

THERMAL ENERGY STORAGE (TES) SYSTEM ACCEPTANCE

CEC-NRCA-MCH-15-A (Revised 05/15)

CALIFORNIA ENERGY COMMISSION



CERTIFICATE OF ACCEPTANCE		NRCA-MCH-15-A
Thermal Energy Storage (TES) System Acceptance		(Page 1 of 5)
Project Name:	Enforcement Agency:	Permit Number:
Project Address:	City:	Zip Code:
System Name or Identification/Tag:	System Location or Area Served:	

<i>Note: Submit one Certificate of Acceptance for each system that must demonstrate compliance.</i>	Enforcement Agency Use: Checked by/Date
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Intent:	<i>Verify proper operation of distributed energy storage TES systems.</i>
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A. Construction Inspection
1. Supporting documentation needed to perform test includes:
a. Construction documents (plans, drawings, equipment schedule, etc.)
b. Approved submittals (for chillers, storage tanks, controls)
c. Copy of manufacturers' product literature
d. Copy of Title 24 code
e. Copy of pertinent appendices to Title 24



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B. System Installation Information	
<i>The following information for both the chiller and the storage tank(s) shall be provided on the plans to document the key TES System parameters. Information is likely to be found in submittal documents.</i>	
1. Chiller(s)	
Brand and Model:	
Type (Centrifugal, Reciprocating, etc) and (qty)	
Heat rejection type (air, water, other)	
Charge mode capacity (tons) @ avg. fluid temp.	
Discharge mode capacity (tons) @ temp.	
Discharge mode efficiency (kW/ton or EER)@ design ambient temp.	
Charge mode efficiency @ nighttime design ambient temp. (kW/ton or EER)	
Fluid type and percentage (nameplate)	
2. Storage	
Type (Check):	
<input type="checkbox"/> Ice-on-Coil Internal Melt <input type="checkbox"/> Ice-on-Coil External Melt <input type="checkbox"/> Encapsulated (e.g. ice balls) <input type="checkbox"/> Ice Harvester <input type="checkbox"/> Ice Slurry <input type="checkbox"/> Other Phase Change Material (e.g. paraffin)	<input type="checkbox"/> Chilled Water <input type="checkbox"/> Brine (or chilled water with additives) <input type="checkbox"/> Eutectic Salt <input type="checkbox"/> Clathrate Hydrate Slurry (CHS) <input type="checkbox"/> Cryogenic <input type="checkbox"/> Other (specify: _____)
Brand and Model	
Number of tanks	
If custom tanks used, specify height/width/depth or height/diameter	
Storage capacity per tank (ton-hours) @ entering/leaving temp. and hours discharged	
Storage rate (tons) @ flow rate (gpm) per tank	
Minimum charging temp. based on chiller and tank selections:	
Discharge rate (tons) @ entering/leaving temp. and hours discharged:	



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C. Functional Testing	Results
Step 1: TES System Design Verification	
The installing contractor(s) shall certify the following information, which verifies proper installation of the TES System components, consistent with system design expectations.	
a. Chiller(s) start-up procedure has been completed	Y/N
b. System fluid test and balance has been completed	Y/N
c. Air separation and purge has been completed	Y/N
d. Fluid (e.g. glycol) has been verified at the concentration and type indicated on the design documents	Y/N
e. The TES system has been fully charged at least once and charge duration noted	Y/N
f. The system has been partially discharged at least once and discharge duration noted	Y/N
g. The system is in a partial charge state in preparation for step 2 tests	Y/N
h. Schedule of operation has been activated as designed	Y/N
i. Mode documentation describes the state of system components in each mode of operation	Y/N
Step 2: TES System Controls and Operation Verification	
a. The TES system and the chilled water plant is controlled and monitored by an EMS.	<input type="checkbox"/> Pass / <input type="checkbox"/> Fail
b. The system has controls in place that are configured for the operator to (check all that apply): <input type="checkbox"/> manually select each mode of operation <input type="checkbox"/> use an EMS schedule to specify mode of operation	
<i>For scheduled operation, note the times when the system will be in each mode of operation below.</i>	Pass Fail N/A
Storage/charge mode. Manually select storage mode. Verify that the TES system stores energy.	<input type="checkbox"/> <input type="checkbox"/>
c. If scheduled, force the time between ___(am/pm) and ___(am/pm). Verify that the TES system stores energy.	<input type="checkbox"/> <input type="checkbox"/>
d. End of charge signal. Simulate a full storage charge by changing the thermal storage manufacturer's recommended end of charge output sensor to the EMS. Verify that the storage charging is stopped.	<input type="checkbox"/> <input type="checkbox"/>
e. Discharge mode. Generate a call for cooling. Manually select storage only discharge mode. Verify that the TES system starts discharging with the compressors off. Return to the off/secured mode. If scheduled, force the time to be between ___(am/pm) and ___(am/pm) and verify that the storage starts discharging with the compressors off.	<input type="checkbox"/> <input type="checkbox"/>
f. Mechanical cooling only mode. Generate a call for cooling. Manually select mechanical cooling only mode and verify that the storage does not discharge and the cooling load is met by the compressor only. Return to the off/secured mode. If scheduled, force the time to be between ___(am/pm) and ___(am/pm) and verify that the storage does not discharge and the cooling load is met by the compressor(s) only.	<input type="checkbox"/> <input type="checkbox"/>
g. Discharge and mechanical cooling mode. Generate a call for cooling. Manually select discharge and mechanical cooling mode and verify that the TES system discharges with the chiller(s) sharing the load. Return to the off/secured mode. If scheduled, force the time to be between ___(am/pm) and ___(am/pm) and verify that the storage starts discharging with the compressor(s) sharing the load.	<input type="checkbox"/> <input type="checkbox"/>
h. Off/storage-secured mode. Manually select the off/storage-secured mode and verify that the storage does not discharge and all compressors are off, regardless of the presence of calls for cooling. If scheduled, force the time to be between ___(am/pm) and ___(am/pm) and verify that the storage does not discharge and all compressors are off, regardless of the presence of calls for cooling.	<input type="checkbox"/> <input type="checkbox"/>
i. Charge plus cool mode. If provisions for this mode have been made by the system designer, verify that the tank(s) can be charged while serving an active cooling load, simulated by generating a call for cooling and entering the charge mode either manually or by time schedule. If the system disallows this mode of operation, verify that energy storage is disallowed or discontinued while an active cooling load is present.	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>

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D. Evaluation (check one)
<input type="checkbox"/> PASS: Construction Inspection responses are complete and all applicable tests in step 2 pass.



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DOCUMENTATION AUTHOR'S DECLARATION STATEMENT		
1. I certify that this Certificate of Acceptance documentation is accurate and complete.		
Documentation Author Name:	Documentation Author Signature:	
Documentation Author Company Name:	Date Signed:	
Address:	ATT Certification Identification (If applicable):	
City/State/Zip:	Phone:	
FIELD TECHNICIAN'S DECLARATION STATEMENT		
I certify the following under penalty of perjury, under the laws of the State of California:		
<ol style="list-style-type: none"> The information provided on this Certificate of Acceptance is true and correct. I am the person who performed the acceptance verification reported on this Certificate of Acceptance (Field Technician). The construction or installation identified on this Certificate of Acceptance complies with the applicable 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 Certificate(s) of Installation for the construction or installation identified on this Certificate of Acceptance has been completed and signed by the responsible builder/installer and has been posted or made available with the building permit(s) issued for the building. 		
Field Technician Name:	Field Technician Signature:	
Field Technician Company Name:	Position with Company (Title):	
Address:	ATT Certification Identification (if applicable):	
City/State/Zip:	Phone:	Date Signed:
RESPONSIBLE PERSON'S DECLARATION STATEMENT		
I certify the following under penalty of perjury, under the laws of the State of California:		
<ol style="list-style-type: none"> 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 Certificate of Acceptance. I am eligible under Division 3 of the Business and Professions Code in the applicable classification to accept responsibility for the system design, construction or installation of features, materials, components, or manufactured devices for the scope of work identified on this Certificate of Acceptance and attest to the declarations in this statement (responsible acceptance person). The information provided on this Certificate of Acceptance substantiates that the construction or installation identified on this Certificate of Acceptance 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 Certificate(s) of Installation for the construction or installation identified on this Certificate of Acceptance 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. 		
Responsible Acceptance Person Name:	Responsible Acceptance Person Signature:	
Responsible Acceptance Person Company Name:	Position with Company (Title):	
Address:	CSLB License:	
City/State/Zip:	Phone:	Date Signed: