Name:	
Field Technician's Name:	Field Technician's Signature:
Date Signed:	Position With Company (Title):

RESPONSIBLE PERSON'S DECLARATION STATEMENT

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Company Name:		Phone:
Responsible Person's Name:		Responsible Person's Signature:
License:	Date Signed:	Position With Company (Title):

Intent:	***Ensure that both the chilled water and hot water supply temperatures are automatically reset based on either building loads or outdoor air temperature, as indicated in the control sequences.***

Construction Inspection

1. Supporting documentation needed to perform test includes, but not limited to:
   a. 2013 Building Energy Efficiency Standards Nonresidential Compliance Manual (*NA7.5.8 Supply Water Temperature Reset Controls Acceptance At-A-Glance)*
2. Instrumentation to perform test includes, but is not limited to:
   a. Calibrated reference temperature sensor, icewater, or drywell bath.
      1. Calibration Date: _____ (must be within last year).
3. Document that hydronic system supply temperature sensor(s) have been field calibrated: (check the following that apply):
   ☐ Field-calibrated by TAB contractor or other.
      ☐ Calibration complete, hydronic system supply temperature sensors within 1% of calibrated reference sensor, icewater or drywell bath.
      ☐ Provide supporting documentation.
   ☐ Performed field-calibration using calibrated reference temperature sensor or drywell bath.
      ☐ Calibration complete, hydronic system supply temperature sensors within 1% of calibrated reference sensor, icewater or drywell bath. (Provide supporting documentation).

A. Functional Testing	Results
Step 1: Test Maximum Reset Value	
a. Change reset control variable to its maximum value. This can be accomplished by any one of the following (check method):	☐
☐ Commanding at least one coil valve to 100% open	
☐ Adjust discharge air temperature or zone temperature setpoints to drive a valve into a 100% open.	
☐ Override actual outdoor air sensor to exceed maximum water temperature boundary value.	
b. Verify that chilled or hot water temperature setpoint is reset to appropriate value.	Y / N
c. Verify that actual system temperature changes to within 2% of the new setpoint.	Y / N
Step 2: Test Minimum Reset Value	
a. Change reset control variable to its minimum value	☐
b. Verify that chilled or hot water temperature setpoint is reset to appropriate value	Y / N
c. Verify that actual system temperature changes to within 2% of the new setpoint	Y / N
Step 3: Test Automatic Control of Reset Control Variable.	
a. Restore reset control variable to automatic control	☐
b. Verify that chilled or hot water temperature setpoint is reset to appropriate value	Y / N
c. Verify that actual supply temperature changes to meet setpoint	Y / N
d. Verify that actual supply temperature changes to within 2% of the new setpoint	Y / N

B. Testing Results	PASS / FAIL	
System passes criteria in 1c, 2c and 3d	☐	☐

C. **Evaluation :**
☐ PASS: All **Construction Inspection** responses are complete and all **Testing Results** responses are "Pass"
Notes:

CERTIFICATE OF ACCEPTANCE	NRCA-MCH-09-A
NA7.5.8 Supply Water Temperature Reset Controls Acceptance	**(Page 1 of 3)**

Project Name/Address:	
System Name or Identification/Tag:	System Location or Area Served:

Enforcement Agency:	Permit Number:
Note: Submit one Certificate of Acceptance for each system that must demonstrate compliance.	Enforcement Agency Use: Checked by/Date

Documentation Author's Declaration Statement

- **I certify that this Certificate of Acceptance documentation is accurate and complete.**

Name:	Signature:
Company :	Date:
Address:	If Applicable ☐ CEA or ☐ CEPE (Certification #):
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Company Name:	
Field Technician's Name:	Field Technician's Signature:
Date Signed:	Position With Company (Title):

RESPONSIBLE PERSON'S DECLARATION STATEMENT

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Company Name:		Phone:
Responsible Person's Name:		Responsible Person's Signature:
License:	Date Signed:	Position With Company (Title):

Unbold

Intent:	***Ensure that both the chilled water and hot water supply temperatures are automatically reset based on either building loads or outdoor air temperature, as indicated in the control sequences.***

Construction Inspection

1. Supporting documentation needed to perform test includes, but not limited to:
   a. 2013 Building Energy Efficiency Standards Nonresidential Compliance Manual (*NA7.5.8 Supply Water Temperature Reset Controls Acceptance At-A-Glance)*
2. Instrumentation to perform test includes, but is not limited to:
   a. Calibrated reference temperature sensor, icewater, or drywell bath.
      1. Calibration Date: _____ (must be within last year).
3. Document that hydronic system supply temperature sensor(s) have been field calibrated: (check the ~~following that apply~~):
   ☐ Field-calibrated by TAB contractor or other.
      ☐ Calibration complete, hydronic system supply temperature sensors within 1% of calibrated reference sensor, icewater
      ☐ Provide supporting documentation.
   ☐ Performed field-calibration using calibrated reference temperature sensor or drywell bath.
      ☐ Calibration complete, hydronic system supply temperature sensors within 1% of calibrated reference sensor, icewater or drywell bath. (Provide supporting documentation).

one that applies

A. Functional Testing	Results
Step 1: Test Maximum Reset Value	
a. Change reset control variable to its maximum value. This can be accomplished by any one of the following (check method):	☐
☐ Commanding at least one coil valve to 100% open	
☐ Adjust discharge air temperature or zone temperature setpoints to drive a valve into a 100% open.	
☐ Override actual outdoor air sensor to exceed maximum water temperature boundary value.	
b. Verify that chilled or hot water temperature setpoint is reset to appropriate value.	Y / N
c. Verify that actual system temperature changes to within 2% of the new setpoint.	Y / N
Step 2: Test Minimum Reset Value	
a. Change reset control variable to its minimum value	☐
b. Verify that chilled or hot water temperature setpoint is reset to appropriate value	Y / N
c. Verify that actual system temperature changes to within 2% of the new setpoint	Y / N
Step 3: Test Automatic Control of Reset Control Variable.	
a. Restore reset control variable to automatic control	☐
b. Verify that chilled or hot water temperature setpoint is reset to appropriate value	Y / N
c. Verify that actual supply temperature changes to meet setpoint	Y / N
d. Verify that actual supply temperature changes to within 2% of the new setpoint	Y / N

B. Testing Results	PASS / FAIL	
System passes criteria in 1c, 2c and 3d	☐	☐

C. **Evaluation :**
☐ PASS: All **Construction Inspection** responses are complete and all **Testing Results** responses are "Pass"
Notes:

CERTIFICATE OF ACCEPTANCE	NRCA-MCH-08-A
NA7.5.7 Valve Leakage Test	**(Page 1 of 2)**

Project Name/Address:	
System Name or Identification/Tag:	System Location or Area Served:

Enforcement Agency:	Permit Number:
Note: Submit one Certificate of Acceptance for each system that must demonstrate compliance.	Enforcement Agency Use: Checked by/Date

Documentation Author's Declaration Statement

- **I certify that this Certificate of Acceptance documentation is accurate and complete.**

Name:	Signature:
Company :	Date:
Address:	If Applicable ☐ CEA or ☐ CEPE (Certification #):
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Company Name:		
Field Technician's Name:		Field Technician's Signature:
	Date Signed:	Position With Company (Title):

RESPONSIBLE PERSON'S DECLARATION STATEMENT

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Company Name:		Phone:
Responsible Person's Name:		Responsible Person's Signature:
License:	Date Signed:	Position With Company (Title):

Project Name/Address:	
System Name or Identification/Tag:	System Location or Area Served:

Intent: *Ensure that control valves serving variable flow systems are designed to withstand the pump pressure over the full range of operation.*

Construction Inspection

1 Instrumentation to perform test includes, but not limited to:

a. Calibrated differential pressure gauge

b. Pump curve submittals showing the shut-off head

2 Installation

☐ Valve and piping arrangements were installed per the design drawings

A. Functional Testing	**Pump Tag (Id)**	**Results**
Step 1: Determine pump dead head pressure		
a. Close pump discharge isolation valve		Y / N
b. Measure and record the differential pump pressure	Ft. W.C. =	
c. Record the shut-off head from the submittal	Ft. W.C. =	
d. The measurement across the pump in step 1b is within 5% of the pump submittal in step 1c		Y / N
e. Open pump discharge isolation valve		Y / N
Step 2: Automatically close all valves on the systems being tested. If 3-way valves are present, close off the bypass line(s).		
a. The 2 way valves automatically close		Y / N
b. Measure and record the differential pump pressure in feet of water column	Ft. W.C. =	
c. The measurement across the pump in step 2b is within 5% of the measurement in step 1b		Y / N
Step 3: System returned to initial operating conditions	Y / N	

B. Testing Results	**PASS**	**FAIL**
Step 1: Pressure measurement is within 5% of submittal data for all pumps	☐	☐
Step 2: Pressure measurements are within 5%	☐	☐

C. Evaluation:

☐ PASS: All **Construction Inspection** responses are complete and all **Testing Results** responses are "Pass"

CERTIFICATE OF ACCEPTANCE	NRCA-MCH-08-A
NA7.5.7 Valve Leakage Test	**(Page 1 of 2)**

Project Name/Address:	
System Name or Identification/Tag:	System Location or Area Served:

Enforcement Agency:	Permit Number:
Note: Submit one Certificate of Acceptance for each system that must demonstrate compliance.	Enforcement Agency Use: Checked by/Date

Documentation Author's Declaration Statement

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Company Name:		
Field Technician's Name:		Field Technician's Signature:
	Date Signed:	Position With Company (Title):

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Company Name:		Phone:
Responsible Person's Name:		Responsible Person's Signature:
License:	Date Signed:	Position With Company (Title):

Project Name/Address:	
System Name or Identification/Tag:	System Location or Area Served:

Intent: *Ensure that control valves serving variable flow systems are designed to withstand the pump pressure over the full range of operation.*

Construction Inspection

1 Instrumentation to perform test includes, but not limited to:

a. Calibrated differential pressure gauge

b. Pump curve submittals showing the shut-off head

2 Installation

☐ Valve and piping arrangements were installed per the design drawings

A. Functional Testing	**Pump Tag (Id)**	**Results**
Step 1: Determine pump dead head pressure		
a. Close pump discharge isolation valve		Y / N
b. Measure and record the differential pump pressure	Ft. W.C. =	
c. Record the shut-off head from the submittal	Ft. W.C. =	
d. The measurement across the pump in step 1b is within 5% of the pump submittal in step 1c		Y / N
e. Open pump discharge isolation valve		Y / N
Step 2: Automatically close all valves on the systems being tested. If 3-way valves are present, close off the bypass line(s).		
a. The 2 way valves automatically close		Y / N
b. Measure and record the differential pump pressure in feet of water column	Ft. W.C. =	
c. The measurement across the pump in step 2b is within 5% of the measurement in step 1b		Y / N
Step 3: System returned to initial operating conditions	Y / N	

B. Testing Results	**PASS**	**FAIL**
Step 1: Pressure measurement is within 5% of submittal data for all pumps	☐	☐
Step 2: Pressure measurements are within 5%	☐	☐

C. Evaluation:

☐ PASS: All **Construction Inspection** responses are complete and all **Testing Results** responses are "Pass"

CERTIFICATE OF ACCEPTANCE	NRCA-MCH-07-A
NA7.5.6 Supply Fan VFD Acceptance	**(Page 1 of 3)**

Project Name/Address:	
System Name or Identification/Tag:	System Location or Area Served:

Enforcement Agency:	Permit Number:
Note: Submit one Certificate of Acceptance for each system that must demonstrate compliance.	Enforcement Agency Use: Checked by/Date

Documentation Author's Declaration Statement

- **I certify that this Certificate of Acceptance documentation is accurate and complete.**

Name:	Signature:
Company :	Date:
Address:	If Applicable ☐ CEA or ☐ CEPE (Certification #):
City/State/Zip:	Phone:

FIELD TECHNICIAN'S DECLARATION STATEMENT

- I certify under penalty of perjury, under the laws of the State of California, the information provided on this form is true and correct.
- I am the person who performed the acceptance requirements verification reported on this Certificate of Acceptance (Field Technician).
- I certify that the construction/installation identified on this form complies with the acceptance requirements indicated in the plans and specifications approved by the enforcement agency, and conforms to the applicable acceptance requirements and procedures specified in Reference Nonresidential Appendix NA7.
- I have confirmed that the Installation Certificate(s) for the construction/installation identified on this form has been completed and is posted or made available with the building permit(s) issued for the building.

Company Name:	
Field Technician's Name:	Field Technician's Signature:
Date Signed:	Position With Company (Title):

RESPONSIBLE PERSON'S DECLARATION STATEMENT

- I certify under penalty of perjury, under the laws of the State of California, that I am the Field Technician, or the Field Technician is acting on my behalf as my employee or my agent and I have reviewed the information provided on this form.
- I am a licensed contractor, architect, or engineer who is eligible under Division 3 of the Business and Professions Code, in the applicable classification, to take responsibility for the scope of work specified on this document and attest to the declarations in this statement (responsible person).
- I certify that the information provided on this form substantiates that the construction/installation identified on this form complies with the acceptance requirements indicated in the plans and specifications approved by the enforcement agency, and conforms to the applicable acceptance requirements and procedures specified in Reference Nonresidential Appendix NA7.
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- I will ensure that a completed, signed copy of this Certificate of Acceptance shall be posted, or made available with the building permit(s) issued for the building, and made available to the enforcement agency for all applicable inspections. I understand that a signed copy of this Certificate of Acceptance is required to be included with the documentation the builder provides to the building owner at occupancy.

Company Name:		Phone:
Responsible Person's Name:		Responsible Person's Signature:
License:	Date Signed:	Position With Company (Title):

Intent:	***Verify that the supply fan speed in a variable air volume system modulates to meet system airflow demand.***

Construction Inspection

Note: MECH-7A can be performed in conjunction with MECH-2A Outdoor Air Acceptance since testing activities overlap.

1. Supporting documentation needed to perform test includes:
   a. As-built and/or Design Documents including Mechanical Equipment Schedules.
   b. 2013 Building Energy Efficiency Standards Nonresidential Compliance Manual *(NA7.5.6 Supply Fan Variable Flow Controls Acceptance At-A-Glance)*.
   c. 2013 Building Energy Efficiency Standards.
2. Instrumentation to perform test includes:
   a. Calibrated differential pressure gauge.
      Date of calibration:_____(*must be within one year*)
   b. Pitot tube
   c. Drill
3. Installation:
   a. The static pressure location, setpoint, and reset control meets the requirements of 2013 Building Energy Efficiency Standards section 140.4(c)2C: (check all the following that apply).
      ☐ If sensor is located downstream of major duct splits, multiple sensors are installed in each major branch with fan capacity controlled to satisfy the sensor furthest below its setpoint.
      ☐ Set point is no greater than one-third of the total design fan static pressure.
         Design TSP: _____in. w.c. Setpoint: _____in.w.c.
      ☐ If system has DDC to the zone level it has reset control complying with 2013 Building Energy Efficiency Standards Section 140.4(c) 2D. Reset is based on the zone requiring the most pressure; i.e., the set point is reset lower until one zone damper is nearly wide open.
4. Field calibrate all discharge static pressure sensors:
   ☐ Performed field-calibration using calibrated differential pressure gauge and pitot tube.
      ☐ Calibration complete, all pressure sensors within 10% of calibrated reference sensor (provide supporting documentation).

Notes:

A.	**Functional Testing**	**Results**
Step 1: Drive all VAV boxes to full design airflow.		
a.	Refer to design documents and record system design airflow.	cfm
b.	Supply fan speed modulates to increase capacity.	Y / N
c.	Record fan VFD speed:	Hz
d.	Supply fan maintains discharge static pressure within +/-10% of the current operating set point. If NA, indicate reason in Notes section.	Y / N / NA
	Note: If NOT performing this test in conjunction with MECH-2A, other methods for verifying VFD operation include increasing static pressure setpoint or putting all the VAV boxes into full cooling. Was one of these methods used? *Due to diversity in system design, static pressure setpoint will likely not be achieved when all VAV boxes are in full cooling. If this occurs, verify fan speed is 60 Hz and indicate NA in step 1.d.*	Y / N
e.	Verify that supply fan controls stabilize within a 5 minute period.	Y / N
Notes:		
Step 2: Drive all VAV boxes to reduced or minimum airflow.		
a.	Supply fan speed modulates to decrease capacity.	Y / N
b.	Record fan VFD speed:	Hz
c.	Current operating static pressure setpoint has decreased (for systems with DDC to the zone level).	Y / N / NA
d.	Supply fan maintains discharge static pressure within +/-10% of the current operating setpoint.	Y / N
e.	Supply fan controls stabilize within a 5 minute period.	Y / N
Notes:		
Step 3: System returned to initial operating conditions		Y / N

B.	**Testing Results**	**PASS** / **FAIL**
Step 1: Drive all VAV boxes to achieve full design airflow (Pass if all answers are Yes)	☐	☐
Step 2: Drive all VAV boxes to minimum flow (Pass if all answers are Yes)	☐	☐

C.	**Evaluation:**
☐	PASS: All **Construction Inspection** responses are complete and all **Testing Results** responses are "Pass"
Notes:	

CERTIFICATE OF ACCEPTANCE	NRCA-MCH-07-A
NA7.5.6 Supply Fan VFD Acceptance	**(Page 1 of 3)**

Project Name/Address:	
System Name or Identification/Tag:	System Location or Area Served:

Enforcement Agency:	Permit Number:
Note: Submit one Certificate of Acceptance for each system that must demonstrate compliance.	Enforcement Agency Use: Checked by/Date

Documentation Author's Declaration Statement

- **I certify that this Certificate of Acceptance documentation is accurate and complete.**

Name:	Signature:
Company :	Date:
Address:	If Applicable ☐ CEA or ☐ CEPE (Certification #):
City/State/Zip:	Phone:

FIELD TECHNICIAN'S DECLARATION STATEMENT

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Company Name:	
Field Technician's Name:	Field Technician's Signature:
Date Signed:	Position With Company (Title):

RESPONSIBLE PERSON'S DECLARATION STATEMENT

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- I am a licensed contractor, architect, or engineer who is eligible under Division 3 of the Business and Professions Code, in the applicable classification, to take responsibility for the scope of work specified on this document and attest to the declarations in this statement (responsible person).
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Company Name:		Phone:
Responsible Person's Name:		Responsible Person's Signature:
License:	Date Signed:	Position With Company (Title):

Intent:	***Verify that the supply fan speed in a variable air volume system modulates to meet system airflow demand.***

Construction Inspection

Note: MECH-7A can be performed in conjunction with MECH-2A Outdoor Air Acceptance since testing activities overlap.

1. Supporting documentation needed to perform test includes:
   a. As-built and/or Design Documents including Mechanical Equipment Schedules.
   b. 2013 Building Energy Efficiency Standards Nonresidential Compliance Manual *(NA7.5.6 Supply Fan Variable Flow Controls Acceptance At-A-Glance)*.
   c. 2013 Building Energy Efficiency Standards.
2. Instrumentation to perform test includes:
   a. Calibrated differential pressure gauge.
      Date of calibration:_____(*must be within one year*)
   b. Pitot tube
   c. Drill
3. Installation:
   a. The static pressure location, setpoint, and reset control meets the requirements of 2013 Building Energy Efficiency Standards section 140.4(c)2C: (check all the following that apply).
      ☐ If sensor is located downstream of major duct splits, multiple sensors are installed in each major branch with fan capacity controlled to satisfy the sensor furthest below its setpoint.
      ☐ ~~Set point is no greater than one-third of the total design fan static pressure.~~
      ~~Design TSP: _____in. w.c. Setpoint: _____in.w.c.~~
      ☐ If system has DDC to the zone level it has reset control complying with 2013 Building Energy Efficiency Standards Section 140.4(c) 2D. Reset is based on the zone requiring the most pressure; i.e., the set point is reset lower until one zone damper is nearly wide open.
4. ~~Field calibrate all discharge static pressure sensors:~~
   ~~☐ Performed field-calibration using calibrated differential pressure gauge and pitot tube.~~
   ~~☐ Calibration complete, all pressure sensors within 10% of calibrated reference sensor (provide supporting documentation).~~

There are several factors that may affect this. Once the system is installed, it will be very difficult to correct this item. It is recommended this be removed.

To verify calibration, the sensor would need to be tested across the entire span of what the instrument is rated. This would be very difficult to do in the field. Recommend removing this. The only thing that could be done is to compare the sensor reading value to the measured value which would be a single point measurement.

Notes:

A.	**Functional Testing**	**Results**
Step 1: Drive all VAV boxes to full design airflow.		
a.	Refer to design documents and record system design airflow.	cfm
b.	Supply fan speed modulates to increase capacity.	Y / N
c.	Record fan VFD speed:	Hz
d.	Supply fan maintains discharge static pressure within +/-10% of the current operating set point. If NA, indicate reason in Notes section.	Y / N / NA
	Note: If NOT performing this test in conjunction with MECH-2A, other methods for verifying VFD operation include increasing static pressure setpoint or putting all the VAV boxes into full cooling. Was one of these methods used? *Due to diversity in system design, static pressure setpoint will likely not be achieved when all VAV boxes are in full cooling. If this occurs, verify fan speed is 60 Hz and indicate NA in step 1.d.*	Y / N
e.	Verify that supply fan controls stabilize within a 5 minute period.	Y / N
Notes:		
Step 2: Drive all VAV boxes to reduced or minimum airflow.		
a.	Supply fan speed modulates to decrease capacity.	Y / N
b.	Record fan VFD speed:	Hz
c.	Current operating static pressure setpoint has decreased (for systems with DDC to the zone level).	Y / N / NA
d.	Supply fan maintains discharge static pressure within +/-10% of the current operating setpoint.	Y / N
e.	Supply fan controls stabilize within a 5 minute period.	Y / N
Notes:		
Step 3: System returned to initial operating conditions		Y / N

B.	**Testing Results**	**PASS** / **FAIL**
Step 1: Drive all VAV boxes to achieve full design airflow (Pass if all answers are Yes)	☐	☐
Step 2: Drive all VAV boxes to minimum flow (Pass if all answers are Yes)	☐	☐

C.	**Evaluation:**
☐	PASS: All **Construction Inspection** responses are complete and all **Testing Results** responses are "Pass"
Notes:	

CERTIFICATE OF ACCEPTANCE	NRCA-MCH-07-A
NA7.5.6 Supply Fan VFD Acceptance	**(Page 1 of 3)**

Project Name/Address:	
System Name or Identification/Tag:	System Location or Area Served:

Enforcement Agency:	Permit Number:
Note: Submit one Certificate of Acceptance for each system that must demonstrate compliance.	Enforcement Agency Use: Checked by/Date

Documentation Author's Declaration Statement

- **I certify that this Certificate of Acceptance documentation is accurate and complete.**

Name:	Signature:
Company :	Date:
Address:	If Applicable ☐ CEA or ☐ CEPE (Certification #):
City/State/Zip:	Phone:

FIELD TECHNICIAN'S DECLARATION STATEMENT

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Company Name:	
Field Technician's Name:	Field Technician's Signature:
Date Signed:	Position With Company (Title):

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Company Name:		Phone:
Responsible Person's Name:		Responsible Person's Signature:
License:	Date Signed:	Position With Company (Title):

Intent:	***Verify that the supply fan speed in a variable air volume system modulates to meet system airflow demand.***

Construction Inspection

Note: MECH-7A can be performed in conjunction with MECH-2A Outdoor Air Acceptance since testing activities overlap.

1. Supporting documentation needed to perform test includes:
   a. As-built and/or Design Documents including Mechanical Equipment Schedules.
   b. 2013 Building Energy Efficiency Standards Nonresidential Compliance Manual *(NA7.5.6 Supply Fan Variable Flow Controls Acceptance At-A-Glance)*.
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2. Instrumentation to perform test includes:
   a. Calibrated differential pressure gauge.
      Date of calibration:_____(*must be within one year*)
   b. Pitot tube
   c. Drill
3. Installation:
   a. The static pressure location, setpoint, and reset control meets the requirements of 2013 Building Energy Efficiency Standards section 140.4(c)2C: (check all the following that apply).
      ☐ If sensor is located downstream of major duct splits, multiple sensors are installed in each major branch with fan capacity controlled to satisfy the sensor furthest below its setpoint.
      ☐ ~~Set point is no greater than one-third of the total design fan static pressure.~~
      ~~Design TSP: _____in. w.c. Setpoint: _____in.w.c.~~
      ☐ If system has DDC to the zone level it has reset control complying with 2013 Building Energy Efficiency Standards Section 140.4(c) 2D. Reset is based on the zone requiring the most pressure; i.e., the set point is reset lower until one zone damper is nearly wide open.
4. ~~Field calibrate all discharge static pressure sensors:~~
   ~~☐ Performed field-calibration using calibrated differential pressure gauge and pitot tube.~~
   ~~☐ Calibration complete, all pressure sensors within 10% of calibrated reference sensor (provide supporting documentation).~~

There are several factors that may affect this. Once the system is installed, it will be very difficult to correct this item. It is recommended this be removed.

To verify calibration, the sensor would need to be tested across the entire span of what the instrument is rated. This would be very difficult to do in the field. Recommend removing this. The only thing that could be done is to compare the sensor reading value to the measured value which would be a single point measurement.

Notes:

A.	**Functional Testing**	**Results**
Step 1: Drive all VAV boxes to full design airflow.		
a.	Refer to design documents and record system design airflow.	cfm
b.	Supply fan speed modulates to increase capacity.	Y / N
c.	Record fan VFD speed:	Hz
d.	Supply fan maintains discharge static pressure within +/-10% of the current operating set point. If NA, indicate reason in Notes section.	Y / N / NA
	Note: If NOT performing this test in conjunction with MECH-2A, other methods for verifying VFD operation include increasing static pressure setpoint or putting all the VAV boxes into full cooling. Was one of these methods used? *Due to diversity in system design, static pressure setpoint will likely not be achieved when all VAV boxes are in full cooling. If this occurs, verify fan speed is 60 Hz and indicate NA in step 1.d.*	Y / N
e.	Verify that supply fan controls stabilize within a 5 minute period.	Y / N
Notes:		
Step 2: Drive all VAV boxes to reduced or minimum airflow.		
a.	Supply fan speed modulates to decrease capacity.	Y / N
b.	Record fan VFD speed:	Hz
c.	Current operating static pressure setpoint has decreased (for systems with DDC to the zone level).	Y / N / NA
d.	Supply fan maintains discharge static pressure within +/-10% of the current operating setpoint.	Y / N
e.	Supply fan controls stabilize within a 5 minute period.	Y / N
Notes:		
Step 3: System returned to initial operating conditions		Y / N

B.	**Testing Results**	**PASS** / **FAIL**
Step 1: Drive all VAV boxes to achieve full design airflow (Pass if all answers are Yes)	☐	☐
Step 2: Drive all VAV boxes to minimum flow (Pass if all answers are Yes)	☐	☐

C.	**Evaluation:**
☐	PASS: All **Construction Inspection** responses are complete and all **Testing Results** responses are "Pass"
Notes:	

CERTIFICATE OF ACCEPTANCE	NRCA-MCH-07-A
NA7.5.6 Supply Fan VFD Acceptance	**(Page 1 of 3)**

Project Name/Address:	
System Name or Identification/Tag:	System Location or Area Served:

Enforcement Agency:	Permit Number:
Note: Submit one Certificate of Acceptance for each system that must demonstrate compliance.	Enforcement Agency Use: Checked by/Date

Documentation Author's Declaration Statement

- **I certify that this Certificate of Acceptance documentation is accurate and complete.**

Name:	Signature:
Company :	Date:
Address:	If Applicable ☐ CEA or ☐ CEPE (Certification #):
City/State/Zip:	Phone:

FIELD TECHNICIAN'S DECLARATION STATEMENT

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Company Name:	
Field Technician's Name:	Field Technician's Signature:
Date Signed:	Position With Company (Title):

RESPONSIBLE PERSON'S DECLARATION STATEMENT

- I certify under penalty of perjury, under the laws of the State of California, that I am the Field Technician, or the Field Technician is acting on my behalf as my employee or my agent and I have reviewed the information provided on this form.
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Company Name:		Phone:
Responsible Person's Name:		Responsible Person's Signature:
License:	Date Signed:	Position With Company (Title):

Intent:	***Verify that the supply fan speed in a variable air volume system modulates to meet system airflow demand.***

Construction Inspection

Note: MECH-7A can be performed in conjunction with MECH-2A Outdoor Air Acceptance since testing activities overlap.

1. Supporting documentation needed to perform test includes:
   a. As-built and/or Design Documents including Mechanical Equipment Schedules.
   b. 2013 Building Energy Efficiency Standards Nonresidential Compliance Manual *(NA7.5.6 Supply Fan Variable Flow Controls Acceptance At-A-Glance)*.
   c. 2013 Building Energy Efficiency Standards.
2. Instrumentation to perform test includes:
   a. Calibrated differential pressure gauge.
      Date of calibration:_____(*must be within one year*)
   b. Pitot tube
   c. Drill
3. Installation:
   a. The static pressure location, setpoint, and reset control meets the requirements of 2013 Building Energy Efficiency Standards section 140.4(c)2C: (check all the following that apply).
      ☐ If sensor is located downstream of major duct splits, multiple sensors are installed in each major branch with fan capacity controlled to satisfy the sensor furthest below its setpoint.
      ☐ Set point is no greater than one-third of the total design fan static pressure.
         Design TSP: _____in. w.c. Setpoint: _____in.w.c.
      ☐ If system has DDC to the zone level it has reset control complying with 2013 Building Energy Efficiency Standards Section 140.4(c) 2D. Reset is based on the zone requiring the most pressure; i.e., the set point is reset lower until one zone damper is nearly wide open.
4. Field calibrate all discharge static pressure sensors:
   ☐ Performed field-calibration using calibrated differential pressure gauge and pitot tube.
      ☐ Calibration complete, all pressure sensors within 10% of calibrated reference sensor (provide supporting documentation).

Notes:

A.	**Functional Testing**	**Results**
Step 1: Drive all VAV boxes to full design airflow.		
a.	Refer to design documents and record system design airflow.	cfm
b.	Supply fan speed modulates to increase capacity.	Y / N
c.	Record fan VFD speed:	Hz
d.	Supply fan maintains discharge static pressure within +/-10% of the current operating set point. If NA, indicate reason in Notes section.	Y / N / NA
	Note: If NOT performing this test in conjunction with MECH-2A, other methods for verifying VFD operation include increasing static pressure setpoint or putting all the VAV boxes into full cooling. Was one of these methods used? *Due to diversity in system design, static pressure setpoint will likely not be achieved when all VAV boxes are in full cooling. If this occurs, verify fan speed is 60 Hz and indicate NA in step 1.d.*	Y / N
e.	Verify that supply fan controls stabilize within a 5 minute period.	Y / N
Notes:		
Step 2: Drive all VAV boxes to reduced or minimum airflow.		
a.	Supply fan speed modulates to decrease capacity.	Y / N
b.	Record fan VFD speed:	Hz
c.	Current operating static pressure setpoint has decreased (for systems with DDC to the zone level).	Y / N / NA
d.	Supply fan maintains discharge static pressure within +/-10% of the current operating setpoint.	Y / N
e.	Supply fan controls stabilize within a 5 minute period.	Y / N
Notes:		
Step 3: System returned to initial operating conditions		Y / N

B.	**Testing Results**	**PASS** / **FAIL**
Step 1: Drive all VAV boxes to achieve full design airflow (Pass if all answers are Yes)	☐	☐
Step 2: Drive all VAV boxes to minimum flow (Pass if all answers are Yes)	☐	☐

C.	**Evaluation:**
☐	PASS: All **Construction Inspection** responses are complete and all **Testing Results** responses are "Pass"
Notes:	

CERTIFICATE OF ACCEPTANCE	NRCA-MCH-06-A
NA7.5.5 Demand Control Ventilation Systems Acceptance	**(Page 1 of 2)**

Project Name/Address:	
System Name or Identification/Tag:	System Location or Area Served:

Enforcement Agency:	Permit Number:
Note: Submit one Certificate of Acceptance for each system that must demonstrate compliance.	Enforcement Agency Use: Checked by/Date

Documentation Author's Declaration Statement

- **I certify that this Certificate of Acceptance documentation is accurate and complete.**

Name:	Signature:
Company :	Date:
Address:	If Applicable ☐ CEA or ☐ CEPE (Certification #):
City/State/Zip:	Phone:

FIELD TECHNICIAN'S DECLARATION STATEMENT

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Company Name:		
Field Technician's Name:		Field Technician's Signature:
	Date Signed:	Position With Company (Title):

RESPONSIBLE PERSON'S DECLARATION STATEMENT

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- I certify that the information provided on this form substantiates that the construction/installation identified on this form complies with the acceptance requirements indicated in the plans and specifications approved by the enforcement agency, and conforms to the applicable acceptance requirements and procedures specified in Reference Nonresidential Appendix NA7.
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Company Name:		Phone:
Responsible Person's Name:		Responsible Person's Signature:
License:	Date Signed:	Position With Company (Title):

Project Name/Address:	
System Name or Identification/Tag:	System Location or Area Served:

Intent: *Verify that systems required to employ demand Controlled ventilation (refer to §121(c)3) can vary outside ventilation flow rates based on maintaining interior carbon dioxide (CO_2) concentration setpoints*

Construction Inspection

1 Instrumentation to perform test includes, but not limited to:
- a. Calibrated hand-held CO^2 analyzer
- b. Manufacturer's calibration kit
- c. Calibrated CO^2/air mixtures

2 Installation
- ☐ 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.

3 Documentation of all carbon dioxide control sensors includes (check one of the following):
- a. Calibration method
  - ☐ Factory-calibration certificate calibration cert must be attached
  - ☐ Field calibrated
- b. Sensor accuracy
  - ☐ Certified by manufacturer to be no more than +/- 75 ppm calibration cert must be attached

A. Functional Testing	**Results**
a. Disable economizer controls	
b. Outside air CO^2 concentration (select one of the following)	
☐ Measured dynamically using CO^2 sensor	_____ ppm
c. Interior CO^2 concentration setpoint (Outside CO^2 concentration + 600 ppm)	_____ ppm
Step 1: Simulate a signal at or slightly above the CO^2 setpoint or follow manufacturers recommended testing procedures.	
☐ For single zone units, outdoor air damper modulates opens 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 2: Simulate signal well below the CO^2 setpoint or follow manufacturers recommended procedures.	
☐ 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 3: System returned to initial operating conditions	Y / N
B. Testing Results	**PASS / FAIL**
Step 1: Simulate a high CO^2 load (check box complete)	
Step 2: Simulate a low CO^2 load (check box complete)	
C. Evaluation:	
☐ PASS: All **Construction Inspection** responses are complete and all **Testing Results** responses are "Pass"	

CERTIFICATE OF ACCEPTANCE	NRCA-MCH-06-A
NA7.5.5 Demand Control Ventilation Systems Acceptance	**(Page 1 of 2)**

Project Name/Address:	
System Name or Identification/Tag:	System Location or Area Served:

Enforcement Agency:	Permit Number:
Note: Submit one Certificate of Acceptance for each system that must demonstrate compliance.	Enforcement Agency Use: Checked by/Date

Documentation Author's Declaration Statement

- **I certify that this Certificate of Acceptance documentation is accurate and complete.**

Name:	Signature:
Company :	Date:
Address:	If Applicable ☐ CEA or ☐ CEPE (Certification #):
City/State/Zip:	Phone:

FIELD TECHNICIAN'S DECLARATION STATEMENT

- I certify under penalty of perjury, under the laws of the State of California, the information provided on this form is true and correct.
- I am the person who performed the acceptance requirements verification reported on this Certificate of Acceptance (Field Technician).
- I certify that the construction/installation identified on this form complies with the acceptance requirements indicated in the plans and specifications approved by the enforcement agency, and conforms to the applicable acceptance requirements and procedures specified in Reference Nonresidential Appendix NA7.
- I have confirmed that the Installation Certificate(s) for the construction/installation identified on this form has been completed and is posted or made available with the building permit(s) issued for the building.

Company Name:		
Field Technician's Name:		Field Technician's Signature:
	Date Signed:	Position With Company (Title):

RESPONSIBLE PERSON'S DECLARATION STATEMENT

- I certify under penalty of perjury, under the laws of the State of California, that I am the Field Technician, or the Field Technician is acting on my behalf as my employee or my agent and I have reviewed the information provided on this form.
- I am a licensed contractor, architect, or engineer, who is eligible under Division 3 of the Business and Professions Code, in the applicable classification, to take responsibility for the scope of work specified on this document and attest to the declarations in this statement (responsible person).
- I certify that the information provided on this form substantiates that the construction/installation identified on this form complies with the acceptance requirements indicated in the plans and specifications approved by the enforcement agency, and conforms to the applicable acceptance requirements and procedures specified in Reference Nonresidential Appendix NA7.
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Company Name:		Phone:
Responsible Person's Name:		Responsible Person's Signature:
License:	Date Signed:	Position With Company (Title):

Project Name/Address:	
System Name or Identification/Tag:	System Location or Area Served:

Intent: *Verify that systems required to employ demand Controlled ventilation (refer to §121(c)3) can vary outside ventilation flow rates based on maintaining interior carbon dioxide (CO_2) concentration setpoints*

Construction Inspection

1 Instrumentation to perform test includes, but not limited to:
- a. Calibrated hand-held CO^2 analyzer
- b. Manufacturer's calibration kit
- c. Calibrated CO^2/air mixtures

2 Installation
- ☐ 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.

3 Documentation of all carbon dioxide control sensors includes (check one of the following):
- a. Calibration method
  - ☐ Factory-calibration certificate calibration cert must be attached
  - ☐ Field calibrated
- b. Sensor accuracy
  - ☐ Certified by manufacturer to be no more than +/- 75 ppm calibration cert must be attached

A. Functional Testing	**Results**
a. Disable economizer controls	
b. Outside air CO^2 concentration (select one of the following)	
☐ Measured dynamically using CO^2 sensor	_____ ppm
c. Interior CO^2 concentration setpoint (Outside CO^2 concentration + 600 ppm)	_____ ppm
Step 1: Simulate a signal at or slightly above the CO^2 setpoint or follow manufacturers recommended testing procedures.	
☐ For single zone units, outdoor air damper modulates opens 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 2: Simulate signal well below the CO^2 setpoint or follow manufacturers recommended procedures.	
☐ 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 3: System returned to initial operating conditions	Y / N
B. Testing Results	**PASS / FAIL**
Step 1: Simulate a high CO^2 load (check box complete)	
Step 2: Simulate a low CO^2 load (check box complete)	
C. Evaluation:	
☐ PASS: All **Construction Inspection** responses are complete and all **Testing Results** responses are "Pass"	

Enforcement Agency:	Permit Number:
Note: Submit one Certificate of Acceptance for each system that must demonstrate compliance.	Enforcement Agency Use: Checked by/Date

Documentation Author's Declaration Statement

- **I certify that this Certificate of Acceptance documentation is accurate and complete.**

Name:	Signature:
Company :	Date:
Address:	If Applicable ☐ CEA or ☐ CEPE (Certification #):
City/State/Zip:	Phone:

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Company Name:	
Field Technician's Name:	Field Technician's Signature:
Date Signed:	Position With Company (Title):

RESPONSIBLE PERSON'S DECLARATION STATEMENT

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- I am a licensed contractor, architect, or engineer who is eligible under Division 3 of the Business and Professions Code, in the applicable classification, to take responsibility for the scope of work specified on this document and attest to the declarations in this statement (responsible person).
- I certify that the information provided on this form substantiates that the construction/installation identified on this form complies with the acceptance requirements indicated in the plans and specifications approved by the enforcement agency, and conforms to the applicable acceptance requirements and procedures specified in Reference Nonresidential Appendix NA7.
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Company Name:		Phone:
Responsible Person's Name:		Responsible Person's Signature:
License:	Date Signed:	Position With Company (Title):

Intent: Verify that airside economizers function properly

Construction Inspection

1. Supporting documentation needed to perform test includes:
   a. 2013 Building Energy Efficiency Standards Nonresidential Compliance Manual *(NA7.5.4 Air Economizer Controls Acceptance At-A-Glance).*
   b. 2013 Building Energy Efficiency Standards.
2. Instrumentation to perform test includes:
   a. Hand-held temperature probe
      Calibration Date: _____(must be within last year)
   b. Meter capable of measuring enthalpy
      Calibration Date: _____(must be within last year)
   c. 1.2 k Ohm Resistor (for stand alone package systems, i.e. non-DDC controls)
3. Installation: (**all** of the following boxes should be checked)

☐ Economizer lockout setpoint complies with Table 140.4-B found in the 2013 Building Energy Efficiency Standards Section 140.4(e)3.

☐ Economizer reliability features are present per 2013 Building Energy Efficiency Standards Section 140.4(e)4:

- ☐ A. 5-year manufacturer warranty of economizer assembly
- ☐ B. Provide a product specification sheet proving capability of at least 60,000 actuations
- ☐ C. Provide a product specification sheet proving economizer damper sections are certified by AMCA 511 for a maximum damper leakage rate of 10 cfm/sf at 1.0 in. w.g. (Class 1A, 1, and 2 are acceptable)
- ☐ D. If the high limit setpoint is fixed dry-bulb or fixed enthalpy + fixed dry-bulb then the control shall have an adjustable setpoint
- ☐ E. Outdoor air, return air, mixed air, and supply air sensors shall be calibrated as follows:
  - i. Drybulb and wetbulb temperatures accurate to ±2°F over the range of 40°F to 80°F
  - ii. Enthalpy accurate to ±3 Btu/lb over the range of 20 Btu/lb to 36 Btu/lb
  - iii. Relative humidity (RH) accurate to ±5% over the range of 20% to 80% RH
- ☐ F. Check that the sensor performance curve(s) is provided by the factory and sensor output values measured during sensor calibration are plotted on the performance curve(s)
- ☐ G. Sensors used for high limit control shall be located to prevent false readings, including but not limited to being properly shielded from direct sunlight

☐ For DX package units 65,000 Btu/hr or less, verify that a two-stage thermostat is used, and the system is wired so the economizer is the first stage of cooling and the compressor is the second stage

☐ Unitary systems with an economizer have control systems, including two-stage or electronic thermostats, that cycle compressors off when economizers can provide partial cooling

☐ System has return fan speed control, relief dampers, or dedicated relief fans to prevent building over pressurization in full economizer mode.

☐ For systems with DDC controls, sensor used for economizer lockout has been factory or field calibrated.

☐ For systems with non-DDC controls, manufacturer's startup and testing procedures have been applied.

A. Functional Testing	**Results**
Step 1: Disable demand control ventilation systems (if applicable)	
Step 2: Enable the economizer and simulate a cooling demand large enough to drive the economizer fully open. Verify the following:	
a. Economizer damper modulates 100% open.	Y / N
b. Return air damper modulates 100% closed.	Y / N
c. For systems that meet the criteria of 2013 Building Energy Efficiency Standards Section 140.4(e)1, verify that the economizer remains 100% open with the use of mechanical cooling. This occurs when the cooling demand can no longer be met by the economizer alone.	Y / N
d. All applicable fans and dampers operate as intended to maintain building pressure.	Y / N
e. The unit heating is disabled (if applicable).	Y / N / NA
Step 3: Disable the economizer and simulate a cooling demand. Verify the following:	
a. Economizer damper closes to its minimum position.	Y / N
b. All applicable fans and dampers operate as intended to maintain building pressure.	Y / N
c. The unit heating is disabled (if applicable).	Y / N / NA
Step 4: If the unit is equipped with heating, simulate a heating demand and enable the economizer. Verify the following:	
a. Economizer damper closes to its minimum position.	Y / N / NA
b. Return air damper opens.	Y / N / NA
Step 5: Turn off the unit and verify the following:	
a. Economizer damper closes completely.	Y / N
Step 6: System returned to initial operating conditions	Y / N

B. Testing Results	**PASS**	**FAIL**
Step 2: Simulate cooling load and enable the economizer (all answers are Y).		
Step 3: Simulate cooling load and disable the economizer (all answers are Y).		
Step 4: Simulate heating demand and enable the economizer (all answers are Y).		
Step 5: Turn off the unit (all answers are Y).		

C. Evaluation :
☐ PASS: All **Construction Inspection** responses are complete and all **Testing Results** responses are "Pass"

Notes:

Enforcement Agency:	Permit Number:
Note: Submit one Certificate of Acceptance for each system that must demonstrate compliance.	Enforcement Agency Use: Checked by/Date

Documentation Author's Declaration Statement

- **I certify that this Certificate of Acceptance documentation is accurate and complete.**

Name:	Signature:
Company :	Date:
Address:	If Applicable ☐ CEA or ☐ CEPE (Certification #):
City/State/Zip:	Phone:

FIELD TECHNICIAN'S DECLARATION STATEMENT

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Company Name:	
Field Technician's Name:	Field Technician's Signature:
Date Signed:	Position With Company (Title):

RESPONSIBLE PERSON'S DECLARATION STATEMENT

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Company Name:		Phone:
Responsible Person's Name:		Responsible Person's Signature:
License:	Date Signed:	Position With Company (Title):

Intent: Verify that airside economizers function properly

Construction Inspection

1. Supporting documentation needed to perform test includes:
   a. 2013 Building Energy Efficiency Standards Nonresidential Compliance Manual *(NA7.5.4 Air Economizer Controls Acceptance At-A-Glance).*
   b. 2013 Building Energy Efficiency Standards.

2. Instrumentation to perform test includes:
   a. Hand-held temperature probe
      Calibration Date: _____(must be within last year)
   ~~b. Meter capable of measuring enthalpy~~
      ~~Calibration Date:~~ _____ ~~(must be within last year)~~
   c. 1.2 k Ohm Resistor (for stand alone package systems, i.e. non-DDC controls)

This does not exist. Recommend removing.

3. Installation: (**all** of the following boxes should be checked)

☐ Economizer lockout setpoint complies with Table 140.4-B found in the 2013 Building Energy Efficiency Standards Section 140.4(e)3.

☐ Economizer reliability features are present per 2013 Building Energy Efficiency Standards Section 140.4(e)4:

☐ A. 5-year manufacturer warranty of economizer assembly

☐ B. Provide a product specification sheet proving capability of at least 60,000 actuations

☐ C. Provide a product specification sheet proving economizer damper sections are certified by AMCA 511 for a maximum damper leakage rate of 10 cfm/sf at 1.0 in. w.g. (Class 1A, 1, and 2 are acceptable)

☐ D. If the high limit setpoint is fixed dry-bulb or fixed enthalpy + fixed dry-bulb then the control shall have an adjustable setpoint

Recommend removing this as this requirement as the information is not readily available from the manufacturers.

Recommend this to read as "have the following accuracies:"

☐ E. Outdoor air, return air, mixed air, and supply air sensors shall ~~be calibrated as follows:~~

i. Drybulb and wetbulb temperatures accurate to ±2°F over the range of 40°F to 80°F

~~ii. Enthalpy accurate to ±3 Btu/lb over the range of 20 Btu/lb to 36 Btu/lb~~

iii. Relative humidity (RH) accurate to ±5% over the range of 20% to 80% RH

☐ F. ~~Check that the sensor performance curve(s) is provided by the factory and sensor output values measured during sensor calibration are plotted on the performance curve(s)~~

This does not exist. Recommend removing.

☐ G. Sensors used for high limit control shall be located to prevent false readings, includi being properly shielded from direct sunlight

☐ For DX package units 65,000 Btu/hr or less, verify that a two-stage thermostat is used, and the system is wired so the economizer is the first stage of cooling and the compressor is the second stage

☐ Unitary systems with an economizer have control systems, including two-stage or electronic thermostats, that cycle compressors off when economizers can provide partial cooling

☐ System has return fan speed control, relief dampers, or dedicated relief fans to prevent building over pressurization in full economizer mode.

☐ For systems with DDC controls, sensor used for economizer lockout has been factory or field calibrated.

☐ For systems with non-DDC controls, manufacturer's startup and testing procedures have been applied.

CERTIFICATE OF ACCEPTANCE	5-A
NA7.5.4 Air Economizer Controls Acceptanc	f 3)

Simulating a cooling load is difficult, recommend replacing this sequence with the following: "Enable the economizer mode by adjusting the economizer set-point above ambient conditions."

A.	Functional Testing	Results
Step 1: Disable demand control ventilation systems (if applicable)		
Step 2: ~~Enable the economizer and simulate a cooling demand large enough to drive the economizer fully open.~~ Verify the following:		
a.	Economizer damper modulates 100% open.	Y / N
b.	Return air damper modulates 100% closed.	Y / N
c.	~~For systems that meet the criteria of 2013 Building Energy Efficiency Standards Section 140.4(e)1, verify that the economizer remains 100% open with the use of mechanical cooling. This occurs when the cooling demand can no longer be met by the economizer alone.~~	~~Y / N~~
d.	All applicable fans and dampers operate as intended to maintain building pressure.	Y / N
e.	The unit heating is disabled (if applicable).	
Step 3: ~~Disable the economizer and simulate a cooling demand.~~ Verify the follow		
a.	Economizer damper closes to its minimum position.	
b.	All applicable fans and dampers operate as intended to maintain building pr	
c.	The unit heating is disabled (if applicable).	Y / N / NA
~~Step 4: If the unit is equipped with heating, simulate a heating demand and enable the economizer.~~ ~~Verify the following:~~		
~~a.~~	~~Economizer damper closes to its minimum position.~~	~~Y / N / NA~~
~~b.~~	~~Return air damper opens.~~	~~Y / N / NA~~
Step 5: Turn off the unit and verify the following:		
a.	Economizer damper closes completely.	Y / N
Step 6: System returned to initial operating conditions		Y / N

This would only be used in a demand ventilation mode and should not be part of this test. Recommend removing.

This is a redundant test and is not needed. Recommend removing.

B.	Testing Results	PASS	FAIL
Step 2: Simulate cooling load and enable the economize			
Step 3: Simulate cooling load and disable the economiz			
Step 4: Simulate heating demand and enable the econo			
Step 5: Turn off the unit (all answers are Y).			

Simulating a cooling load is difficult, recommend replacing this sequence with the following: "Disable the economizer mode by adjusting the economizer set-point below ambient conditions."

C.	Evaluation :
☐	PASS: All **Construction Inspection** responses are complete and all **Testing Results** responses are "Pass"

Notes:

Enforcement Agency:	Permit Number:
Note: Submit one Certificate of Acceptance for each system that must demonstrate compliance.	Enforcement Agency Use: Checked by/Date

Documentation Author's Declaration Statement

- **I certify that this Certificate of Acceptance documentation is accurate and complete.**

Name:	Signature:
Company :	Date:
Address:	If Applicable ☐ CEA or ☐ CEPE (Certification #):
City/State/Zip:	Phone:

FIELD TECHNICIAN'S DECLARATION STATEMENT

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Company Name:	
Field Technician's Name:	Field Technician's Signature:
Date Signed:	Position With Company (Title):

RESPONSIBLE PERSON'S DECLARATION STATEMENT

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Company Name:		Phone:
Responsible Person's Name:		Responsible Person's Signature:
License:	Date Signed:	Position With Company (Title):

Intent: Verify that airside economizers function properly

Construction Inspection

1. Supporting documentation needed to perform test includes:
   a. 2013 Building Energy Efficiency Standards Nonresidential Compliance Manual *(NA7.5.4 Air Economizer Controls Acceptance At-A-Glance).*
   b. 2013 Building Energy Efficiency Standards.

2. Instrumentation to perform test includes:
   a. Hand-held temperature probe
      Calibration Date: _____(must be within last year)
   ~~b. Meter capable of measuring enthalpy~~
      ~~Calibration Date:~~ _____ ~~(must be within last year)~~
   c. 1.2 k Ohm Resistor (for stand alone package systems, i.e. non-DDC controls)

This does not exist. Recommend removing.

3. Installation: (**all** of the following boxes should be checked)

☐ Economizer lockout setpoint complies with Table 140.4-B found in the 2013 Building Energy Efficiency Standards Section 140.4(e)3.

☐ Economizer reliability features are present per 2013 Building Energy Efficiency Standards Section 140.4(e)4:

☐ A. 5-year manufacturer warranty of economizer assembly

☐ B. Provide a product specification sheet proving capability of at least 60,000 actuations

☐ C. Provide a product specification sheet proving economizer damper sections are certified by AMCA 511 for a maximum damper leakage rate of 10 cfm/sf at 1.0 in. w.g. (Class 1A, 1, and 2 are acceptable)

☐ D. If the high limit setpoint is fixed dry-bulb or fixed enthalpy + fixed dry-bulb then the control shall have an adjustable setpoint

Recommend removing this as this requirement as the information is not readily available from the manufacturers.

Recommend this to read as "have the following accuracies:"

☐ E. Outdoor air, return air, mixed air, and supply air sensors shall ~~be calibrated as follows:~~

i. Drybulb and wetbulb temperatures accurate to ±2°F over the range of 40°F to 80°F

~~ii. Enthalpy accurate to ±3 Btu/lb over the range of 20 Btu/lb to 36 Btu/lb~~

iii. Relative humidity (RH) accurate to ±5% over the range of 20% to 80% RH

☐ F. ~~Check that the sensor performance curve(s) is provided by the factory and sensor output values measured during sensor calibration are plotted on the performance curve(s)~~

This does not exist. Recommend removing.

☐ G. Sensors used for high limit control shall be located to prevent false readings, includi being properly shielded from direct sunlight

☐ For DX package units 65,000 Btu/hr or less, verify that a two-stage thermostat is used, and the system is wired so the economizer is the first stage of cooling and the compressor is the second stage

☐ Unitary systems with an economizer have control systems, including two-stage or electronic thermostats, that cycle compressors off when economizers can provide partial cooling

☐ System has return fan speed control, relief dampers, or dedicated relief fans to prevent building over pressurization in full economizer mode.

☐ For systems with DDC controls, sensor used for economizer lockout has been factory or field calibrated.

☐ For systems with non-DDC controls, manufacturer's startup and testing procedures have been applied.

CERTIFICATE OF ACCEPTANCE	5-A
NA7.5.4 Air Economizer Controls Acceptanc	f 3)

Simulating a cooling load is difficult, recommend replacing this sequence with the following: "Enable the economizer mode by adjusting the economizer set-point above ambient conditions."

A.	Functional Testing	Results
Step 1: Disable demand control ventilation systems (if applicable)		
Step 2: ~~Enable the economizer and simulate a cooling demand large enough to drive the economizer fully open.~~ Verify the following:		
a.	Economizer damper modulates 100% open.	Y / N
b.	Return air damper modulates 100% closed.	Y / N
c.	~~For systems that meet the criteria of 2013 Building Energy Efficiency Standards Section 140.4(e)1, verify that the economizer remains 100% open with the use of mechanical cooling. This occurs when the cooling demand can no longer be met by the economizer alone.~~	~~Y / N~~
d.	All applicable fans and dampers operate as intended to maintain building pressure.	Y / N
e.	The unit heating is disabled (if applicable).	
Step 3: ~~Disable the economizer and simulate a cooling demand.~~ Verify the follow		
a.	Economizer damper closes to its minimum position.	
b.	All applicable fans and dampers operate as intended to maintain building pr	
c.	The unit heating is disabled (if applicable).	Y / N / NA
~~Step 4: If the unit is equipped with heating, simulate a heating demand and enable the economizer.~~ ~~Verify the following:~~		
~~a.~~	~~Economizer damper closes to its minimum position.~~	~~Y / N / NA~~
~~b.~~	~~Return air damper opens.~~	~~Y / N / NA~~
Step 5: Turn off the unit and verify the following:		
a.	Economizer damper closes completely.	Y / N
Step 6: System returned to initial operating conditions		Y / N

This would only be used in a demand ventilation mode and should not be part of this test. Recommend removing.

This is a redundant test and is not needed. Recommend removing.

B.	Testing Results	PASS	FAIL
Step 2: Simulate cooling load and enable the economize			
Step 3: Simulate cooling load and disable the economiz			
Step 4: Simulate heating demand and enable the econo			
Step 5: Turn off the unit (all answers are Y).			

Simulating a cooling load is difficult, recommend replacing this sequence with the following: "Disable the economizer mode by adjusting the economizer set-point below ambient conditions."

C.	Evaluation :
☐	PASS: All **Construction Inspection** responses are complete and all **Testing Results** responses are "Pass"

Notes:

Enforcement Agency:	Permit Number:
Note: Submit one Certificate of Acceptance for each system that must demonstrate compliance.	Enforcement Agency Use: Checked by/Date

Documentation Author's Declaration Statement

- **I certify that this Certificate of Acceptance documentation is accurate and complete.**

Name:	Signature:
Company :	Date:
Address:	If Applicable ☐ CEA or ☐ CEPE (Certification #):
City/State/Zip:	Phone:

FIELD TECHNICIAN'S DECLARATION STATEMENT

- I certify under penalty of perjury, under the laws of the State of California, the information provided on this form is true and correct.
- I am the person who performed the acceptance requirements verification reported on this Certificate of Acceptance (Field Technician).
- I certify that the construction/installation identified on this form complies with the acceptance requirements indicated in the plans and specifications approved by the enforcement agency, and conforms to the applicable acceptance requirements and procedures specified in Reference Nonresidential Appendix NA7.
- I have confirmed that the Installation Certificate(s) for the construction/installation identified on this form has been completed and is posted or made available with the building permit(s) issued for the building.

Company Name:	
Field Technician's Name:	Field Technician's Signature:
Date Signed:	Position With Company (Title):

RESPONSIBLE PERSON'S DECLARATION STATEMENT

- I certify under penalty of perjury, under the laws of the State of California, that I am the Field Technician, or the Field Technician is acting on my behalf as my employee or my agent and I have reviewed the information provided on this form.
- I am a licensed contractor, architect, or engineer who is eligible under Division 3 of the Business and Professions Code, in the applicable classification, to take responsibility for the scope of work specified on this document and attest to the declarations in this statement (responsible person).
- I certify that the information provided on this form substantiates that the construction/installation identified on this form complies with the acceptance requirements indicated in the plans and specifications approved by the enforcement agency, and conforms to the applicable acceptance requirements and procedures specified in Reference Nonresidential Appendix NA7.
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Company Name:		Phone:
Responsible Person's Name:		Responsible Person's Signature:
License:	Date Signed:	Position With Company (Title):

Intent: Verify that airside economizers function properly

Construction Inspection

1. Supporting documentation needed to perform test includes:
   a. 2013 Building Energy Efficiency Standards Nonresidential Compliance Manual *(NA7.5.4 Air Economizer Controls Acceptance At-A-Glance).*
   b. 2013 Building Energy Efficiency Standards.
2. Instrumentation to perform test includes:
   a. Hand-held temperature probe
      Calibration Date: _____(must be within last year)
   b. Meter capable of measuring enthalpy
      Calibration Date: _____(must be within last year)
   c. 1.2 k Ohm Resistor (for stand alone package systems, i.e. non-DDC controls)
3. Installation: (**all** of the following boxes should be checked)

☐ Economizer lockout setpoint complies with Table 140.4-B found in the 2013 Building Energy Efficiency Standards Section 140.4(e)3.

☐ Economizer reliability features are present per 2013 Building Energy Efficiency Standards Section 140.4(e)4:

- ☐ A. 5-year manufacturer warranty of economizer assembly
- ☐ B. Provide a product specification sheet proving capability of at least 60,000 actuations
- ☐ C. Provide a product specification sheet proving economizer damper sections are certified by AMCA 511 for a maximum damper leakage rate of 10 cfm/sf at 1.0 in. w.g. (Class 1A, 1, and 2 are acceptable)
- ☐ D. If the high limit setpoint is fixed dry-bulb or fixed enthalpy + fixed dry-bulb then the control shall have an adjustable setpoint
- ☐ E. Outdoor air, return air, mixed air, and supply air sensors shall be calibrated as follows:
  - i. Drybulb and wetbulb temperatures accurate to ±2°F over the range of 40°F to 80°F
  - ii. Enthalpy accurate to ±3 Btu/lb over the range of 20 Btu/lb to 36 Btu/lb
  - iii. Relative humidity (RH) accurate to ±5% over the range of 20% to 80% RH
- ☐ F. Check that the sensor performance curve(s) is provided by the factory and sensor output values measured during sensor calibration are plotted on the performance curve(s)
- ☐ G. Sensors used for high limit control shall be located to prevent false readings, including but not limited to being properly shielded from direct sunlight

☐ For DX package units 65,000 Btu/hr or less, verify that a two-stage thermostat is used, and the system is wired so the economizer is the first stage of cooling and the compressor is the second stage

☐ Unitary systems with an economizer have control systems, including two-stage or electronic thermostats, that cycle compressors off when economizers can provide partial cooling

☐ System has return fan speed control, relief dampers, or dedicated relief fans to prevent building over pressurization in full economizer mode.

☐ For systems with DDC controls, sensor used for economizer lockout has been factory or field calibrated.

☐ For systems with non-DDC controls, manufacturer's startup and testing procedures have been applied.

A. Functional Testing	**Results**
Step 1: Disable demand control ventilation systems (if applicable)	
Step 2: Enable the economizer and simulate a cooling demand large enough to drive the economizer fully open. Verify the following:	
a. Economizer damper modulates 100% open.	Y / N
b. Return air damper modulates 100% closed.	Y / N
c. For systems that meet the criteria of 2013 Building Energy Efficiency Standards Section 140.4(e)1, verify that the economizer remains 100% open with the use of mechanical cooling. This occurs when the cooling demand can no longer be met by the economizer alone.	Y / N
d. All applicable fans and dampers operate as intended to maintain building pressure.	Y / N
e. The unit heating is disabled (if applicable).	Y / N / NA
Step 3: Disable the economizer and simulate a cooling demand. Verify the following:	
a. Economizer damper closes to its minimum position.	Y / N
b. All applicable fans and dampers operate as intended to maintain building pressure.	Y / N
c. The unit heating is disabled (if applicable).	Y / N / NA
Step 4: If the unit is equipped with heating, simulate a heating demand and enable the economizer. Verify the following:	
a. Economizer damper closes to its minimum position.	Y / N / NA
b. Return air damper opens.	Y / N / NA
Step 5: Turn off the unit and verify the following:	
a. Economizer damper closes completely.	Y / N
Step 6: System returned to initial operating conditions	Y / N

B. Testing Results	**PASS**	**FAIL**
Step 2: Simulate cooling load and enable the economizer (all answers are Y).		
Step 3: Simulate cooling load and disable the economizer (all answers are Y).		
Step 4: Simulate heating demand and enable the economizer (all answers are Y).		
Step 5: Turn off the unit (all answers are Y).		

C. Evaluation :
☐ PASS: All **Construction Inspection** responses are complete and all **Testing Results** responses are "Pass"

Notes:

CERTIFICATE OF ACCEPTANCE	NRCA-MCH-04-A
Air Distribution Systems Acceptance	**(Page 1 of 3)**

Project Name/Address:	
System Name or Identification/Tag:	System Location or Area Served:

Enforcement Agency:	Permit Number:
Note: Submit one Certificate of Acceptance for each system that must demonstrate compliance.	Enforcement Agency Use: Checked by/Date

Documentation Author's Declaration Statement

- **I certify that this Certificate of Acceptance documentation is accurate and complete.**

Name:	Signature:
Company :	Date:
Address:	If Applicable ☐ CEA or ☐ CEPE (Certification #):
City/State/Zip:	Phone:

FIELD TECHNICIAN'S DECLARATION STATEMENT

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2. I am the person who performed the acceptance requirements verification reported on this Certificate of Acceptance (Field Technician).
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Company Name:		
Field Technician's Name:		Field Technician's Signature:
	Date Signed:	Position With Company (Title):

RESPONSIBLE PERSON'S DECLARATION STATEMENT

5. I certify under penalty of perjury, under the laws of the State of California, that I am the Field Technician, or the Field Technician is acting on my behalf as my employee or my agent and I have reviewed the information provided on this form.
6. I am a licensed contractor, architect, or engineer, who is eligible under Division 3 of the Business and Professions Code, in the applicable classification, to take responsibility for the scope of work specified on this document and attest to the declarations in this statement (responsible person).
7. I certify that the information provided on this form substantiates that the construction/installation identified on this form complies with the acceptance requirements indicated in the plans and specifications approved by the enforcement agency, and conforms to the applicable acceptance requirements and procedures specified in Reference Nonresidential Appendix NA7.
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Company Name:		Phone:
Responsible Person's Name:		Responsible Person's Signature:
License:	Date Signed:	Position With Company (Title):

Project Name/Address:	
System Name or Identification/Tag:	System Location or Area Served:

Intent:
- *New single zone supply ductwork must be less than 6% leakage rate.*
- *Existing single zone ductwork must be less than 15% leakage or other compliance path.*

Construction Inspection

1 Scope of test:
- **New Buildings -** Test required if called out on the NRCC-MCH-1-E Performance Run, or
- **Existing Buildings** – this test required if 1(a) through 1(d) are all checked

Ductwork conforms to the following:

☐ 1a) Connected to a constant volume, single zone air conditioner, heat pump, or furnace

☐ 1b) Serves less than 5000 square feet of floor area

☐ 1c) Has more than 25% duct surface area located in one or more of the following spaces
- Outdoors
- A space directly under a roof where the R-value of the roof is less than the R-value of the ceiling
- A space directly under a roof with fixed vents or openings to the outside or unconditioned spaces
- An unconditioned crawlspace
- Other unconditioned spaces

☐ 1d) A duct is extended or any of the following replaced: air handler, outdoor condensing unit of a split system, cooling or heating coil, or the furnace heat exchanger.

2 Instrumentation to perform test includes:

a. Duct Pressure Test

3 Material and Installation:

New duct systems shall meet all of the following requirements:

	a. Choice of drawbands (check one of the following)
☐	Stainless steel worm-drive hose clamps
☐	UV-resistant nylon duct ties
☐	b. Flexible ducts are not constricted in any way
☐	c. Duct leakage tests performed before access to ductwork and connections are blocked
☐	d. Joints and seams are not sealed with cloth back rubber adhesive tape unless used in combination with Mastic and drawbands. Cloth backed tape may be used if tape has been approved by the CEC.
☐	e. Duct R-values are verified R-8 in non-conditioned spaces.
☐	f. Ductwork located outdoors has insulation that is protected from damage and suitable for outdoor service
☐	g. A sticker has been affixed to the exterior surface of the air handler access door (example located in Chapter 10 of the Nonresidential Compliance Manual).

4 Visual Inspection:
- **New Buildings** – this test required
- **Existing Buildings** – this test required

Visually inspect to verify that the following locations have been sealed:

a. Connections to plenums and other connections to the forced air unit
b. Refrigerant line and other penetrations into the forced air unit
c. Air handler door panel (do not use permanent sealing material, metal tape is acceptable)
d. Register boots sealed to surrounding material
e. Connections between lengths of duct, as well as connections to takeoffs, wyes, tees, and splitter boxes

Project Name/Address:	
System Name or Identification/Tag:	System Location or Area Served:

	Visually inspect to verify that portions of the duct system that are excessively damaged have been replaced. Ducts that are considered to be excessively damaged are:
a. Flex ducts with the vapor barrier split or cracked with a total linear split or crack length greater than 12 inches	
b. Crushed ducts where cross-sectional area is reduced by 30 percent or more	
c. Metal ducts with rust or corrosion resulting in leaks greater than 2 inches in any dimension	
d. Ducts that have been subject to animal infestation resulting in leaks greater than 2 inches in any dimension	

Functional Testing		
Nominal Rated Fan Flow Calculations		Enter Values
1	Determine Nominal Rated Fan Flow using one of the following two calculation methods:	
	a) Cooling system method: Nominal Cooling Capacity _____ (tons) x 400 (cfm/ton) = _____ (cfm)	
	b) Heating system method (for heating only units): Output Capacity _____ (kBtuh) x 21.7 (cfm/kBtuh) = _____ (cfm)	
2	Enter the rated fan flow value from calculations 1(a) or 1(b) (cfm)	

Completely New or Replacement Duct System:			
3	Duct Pressurization Test Results (CFM @ 25 Pa). Enter Tested Leakage Flow in CFM:		
4	Pass if Leakage Percentage <6%: [_____(**Line # 3**) / _____(**Line # 2**)] x 100%	%	☐ Pass ☐ Fail

Pre-existing Duct System with Duct Alteration and/or HVAC Equipment Change-Out:			
5	Enter Tested Leakage Flow in CFM: **Pre-Test** of Existing or Altered Duct System prior to Duct System Alteration and/or Equipment Change-Out.		
6	Enter Tested Leakage Flow in CFM: **Final Test** of New Duct System or Altered Duct System for Duct System Alteration and/or Equipment Change-Out.		
Use one of the following three tests or verification standards for compliance:			
7	Pass if Leakage Percentage <15% [_____ **(Line # 6)** / _____ **(Line # 2)**] x 100%	%	☐ Pass ☐ Fail
8	Pass if Leakage Reduction is >60% and all Accessible Leaks are sealed as confirmed by Visual Inspection and Verification. Leakage reduction = {1 - [_____ **(Line#6)** / _____ **(Line#5)**]} x 100%	%	☐ Pass ☐ Fail
9	Pass if all Accessible Leaks are sealed as confirmed by Visual Inspection and Verification by HERS rater (sampling rate 100% by HERS rater)		☐ Pass ☐ Fail
	Pass if One of Lines # 7 through # 9 pass		☐ Pass ☐ Fail

CERTIFICATE OF ACCEPTANCE	NRCA-MCH-04-A
Air Distribution Systems Acceptance	**(Page 1 of 3)**

Project Name/Address:	
System Name or Identification/Tag:	System Location or Area Served:

Enforcement Agency:	Permit Number:
Note: Submit one Certificate of Acceptance for each system that must demonstrate compliance.	Enforcement Agency Use: Checked by/Date

Documentation Author's Declaration Statement

- **I certify that this Certificate of Acceptance documentation is accurate and complete.**

Name:	Signature:
Company :	Date:
Address:	If Applicable ☐ CEA or ☐ CEPE (Certification #):
City/State/Zip:	Phone:

FIELD TECHNICIAN'S DECLARATION STATEMENT

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Company Name:		
Field Technician's Name:		Field Technician's Signature:
	Date Signed:	Position With Company (Title):

RESPONSIBLE PERSON'S DECLARATION STATEMENT

5. I certify under penalty of perjury, under the laws of the State of California, that I am the Field Technician, or the Field Technician is acting on my behalf as my employee or my agent and I have reviewed the information provided on this form.
6. I am a licensed contractor, architect, or engineer, who is eligible under Division 3 of the Business and Professions Code, in the applicable classification, to take responsibility for the scope of work specified on this document and attest to the declarations in this statement (responsible person).
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Company Name:		Phone:
Responsible Person's Name:		Responsible Person's Signature:
License:	Date Signed:	Position With Company (Title):

Project Name/Address:	
System Name or Identification/Tag:	System Location or Area Served:

Intent:
- *New single zone supply ductwork must be less than 6% leakage rate.*
- *Existing single zone ductwork must be less than 15% leakage or other compliance path.*

Construction Inspection

1 Scope of test:
- **New Buildings -** Test required if called out on the NRCC-MCH-1-E Performance Run, or
- **Existing Buildings** – this test required if 1(a) through 1(d) are all checked

Ductwork conforms to the following:

☐ 1a) Connected to a constant volume, single zone air conditioner, heat pump, or furnace

☐ 1b) Serves less than 5000 square feet of floor area

☐ 1c) Has more than 25% duct surface area located in one or more of the following spaces
- Outdoors
- A space directly under a roof where the R-value of the roof is less than the R-value of the ceiling
- A space directly under a roof with fixed vents or openings to the outside or unconditioned spaces
- An unconditioned crawlspace
- Other unconditioned spaces

☐ 1d) A duct is extended or any of the following replaced: air handler, outdoor condensing unit of a split system, cooling or heating coil, or the furnace heat exchanger.

2 Instrumentation to perform test includes:

a. Duct Pressure Test

3 Material and Installation:

New duct systems shall meet all of the following requirements:

	a. Choice of drawbands (check one of the following)
☐	Stainless steel worm-drive hose clamps
☐	UV-resistant nylon duct ties
☐	b. Flexible ducts are not constricted in any way
☐	c. Duct leakage tests performed before access to ductwork and connections are blocked
☐	d. Joints and seams are not sealed with cloth back rubber adhesive tape unless used in combination with Mastic and drawbands. Cloth backed tape may be used if tape has been approved by the CEC.
☐	e. Duct R-values are verified R-8 in non-conditioned spaces.
☐	f. Ductwork located outdoors has insulation that is protected from damage and suitable for outdoor service
☐	g. A sticker has been affixed to the exterior surface of the air handler access door (example located in Chapter 10 of the Nonresidential Compliance Manual).

4 Visual Inspection:
- **New Buildings** – this test required
- **Existing Buildings** – this test required

Visually inspect to verify that the following locations have been sealed:

a. Connections to plenums and other connections to the forced air unit
b. Refrigerant line and other penetrations into the forced air unit
c. Air handler door panel (do not use permanent sealing material, metal tape is acceptable)
d. Register boots sealed to surrounding material
e. Connections between lengths of duct, as well as connections to takeoffs, wyes, tees, and splitter boxes

Project Name/Address:	
System Name or Identification/Tag:	System Location or Area Served:

	Visually inspect to verify that portions of the duct system that are excessively damaged have been replaced. Ducts that are considered to be excessively damaged are:
a. Flex ducts with the vapor barrier split or cracked with a total linear split or crack length greater than 12 inches	
b. Crushed ducts where cross-sectional area is reduced by 30 percent or more	
c. Metal ducts with rust or corrosion resulting in leaks greater than 2 inches in any dimension	
d. Ducts that have been subject to animal infestation resulting in leaks greater than 2 inches in any dimension	

Functional Testing		
Nominal Rated Fan Flow Calculations		Enter Values
1	Determine Nominal Rated Fan Flow using one of the following two calculation methods:	
	a) Cooling system method: Nominal Cooling Capacity _____ (tons) x 400 (cfm/ton) = _____ (cfm)	
	b) Heating system method (for heating only units): Output Capacity _____ (kBtuh) x 21.7 (cfm/kBtuh) = _____ (cfm)	
2	Enter the rated fan flow value from calculations 1(a) or 1(b) (cfm)	

Completely New or Replacement Duct System:			
3	Duct Pressurization Test Results (CFM @ 25 Pa). Enter Tested Leakage Flow in CFM:		
4	Pass if Leakage Percentage <6%: [_____(**Line # 3**) / _____(**Line # 2**)] x 100%	%	☐ Pass ☐ Fail

Pre-existing Duct System with Duct Alteration and/or HVAC Equipment Change-Out:			
5	Enter Tested Leakage Flow in CFM: **Pre-Test** of Existing or Altered Duct System prior to Duct System Alteration and/or Equipment Change-Out.		
6	Enter Tested Leakage Flow in CFM: **Final Test** of New Duct System or Altered Duct System for Duct System Alteration and/or Equipment Change-Out.		
Use one of the following three tests or verification standards for compliance:			
7	Pass if Leakage Percentage <15% [_____ **(Line # 6)** / _____ **(Line # 2)**] x 100%	%	☐ Pass ☐ Fail
8	Pass if Leakage Reduction is >60% and all Accessible Leaks are sealed as confirmed by Visual Inspection and Verification. Leakage reduction = {1 - [_____ **(Line#6)** / _____ **(Line#5)**]} x 100%	%	☐ Pass ☐ Fail
9	Pass if all Accessible Leaks are sealed as confirmed by Visual Inspection and Verification by HERS rater (sampling rate 100% by HERS rater)		☐ Pass ☐ Fail
	Pass if One of Lines # 7 through # 9 pass		☐ Pass ☐ Fail

CERTIFICATE OF ACCEPTANCE	NRCA-MCH-03-A
NA7.5.2 Constant Volume Single Zone Unitary Air Conditioner and Heat Pump Systems	**(Page 1 of 3)**

Enforcement Agency:	Permit Number:
Note: Submit one Certificate of Acceptance for each system that must demonstrate compliance.	Enforcement Agency Use: Checked by/Date

Documentation Author's Declaration Statement

- **I certify that this Certificate of Acceptance documentation is accurate and complete.**

Name:	Signature:
Company :	Date:
Address:	If Applicable ☐ CEA or ☐ CEPE (Certification #):
City/State/Zip:	Phone:

FIELD TECHNICIAN'S DECLARATION STATEMENT

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Company Name:		
Field Technician's Name:		Field Technician's Signature:
	Date Signed:	Position With Company (Title):

RESPONSIBLE PERSON'S DECLARATION STATEMENT

- I certify under penalty of perjury, under the laws of the State of California, that I am the Field Technician, or the Field Technician is acting on my behalf as my employee or my agent and I have reviewed the information provided on this form.
- I am a licensed contractor, architect, or engineer who is eligible under Division 3 of the Business and Professions Code, in the applicable classification, to take responsibility for the scope of work specified on this document and attest to the declarations in this statement (responsible person).
- I certify that the information provided on this form substantiates that the construction/installation identified on this form complies with the acceptance requirements indicated in the plans and specifications approved by the enforcement agency, and conforms to the applicable acceptance requirements and procedures specified in Reference Nonresidential Appendix NA7.
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Company Name:		Phone:
Responsible Person's Name:		Responsible Person's Signature:
License:	Date Signed:	Position With Company (Title):

Intent:	*Verify the individual components of a constant volume, single-zone, unitary air conditioner and heat pump function correctly, including: thermostat installation and programming, supply fan, heating, cooling, and damper operation per NA7.5.2*

Construction Inspection

1. Supporting documentation needed to perform test includes, but not limited to:
    a. 2013 Building Energy Efficiency Standards Nonresidential Compliance Manual *(NA7.5.2 Constant Volume, Single-zone, Unitary Air Conditioner and Heat Pumps Systems Acceptance At-A-Glance).*
    b. 2013 Building Energy Efficiency Standards Manual.
2. Instrumentation to perform test includes, but not limited to:
    a. None required
3. Installation (check if applies):

    ☐ Thermostat is located within the space-conditioning zone that is served by the HVAC system.
4. Programming (check all those that apply):

    ☐ Thermostat meets the temperature adjustment and dead band requirements of 2013 Building Energy Efficiency Standards Manual section 120.2(b).
    Minimum heating setpoint: _____^{o}F. Maximum cooling setpoint _____^{o}F. Deadband: _____^{o}F.

    ☐ Occupied, unoccupied, and holiday schedules have been programmed per the facility's schedule.

    ☐ Pre-occupancy purge has been programmed to meet the requirements of 2013 Building Energy Efficiency Standards Manual section 120.1(c)2.
        1. Check method used to determine pre-occupancy purge:

            ☐ Lesser of: conditioned floor area times ventilation rate from 2013 Building Energy Efficiency Standards TABLE 120.1-A or 15cfm per person times the expected number of occupants.

            ☐ 3 complete air changes.

Notes:

A. Functional Testing Requirements		**Operating Modes**						
Step 1: Disable economizer control and demand-controlled ventilation (if applicable) to prevent unexpected interactions.								
Occupied Mode								
Step 2: Heating load during occupied condition								
Step 3: No-load during occupied condition								
Step 4: Cooling load during occupied condition								
Unoccupied Mode								
Step 5: No-load during unoccupied condition								
Step 6: Heating load during unoccupied condition								
Step 7: Cooling load during unoccupied condition								
Step 8: Manual override								
		8	**7**	**6**	**5**	**4**	**3**	**2**
Step 2 – 8: Check and verify the following for each simulation mode required								
a.	Supply fan operates continually	☐				☐	☐	☐
b.	Supply fan turns off				☐			
c.	Supply fan cycles on and off		☐	☐				
d.	System reverts to "occupied" mode to satisfy any condition	☐						
e.	System turns off when manual override time period expires	☐						
f.	Gas-fired furnace, heat pump, or electric heater stages on			☐				☐
g.	No heating is provided by the unit		☐		☐	☐	☐	
h.	No cooling is provided by the unit			☐	☐		☐	☐
i.	Compressor stages on		☐			☐		
j.	Outside air damper is open to minimum position	☐				☐	☐	☐
k.	Outside air damper closes completely		☐	☐	☐			
Step 9: System returned to initial operating conditions after all tests have been completed:		Y / N						
B. Testing Results		**8**	**7**	**6**	**5**	**4**	**3**	**2**
Indicate if Passed (P), Failed (F), or N/A (X), fill in appropriate letter								
C. Evaluation:								
☐	PASS: All **Construction Inspection** responses are complete and all applicable **Testing Results** responses are "Pass" (P)							

CERTIFICATE OF ACCEPTANCE	NRCA-MCH-03-A
NA7.5.2 Constant Volume Single Zone Unitary Air Conditioner and Heat Pump Systems	**(Page 1 of 3)**

Enforcement Agency:	Permit Number:
Note: Submit one Certificate of Acceptance for each system that must demonstrate compliance.	Enforcement Agency Use: Checked by/Date

Documentation Author's Declaration Statement

- **I certify that this Certificate of Acceptance documentation is accurate and complete.**

Name:	Signature:
Company :	Date:
Address:	If Applicable ☐ CEA or ☐ CEPE (Certification #):
City/State/Zip:	Phone:

FIELD TECHNICIAN'S DECLARATION STATEMENT

- I certify under penalty of perjury, under the laws of the State of California, the information provided on this form is true and correct.
- I am the person who performed the acceptance requirements verification reported on this Certificate of Acceptance (Field Technician).
- I certify that the construction/installation identified on this form complies with the acceptance requirements indicated in the plans and specifications approved by the enforcement agency, and conforms to the applicable acceptance requirements and procedures specified in Reference Nonresidential Appendix NA7.
- I have confirmed that the Installation Certificate(s) for the construction/installation identified on this form has been completed and is posted or made available with the building permit(s) issued for the building.

Company Name:		
Field Technician's Name:		Field Technician's Signature:
	Date Signed:	Position With Company (Title):

RESPONSIBLE PERSON'S DECLARATION STATEMENT

- I certify under penalty of perjury, under the laws of the State of California, that I am the Field Technician, or the Field Technician is acting on my behalf as my employee or my agent and I have reviewed the information provided on this form.
- I am a licensed contractor, architect, or engineer who is eligible under Division 3 of the Business and Professions Code, in the applicable classification, to take responsibility for the scope of work specified on this document and attest to the declarations in this statement (responsible person).
- I certify that the information provided on this form substantiates that the construction/installation identified on this form complies with the acceptance requirements indicated in the plans and specifications approved by the enforcement agency, and conforms to the applicable acceptance requirements and procedures specified in Reference Nonresidential Appendix NA7.
- I have confirmed that the Installation Certificate(s) for the construction/installation identified on this form has been completed and is posted or made available with the building permit(s) issued for the building.
- I will ensure that a completed, signed copy of this Certificate of Acceptance shall be posted, or made available with the building permit(s) issued for the building, and made available to the enforcement agency for all applicable inspections. I understand that a signed copy of this Certificate of Acceptance is required to be included with the documentation the builder provides to the building owner at occupancy.

Company Name:		Phone:
Responsible Person's Name:		Responsible Person's Signature:
License:	Date Signed:	Position With Company (Title):

Intent:	*Verify the individual components of a constant volume, single-zone, unitary air conditioner and heat pump function correctly, including: thermostat installation and programming, supply fan, heating, cooling, and damper operation per NA7.5.2*

Construction Inspection

1. Supporting documentation needed to perform test includes, but not limited to:
    a. 2013 Building Energy Efficiency Standards Nonresidential Compliance Manual *(NA7.5.2 Constant Volume, Single-zone, Unitary Air Conditioner and Heat Pumps Systems Acceptance At-A-Glance).*
    b. 2013 Building Energy Efficiency Standards Manual.
2. Instrumentation to perform test includes, but not limited to:
    a. None required
3. Installation (check if applies):

    ☐ Thermostat is located within the space-conditioning zone that is served by the HVAC system.
4. Programming (check all those that apply):

    ☐ Thermostat meets the temperature adjustment and dead band requirements of 2013 Building Energy Efficiency Standards Manual section 120.2(b).
    Minimum heating setpoint: _____^{o}F. Maximum cooling setpoint _____^{o}F. Deadband: _____^{o}F.

    ☐ Occupied, unoccupied, and holiday schedules have been programmed per the facility's schedule.

    ☐ Pre-occupancy purge has been programmed to meet the requirements of 2013 Building Energy Efficiency Standards Manual section 120.1(c)2.
        1. Check method used to determine pre-occupancy purge:

            ☐ Lesser of: conditioned floor area times ventilation rate from 2013 Building Energy Efficiency Standards TABLE 120.1-A or 15cfm per person times the expected number of occupants.

            ☐ 3 complete air changes.

Notes:

A. Functional Testing Requirements		**Operating Modes**						
Step 1: Disable economizer control and demand-controlled ventilation (if applicable) to prevent unexpected interactions.								
Occupied Mode								
Step 2: Heating load during occupied condition								
Step 3: No-load during occupied condition								
Step 4: Cooling load during occupied condition								
Unoccupied Mode								
Step 5: No-load during unoccupied condition								
Step 6: Heating load during unoccupied condition								
Step 7: Cooling load during unoccupied condition								
Step 8: Manual override								
		8	**7**	**6**	**5**	**4**	**3**	**2**
Step 2 – 8: Check and verify the following for each simulation mode required								
a.	Supply fan operates continually	☐				☐	☐	☐
b.	Supply fan turns off				☐			
c.	Supply fan cycles on and off		☐	☐				
d.	System reverts to "occupied" mode to satisfy any condition	☐						
e.	System turns off when manual override time period expires	☐						
f.	Gas-fired furnace, heat pump, or electric heater stages on			☐				☐
g.	No heating is provided by the unit		☐		☐	☐	☐	
h.	No cooling is provided by the unit			☐	☐		☐	☐
i.	Compressor stages on		☐			☐		
j.	Outside air damper is open to minimum position	☐				☐	☐	☐
k.	Outside air damper closes completely		☐	☐	☐			
Step 9: System returned to initial operating conditions after all tests have been completed:		Y / N						
B. Testing Results		**8**	**7**	**6**	**5**	**4**	**3**	**2**
Indicate if Passed (P), Failed (F), or N/A (X), fill in appropriate letter								
C. Evaluation:								
☐	PASS: All **Construction Inspection** responses are complete and all applicable **Testing Results** responses are "Pass" (P)							

Enforcement Agency:	Permit Number:
Note: Submit one Certificate of Acceptance for each system that must demonstrate compliance.	Enforcement Agency Use: Checked by/Date

Documentation Author's Declaration Statement

- **I certify that this Certificate of Acceptance documentation is accurate and complete.**

Name:	Signature:
Company :	Date:
Address:	If Applicable ☐ CEA or ☐ CEPE (Certification #):
City/State/Zip:	Phone:

FIELD TECHNICIAN'S DECLARATION STATEMENT

- I certify under penalty of perjury, under the laws of the State of California, the information provided on this form is true and correct.
- I am the person who performed the acceptance requirements verification reported on this Certificate of Acceptance (Field Technician).
- I certify that the construction/installation identified on this form complies with the acceptance requirements indicated in the plans and specifications approved by the enforcement agency, and conforms to the applicable acceptance requirements and procedures specified in Reference Nonresidential Appendix NA7.
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Company Name:	
Field Technician's Name:	Field Technician's Signature:
Date Signed:	Position With Company (Title):

RESPONSIBLE PERSON'S DECLARATION STATEMENT

- I certify under penalty of perjury, under the laws of the State of California, that I am the Field Technician, or the Field Technician is acting on my behalf as my employee or my agent and I have reviewed the information provided on this form.
- I am a licensed contractor, architect, or engineer, who is eligible under Division 3 of the Business and Professions Code, in the applicable classification, to take responsibility for the scope of work specified on this document and attest to the declarations in this statement (responsible person).
- I certify that the information provided on this form substantiates that the construction/installation identified on this form complies with the acceptance requirements indicated in the plans and specifications approved by the enforcement agency, and conforms to the applicable acceptance requirements and procedures specified in Reference Nonresidential Appendix NA7.
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Company Name:		Phone:
Responsible Person's Name:		Responsible Person's Signature:
License:	Date Signed:	Position With Company (Title):

Intent:	***Verify measured outside airflow reading is within ± 10% of the total required outside airflow. Reference MECH-3C (Column H or Column I) or Mechanical Equipment Schedules.***

Construction Inspection

Note: MCH-2A can be performed in conjunction with MCH-7A Supply Fan VFD Acceptance (if applicable) since testing activities overlap.

1. Supporting documentation needed to perform test includes:
   a. As-built and/or design documents (Mechanical Equipment Schedules).
   b. 2013 Building Energy Efficiency Standards Nonresidential Compliance Manual *(NA7.5.1.1 Ventilation Systems: Variable Air Systems At-A-Glance and NA7.5.1.2 Constant Volume Systems Outdoor Air Acceptance At-A-Glance).*
   c. 2013 Building Energy Efficiency Standards.
2. Instrumentation needed to perform test includes:
   a. Watch
   b. Calibrated means to measure airflow (i.e. hot-wire anemometer, velocity pressure probe, etc.).
      1. Method and equipment used:_____
      2. Equipment calibration date (must be within one year):_____
3. System type (check either VAV or CAV): ☐ VAV ☐ CAV

   ☐ Check if Variable Air Volume (VAV) and complete the following:
      a. Outdoor airflow sensor (check one that applies):
      ☐ Sensor used to control outdoor air flow is either factory calibrated or field calibrated.
         ☐ Check if factory calibrated and attach calibration certification.
         ☐ Check if field calibrated and attach calibration results.
      b. Damper Control (must be checked):
         ☐ Dynamic damper control is being used to control outside air. (This is NOT a fixed minimum position).
      c. One of the following dynamic controls is being utilized to control outside air (check method used)
         ☐ Dual Minimum Setpoint Design
         ☐ Energy Balance Method
         ☐ Return Fan Tracking
         ☐ Airflow Measurement of the Entire Outdoor Air Inlet
         ☐ Injection Fan Method
         ☐ Dedicated Minimum Ventilation Damper with Pressure Control
         ☐ Other Active Control, Describe: _____

   ☐ Check if Constant Air Volume (CAV) and verify the following:
      ☐ System is designed to provide a fixed minimum OSA when the unit is on.
4. Method of delivering outside air to the unit (check one of the following):

   ☐ Outside air is ducted to the return air plenum.
      a. Confirm that outside air is ducted to either (check one of the following):
         ☐ Within five ft. of the unit.
         ☐ Within 15 ft. of the unit, with the air directed substantially toward the unit, and with a discharge velocity of at least 500 ft. per minute.

   ☐ Return air plenum is NOT used to distribute outside air to the unit. I.e. outside air is ducted directly to the unit or outside air is provided independent of the unit.
5. Pre-occupancy purge has been programmed for the 1-hour period immediately before the building is normally occupied to provide (one of the following methods must be verified and checked):

   ☐ The conditioned floor area times the ventilation rate from the 2013 Building Energy Efficiency Standards TABLE 121-A, or 15 cfm per person times the expected number of occupants, whichever is less.

☐ 3 complete air changes to the zone served by the air handler.

NA7.5.1.1 Outdoor Air Acceptance

A. Functional Testing (Check appropriate column)		☐ **CAV**	☐ **VAV**
Step 1: Verify unit is not in economizer mode during test (economizer disabled).		☐	☐
Note: Shaded boxes do not apply for CAV systems			
Step 2: CAV and VAV testing at full supply airflow			
a.	Adjust supply air to achieve design airflow or maximum airflow at full cooling. Record VFD speed (Hz).		Hz
b.	Measured outdoor airflow reading (cfm)	cfm	cfm
c.	Required outdoor airflow (cfm) *(from MECH-3C, Column I, or Mechanical Equipment Schedules).*	cfm	cfm
d.	Time for outside air damper to stabilize after full supply airflow is achieved (minutes):		min
Step 3: VAV testing at reduced supply airflow		**CAV**	**VAV**
a.	Adjust supply airflow to either the sum of the minimum zone airflows, full heating, or 30% of the total design airflow. Record VFD speed (Hz).		Hz
b.	Measured outdoor airflow reading (cfm)		cfm
c.	Required outdoor airflow (cfm) *(from MECH-3C, Column I, or mechanical equipment schedules).*		cfm
d.	Time for outside air damper to stabilize after reduced supply airflow is achieved (minutes):		min
Step 4: Return to initial conditions (check)		☐	☐

B. Testing Calculations & Results			
Determine Percent Outside Air at full supply airflow ($\%OA_{FA}$) for Step 2			
a.	$\%OA_{FA}$ = Measured outdoor airflow reading /Required outdoor airflow (Step2b/Step2c)	%	%
b.	$\%OA_{FA}$ is within 10% of design Outside Air. ($90\% \le \%OA_{FA} \le 110\%$)	Y / N	Y / N
c.	Outside air damper position stabilizes within 5 minutes (Step 2d < 5 minutes)		Y / N
Determine Percent Outside Air at reduced supply airflow ($\%OA_{RA}$) for Step 3 (VAV only)			
a.	$\%OA_{RA}$ = Measured outdoor airflow reading /Required outdoor airflow reading (Step3b/Step3c)		%
b.	$\%OA_{RA}$ is within 10% of design Outside Air. ($90\% \le \%OA_{RA} \le 110\%$)		Y / N
c.	Outside air damper position stabilizes within 5 minutes (Step 3d < 5 minutes)		Y / N
Note: The intent of this test is to ensure that 1) all air handlers provide the minimum amount of OSA and 2) VAV air handlers use dynamic controls to avoid over ventilation.			

C.	**Evaluation :**
☐	PASS: All **Construction Inspection** responses are complete and **Testing Calculations & Results** responses are positive (Y - yes)

Enforcement Agency:	Permit Number:
Note: Submit one Certificate of Acceptance for each system that must demonstrate compliance.	Enforcement Agency Use: Checked by/Date

Documentation Author's Declaration Statement

- **I certify that this Certificate of Acceptance documentation is accurate and complete.**

Name:	Signature:
Company :	Date:
Address:	If Applicable ☐ CEA or ☐ CEPE (Certification #):
City/State/Zip:	Phone:

FIELD TECHNICIAN'S DECLARATION STATEMENT

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Company Name:	
Field Technician's Name:	Field Technician's Signature:
Date Signed:	Position With Company (Title):

RESPONSIBLE PERSON'S DECLARATION STATEMENT

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- I am a licensed contractor, architect, or engineer, who is eligible under Division 3 of the Business and Professions Code, in the applicable classification, to take responsibility for the scope of work specified on this document and attest to the declarations in this statement (responsible person).
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Company Name:		Phone:
Responsible Person's Name:		Responsible Person's Signature:
License:	Date Signed:	Position With Company (Title):

Intent:	***Verify measured outside airflow reading is within ± 10% of the total required outside airflow. Reference MECH-3C (Column H or Column I) or Mechanical Equipment Schedules.***

Construction Inspection

Note: MCH-2A can be performed in conjunction with MCH-7A Supply Fan VFD Acceptance (if applicable) since testing activities overlap.

1. Supporting documentation needed to perform test includes:
   a. As-built and/or design documents (Mechanical Equipment Schedules).
   b. 2013 Building Energy Efficiency Standards Nonresidential Compliance Manual *(NA7.5.1.1 Ventilation Systems: Variable Air Systems At-A-Glance and NA7.5.1.2 Constant Volume Systems Outdoor Air Acceptance At-A-Glance).*
   c. 2013 Building Energy Efficiency Standards.
2. Instrumentation needed to perform test includes:
   a. Watch
   b. Calibrated means to measure airflow (i.e. hot-wire anemometer, velocity pressure probe, etc.).
      1. Method and equipment used:_____
      2. Equipment calibration date (must be within one year):_____
3. System type (check either VAV or CAV): ☐ VAV ☐ CAV

   ☐ Check if Variable Air Volume (VAV) and complete the following:
      a. Outdoor airflow sensor (check one that applies):
      ☐ Sensor used to control outdoor air flow is either factory calibrated or field calibrated.
         ☐ Check if factory calibrated and attach calibration certification.
         ☐ Check if field calibrated and attach calibration results.
      b. Damper Control (must be checked):
         ☐ Dynamic damper control is being used to control outside air. (This is NOT a fixed minimum position).
      c. One of the following dynamic controls is being utilized to control outside air (check method used)
         ☐ Dual Minimum Setpoint Design
         ☐ Energy Balance Method
         ☐ Return Fan Tracking
         ☐ Airflow Measurement of the Entire Outdoor Air Inlet
         ☐ Injection Fan Method
         ☐ Dedicated Minimum Ventilation Damper with Pressure Control
         ☐ Other Active Control, Describe: _____

   ☐ Check if Constant Air Volume (CAV) and verify the following:
      ☐ System is designed to provide a fixed minimum OSA when the unit is on.
4. Method of delivering outside air to the unit (check one of the following):

   ☐ Outside air is ducted to the return air plenum.
      a. Confirm that outside air is ducted to either (check one of the following):
         ☐ Within five ft. of the unit.
         ☐ Within 15 ft. of the unit, with the air directed substantially toward the unit, and with a discharge velocity of at least 500 ft. per minute.

   ☐ Return air plenum is NOT used to distribute outside air to the unit. I.e. outside air is ducted directly to the unit or outside air is provided independent of the unit.
5. Pre-occupancy purge has been programmed for the 1-hour period immediately before the building is normally occupied to provide (one of the following methods must be verified and checked):

   ☐ The conditioned floor area times the ventilation rate from the 2013 Building Energy Efficiency Standards TABLE 121-A, or 15 cfm per person times the expected number of occupants, whichever is less.

☐ 3 complete air changes to the zone served by the air handler.

NA7.5.1.1 Outdoor Air Acceptance

A. Functional Testing (Check appropriate column)		☐ **CAV**	☐ **VAV**
Step 1: Verify unit is not in economizer mode during test (economizer disabled).		☐	☐
Note: Shaded boxes do not apply for CAV systems			
Step 2: CAV and VAV testing at full supply airflow			
a.	Adjust supply air to achieve design airflow or maximum airflow at full cooling. Record VFD speed (Hz).		Hz
b.	Measured outdoor airflow reading (cfm)	cfm	cfm
c.	Required outdoor airflow (cfm) *(from MECH-3C, Column I, or Mechanical Equipment Schedules).*	cfm	cfm
d.	Time for outside air damper to stabilize after full supply airflow is achieved (minutes):		min
Step 3: VAV testing at reduced supply airflow		**CAV**	**VAV**
a.	Adjust supply airflow to either the sum of the minimum zone airflows, full heating, or 30% of the total design airflow. Record VFD speed (Hz).		Hz
b.	Measured outdoor airflow reading (cfm)		cfm
c.	Required outdoor airflow (cfm) *(from MECH-3C, Column I, or mechanical equipment schedules).*		cfm
d.	Time for outside air damper to stabilize after reduced supply airflow is achieved (minutes):		min
Step 4: Return to initial conditions (check)		☐	☐

B. Testing Calculations & Results			
Determine Percent Outside Air at full supply airflow ($\%OA_{FA}$) for Step 2			
a.	$\%OA_{FA}$ = Measured outdoor airflow reading /Required outdoor airflow (Step2b/Step2c)	%	%
b.	$\%OA_{FA}$ is within 10% of design Outside Air. ($90\% \le \%OA_{FA} \le 110\%$)	Y / N	Y / N
c.	Outside air damper position stabilizes within 5 minutes (Step 2d < 5 minutes)		Y / N
Determine Percent Outside Air at reduced supply airflow ($\%OA_{RA}$) for Step 3 (VAV only)			
a.	$\%OA_{RA}$ = Measured outdoor airflow reading /Required outdoor airflow reading (Step3b/Step3c)		%
b.	$\%OA_{RA}$ is within 10% of design Outside Air. ($90\% \le \%OA_{RA} \le 110\%$)		Y / N
c.	Outside air damper position stabilizes within 5 minutes (Step 3d < 5 minutes)		Y / N
Note: The intent of this test is to ensure that 1) all air handlers provide the minimum amount of OSA and 2) VAV air handlers use dynamic controls to avoid over ventilation.			

C.	**Evaluation :**
☐	PASS: All **Construction Inspection** responses are complete and **Testing Calculations & Results** responses are positive (Y - yes)

Enforcement Agency:	Permit Number:
Note: Submit one Certificate of Acceptance for each system that must demonstrate compliance.	Enforcement Agency Use: Checked by/Date

Documentation Author's Declaration Statement

- **I certify that this Certificate of Acceptance documentation is accurate and complete.**

Name:	Signature:
Company :	Date:
Address:	If Applicable ☐ CEA or ☐ CEPE (Certification #):
City/State/Zip:	Phone:

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Company Name:	
Field Technician's Name:	Field Technician's Signature:
Date Signed:	Position With Company (Title):

RESPONSIBLE PERSON'S DECLARATION STATEMENT

- I certify under penalty of perjury, under the laws of the State of California, that I am the Field Technician, or the Field Technician is acting on my behalf as my employee or my agent and I have reviewed the information provided on this form.
- I am a licensed contractor, architect, or engineer, who is eligible under Division 3 of the Business and Professions Code, in the applicable classification, to take responsibility for the scope of work specified on this document and attest to the declarations in this statement (responsible person).
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Company Name:		Phone:
Responsible Person's Name:		Responsible Person's Signature:
License:	Date Signed:	Position With Company (Title):

Unbold the intent

Intent:	***Verify measured outside airflow reading is within ± 10% of the total required outside airflow. Reference MECH-3C (Column H or Column I) or Mechanical Equipment Schedules.***

Construction Inspection

Note: MCH-2A can be performed in conjunction with MCH-7A Supply Fan VFD Acceptance (if applicable) since testing activities overlap.

1. Supporting documentation needed to perform test includes:
   a. As-built and/or design documents (Mechanical Equipment Schedules).
   b. 2013 Building Energy Efficiency Standards Nonresidential Compliance Manual *(NA7.5.1.1 Ventilation Systems: Variable Air Systems At-A-Glance and NA7.5.1.2 Constant Volume Systems Outdoor Air Acceptance At-A-Glance).*
   c. 2013 Building Energy Efficiency Standards.
2. Instrumentation needed to perform test includes:
   a. Watch
   b. Calibrated means to measure airflow (i.e. hot-wire anemometer, velocity pressure probe, etc.).
      1. Method and equipment used:_____
      2. Equipment calibration date (must be within one year):_____
3. System type (check either VAV or CAV): ☐ VAV ☐ CAV

☐ Check if Variable Air Volume (VAV) and complete the following:
   a. Outdoor airflow sensor (check one that applies):
   ☐ Sensor used to control outdoor air flow is either factory calibrated or field calibrated.
      ☐ Check if factory calibrated and attach calibration certification.
      ☐ Check if field calibrated and attach calibration results.

Remove checkbox

   b. Damper Control (must be checked):
      ☐ Dynamic damper control is being used to control outside air. (This is NOT a fixed minimum position).
   c. One of the following dynamic controls is being utilized to control outside air (check method used)
      ☐ Dual Minimum Setpoint Design
      ☐ Energy Balance Method
      ☐ Return Fan Tracking
      ☐ Airflow Measurement of the Entire Outdoor Air Inlet
      ☐ Injection Fan Method
      ☐ Dedicated Minimum Ventilation Damper with Pressure Control
      ☐ Other Active Control, Describe: _____

☐ Check if Constant Air Volume (CAV) and verify the following:
   ☐ System is designed to provide a fixed minimum OSA when the unit is on.

4. Method of delivering outside air to the unit (check one of the

"substantially" is subjective.
What is meant by discharge (RA?)

   ☐ Outside air is ducted to the return air plenum.
      a. Confirm that outside air is ducted to either (check one of the following):
         ☐ Within five ft. of the unit.
         ☐ Within 15 ft. of the unit, with the air directed substantially toward the unit, and with a discharge velocity of at least 500 ft. per minute.

a minimum of

   ☐ Return air plenum is NOT used to distribute outside air – de air is ducted directly to the unit or outside air is provided independent of the unit.
5. Pre-occupancy purge has been programmed for the 1-hour period immediately before the building provide (one of the following methods must be verified and checked):

How does the tester get these values?

   ☐ The conditioned floor area times the ventilation rate from the 2013 Building Energy Efficiency S or 15 cfm per person times the expected number of occupants, whichever is less.

☐ 3 complete air changes to the zone served by the air handler.

NA7.5.1.1 Outdoor Air Acceptance

A. **Functional Testing** (Check appropriate column)		☐ **CAV**	☐ **VAV**
Step 1: Verify unit is not in economizer mode during test		☐	☐
Note: Shaded boxes do not apply for CAV systems			
Step 2: CAV and VAV testing at full supply airflow			
a.	Adjust supply air to achieve design airflow or maximum airflow at full cooling. Record VFD speed (Hz).		Hz
b.	Measured outdoor airflow reading (cfm)	cfm	cfm
c.	Required outdoor airflow (cfm) *(from MECH-3C, Column I, or Mechanical Equipment Schedules).*	cfm	cfm
d.	Time for outside air damper to stabilize after full supply airflow is achieved (minutes):		min
Step 3: VAV testing at reduced supply airflow		**CAV**	**VAV**
a.	Adjust supply airflow to either the sum of the minimum zone airflows, full heating, or 30% of the total design airflow. Record VFD speed (Hz).		Hz
b.	Measured outdoor airflow reading (cfm)		cfm
c.	Required outdoor airflow (cfm) *(from MECH-3C, Column I, or mechanical equipment schedules).*		cfm
d.	Time for outside air damper to stabilize after reduced supply airflow is achieved (minutes):		min
Step 4: Return to initial conditions (check)		☐	☐

This should be recorded as well

B. **Testing Calculations & Results**			
Determine Percent Outside Air at full supply airflow ($\%OA_{FA}$) for Step 2			
a.	$\%OA_{FA}$ = Measured outdoor airflow reading /Required outdoor airflow (Step2b/Step2c)	%	%
b.	$\%OA_{FA}$ is within 10% of design Outside Air. ($90\% \le \%OA_{FA} \le 110\%$)	Y / N	Y / N
c.	Outside air damper position stabilizes within 5 minutes (Step 2d < 5 minutes)		Y / N
Determine Percent Outside Air at reduced supply airflow ($\%OA_{RA}$) for Step 3 (VAV only)			
a.	$\%OA_{RA}$ = Measured outdoor airflow reading /Required outdoor airflow reading (Step3b/Step3c)		%
b.	$\%OA_{RA}$ is within 10% of design Outside Air. ($90\% \le \%OA_{RA} \le 110\%$)		Y / N
c.	Outside air damper position stabilizes within 5 minutes (Step 3d < 5 minutes)		Y / N
Note: The intent of this test is to ensure that 1) all air handlers provide the minimum amount of OSA and 2) VAV air handlers use dynamic controls to avoid over ventilation.			

C.	**Evaluation :**
☐	PASS: All **Construction Inspection** responses are complete and **Testing Calculations & Results** responses are positive (Y - yes)