2005 CERTIFICATE OF ACCEPTANCE (Part 1 of 3) MECH-1-A

PROJECT NAME		DATE
PROJECT ADDRESS		
TESTING AUTHORITY	TELEPHONE	_____ Checked by/Date Enforcement Agency Use

GENERAL INFORMATION

DATE OF BLDG. PERMIT	PERMIT #	BLDG. CONDITIONED FLOOR AREA	CLIMATE ZONE
BUILDING TYPE	☐ NONRESIDENTIAL	☐ HIGH RISE RESIDENTIAL	☐ HOTEL/MOTEL GUEST ROOM
PHASE OF CONSTRUCTION	☐ NEW CONSTRUCTION	☐ ADDITION ☐ ALTERATION	☐ UNCONDITIONED

STATEMENT OF ACCEPTANCE

This Certificate of Acceptance summarizes the results of the acceptance tests related to building mechanical requirements per Title 24, Part 6. (Sections 10-103.b, 121.f, 122.h, 125.a, 125.b, 125.c, 125.c.5, 125.d)

Please check one:

☐ I hereby affirm that I am eligible under the provisions of Division 3 of the Business and Professions Code to sign this document as the person responsible for it's preparation; and that I am licensed in the State of California as a civil engineer or mechanical engineer, or I am a licensed architect.

☐ I affirm that I am eligible under the exemption to Division 3 of the Business and Professions Code by Section 5537.2 or 6737.3 to sign this document as the person responsible for its preparation; and that I am a licensed contractor performing this work.

☐ I affirm that I am eligible under the exemption to Division 3 of the business and Professions Code to sign this document because it pertains to a structure or type of work described pursuant to Business and Professions Code sections 5537, 5538, and 6737.1.

(These sections of the Business and Professions Code are printed in full in the Nonresidential Manual.)

TESTING AUTHORITY - NAME	SIGNATURE	DATE	LIC.#

INSTRUCTIONS TO APPLICANT

For Detailed instructions on the use of this and all Energy efficiency Standards acceptance forms, please refer to the Nonresidential Manual published by the California Energy Commission.

Part 1 of 3 - Statement of Acceptance
Part 2 of 3 - Summary of Acceptance Tests
Part 3 of 3 - Summary of Acceptance Testing Results

2005 CERTIFICATE OF ACCEPTANCE (Part 2 of 3) MECH-1-A

PROJECT NAME	DATE

SUMMARY OF ACCEPTANCE TESTS

SYSTEM ACCEPTANCE DOCUMENT (Form __ of _	TESTING AUTHORITY	DATE OF TEST	PASS / FAIL	NOTES Bldg.

NOTE: Use additional sheets as necessary

2005 CERTIFICATE OF ACCEPTANCE (Part 3 of 3) MECH-1-A

PROJECT NAME	DATE

SUMMARY OF ACCEPTANCE TESTING RESULTS

Certified	N / A	Testing Authority Certifies That:
Air Distribution Systems		
☐	☐	The air distribution ducts and plenums meet the requirements of Section 124(a) through Section 124(g).
☐	☐	The air distribution ducts meet the requirements of Section 144(k).
Variable Air Volume Systems		
☐	☐	The fans meet the requirements of Section 144.c.2.
☐	☐	The variable air volume systems installed to comply Section 141 with individual VAV fans of motors 10 horsepower or larger shall comply with Section 144.c.2.B.
Hydronic System Controls		
☐	☐	The fans meet the requirements of Section 144(i).
☐	☐	Hydronic systems installed to comply to Section 141 shall be certified to meet requirements of each of Sections 144.i.1 through 144.i.6.
Economizer		
☐	☐	The economizers meet the requirements of Section 144.e1, 2, and 3.

2005 ACCEPTANCE REQUIREMENTS FOR CODE COMPLIANCE

Ventilation System Acceptance Document — MECH-2-A

NJ.3.1, NJ.3.2 — Form __ of __

PROJECT NAME		DATE
PROJECT ADDRESS		
TESTING AUTHORITY	TELEPHONE	
VENTILATION SYSTEM NAME / DESIGNATION		_____ Checked by/Date Enforcement Agency Use

Intent: Verify measured outside airflow CFM is within ± 10% of the total required outside airflow value found in the Standards Mechanical Plan (MECH-3, Column I), per 121(f).

Construction Inspection

1 Instrumentation to perform test includes, but not limited to:
   a. Watch
   b. Means to measure airflow (hot wire anemometer or pitot tube)

2 Check one of the following:

☐ Variable Air Volume (VAV) - Check as appropriate:
   a. Sensor used to control outdoor air flow must have calibration certificate or be field calibrated
      ☐ Calibration certificate (attach calibration certification)
      ☐ Field calibration (attach results)

☐ Constant Air Volume (CAV) - Check as appropriate:
   ☐ System is designed to provide a fixed minimum OSA when the unit is on

Certification Statement: I certify that all statements are true on this MECH-2-A form including the PASS/FAIL Evaluation. I affirm I am eligible to sign this form under the provisions described in the Statement of Acceptance on form MECH-1-A

Name: _____

Company: _____

Signature: _____ Date: _____

License: _____ Expires: _____

2005 ACCEPTANCE REQUIREMENTS FOR CODE COMPLIANCE

Ventilation System Acceptance Document — MECH-2-A

NJ.3.1, NJ.3.2 — Form __ of __

PROJECT NAME	DATE

A. Equipment Testing			CAV	VAV
a.		Constant or Variable Air Volume (CAV or VAV) - check appropriate column		
b.		Verify unit is not in economizer mode during test - check appropriate column		
Step 1: CAV and VAV testing at full supply airflow				
	1	Drive boxes open (check)		
	2	Measured outdoor airflow (cfm)		
	3	Required outdoor airflow (cfm) *(from MECH-3, column I)*		
	4	Time for outside air damper to stabilize after VAV boxes open (minutes)		
	5	Return to initial conditions (check)		
Step 2: VAV testing at reduced supply airflow				
	1	Drive boxes to minimum (check)		
	2	Measured outdoor airflow (cfm)		
	3	Required outdoor airflow (cfm) *(from MECH-3, column I)*		
	4	Time for outside air damper to stabilize after VAV boxes open (minutes)		
	5	Return to initial conditions (check)		

B. Testing Calculations & Results	CAV	VAV
Step 1: % Outdoor Air = Measured outside air /Required outside air (Step1:2/Step1:3)	%	%
90%< %Outdoor Air > 110%	Y / N	Y / N
Outside air damper position stabilizes within 15 minutes (Step 1:4 < 15 minutes)	Y / N	Y / N
Step 2: % Outdoor Air = Measured outside air /Required outside air (Step2:2/Step2:3)		
90%< %Outdoor Air > 110%		Y / N
Outside air damper position stabilizes within 15 minutes (Step 2:4 < 15 minutes)		Y / N

Note: Shaded areas do not apply for particular test procedure

C. PASS / FAIL Evaluation (check one):	
☐	PASS: All **Construction Inspection** responses are complete and **Testing Calculations & Results** responses are positive (Y - yes)
☐	FAIL: Any **Construction Inspection** responses are incomplete *OR* there is one or more negative (N - no) responses in **Testing Calculations & Results** section. Provide explanation below. Use and attach additional pages if necessary.

2005 ACCEPTANCE REQUIREMENTS FOR CODE COMPLIAI

Packaged HVAC Systems Acceptance Document MECH-3-A

NJ.4.1 **Form __ of _**

PROJECT NAME		DATE
PROJECT ADDRESS		
TESTING AUTHORITY	TELEPHONE	
PACKAGED HVAC NAME / DESIGNATION		Checked by/Date Enforcement Agency Use

Intent: Verify that under a specific load whether in occupied or unoccupied condition, the system meets a specific sequence of operation.

Construction Inspection

1 Instrumentation to perform test includes, but not limited to:
   a. None required

2 Installation
   ☐ Thermostat or zone temperature sensor is located within the zone that the HVAC system serv
   ☐ Thermostat or sensor is wired to the HVAC system correctly

3 Programming (check **all** of the following)
   ☐ Heating and cooling thermostats are capable of a 5°F deadband where cooling and heating are at a minimum (§122b3)
   ☐ Occupied, unoccupied, and holiday schedule have been programmed.
   ☐ Pre-occupancy purge (at least lesser of minimum outside air or 3 ACH for one hour prior to occupancy) programmed (§121.c.2)
   ☐ Set up and set back setpoints have been programmed as required

Certification Statement: I certify that all statements are true on this MECH-3-A form including the PASS/FAIL Evaluation. I affirm I am eligible to sign this form under the provisions described in the Statement of Acceptance on form MECH-1-A

Name: _____

Company: _____

Signature: _____ Date: _____

License: _____ Expires: _____

2005 ACCEPTANCE REQUIREMENTS FOR CODE COMPLIAI

Packaged HVAC Systems Acceptance Document — MECH-3-A

NJ.4.1 — **Form __ of _**

PROJECT NAME	DATE

B. Equipment Testing Requirements — **Operating Modes**

Check and verify the following for each simulation mode required			A: Heating load during occupied condition	B: No-load during occupied condition	C: Heating load during unoccupied condition	D: No-load during unoccupied condition	E: Cooling load during occupied condition	F: Cooling load during unoccupied condition	G: Manual override
	1	Supply fan operates continually	☐	☐			☐	☐	
	2	Supply fan turns off				☐			
	3	Supply fan cycles on and off			☐				☐
	4	System reverts to "occupied" mode to satisfy any condition					☐		
	5	System turns off when manual override time period expires					☐		
	6	Gas-fired furnace, heat pump, or electric heater stages on	☐		☐				
	7	Neither heating or cooling is provided by the unit		☐		☐			
	8	No heating is provided by the unit		☐		☐		☐	☐
	9	No cooling is provided by the unit	☐	☐	☐	☐			
	10	Compressor stages on						☐	☐
	11	Outside air damper is open to minimum position	☐	☐			☐	☐	
	12	Outside air damper closes completely				☐			
	13	System returned to initial operating conditions after all tests have been completed	Y/N						

Note: Shaded areas do not apply for particular test procedure

C. Testing Results							
Indicate if Passed (P), Failed (F), or Not Applicable (X), fill in appropriate letter							

D. PASS / FAIL Evaluation (check one):

☐	PASS: All **Construction Inspection** responses are complete and all applicable **Testing Results** responses are "Passed" (P)
☐	FAIL: Any **Construction Inspection** responses are incomplete *OR* there is one or more "Failed" (F) responses in **Testing Results** section. Provide explanation below. Use and attach additional pages if necessary.

2005 ACCEPTANCE REQUIREMENTS FOR CODE COMPLIANCE

Economizer Acceptance Document — MECH-4-A

NJ.7.1 — Form __ of __

PROJECT NAME		DATE
PROJECT ADDRESS		
TESTING AUTHORITY	TELEPHONE	
AIR ECONOMIZER NAME / DESIGNATION		_____ Checked by/Date Enforcement Agency Use

Intent: Verify that an HVAC system uses outside air to satisfy space cooling loads when outside air conditions are acceptable.

Construction Inspection

1 Instrumentation to perform test includes, but not limited to:
   a. Hand-held temperature probes
   b. Multi-meter capable of measuring ohms and milliamps

2 Test method (check one of the following):

☐ Economizer comes from HVAC system manufacturer installed by and has been factory calibrated and tested. **Attach documentation and complete certification statement. No equipment testing required.**

☐ Economizer field installed and field tested.

3 Installation (check **all** of the following first level boxes)

☐ Economizer high limit setpoint complies with Table 144-C per Standards Section 144(e)3

☐ System controls are wired correctly to ensure economizer is fully integrated (i.e. economizer will operate when mechanical cooling is enabled), if all boxes are checked for Standalone Control or EMS Control

Stand-alone Control Systems:

- ☐ HVAC unit has two-stage thermostat and the economizer is wired to be the first stage of control
- ☐ First stage of cooling (Y1) from thermostat is separately wired to Y1 at HVAC unit
- ☐ Second stage of cooling (Y2) from thermostat is separately wired to Y2 at HVAC unit
- ☐ Two stages of cooling are not jumpered or wired together

EMS Controlled Systems:

- ☐ Control sequence of operations will allow economizer to be integrated with cooling coil

☐ Economizer high limit control sensor(s) are properly installed

☐ System is provided with either barometric relief or powered relief (a relief fan or a return fan)

☐ Sensor(s) used for economizer high limit control has factory calibration certificate or is field calibrated. Sensors include: outside air sensor only if single-point changeover; both outside and return air sensors if differential changeover control. Field calibration is not necessary if economizer is factory installed.

Certification Statement: I certify that all statements are true on this MECH-4-A form including the PASS/FAIL Evaluation. I affirm I am eligible to sign this form under the provisions described in the Statement of Acceptance on form MECH-1-A

Name: _____

Company: _____

Signature: _____ Date: _____

License: _____ Expires: _____

2005 ACCEPTANCE REQUIREMENTS FOR CODE COMPLIANCE

Economizer Acceptance Document — MECH-4-A

NJ.7.1 — Form __ of __

PROJECT NAME	DATE

A. Equipment Testing

Step 1: Simulate a cooling load and enable the economizer (check and verify the following)

☐	Economizer damper modulates open to maximum position to provide 100% of design supply air quantity as outside air
☐	Return air damper modulates closed and is completely closed when economizer damper is 100% open
☐	Economizer damper is 100% open before mechanical cooling is enabled
☐	Relief is provided through barometric damper or powered relief (relief or return fan and exhaust damper)
☐	Mechanical cooling is only enabled if cooling space temperature setpoint is not met with economizer at 100% open
☐	There are no signs of building overpressurization

Step 2: Simulate a cooling load and disable the economizer (check and verify the following)

☐	Economizer damper closes to minimum position
☐	Return air damper opens to normal operating position
☐	Relief fan (if applicable) shuts off or barometric relief dampers close. If system uses a return fan, the exhaust damper is shut.
☐	Mechanical cooling remains enabled until cooling space temperature setpoint is met

Step 3: System returned to initial operating conditions	Y / N

B. Testing Results	**PASS / FAIL**
Step 1: Simulate cooling load and enable the economizer (all check boxes are complete)	
Step 2: Simulate cooling load and disable the economizer (all check boxes are complete)	

C. PASS / FAIL Evaluation (check one):

☐	PASS: All **Construction Inspection** responses are complete and all **Testing Results** responses are "Pass"
☐	FAIL: Any **Construction Inspection** responses are incomplete *OR* there is one or more "Fail" responses in **Testing Results** section. Provide explanation below. Use and attach additional pages if necessary.

2005 ACCEPTANCE REQUIREMENTS FOR CODE COMPLIANCE

Demand Control Ventilation Acceptance Document — MECH-6-A

NJ.8.1 — Form __ of __

PROJECT NAME		DATE
PROJECT ADDRESS		
TESTING AUTHORITY	TELEPHONE	
DCV NAME / DESIGNATION		_____ Checked by/Date Enforcement Agency Use

Intent: Verify outside air ventilation flow rate can be modulated automatically based on maintaining interior carbon dioxide concentration setpoint.

Construction Inspection

1 Instrumentation to perform test may include, but not limited to:
   a. Calibrated hand-held CO2 analyzer
   b. Manufacturer's calibration kit
   c. Calibrated CO2/air mixtures

2 Installation
   ☐ The sensor is located in the room between 1 ft and 6 ft above the floor
   ☐ System controls are wired correctly to ensure proper control of outdoor air damper system

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

Certification Statement: I certify that all statements are true on this MECH-6-A form including the PASS/FAIL Evaluation. I affirm I am eligible to sign this form under the provisions described in the Statement of Acceptance on form MECH-1-A

Name: _____

Company: _____

Signature: _____ Date: _____

License: _____ Expires: _____

2005 ACCEPTANCE REQUIREMENTS FOR CODE COMPLIANCE

Demand Control Ventilation Acceptance Document	**MECH-6-A**
NJ.8.1	**Form __ of __**

PROJECT NAME	DATE

A. Equipment Testing	
a. Verify economizer controls disabled	
b. Outside air CO2 concentration (select one of the following)	
☐ Assumed to be 400 ppm	_____ ppm
☐ Measured dynamically using CO2 sensor	_____ ppm
c. Interior CO2 concentration setpoint (Outside CO2 concentration + 600 ppm)	_____ ppm
Step 1: Simulate a high CO2 load	
☐ Outdoor air damper modulates opens per Standards toward maximum position to satisfy outdoor air requirements specified in Section 121(c)4, Table 121-A.	
Step 2: Simulate a low CO2 load, or increase CO2 setpoint	
☐ Outdoor air damper closes to minimum position during occupancy	
Step 3: System returned to initial operating conditions	Y / N

B. Testing Results	**PASS / FAIL**
Step 1: Simulate a high CO2 load (check box complete)	
Step 2: Simulate a low CO2 load (check box complete)	

C. PASS / FAIL Evaluation (check one):	
☐	PASS: All **Construction Inspection** responses are complete and all **Testing Results** responses are "Pass"
☐	FAIL: Any **Construction Inspection** responses are incomplete *OR* there is one or more "Fail" responses in **Testing Results** section. Provide explanation below. Use and attach additional pages if necessary.

2005 ACCEPTANCE REQUIREMENTS FOR CODE COMPLIANCE

Supply Fan VFD Acceptance Document — MECH-7-A

NJ.9.1 — Form __ of __

PROJECT NAME		DATE
PROJECT ADDRESS		
TESTING AUTHORITY	TELEPHONE	
VFD NAME / DESIGNATION		_____ Checked by/Date Enforcement Agency Use

Intent: Verify that the supply fan in a variable air volume application modulates to meet air flow demand and operating parameters are within +/-10% of design value and/or setpoint.

Construction Inspection

1 Instrumentation to perform test includes, but not limited to:
   a. Differential pressure gauge

2 Test preparation
   ☐ Disable discharge air temperature reset sequences to prevent unwanted interaction while performing tests

3 Documentation of all discharge static pressure sensors including (check one of the following):
   a. Factory-calibrated (proof required)
      ☐ Factory-calibration certificate
   b. Field-calibrated
      ☐ Calibration complete, all pressure sensors within 10% of calibrated reference sensor

Certification Statement: I certify that all statements are true on this MECH-7-A form including the PASS/FAIL Evaluation. I affirm I am eligible to sign this form under the provisions described in the Statement of Acceptance on form MECH-1-A

Name: _____

Company: _____

Signature: _____ Date: _____

License: _____ Expires: _____

2005 ACCEPTANCE REQUIREMENTS FOR CODE COMPLIANCE

Supply Fan VFD Acceptance Document — MECH-7-A

NJ.9.1 — **Form __ of __**

PROJECT NAME	DATE

	A. Equipment Testing		Results
Step 1: Drive all VAV boxes to achieve design airflow			
2.	Witness proper response from supply fan (e.g. VFD near 100%; variable pitch blades loaded)		Y / N
3.	Controller supply air static pressure setpoint at full flow		
4.	Measured supply fan discharge static pressure	In. WC=	
5.	Time for system to stabilize to full flow	Minutes =	
Step 2: Drive all VAV boxes to minimum flow			
6.	Witness proper response from supply fan (e.g. VFD slows fan speed; variable pitch blades unloade		Y / N
7.	Controller supply air static pressure setpoint at minimum flow		
8.	Measured supply fan discharge static pressure	In. WC=	
9.	Time for system to stabilize to minimum flow	Minutes =	
Step 3: System returned to initial operating conditions			Y / N

	B. Test Calculations and Results		
Compare design static pressure with controller setpoint and measured pressure at full flow			
1.	Ratio Measured static pressure / controller pressure setpoint at full flow **(A.4./A.3.)**	%=	
2.	90% < Measured static pressure / Controller pressure setpoint, at full flow **(B.2.)** < 110%		Y / N
3.	System stabilizes to full flow within 15 minutes (no hunting): **A.5. < 15 minutes**		Y / N
Compare controller setpoint to measured pressure at minimum flow and setpoint at full flow			
4.	Controller pressure setpoint at min flow ≤ controller pressure setpoint at full flow **(A.7. ≤ A.3.)**		Y / N
5.	Ratio Measured static pressure / Controller pressure setpoint at min flow **(A.8./A.7.)**	%=	
6.	90% < Measured static pressure / Controller pressure setpoint, at min flow **(B.5.)** < 110%		Y / N
7.	System stabilizes to minimum flow within 15 minutes (no hunting): **A.9. < 15 minutes**		Y / N

	C. PASS / FAIL Evaluation (check one)
☐	PASS: All **Construction Inspection** responses are complete and **Testing Results** responses are positive (Y - yes)
☐	FAIL: Any **Construction Inspection** responses are incomplete *OR* there is one or more negative (N - no) responses in **Testing Results** section. Provide explanation below. Use and attach additional pages if necessary.

2005 ACCEPTANCE REQUIREMENTS FOR CODE COMPLIANCE

Supply Fan VFD Acceptance Document — MECH-7-A

NJ.9.1 — Form __ of __

PROJECT NAME		DATE
PROJECT ADDRESS		
TESTING AUTHORITY	TELEPHONE	
VFD NAME / DESIGNATION		_____ Checked by/Date Enforcement Agency Use

Intent: Verify that the supply fan in a variable air volume application modulates to meet air flow demand and operating parameters are within +/-10% of design value and/or setpoint.

Construction Inspection

1 Instrumentation to perform test includes, but not limited to:
   a. Differential pressure gauge

2 Test preparation
   ☐ Disable discharge air temperature reset sequences to prevent unwanted interaction while performing tests

3 Documentation of all discharge static pressure sensors including (check one of the following):
   a. Factory-calibrated (proof required)
      ☐ Factory-calibration certificate
   b. Field-calibrated
      ☐ Calibration complete, all pressure sensors within 10% of calibrated reference sensor

Certification Statement: I certify that all statements are true on this MECH-7-A form including the PASS/FAIL Evaluation. I affirm I am eligible to sign this form under the provisions described in the Statement of Acceptance on form MECH-1-A

Name: _____

Company: _____

Signature: _____ Date: _____

License: _____ Expires: _____

2005 ACCEPTANCE REQUIREMENTS FOR CODE COMPLIANCE

Supply Fan VFD Acceptance Document — MECH-7-A

NJ.9.1 — **Form __ of __**

PROJECT NAME	DATE

	A. Equipment Testing		Results
Step 1: Drive all VAV boxes to achieve design airflow			
2.	Witness proper response from supply fan (e.g. VFD near 100%; variable pitch blades loaded)		Y / N
3.	Controller supply air static pressure setpoint at full flow		
4.	Measured supply fan discharge static pressure	In. WC=	
5.	Time for system to stabilize to full flow	Minutes =	
Step 2: Drive all VAV boxes to minimum flow			
6.	Witness proper response from supply fan (e.g. VFD slows fan speed; variable pitch blades unloade		Y / N
7.	Controller supply air static pressure setpoint at minimum flow		
8.	Measured supply fan discharge static pressure	In. WC=	
9.	Time for system to stabilize to minimum flow	Minutes =	
Step 3: System returned to initial operating conditions			Y / N

	B. Test Calculations and Results		
Compare design static pressure with controller setpoint and measured pressure at full flow			
1.	Ratio Measured static pressure / controller pressure setpoint at full flow **(A.4./A.3.)**	%=	
2.	90% < Measured static pressure / Controller pressure setpoint, at full flow **(B.2.)** < 110%		Y / N
3.	System stabilizes to full flow within 15 minutes (no hunting): **A.5. < 15 minutes**		Y / N
Compare controller setpoint to measured pressure at minimum flow and setpoint at full flow			
4.	Controller pressure setpoint at min flow ≤ controller pressure setpoint at full flow **(A.7. ≤ A.3.)**		Y / N
5.	Ratio Measured static pressure / Controller pressure setpoint at min flow **(A.8./A.7.)**	%=	
6.	90% < Measured static pressure / Controller pressure setpoint, at min flow **(B.5.)** < 110%		Y / N
7.	System stabilizes to minimum flow within 15 minutes (no hunting): **A.9. < 15 minutes**		Y / N

	C. PASS / FAIL Evaluation (check one)
☐	PASS: All **Construction Inspection** responses are complete and **Testing Results** responses are positive (Y - yes)
☐	FAIL: Any **Construction Inspection** responses are incomplete *OR* there is one or more negative (N - no) responses in **Testing Results** section. Provide explanation below. Use and attach additional pages if necessary.

2005 ACCEPTANCE REQUIREMENTS FOR CODE COMPLIANCE

Hydronic System Control Acceptance Document — MECH-8-A

NJ.10.1 - NJ.10.5 — Form __ of __

PROJECT NAME		DATE
PROJECT ADDRESS		
TESTING AUTHORITY	TELEPHONE	
HYDRONIC SYSTEM NAME / DESIGNATION		Checked by/Date Enforcement Agency Use

Intent: Satisfy HVAC water pumping requirements per Section 144(j).

Construction Inspection

1 Instrumentation to perform tests include, but not limited to:
   a. Differential pressure gauge
   b. Portable temperature probe

2 Variable Flow Controls (VFC) and Automatic Isolation Controls (AIC) Inspection

VFC AIC

☐ ☐ Valve and piping arrangements were installed per the design drawings to achieve the desired control

3 Supply Water Temperature Reset Controls Inspection

- ☐ Supply temperature sensors have been calibrated
  - ☐ Manufacturer's calibration certificates (attached)
  - ☐ Site calibration within 2° F of temperature measurement with reference meter
- ☐ Sensor locations are adequate to achieve accurate measurements
- ☐ Installed sensors comply with specifications

4 Water-loop Heat Pump Controls Inspection

- ☐ Valves were installed per the design drawings to achieve equipment isolation requirements
- ☐ All sensor locations comply with design drawings

5 Variable Frequency Drive Controls Inspection

- ☐ All valves, sensors, and equipment were installed per the design drawings
- ☐ Pressure sensors are calibrated
  - ☐ Manufacturer's calibration certificates (attached)
  - ☐ Site calibration within 10% of pressure measurement with reference meter

Certification Statement: I certify that all statements are true on this MECH-8-A form including the PASS/FAIL Evaluation. I affirm I am eligible to sign this form under the provisions described in the Statement of Acceptance on form MECH-1-A

Name: _____

Company: _____

Signature: _____ Date: _____

License: _____ Expires: _____

2005 ACCEPTANCE REQUIREMENTS FOR CODE COMPLIANCE

Hydronic System Control Acceptance Document — MECH-8-A

NJ.10.1 - NJ.10.5 — Form __ of __

PROJECT NAME	DATE

			System ID				
A.	**System Type**	**1**	**2**	**3**	**4**	**5**
	1 Chilled water					
	2 Heating hot water					
	3 Water-loop heat pump loop					
	4 Other (fill in blank):					
	5 Other (fill in blank):					
B.	**Select Acceptance Test (check all tests completed)**	**1**	**2**	**3**	**4**	**5**
☐	Variable Flow Control - Alternate 1 (Flow measurement)					
☐	Variable Flow Control - Alternate 2 (No flow measurement)					
☐	Automatic Isolation Controls					
☐	Supply Water Temperature Reset Controls					
☐	Water-loop Heat Pump Controls - Alternate 1 (With Flow Meter)					
☐	Water-loop Heat Pump Controls - Alternate 2 (Without Flow Meter)					
☐	(Pump) Variable Frequency Drive Controls - Alternate 1(With Flow Meter)					
☐	(Pump) Variable Frequency Drive Controls - Alternate 2(Without Flow Meter)					

	C. Equipment Testing Requirements	System ID				
	Verify and document the following (check applicable tests)	**1**	**2**	**3**	**4**	**5**
	NJ 10.1 Variable Flow Control - Alternate 1 (Flow measurement)					
	Step 1: Open all control valves.					
a.	Measured system flow (gpm) GPM =					
b.	Design system flow (gpm) GPM =					
c.	System operation achieves design conditions	☐	☐	☐	☐	☐
	Step 2: Initiate closure of control valves					
a.	Measured system flow (gpm) GPM =					
b.	Design system flow (gpm) GPM =					
c.	Design pump flow control strategy achieves flow reduction requirements	☐	☐	☐	☐	☐
d.	Ensure all valves operate correctly against the system pressure	☐	☐	☐	☐	☐
	Step 3: System returned to initial operating conditions	Y / N	Y / N	Y / N	Y / N	Y / N
	NJ.10.1 Variable Flow Control- Alternate 2 (No flow measurement)					
	Step 1:Drive all valves shut and dead head pump against manual isolation valve					
a.	Measured pressure across the pump (ft. H20) ΔP=					
	Step 2: Open manual isolation valve and measure pump DP with control valves closed					
a.	Measured pressure across the pump (ft. H20) ΔP=					
b.	Both shutoff pressures are within +/- 5% of each other	☐	☐	☐	☐	☐
	Step 3: System returned to initial operating conditions	Y / N	Y / N	Y / N	Y / N	Y / N
	NJ.10.2 Automatic Isolation Controls					
	Step 1:Drive all valves shut and dead head pump against manual isolation valve					
a.	Measured pressure across the pump (ft. H20) ΔP=					
	Step 2: Open manual isolation valve and start/stop each chiller or boiler one at a time					
a.	Verify automatic isolation valve opens fully when respective unit is ON	☐	☐	☐	☐	☐
b.	Verify automatic isolation valve closes fully when respective unit is OFF	☐	☐	☐	☐	☐
	Step 3: Stop all chillers and boilers on the hydronic loop					
a.	Measured pressure across the pump (ft. H20) ΔP=					
b.	Both shutoff pressures (1a and 3a) are within +/- 5% of each other	☐	☐	☐	☐	☐
	Step 4: System returned to initial operating conditions	Y / N	Y / N	Y / N	Y / N	Y / N

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PROJECT NAME			DATE				
NJ.10.3 Supply Water Temperature Reset Controls							
Step 1: Manually change design control variable to maximum setpoint							
a.	Reset temperature setpoint	°F =					
b.	Measured water temperature	°F =					
c.	Water temperature setpoint is reset to appropriate value		☐	☐	☐	☐	☐
d.	Actual water supply temperature meets setpoint		☐	☐	☐	☐	☐
Step 2: Manually change design control variable to minimum setpoint							
a.	Reset temperature setpoint	°F =					
b.	Measured water temperature	°F =					
c.	Water temperature setpoint is reset to appropriate value		☐	☐	☐	☐	☐
d.	Actual water supply temperature meets setpoint		☐	☐	☐	☐	☐
Step 3: System returned to initial operating conditions			Y / N	Y / N	Y / N	Y / N	Y / N
NJ 10.4 Water-loop Heat Pump Controls (for circulation pumps > 5 hp) - Alternate 1 (Flow measurement)							
Step 1: Open all control valves							
a.	Measured system flow (gpm)	GPM =					
b.	Design system flow (gpm)	GPM =					
c.	System operation achieves design conditions +/- 5% (Step 1.a./Step 1.b.)		☐	☐	☐	☐	☐
Step 2: Initiate shut-down sequence on each individual heat pumps							
a.	Isolation valves close automatically upon unit shut-down		☐	☐	☐	☐	☐
b.	Ensure all valves operate correctly at shut-off system pressure conditions		☐	☐	☐	☐	☐
c.	System flow reduced for each individual heat pump shut down		☐	☐	☐	☐	☐
Step 3: System returned to initial operating conditions			Y / N	Y / N	Y / N	Y / N	Y / N
NJ.10.4 Water-loop Heat Pump Controls (for circulation pumps > 5 hp) - Alternate 2 (No flow measurement)							
Step 1:Drive all valves shut and dead head pump against manual isolation valve							
a.	Measured pressure across the pump (ft. H20)	ΔP=					
Step 2: Open manual isolation valve and measure pump DP with automatic isolation valves closed							
a.	Measured pressure across the pump (ft. H20)	ΔP=					
b.	Both shutoff pressures are within +/- 5% of each other		☐	☐	☐	☐	☐
Step 3: System returned to initial operating conditions			Y / N	Y / N	Y / N	Y / N	Y / N
NJ.10.5 (Pump) Variable Frequency Drive Controls - Alternate 1 (With Flow Meters)							
Step 1: Open all control valves							
a.	Measured system flow (gpm)	GPM =					
b.	Design system flow (gpm)	GPM =					
c.	Design pump power (estimated by motor HP/ motor efficiency x 0.746 kW/HP)	kW =					
d.	System operation achieves design conditions +/- 5% (Step 1.a./Step 1.b.)		☐	☐	☐	☐	☐
e.	VFD operates near 100% speed at full flow		☐	☐	☐	☐	☐
Step 2: Modulate control valves closed							
a.	Ensure all valves operate correctly at system pressure conditions		☐	☐	☐	☐	☐
b.	Witness proper response from VFD (speed decreases as valves close)		☐	☐	☐	☐	☐
c.	Time for system to stabilize	Min =					
d.	System operation stabilizes within 5 min. after test procedures are initiated		☐	☐	☐	☐	☐
Step 3: Adjust system operation to achieve 50% flow							
a.	Measured system flow (gpm)	GPM =					
b.	Measured pump power at full flow	kW =					
c.	%Power = part load kW/full load design kW (Step 3.b. / Step 1.c.)	% =					
d.	VFD input power less than 30% of design		☐	☐	☐	☐	☐
Step 4: Adjust to achieve flow rate where VFD is below min speed setpoint							
a.	VFD minimum setpoint	Hz =					
b.	Ensure VFD maintains minimum speed setpoint		☐	☐	☐	☐	☐
Step 5: System returned to initial operating conditions			Y / N	Y / N	Y / N	Y / N	Y / N

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PROJECT NAME	DATE

NJ.10.5 (Pump) Variable Frequency Drive Controls - Alternate 2 (Without Flow Meters)						
Step 1: Open all control valves						
a.	Visually inspect a few valves to verify that they open					
b.	Time for system to stabilize Min =					
c.	System operation stabilizes within 5 min. after test procedures are initiated	☐	☐	☐	☐	☐
d.	VFD operates near 100% speed at full flow	☐	☐	☐	☐	☐
e.	Measured pressure at loop pressure sensor control point *(psi or ft WC)*					
Step 2: Modulate control valves closed						
a.	Visually inspect a few valves to verify that they close	☐	☐	☐	☐	☐
b.	Witness proper response from VFD (speed decreases as valves close)	☐	☐	☐	☐	☐
c.	Time for system to stabilize Min =					
d.	System operation stabilizes within 5 min. after test procedures are initiated	☐	☐	☐	☐	☐
e.	Measured pressure at loop pressure sensor control point *(psi or ft WC)*					
f.	Measured pressure with valves closed ≤ pressure with valves open	☐	☐	☐	☐	☐
Step 3: System returned to initial operating conditions		Y / N	Y / N	Y / N	Y / N	Y / N

D. PASS / FAIL Evaluation (check one):

☐ PASS: All applicable **Construction Inspection** responses are complete and applicable **Equipment Testing Requirements** check boxes are compete.

☐ FAIL: Any applicable **Construction Inspection** responses are incomplete *OR* there is one or more unchecked box for an applicable test in the **Equipment Testing Requirements** section. Provide explanation below. Use and attach additional pages if necessary.