Functional Test

Project _____

FT-_____   SERVICE WATER HEATER (GAS)

Related Tests: Small Service Water Heater Circulating Pumps

1.   Participants

<u>Party</u>	<u>Participation</u>
_____	_____
_____	_____
_____	_____

Party filling out this form and witnessing testing _____
Dates of tests _____

2.   Test Prerequisites

a.   __ The following have been started up and startup reports and prefunctional checklists submitted and approved ready for functional testing:
  __ Hot water heaters (GWH-1 and 2)   __ Service hot water piping

b.   __ All control system functions for this and all interlocking systems are programmed and operable per contract documents, including final setpoints and schedules and with debugging, loop tuning and sensor and device calibrations completed.   _____   _____

<div align="center">Controls Contractor Signature or Verbal   Date</div>

c.   __ Piping system flushing complete and required report approved.

g.   __ All A/E punchlist items for this equipment corrected.

h.   __ These functional test procedures reviewed and approved by installing contractor.

i.   __ Safeties and operating ranges reviewed.

j.   __ Test requirements and sequences of operation attached.

k.   __ Schedules and setpoints attached.

l.   __ Sufficient clearance around equipment for servicing.

m.   __ Have all energy savings control strategies, setpoints and schedules been incorporated that this water heater and control system are capable of? Is the temperature setpoint as low as it could practically be?

n.   __ **Sensor Calibration Checks.** The sensors listed below checked for calibration and adequate location. This is a spot check on a sample of the calibrations done during prefunctional checklisting.*

"In calibration" means making a reading with a calibrated test instrument within 6 inches of the site sensor. Verify that the sensor reading (via the permanent thermostat, gage or building automation system (BAS)) compared to the test instrument-measured value is within the tolerances specified in the prefunctional checklist requirements. If not, install offset in BAS, calibrate or replace sensor. Use the same test instruments as used for the original calibration, if possible.

Sensor & Location	Location OK[1]	**1st** Gage or BAS Value	Instrument Measured Value	**Final** Gage or BAS Value	Pass Y/N?

<u>Notes:</u>

Sensor & Location	Location OK[1]	**1st** Gage or BAS Value	Instrument Measured Value	**Final** Gage or BAS Value	Pass Y/N?
HWST thermometer					
HWRT thermometer					

[1]Sensor location is appropriate and away from causes of erratic operation.

o.   __ Other misc. checks of the prefunctional checklist and startup reports completed successfully.

p.   __ Record made of all values for current setpoints, etc. that may be changed to accomodate testing:

Parameter	Pre-Test Values	Returned to Pre-Test Values √
Hot water temperature setpoint GWH-1 Hot water temperature setpoint GWH-2		

3.   Testing Procedures and Record

Proced. No. & Spec. Seq. ID[1]	Req ID No.[2]	**Test Procedure**[3] **(including special conditions)**	**Expected and Actual Response**[4] [Write ACTUAL response in brackets or circle]	**Pass Y/N**	**Note #**
Boiler Burner Control Sequencing					
1		With the heaters in auto, but in standby, drain hot water via PRV to call for heat, or adjust the HW temperature setpoint to be 4 degrees above the HWT (from the thermometers). Flue damper should be shut.	Flue damper opens. GWH-1. GWH-2 Spark ignition lights pilot light. GWH-1 GWH-2 Main burners fire after pilot is lit. GWH-1 GWH-2		
2		--continued	When HW temperature meets setpoint, pilot & burners shut OFF; GWH-1 GWH-2 Flue damper closes. GWH-1 GWH-2		
3		Power failure. With WH satisfied and burner OFF, shut OFF power to flue damper.	Flue damper should open. GWH-1 GWH-2		
4		Observe the typical loop dT (HWST - HWRT).	It should be less than 8F [_____].		
5		Pressure relief valve. Test the presssure relief valve.	Water should be released. GWH-1 GWH-2		

Notes:

Proced. No. & Spec. Seq. ID[1]	Req ID No.[2]	Test Procedure[3] (including special conditions)	Expected and Actual Response[4] [Write ACTUAL response in brackets or circle]	Pass Y/N	Note #
6		Inspect for flammables around WH.	There should be no flammables near WH.		
7		Does quality and quantity of makeup air appear adequate?	Appears adequate.		
8	**--**	**Return all changed parameters & conditions to pre-test values[5]**	**Check off in table of Section 2 above when completed**		

[1]Sequences of operation attached to this test.
[2]Mode or function ID being tested from testing requirements section of the project Specifications.
[3]Step-by-step procedures for manual testing, trend logging or data-logger monitoring.
[4]Include tolerances for a passing condition. Fill-in spaces or lines not in brackets denote sequence parameters still to be specified by the A/E, conrols contractor or vendor. Write "Via BAS" for verifications of device position from BAS readout or "Via obs" for actual observation or from test instrument reading.
[5]Record any permanently changed parameter values and submit changes to Owner.

A summary of deficiencies identified during testing is attached.

-- END OF TEST --

Notes: