|  |  |
| --- | --- |
| FT: | **22 30 00** |
| **ITEM:** | **Domestic Water Heaters** |
| **ID:** |  |
| **AREA SERVED:** |  |

Form Filled Out By:

|  |  |  |
| --- | --- | --- |
|  | **Name & Company** | **Date** |
| GC |  |  |
| PC |  |  |
| EC |  |  |
| BC |  |  |
| CC |  |  |
| OR |  |  |
| A/E |  |  |
| CA |  |  |

GC = General Contractor; PC = Plumbing Contractor; EC = Electrical Contractor; BC = Balancing Contractor; CC = Controls Contractor; OR = Owner Representative; A/E = Architect/Engineer; CA = Commissioning Agent

XX = No Initials Required

# TEST PREREQUISITES

The following items have been completed and the equipment is ready for Functional Testing.

Check if OK. Enter note number if deficient.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Item | **GC** | **PC** | **EC** | **BC** | **CC** | **OR** | **A/E** | **CA** |
| Unit startup completed | XX |  | XX | XX | XX |  |  |  |
| Start-up report submitted | XX |  | XX | XX | XX |  |  |  |
| Test and Balance (TAB) completed | XX |  | XX |  | XX |  |  |  |
| SOO programmed | XX |  | XX | XX |  |  |  |  |
| Prefunctional Checklist completed | XX |  | XX | XX | XX |  |  |  |

# SENSOR CALIBRATION VERIFICATIONS

* Check a representative sample of sensors for calibration and adequate location.
* Test the packaged controls and BAS readings.
* Use the same test instruments as used for the original calibration, if possible.
* Verify that the sensor reading (via the permanent thermostat, gage, packaged control panel or BAS) compared to the test instrument-measured value is within the tolerances specified in the contract requirements. (\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_).
  + “In calibration” means making a reading with a calibrated test instrument within 6 inches of the site sensor.
  + For items out of calibration or adjustment, fix now if easy, via an offset in the BAS, calibration or replacement of sensor.

| **Sensor &**  **Location** | **Location OK1** | **1st Gage / Pkg**  **& BAS Value** | **Test Inst**  **Value** | **Final Gage / Pkg**  **& BAS Value** | **Pass**  **Y/N?** |
| --- | --- | --- | --- | --- | --- |
| Supply temperature |  | Pkg:  BAS: |  | Pkg:  BAS: |  |
| Return temperature |  | Pkg:  BAS: |  | Pkg:  BAS: |  |
|  |  | Pkg:  BAS: |  | Pkg:  BAS: |  |
|  |  | Pkg:  BAS: |  | Pkg:  BAS: |  |
|  |  | Pkg:  BAS |  | Pkg:  BAS |  |

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

# DEVICE CALIBRATION VERIFICATIONS

* Check a representative sample of actuators and devices for calibration and adequate operation.
  + “In calibration” means observing readout in the BAS and going to the actuator or controlled device and verifying that the BAS reading is correct.
  + For items out of calibration or adjustment, fix now if easy, via an offset in the BAS, or a mechanical fix.

| **Device / Actuator &**  **Location** | **Procedure** | **1st BAS**  **Value** | **Site**  **Observation** | **Final BAS**  **Value** | **Pass**  **Y/N?** |
| --- | --- | --- | --- | --- | --- |
| Thermostatic Mixing Valve |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |

# FUNCTIONAL PERFORMANCE VERIFICATIONS

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Sequence of Operations Checks:** | |  |  |  | |  |  | |
| The following is a step by step test to verify the system follows the design sequence of operation. The test procedure column indicates what adjustments are needed for testing. The acceptable response column indicates the acceptable responses to the test adjustments. Each step is either pass or fail. | | | | | | | |
| **Step** | **Test Procedure** | **Acceptable Response** | | | **Pass/Fail** | | |
| 1 | Confirm the Domestic Hot water tank setpoint is programmed to 140 Degrees F. and the Thermostatic 3-way mixing valve modulates to maintain the hot water supply temperature of 120 Degrees F | Hot water tank maintains 140 degrees at all times. | | |  | | |
| Temperature at heating water outlets is 120 degrees. | | |  | | |
| 2 | Fully open the heating water at the most hydronically remote faucet | Verify the domestic heating water is provided in a reasonable amount of time. | | |  | | |
| Measure the water temperature to confirm the water is meeting the domestic heating water temperature setpoint (120 Degrees F) | | |  | | |
| 3 | Fully open all heating water valves at all faucets | Verify the domestic heating water is provided in a reasonable amount of time to all faucets | | |  | | |
| Measure the water temperature to confirm the water is meeting the domestic heating water temperature setpoint (Sample faucets) | | |  | | |
| 4 | Adjust the domestic heating water supply temperature setpoint (set to 100 degrees F) | Verify the thermostatic 3 way mixing valve modulates to reach new setpoint | | |  | | |
| 5 | Return supply temperature setpoint to original setting (120 degrees F) | Verify the thermostatic 3 way mixing valve modulates to reach original setpoint | | |  | | |
| 6 | Shut off electrical power to the system using the unit mounted on/off switch | Verify water heater and circulation pump turn off | | |  | | |
| 7 | Return power to the system | Verify system returns to stable operation | | |  | | |
| 8 | Adjust setpoints and operations to test alarm conditions | Verify alarms are properly configured and reporting | | |  | | |

# OUTSTANDING ITEMS

Note outstanding items in table below. Use numbers referenced above.

|  |  |  |
| --- | --- | --- |
| Resolved (Initial / Date) | **Note** | Description |
|  | **1.** |  |
|  | **2.** |  |
|  | **3.** |  |
|  | **4.** |  |
|  | **5.** |  |
|  | **6.** |  |
|  | **7.** |  |
|  | **8.** |  |
|  | **9.** |  |
|  | **10.** |  |

# FIELD NOTES

Fill in as appropriate.

|  |
| --- |
|  |
|  |
|  |
|  |
|  |

# SIGN OFF

System / Equipment has been installed in accordance with the Contract Documents and is ready for Owner acceptance.

|  |  |  |
| --- | --- | --- |
|  | **Signature** | **Date** |
| **Contractor’s Representative** |  |  |
| **A /E Representative** |  |  |
| **Commissioning Agent** |  |  |
| **Owner’s Representative** |  |  |

## END OF TEST