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| **A. Design HERS Verified Dwelling Unit Water Heating Systems Information**  This table reports the water heating system(s) features specified on the registered CF1R compliance document for this project. | | | | | | | | | | | |
| 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 |
| Dwelling Unit Name | Water Heating System ID or Name | Water Heating System Type | Water Heater Type | # of Water Heaters in System | Fuel Type | Rated Input Type | Rated Input Value | Central DHW System Distribution | Dwelling Unit DHW System  Distribution Type | Compact Distrib. | Drain Water Heat Recovery |
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| **B. Installed HERS Verified Dwelling Unit Water Heating Systems Information**  This table reports the water heating system features installed in this project. | | | | | | | | | | | |
| 01 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 |
| Dwelling Unit Name | Water Heating System ID or Name | Water Heating System Type | Water Heater Type | # of Water Heaters in System | Fuel Type | Rated Input Type | Rated Input Value | Central DHW System Distribution | Dwelling Unit DHW System  Distribution Type | Compact Distrib. | Drain Water Heat Recovery |
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| **C. Design HERS Verified Dwelling Unit Water Heating Efficiency Information**  This table reports the water heater(s) efficiency features specified on the registered CF1R compliance document for this project. (Not needed for central systems) | | | | | | |
| 01 | 02 | 03 | 04 | 05 | 06 | 07 |
| Water Heating System ID or Name | Heating Efficiency Type | Heating Efficiency Value | Standby Loss  (%) | Exterior Insulation  R-Value | Water Heater Storage  Volume (gal) | Tank location |
|  |  |  |  |  |  |  |
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| --- | --- | --- | --- | --- | --- | --- | --- |
| **D. Installed HERS Verified Dwelling Unit Water Heating Efficiency Information**  This table reports the water heater(s) efficiency features installed in this project. (Not needed for central systems) | | | | | | | |
| 01 | 02 | 03 | | 04 | 05 | 06 | 07 |
| Water Heating System ID or Name | Heating Efficiency Type | Heating Efficiency Value | | Standby Loss  (%) | Exterior Insulation  R-Value | Water Heater Storage  Volume (gal) | Tank location |
|  |  |  | |  |  |  |  |
|  |  |  | |  |  |  |  |
| 08 | Compliance Statement | |  | | | | |

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| --- | --- | --- |
| **E. Installed Water Heater Manufacturer Information** | | |
| 01 | 02 | 03 |
| Water Heating System ID or Name | Manufacturer | Model Number |
|  |  |  |
|  |  |  |

|  |  |  |
| --- | --- | --- |
| **F. Mandatory Measures for all Domestic Hot Water Distribution Systems** | | |
| 01 | Equipment shall meet the applicable requirements of the Appliance Efficiency Regulations (Section 110.3(b)1). | |
| 02 | Unfired Storage Tanks are insulated with an external R-12 or combination of R-16 internal and external Insulation. (Section 110.3(c)4). | |
| 03 | The following pipes are insulated, to the thicknesses required by Table 120.3A, except for those sections of pipe that are subject to one of the exceptions below: All domestic hot water piping shall be insulated as specified in Section 609.11 of the California Plumbing Code. In addition, the following piping conditions shall have a minimum insulation wall thickness of 1 inch or a minimum insulation R-value of 7.7 (RA4.4.1)   * + The first 5 feet (1.5 meters) of cold water pipes from the storage tank.   + All piping with a nominal diameter of 3/4 inch (19 millimeter) and less than 1 inch.   + All hot water piping from the heating source to the kitchen fixtures.   + Piping from the heating source to storage tank or between tanks   + All piping associated with a recirculation system.   + All underground piping.   + Insulation buried below grade must be installed in a water proof and non-crushable casing or sleeve.   + Piping that penetrates framing members shall not be required to have pipe insulation for the distance of the framing penetration. Piping that penetrates metal framing shall use grommets, plugs, wrapping or other insulating material to assure that no contact is made with the metal framing. Insulation shall butt securely against all framing members.   + Piping installed in interior or exterior walls that is surrounded on all sides by at least 1 inch (2.5 cm) of insulation.   + Piping installed in crawlspace with a minimum of 1 inches (2.5 cm) of crawlspace insulation above and below.   + Piping installed in attics with a minimum of 4 inches (10 cm) of attic insulation on top   + Pipe insulation shall fit tightly and all elbows and tees shall be fully insulated. | |
| 04 | For Gas or Propane Water Heaters: Ensure the following are installed (Section 150.0(n))   * A dedicated 125V, 20A electrical receptacle connected to the electric panel with a 120/240V 3 conductor, 10 AWG copper branch circuit, within 3 feet from the water heater and is accessible with no obstructions;   + The conductor shall be labeled with the word “Spare” on both ends; and   + A reserved single pole circuit breaker space next to the circuit breaker next to the branch circuit labeled “Future” 240V shall be provided. * A Category III or IV vent, or a Type B vent with straight pipe between outside and water heater * A condensate drain no more than 2 inches higher than the base on water heater for natural draining * A gas supply line with capacity of at least 200,000 Btu/hr | |
| 05 | Verification Status: | * Pass - all applicable requirements are met; or * Fail - one or more applicable requirements are not met. Enter reason for failure in corrections notes field below; or * All N/A - This entire table is not applicable |
| 06 | Correction Notes: | |
| **The responsible person’s signature on this compliance document affirms that all applicable requirements in this table have been met unless otherwise noted in the Verification Status and the Corrections Notes in this table.** | | |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **G. HERS-Verified Compact Hot Water Distribution Expanded Credit (CHWDS-H-EX) (RA3.6.5)**  For dwelling units with multiple systems, enter the master bath distance and kitchen distance to the closest water heater, and enter the average of the furthest fixture to each water heater. | | | | | | | | |
| 01 | | 02 | | 03 | 04 | 05 | 06 | 07 |
| Dwelling Name | | Number of Stories | | Master Bath distance of furthest fixture to Water Heater in feet | Kitchen distance from furthest fixture to Water Heater in feet | Furthest Third furthest fixture to Water Heater in feet (Avg for multiple water heaters) | Weighted Distance | Qualification Distance |
|  | |  | |  |  |  |  |  |
|  | |  | |  |  |  |  |  |
| 08 | No hot water piping >1 inch diameter is allowed. | | | | | | | |
| 09 | Length of 1 inch diameter piping is limited to 8 feet or less. | | | | | | | |
| 10 | Two and three story buildings cannot have hot water distribution piping in the attic, unless the water heater is also located in the attic. | | | | | | | |
| 11 | Eligible recirculating systems must be HERS-Verified Demand Recirculation: Manual Control conforming to RA4.4.17. | | | | | | | |
| 12 | Verification Status: | | * Pass - all applicable requirements are met; or * Fail - one or more applicable requirements are not met. Enter reason for failure in corrections notes field below; or * All N/A - This entire table is not applicable | | | | | |
| 13 | Correction Notes: | | | | | | | |
| **The responsible person’s signature on this compliance document affirms that all applicable requirements in this table have been met unless otherwise noted in the Verification Status and the Corrections Notes in this table.** | | | | | | | | |

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| --- | --- | --- | --- | --- | --- | --- |
| **H. Compact Hot Water Distribution (CHWDS) (RA4.4.6)**  For dwelling units with multiple systems, enter the master bath distance and kitchen distance to the closest water heater, and enter the average of the furthest fixture to each water heater. | | | | | | |
| 01 | 02 | 03 | 04 | 05 | 06 | 07 |
| Dwelling  Name | Number of Stories | Master Bath distance of furthest fixture to Water Heater in feet | Kitchen distance from furthest fixture to Water Heater in feet | Furthest Third furthest fixture to Water Heater in feet (Avg for multiple water heaters) | Weighted Distance | Qualification Distance |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
| **The responsible person’s signature on this compliance document affirms that all applicable requirements in this table have been met** | | | | | | |

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| **I. HERS-Verified Drain Water Heat Recovery System (DWHR-H)**  DWHR devices shall comply with these requirements. | | | | | | | | | | |
| **Design DWHR System Information** | | | | | | | | | | |
| 01 | | 02 | | | 03 | | | 04 | | |
| System ID/Name | | Rated Effectiveness | | | Installation Configuration | | | Percent of shower served by the DWHR device | | |
|  | |  | | |  | | |  | | |
|  | |  | | |  | | |  | | |
| **Installed DWHR System Information** | | | | | | | | | | |
| 05 | 06 | | 07 | 08 | | | 09 | | 10 | 11 |
| System Name/ID | Manufacturer | | Model # | Rated effectiveness | | | Installation Configuration | | Percent of shower served by the DWHR device | DWHR System Certified by CEC  (Yes/No) |
|  |  | |  |  | | |  | |  |  |
|  |  | |  |  | | |  | |  |  |
| 12 | For water heating system serving a single dwelling, the DWHR system shall, at the minimum, recover heat from the master bathroom shower and must at least transfer that heat either back to the respective shower(s) or the water heater. | | | | | | | | | |
| 13 | For central water heating system serving multiple dwellings, the DWHR system shall, at the minimum, recover heat from half the showers located above the first floor and must at least transfer that heat either back to all the respective showers or the water heater. | | | | | | | | | |
| 14 | The DWHR unit(s) shall be installed within 1 degrees of the rated slope. Sloped DWHR shall have a minimum lengthwise slope of 1 degree. The lateral level tolerance shall be within plus or minus 1 degree. | | | | | | | | | |
| 15 | Verification Status: | | | | | * Pass - all applicable requirements are met; or * Fail - one or more applicable requirements are not met. Enter reason for failure in corrections notes field below; or * All N/A - This entire table is not applicable | | | | |
| 16 | Correction Notes: | | | | | | | | | |
| **The responsible person’s signature on this compliance document affirms that all applicable requirements in this table have been met unless otherwise noted in the Verification Status and the Corrections Notes in this table.** | | | | | | | | | | |

| **J. HERS-Verified Pipe Insulation Credit Requirements (PIC-H) (RA3.6.3)**  Systems that utilize this distribution type shall comply with these requirements. | | |
| --- | --- | --- |
| 01 | HERS rater shall perform a visual inspection that all hot water piping comply with the insulation requirements in 150.0(J). | |
| 02 | Verification Status: | * Pass - all applicable requirements are met; or * Fail - one or more applicable requirements are not met. Enter reason for failure in corrections notes field below; or * All N/A - This entire table is not applicable |
| 03 | Correction Notes: | |
| **The responsible person’s signature on this compliance document affirms that all applicable requirements in this table have been met unless otherwise noted in the Verification Status and the Corrections Notes in this table.** | | |

| **K. HERS-Verified Parallel Piping Requirements (PP-H) (RA3.6.4)**  Systems that utilize this distribution type shall comply with these requirements. | | |
| --- | --- | --- |
| 01 | Each central manifold has 5 feet or less of pipe between manifold and water heater. | |
| 02 | For manifolds that include valves, the manifold must be readily accessible in accordance with the plumbing code. | |
| 03 | Hot water distribution system piping from the manifold to the fixtures and appliances must take the most direct path. For example, piping from a second story manifold cannot supply the first floor. | |
| 04 | The hot water distribution piping must be separated by at least 2 inches from any other hot water supply piping, and at least 6 inches from any cold water supply piping. Alternatively, the hot water supply piping must be insulated to the thicknesses shown in TABLE 120.3-A. | |
| 05 | Verification Status: | * Pass - all applicable requirements are met; or * Fail - one or more applicable requirements are not met. Enter reason for failure in corrections notes field below; or * All N/A - This entire table is not applicable |
| 06 | Correction Notes: | |
| **The responsible person’s signature on this compliance document affirms that all applicable requirements in this table have been met unless otherwise noted in the Verification Status and the Corrections Notes in this table.** | | |

| **L. Parallel Piping Requirements (PP) (RA4.4.4)**  Systems that utilize this distribution type shall comply with these requirements. | |
| --- | --- |
| 01 | Each central manifold has 15 feet or less of pipe between manifold and water heater |
| 02 | For manifolds that include valves, the manifold must be readily accessible in accordance with the plumbing code. |
| 03 | Hot water distribution system piping from the manifold to the fixtures and appliances must take the most direct path. For instance, piping from a second story manifold cannot supply the first floor |
| 04 | The hot water distribution piping must be separated by at least 2 inches from any other hot water supply piping, and at least 6 inches from any cold water supply piping. Alternatively, the hot water supply piping must be insulated to the thicknesses shown in TABLE 120.3-A. |
| **The responsible person’s signature on this compliance document affirms that all applicable requirements in this table have been met.**  **et.** | |

| **M. Point of Use Requirements (POU) (RA4.4.5)**  Systems that utilize this distribution type shall comply with these requirements. | |
| --- | --- |
| 01 | All hot water supply pipe run lengths are equal to or less than the maximum values shown below, based on the pipe diameter. If a combination of piping is used in a single run, then one half the allowed length of each size is the maximum installed length.  The maximum allowed length of piping for the longest run terminating in:  3/8 inch - For only one pipe size - max length allowed is 15 feet  For combination pipe sizes the max allowed length of 3/8-inch piping is 7.5 feet, of ½ inch piping is 5 feet, and ¾ inch piping is 2.5 feet.  ½ inch - For only one pipe size – max length allowed is 10 feet  For combination pipe sizes the allowed length of ½-inch piping is 5 feet, and ¾ inch piping is 2.5 feet.  ¾ inch - For only one pipe size = 5 feet |
| **The responsible person’s signature on this compliance document affirms that all applicable requirements in this table have been met.** | |

| **N. Mandatory Requirements for all Recirculation Systems (RA4.4.7)**  Systems that utilize this distribution type shall comply with these requirements. | |
| --- | --- |
| 01 | A check valve located between the recirculation pump and the water heater to prevent unintentional recirculation. |
| 02 | Piping must take most direct path between water heater and fixtures. |
| 03 | Insulation is not required on the cold water line when it is used as the return. |
| 04 | If more than one loop installed each loop shall have its own pump and controls. |
| **The responsible person’s signature on this compliance document affirms that all applicable requirements in this table have been met** | |

| **O. Recirculation Non-Demand Controls Requirements (R-ND) (RA4.4.8)**  Systems that utilize this distribution type shall comply with these requirements. | |
| --- | --- |
| 01 | The active control shall be either: timer, temperature, or time and temperature. Timers shall be set to less than 24 hours. The temperature sensor shall be connected to the piping and to the controls for the pump. |
| **The responsible person’s signature on this compliance document affirms that all applicable requirements in this table have been met.** | |

| **P. Demand Recirculation Manual Control (R-DRmc) (RA4.4.9)/Sensor Control (RDRsc) (RA4.4.10) Requirements**  Systems that utilize this distribution type shall comply with these requirements. | |
| --- | --- |
| 01 | The system operates “on-demand”, meaning that the pump begins to operate shortly before or immediately after hot water draw begins, and stops when the return water temperature reaches a certain threshold value. For Demand Recirculation Manual Control, the pump shall be turned on using a manual switch system. For Demand Recirculation Sensor Control, the pump shall be turned on using a sensor system. |
| 02 | The controls shall be located in the kitchen, bathroom, and any hot water fixture location that is at least 20 feet from the water heater. |
| 03 | Manual controls may be active by wired or wireless mechanisms. |
| 04 | Sensor Controls may be activated by wired or wireless mechanisms, including buttons, motion sensors, door switches and flow switches. Each control shall have standby power of 1 Watt or less. |
| 05 | Pump and control placement shall meet one of the following criteria:   * When a dedicated return line has been installed the pump, controls and thermo-sensor are installed at the end of the supply portion of the recirculation loop; or * The pump and controls are installed on the dedicated return line near the water heater and the thermo-sensor is installed in an accessible location as close to the end of the supply portion of the recirculation loop as possible; or * When the cold water line is used as the return, the pump, demand controls and thermo-sensor shall be installed in an accessible location at the end of supply portion of the hot water distribution line (typically under a sink). |
| 06 | After the pump has been activated, the controls shall allow the pump to operate until the water temperature at the thermo-sensor rises to one of the following values:   * Not more than 10°F (5.6°C) above the initial temperature of the water in the pipe * Not more than 102°F (38.9°C). |
| 07 | Controls shall limit operation to no more than 5 minutes following activation. |
| **The responsible person’s signature on this compliance document affirms that all applicable requirements in this table have been met.** | |

| **Q. HERS-Verified Demand Recirculation Manual Control (RDRmc-H) (RA3.6.6)/Sensor Control (RDRsc-H) (RA3.6.7) Requirements**  Systems that utilize this distribution type shall comply with these requirements | | |
| --- | --- | --- |
| 01 | HERS rater shall perform a visual inspection to verify that the demand pump, manual/sensor controls and thermo-sensor are present and operating properly consistent with the applicable requirements of RA4.4.9 and RA4.4.10 | |
| 02 | Verification Status: | * Pass - all applicable requirements are met; or * Fail - one or more applicable requirements are not met. Enter reason for failure in corrections notes field below; or * All N/A - This entire table is not applicable |
| 03 | Correction Notes: | |
| **The responsible person’s signature on this compliance document affirms that all applicable requirements in this table have been met unless otherwise noted in the Verification Status and the Corrections Notes in this table.** | | |

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| **R. Determination of HERS Verification Compliance** |
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| --- | --- |
| **Documentation Author's Declaration Statement** | |
| 1. I certify that this Certificate of Verification documentation is accurate and complete. | |
| Documentation Author Name: | Documentation Author Signature: |
| Company: | Date Signed: |
| Address: | CEA/HERS Certification Information (if applicable): |
| City/State/Zip: | Phone: |
| **Responsible Person's Declaration statement** | |
| I certify the following under penalty of perjury, under the laws of the State of California:   1. The information provided on this Certificate of Verification is true and correct. 2. I am the certified HERS Rater who performed the verification identified and reported on this Certificate of Verification (responsible rater). 3. The installed features, materials, components, manufactured devices, or system performance diagnostic results that require HERS verification identified on this Certificate of Verification comply with the applicable requirements in Reference Appendices RA2, RA3, and the requirements specified on the Certificate of Compliance for the building approved by the enforcement agency. 4. The information reported on applicable sections of the Certificate(s) of Installation (CF2R) signed and submitted by the person(s) responsible for the construction or installation conforms to the requirements specified on the Certificate(s) of Compliance (CF1R) approved by the enforcement agency. 5. I will ensure that a registered copy of this Certificate of Verification 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 registered copy of this Certificate of Verification is required to be included with the documentation the builder provides to the building owner at occupancy. | |
| **BUILDER OR INSTALLER INFORMATION AS SHOWN ON THE CERTIFICATE OF INSTALLATION** | |
| Company Name (Installing Subcontractor, General Contractor, or Builder/Owner): | |
| Responsible Builder or Installer Name: | CSLB License: |
| **HERS PROVIDER DATA REGISTRY INFORMATION** | |
| Sample Group Number (if applicable): | Dwelling Test Status in Sample Group (if applicable) |
| **HERS RATER INFORMATION** | |
| HERS Rater Company Name: | |
| Responsible Rater Name: | Responsible Rater Signature: |
| Responsible Rater Certification Number w/ this HERS Provider | Date Signed: |

**CF3R-PLB-22-H User Instructions**

**A. Design Central Water Heating Systems Information**

This table reports the water heating system features that were specified on the registered CF1R compliance document for this project. For information only and requires no user input.

**B. Installed Dwelling Unit Water Heating Systems Information**

This table reports the water heating system information that is being installed. Require one line for each system.

01 Water Heating System ID or Name – Reference information from CF1R.

02 Water Heating System Type – Reference information from CF1R. The different kinds of water heating system type are DHW, or Combined Hydronic.

03 Water Heater Type – Information from CF1R. The different kinds of water heaters are Large/Commercial Storage, Small/Consumer Storage, Residential-Duty Commercial Storage, Heat Pump, Boiler, Large/Commercial Instantaneous, Small/Consumer Instantaneous, Residential-Duty Commercial Instantaneous or Indirect.

04 # of Water Heaters in system – Reference information from CF1R.

05 Fuel Type – Reference information from CF1R. The different kinds of fuel types are natural gas, propane, oil, or electricity.

06 Rated Input Type – Reference information from CF1R. For natural gas, propane and oil fuel type the input type is Btu/hr. For electric the input type is kW.

07 Rated Input Value – User input. Numerical value of the rated input. Must be equal to or less than value indicated on the CF1R.

08 Central DHW System Distribution - Reference information from CF1R.

09 Dwelling Unit DHW System Distribution Type - Reference information from CF1R.

10 Compact Distribution - Reference information from CF1R.

11 Drain Water Heat Recovery - Reference information from CF1R.

**C. Design Dwelling Unit Water Heating Efficiency Information**

This table reports the water heating system features that were specified on the registered CF1R compliance document for this project. For information only and requires no user input.

**D. Installed Dwelling Unit Water Heating Efficiency Information**

This table reports the water heating system information that is being installed. Require one line for each central system.

01 Water Heating System ID or Name – Reference information from CF1R

02 Heating Efficiency Type – Reference information from CF1R. Different efficiency types are Energy Factor, AFUE, UEF and Thermal Efficiency.

03 Heating Efficiency Value – User input. Numerical value of the Heating Efficiency. Must be equal to or higher efficiency than value indicated on the CF1R.

04 Standby Loss – User input. Must be equal to or less than value indicated on the CF1R. Value may be N/A if CF1R value is N/A.

05 Exterior Insulation R-Value – User input. Must be equal to or higher than value indicated on the CF1R. Value may be N/A if CF1R value is N/A.

06 Water Heater Storage Volume (gal) – User input. Value may be N/A if water heater type is instantaneous with zero storage.

07 Tank location – User input. Must be equal to system type indicated on the CF1R.

**E. Installed Water Heater Manufacturer Information**

This table reports the manufacturer information of the installed water heater(s). Require one line for each installed water heater

01 Water Heating System ID or Name – Reference information from CF1R.

02 Manufacturer – User input. Enter the name of the water heater manufacturer.

03 Model Number – User input. Enter the model number of the water heater.

**F. Mandatory Measures for all Domestic Hot Water Distribution Systems**

This table lists the requirements for all DHW systems. HERS rater must ensure all the requirements in this table are met.

**G. HERS-Verified Compact Hot Water Distribution Expanded Credit and**

**H. Compact Hot Water Distribution Basic**

If performance compliance is used, this table lists the values used in the performance calculation and require no user input.

If prescriptive compliance is used, fill out this table

01 Reference information from CF1R

02 Enter the Master Bath distance of furthest fixture to Water Heater in feet. For multiple water heaters, enter the distance to the closest water heater.

03 Enter the Kitchen distance from furthest fixture to Water Heater in feet. For multiple water heaters, enter the distance to the closest water heater.

04 Enter Furthest Third fixtures from fixture to Water Heater in feet. For multiple water heaters, enter the average of the furthest distance of each water heater.

05 Calculated value – no user input required

06 Calculated value – no user input required

**I. HERS-Verified Drain Water Heat Recovery System**

This table lists the requirements for all central recirculation systems. HERS rater must ensure all the requirements in this table are met.

01 Reference information from CF1R.

02 Reference information from CF1R.

03 Reference information from CF1R.

04 Reference information from CF1R.

05 Reference information from CF1R.

06 Drain Water Heat Recovery Manufacturer’s name- Enter the name of the Manufacturer.

07 Drain Water Heat Recovery Manufacturer’s model number – Enter the Model number.

08 Rated Effectiveness’ – Enter the rated effectiveness of the DWHR device.

09Installation Configuration – Enter type of configuration. Available options are Equal flow, unequal to shower, and unequal to water heater

10 Percent of shower served by the DWHR device – Enter the percent of showers served by this DWHR device.

11 DWHR System Certified by CEC – Enter “Yes” if certified or else enter “No”.

**J. HERS-Verified Pipe Insulation Credit Requirements**

This table only applies to systems indicated as **HERS-Verified Pipe Insulation Credit.** In addition to the mandatory requirements in Table F, the HERS rater must ensure the requirements in this table are met.

**K. HERS-Verified Parallel Piping Requirements**

This table only applies to systems indicated as **HERS-Verified Parallel Piping.** In addition to the mandatory requirements in Table F, the HERS rater must ensure the requirements in this table are met.

**L. Parallel Piping Requirements**

This table only applies to systems indicated as **Parallel Piping.** In addition to the mandatory requirements in Table F, the installer must ensure the requirements in this table are met.

**M. Point of Use Requirements**

This table only applies to systems indicated as **Point of Use** In addition to the mandatory requirements in Table F, the installer must ensure the requirements in this table are met.

**N. Mandatory Requirements for all Recirculation Systems**

The requirements of this table apply to all recirculation systems listed below.

**O. Recirculation Non-Demand Controls Requirements**

This table only applies to systems indicated as **Recirculation Non-demand controls.** In addition to the mandatory requirements in Table F and N, the installer must ensure the requirements in this table are met.

**P. Demand Recirculation Manual Control/Sensor Control Requirements**

This table only applies to systems indicated as **Demand Recirculation Manual Control, Demand Recirculation Senor Control, HERS-Verified Demand Recirculation Manual Control** or **HERS-Verified Demand Recirculation Senor Control.** In addition to the mandatory requirements in Table F and N, the installer must ensure the requirements in this table are met.

**Q. HERS-Verified Demand Recirculation Manual Control (RDRmc-H) (RA3.6.6)/Sensor Control (RDRsc-H) (RA3.6.7)**

This table only applies to systems indicated as **HERS-Verified Demand Recirculation Manual Control** or **HERS-Verified Demand Recirculation Senor Control.** In addition to the mandatory requirements in Table F and N, the HERS rater must ensure the requirements in this table are met.

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **A. Design HERS Verified Dwelling Unit Water Heating Systems Information**  This table reports the water heating system features that were specified on the registered CF1R compliance document for this project.  <<require one row of data for each Dwelling Unit Water Heating System name identified on the CF1R report>> | | | | | | | | | | | |
| 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 |
| Dwelling Unit Name | Water Heating System ID or Name | Water Heating System Type | Water Heater Type | # of Water Heaters in System | Fuel Type | Rated Input Type | Rated Input Value | Central DHW System Distribution | Dwelling Unit DHW System  Distribution Type | Compact Distrib. | Drain Water Heat Recovery |
| <<reference value from CF1R; if Single Family, then value = Single Family>> | <<reference values from CF1R (see rule in header)>> | <<reference values from CF1R  allowed values=  DHW,  Combined Hydronic, Hydronic>> | <<reference values from CF1R  Allowed values =  Boiler, Indirect, Consumer Instantaneous, Commercial Instantaneous, Consumer Storage, Commercial Storage, Residential-Duty Commercial Storage, or Residential-Duty Commercial Instantaneous >> | <<reference values from CF1R>> | <<reference values from CF1R. Allowed values are Heat Pump, Electric Resistance, Natural Gas, or Propane >> | <<If A06 = Heat Pump, then value = NA;  Else reference values from CF1R. Allowed values:  If Fuel Type A06 = Natural Gas, Propane then value = Btu/Hr. Else if Fuel Type = Electric Resistance then value = kW >> | <<if A06 = Heat Pump, then result = NA;  If performance, reference values from CF1R-PRF; Elseif Prescriptive, then value = NA > | <<reference values from CF1R. If Central DHW System then value = Yes, else value = NA | <<reference values from CF1R  If performance and  A09 = NA then allowed values are  \*Standard Distribution System  \* Point of Use  \* Parallel Piping  \*Recirculation System Non-Demand Control  \* Demand Recirculation Manual Control  \* Demand Recirculation Sensor Control  \*HERS-Verified Pipe Insulation Credit  \* HERS-Verified Parallel Piping  \* HERS-Verified Demand Recirculation Manual Control  \* HERS-Verified Demand Recirculation Sensor Control;  Else if A09 ≠ NA then allowed values are  \* Standard Distribution System  \*HERS-Verified Pipe Insulation Credit;  Else if prescriptive,  Allowed values are  \*Standard Distribution System  \*Demand Recirculation  \* Demand Recirculation Manual Control>> | <<reference values from CF1R. Allowed values are  \*Basic  \*Expanded  \*None>> | <<reference values from CF1R. Allowed values are  \*Yes  \*None>> |
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| **B. Installed HERS Verified Dwelling Unit Water Heating Systems Information**  This table reports the water heating system features installed in this project.  <<require one row of data for each Dwelling Unit Water Heating System name identified on the CF1R report>> | | | | | | | | | | | |
| 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 |
| Dwelling Unit Name | Water Heating System ID or Name | Water Heating System Type | Water Heater Type | # of Water Heaters in System | Fuel Type | Rated Input Type | Rated Input Value | Central DHW System Distribution | Dwelling Unit DHW System  Distribution Type | Compact Distrib. | Drain Water Heat Recovery |
| <<Reference value from A01 >> | <<Reference value from A02>> | << reference value from A03>> | << reference value from A04>> | << reference value from A05>> | << Reference value from A06>> | << Reference value from A07 >> | <<User input value which must pass the following range tests: Value may be NA if B08is NA.  If B06 = Natural Gas or Propane, then  If B04 = Commercial Storage, then value must be > 75,000 Btu/hr;  If B04 = Consumer Storage, then value must be ≤ 75,000 Btu/hr;  If B04 = Commercial Instant, then value must be > 200,000 Btu/hr;  If B04 = Consumer Instant, then value must be ≤ 200,000 Btu/hr;  Else if B04 = Residential-Duty Commercial Storage, then value must be ≤ 105,000 Btu/hr;  Else if B06 = Electricity, then  If B04 = Commercial Storage or Commercial Instant, then value must be > 12 kW;  If B04 = Consumer Storage or Consumer Instant, then value must be ≤ 12 kW;  Else if B04 = Residential-Duty Commercial Instantaneous, then value must be ≤ 58.6 kW;  If the value passes range test and if A06 = Electric Resistance, it is stored in WaterHeaterElectricFiredRatedInput, Otherwise the value is stored in WaterHeaterGasFiredRatedInput>> | << Reference value from A09>> | << Reference value from Design Dwelling Unit DHW System Distribution A10>> | << Reference value from A11>> | << Reference value from A12>> |
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| **C. Design HERS Verified Dwelling Unit Water Heating Efficiency Information**  This table reports the water heater(s) efficiency features specified on the registered CF1R compliance document for this project.  <<If A09 “Central DHW Distribution” ≠ “NA”, then display the "section does not apply" message; else display this entire table >> | | | | | | |
| 01 | 02 | 03 | 04 | 05 | 06 | 07 |
| Water Heating System ID or Name | Heating Efficiency Type | Heating Efficiency Value | Standby Loss  (%) | Exterior Insulation  R-Value | Water Heater Storage  Volume (gal) | Tank location |
| <<Reference value from design Water Heating System ID or Name (A02)>> | << reference values from CF1R; if parent CF1R = CF1R-ADD, ALT or NCB, then value = NA; else if parent = CF1R-PRF, then allowed values are:  \*Uniform Energy Factor  \*AFUE  \*Thermal Efficiency >> | << reference values from CF1R-PRF-01; Else = NA>> | <<reference values from CF1R-PRF-01. Else = NA >> | <<reference values from CF1R-PRF-01. Else = NA >> | <<reference values from CF1R. NA is allowed only if Water Heater Type = Consumer Instantaneous,  Commercial Instantaneous, or Residential-Duty Commercial Instantaneous >> | <<Reference value from CF1R>> |
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| **D. Installed HERS Verified Dwelling Unit Water Heating Efficiency Information**  This table reports the water heating system efficiency features that were installed in this project.  <<If A09 “Central DHW Distribution” ≠ “NA”, then display the "section does not apply" message; else display this entire table >> | | | | | | |
| 01 | 02 | 03 | 04 | 05 | 06 | 07 |
| Water Heating System ID or Name | Heating Efficiency Type | Heating Efficiency Value | Standby Loss  (%) | Exterior Insul.  R-Value | Water Heater Storage  Volume (gal) | Tank location |
| <<Reference value from design Water Heating System ID or Name (A02)>> | <<Reference value from Design Water Heater Type (C02). Value may be NA if C02 is NA >> | <<User input value; check value must be ≥ value in C03 to comply, else flag non-compliant values and do not allow the doc to be registered >> | <<User input value; check value must be ≤ value in C04 to comply, else flag non-compliant values and do not allow the doc to be registered. Value may be NA if C04 is NA >> | <<User input value; check value must be ≥ value in C05 to comply, else flag non-compliant values and do not allow the doc to be registered. Value may be NA if C05 is NA >> | << User Input must equal reference values from C06, else flag non-compliant values and do not allow the doc to be registered. NA is allowed only if Water Heater Type = Consumer Instantaneous or Commercial Instantaneous>> | <<Reference value from C07 >> |
|  |  |  |  |  |  |  |
| 08 | Compliance Statement | <<calculated field: If D03 = NA or D03 ≥ C03, D04 = NA or D04 ≤ C04, D05 = NA or D05 ≥ C05, D06 = C06, and D07 = C07, then display result = System complies; else display result = system does not comply>> | | | | |

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| **E. Installed Water Heater Manufacturer Information**  <<If A09 “Central DHW Distribution” ≠“NA”, then display the "section does not apply" message; else display this entire table >> | | |
| 01 | 02 | 03 |
| Water Heating System ID or Name | Manufacturer | Model Number |
| <<reference value from A02>> | <<User input>> | <<User input>> |
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| **F. Mandatory Measures for all Domestic Hot Water Distribution Systems** | | |
| 01 | Equipment shall meet the applicable requirements of the Appliance Efficiency Regulations (Section 110.3(b)1). | |
| 02 | Unfired Storage Tanks are insulated with an external R-12 or combination of R-16 internal and external Insulation. (Section 110.3(c)4). | |
| 03 | The following pipes are insulated, to the thicknesses required by Table 120.3A, except for those sections of pipe that are subject to one of the exceptions below: All domestic hot water piping shall be insulated as specified in Section 609.11 of the California Plumbing Code. In addition, the following piping conditions shall have a minimum insulation wall thickness of 1 inch or a minimum insulation R-value of 7.7 (RA4.4.1)   * + The first 5 feet (1.5 meters) of cold water pipes from the storage tank.   + All piping with a nominal diameter of 3/4 inch (19 millimeter) and less than 1 inch.   + All hot water piping from the heating source to the kitchen fixtures.   + All underground piping.   + Insulation buried below grade must be installed in a water proof and non-crushable casing or sleeve.   + Piping from the heating source to storage tank or between tanks   + Piping that penetrates framing members shall not be required to have pipe insulation for the distance of the framing penetration. Piping that penetrates metal framing shall use grommets, plugs, wrapping or other insulating material to assure that no contact is made with the metal framing. Insulation shall butt securely against all framing members.   + Piping installed in interior or exterior walls that is surrounded on all sides by at least 1 inch (2.5 cm) of insulation.   + Piping installed in crawlspace with a minimum of 1 inches (2.5 cm) of crawlspace insulation above and below.   + Piping installed in attics with a minimum of 4 inches (10 cm) of attic insulation on top   + Pipe insulation shall fit tightly and all elbows and tees shall be fully insulated. | |
| 04 | For Gas or Propane Water Heaters: Ensure the following are installed (Section 150.0(n))   * A dedicated 125V, 20A electrical receptacle connected to the electric panel with a 120/240V 3 conductor, 10 AWG copper branch circuit, within 3 feet from the water heater and accessible with no obstructions;   + The conductor shall be labeled with the work “Spare” on both ends; and   + A reserved single pole circuit breaker space next to the circuit breaker next to the branch circuit labeled “Future” 240V shall be provided. * A Category III or IV vent, or a Type B vent with straight pipe between outside and water heater * A condensate drain no more than 2 inches higher than the base on water heater for natural draining * A gas supply line with capacity of at least 200,000 Btu/hr | |
| 05 | Verification Status: | * Pass - all applicable requirements are met; or * Fail - one or more applicable requirements are not met. Enter reason for failure in corrections notes field below; or * All N/A - This entire table is not applicable |
| 06 | Correction Notes: <<if Verification Status= Fail, then text entry in this Corrections Notes field is required; user input text>> | |
| **The responsible person’s signature on this compliance document affirms that all applicable requirements in this table have been met unless otherwise noted in the Verification Status and the Corrections Notes in this table.** | | |

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| **G. HERS-Verified Compact Hot Water Distribution Expanded Credit (CHWDS-H-EX) (RA3.6.5)**  For dwelling units with multiple systems, enter the master bath distance and kitchen distance to the closest water heater, and enter the average of the furthest fixture to each water heater.  << Require one row for each dwelling identified in Table A with A11 = Expanded. If no dwelling in A11 = Expanded, then display section does not apply message>> | | | | | | | | |
| 01 | | 02 | | 03 | 04 | 05 | 06 | 07 |
| Dwelling Name | | Number of Stories | | Master Bath distance of furthest fixture to Water Heater in feet | Kitchen distance from furthest fixture to Water Heater in feet | Furthest Third furthest fixture to Water Heater in feet (Avg for multiple water heaters) | Weighted Distance | Qualification Distance |
| <<Reference value from A01>> | | <<if performance, then value = NA;  Else if prescriptive, user select from list: 1, 2, 3>> | | <<Reference Value from CF1R-PRF;  Else if prescriptive compliance, user input>> | <<Reference Value from CF1R-PRF;  Else if prescriptive compliance, user input>> | <<Reference Value from CF1R-PRF;  Else if prescriptive compliance, user input>> | <<Reference value from CF1R-PRF;  else if prescriptive and A10 = Standard Distribution System, then value = (G03\*0.4) +(G04\*0.4) +( G05\*0.2);  else if A10 = Demand Recirculation Manual Control, then value = G05>> | << Reference Value from CF1R-PRF;  Else if prescriptive compliance, value =  ((a+b \*CFA)/n) >>  *Where:*  *a, b = Qualification distance coefficients from Table 4.4.6-2 below,*  *CFA = Conditioned floor area of the dwelling unit (ft2) from CF1R, and*  *n = Number of water heaters in the dwelling unit from A05 (unitless).* |
|  | |  | |  |  |  |  |  |
| 08 | No hot water piping >1 inch diameter is allowed. | | | | | | | |
| 09 | Length of 1 inch diameter piping is limited to 8 feet or less. | | | | | | | |
| 10 | Two and three story buildings cannot have hot water distribution piping in the attic, unless the water heater is also located in the attic. | | | | | | | |
| 11 | Eligible recirculating systems must be HERS-Verified Demand Recirculation: Manual Control conforming to RA4.4.17. | | | | | | | |
| 12 | Verification Status: | | * Pass - all applicable requirements are met; or * Fail - one or more applicable requirements are not met. Enter reason for failure in corrections notes field below; or * All N/A - This entire table is not applicable | | | | | |
| 13 | Correction Notes: <<if Verification Status= Fail, then text entry in this Corrections Notes field is required; user input text>> | | | | | | | |
| **The responsible person’s signature on this compliance document affirms that all applicable requirements in this table have been met unless otherwise noted in the Verification Status and the Corrections Notes in this table.** | | | | | | | | |

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| **H. Compact Hot Water Distribution (CHWDS) (RA4.4.6)**  For dwelling units with multiple systems, enter the master bath distance and kitchen distance to the closest water heater, and enter the average of the furthest fixture to each water heater.  << Require one row for each dwelling identified in Table A with A11 = Basic. If no dwelling in A11 = Basic, then display section does not apply message>> | | | | | | |
| 01 | 02 | 03 | 04 | 05 | 06 | 07 |
| Dwelling Name | Number of Stories | Master Bath distance of furthest fixture to Water Heater in feet | Kitchen distance from furthest fixture to Water Heater in feet | Furthest Third furthest fixture to Water Heater in feet (Avg for multiple water heaters) | Weighted Distance | Qualification Distance |
| <<Reference value from A01>> | <<if performance, then value = NA;  Else if prescriptive, user select from list: 1, 2, 3>> | <<Reference Value from CF1R-PRF;  Else if prescriptive compliance, user input>> | <<Reference Value from CF1R-PRF;  Else if prescriptive compliance, user input>> | <<Reference Value from CF1R-PRF;  Else if prescriptive compliance, user input>> | <<Reference value from CF1R-PRF;  else if prescriptive and A10 = Standard Distribution System, then value = (H03\*0.4) +(H04\*0.4) +( H05\*0.2);  else if A10 = Demand Recirculation Manual Control, then value = H05>> | << Reference Value from CF1R-PRF;  Else if prescriptive compliance, value =  ((a+b \*CFA)/n) >>  *Where:*  *a, b = Qualification distance coefficients from Table 4.4.6-2 below,*  *CFA = Conditioned floor area of the dwelling unit (ft2) from CF1R, and*  *n = Number of water heaters in the dwelling unit from A05 (unitless).* |
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| **The responsible person’s signature on this compliance document affirms that all applicable requirements in this table have been met** | | | | | | |

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| Table 4.4.6-2: Coefficients for the Qualification Distance Calculation  **<< do not show table, only use for equation in G07 and H07>>** | | | | |
|  | **Coefficient a** | | **Coefficient b** | |
| **Building Type** | **Non-Recirculating** | **Recirculating** | **Non-Recirculating** | **Recirculating** |
| **Single Family** | Use when distribution type (A10) is \*Standard Distribution System | Use when distribution type (A10) is  \* Demand Recirculation Manual Control |  |  |
| One story | 10 | 22.7 | 0.0095 | 0.0099 |
| Two story | 15 | 11.5 | 0.0045 | 0.0095 |
| Three story | 10 | 0.5 | 0.0030 | 0.014 |
|  |  |  |  |  |
| **Multifamily (Non Central)** |  |  |  |  |
| One story | 7.5 | n/a | 0.0080 | n/a |
| Two or more story | 7.5 | n/a | 0.0050 | n/a |

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| **I. HERS-Verified Drain Water Heat Recovery System (DWHR-H)**  <<If A12 “Drain Water Heat Recovery” = “None”, then display the "section does not apply" message; else display this entire table >> | | | | | | | | | |
| **Design DWHR System Information** | | | | | | | | | |
| 01 | 02 | | | 03 | | | | 04 | |
| System ID/Name | Rated Effectiveness | | | Installation Configuration | | | | Percent of shower served by the DWHR device | |
| <<Reference value from A02>> | <<If performance, reference value from CF1R-PRF.  If prescriptive, display “≥ 42%”>> | | | <<If performance, reference value from CF1R-PRF.  If prescriptive, display “NA”>> | | | | <<If performance, reference value from CF1R-PRF  If prescriptive, display “NA”>> | |
|  |  | | |  | | | |  | |
| **Installed DWHR System Information** | | | | | | | | | |
| 05 | 06 | 07 | 08 | | 09 | | 10 | | 11 |
| System ID/Name | Manufacturer | Model # | Rated effectiveness | | Installation Configuration | | Percent of shower served by the DWHR device | | DWHR System Certified by CEC |
| <<Reference value from A02>> | <<User input>> | <<User input>> | <<User input, value ≥ Rated Effectiveness in I02, 0.42≤I03<1 >> | | << If performance, reference value from I03. If prescriptive, user pick from list:   * Equal flow * Unequal to shower * Unequal to water heater>> | | << If performance, reference value from I04. If prescriptive, User input,0<I06≤100 >> | | □ Yes □ No |
|  |  |  |  | |  | |  | |  |
| 12 | For water heating system serving a single dwelling, the DWHR system shall, at the minimum, recover heat from the master bathroom shower and must at least transfer that heat either back to the respective shower(s) or the water heater. | | | | | | | | |
| 13 | For central water heating system serving multiple dwellings, the DWHR system shall, at the minimum, recover heat from half the showers located above the first floor and must at least transfer that heat either back to all the respective showers or the water heater. | | | | | | | | |
| 14 | The DWHR unit(s) shall be installed within 1 degrees of the rated slope. Sloped DWHR shall have a minimum lengthwise slope of 1 degree. The lateral level tolerance shall be within plus or minus 1 degree. | | | | | | | | |
| 15 | Verification Status: | | | | | * Pass - all applicable requirements are met; or * Fail - one or more applicable requirements are not met. Enter reason for failure in corrections notes field below; or * All N/A - This entire table is not applicable | | | |
| 16 | Correction Notes: <<if Verification Status= Fail, then text entry in this Corrections Notes field is required; user input text>> | | | | | | | | |
| **The responsible person’s signature on this compliance document affirms that all applicable requirements in this table have been met unless otherwise noted in the Verification Status and the Corrections Notes in this table.** | | | | | | | | | |

| **J. HERS-Verified Pipe Insulation Credit Requirements (PIC-H) (RA3.6.3)**  Systems that utilize this distribution type shall comply with these requirements. <<If there are no systems in column A10 that have a value = “HERS-Verified Pipe Insulation Credit”, then display the "section does not apply" message; else display this entire table >> | | |
| --- | --- | --- |
| 01 | HERS rater shall perform a visual inspection that all hot water piping comply with the insulation requirements in 150.0(J). | |
| 02 | Verification Status: | <<user pick from list:   * Pass - all applicable requirements are met; or * Fail - one or more applicable requirements are not met. Enter reason for failure in corrections notes field below; or * All N/A - This entire table is not applicable |
| 03 | Correction Notes: <<if Verification Status= Fail, then text entry in this Corrections Notes field is required; user input text>> | |
| **The responsible person’s signature on this compliance document affirms that all applicable requirements in this table have been met unless otherwise noted in the Verification Status and the Corrections Notes in this table.** | | |

| **K. HERS-Verified Parallel Piping Requirements (PP-H) (RA3.6.4)**  Systems that utilize this distribution type shall comply with these requirements. <<If A10 “Dwelling Unit DHW System Distribution Type” = “HERS-Verified Parallel Piping”, then display this entire table, else display “section does not apply" message>> | | |
| --- | --- | --- |
| 01 | Each central manifold has 5 feet or less of pipe between manifold and water heater. (RA4.4.15) | |
| 02 | For manifolds that include valves, the manifold must be readily accessible in accordance with the plumbing code. (RA4.4.4) | |
| 03 | Hot water distribution system piping from the manifold to the fixtures and appliances must take the most direct path. For example, piping from a second story manifold cannot supply the first floor. (RA4.4.4) | |
| 04 | The hot water distribution piping must be separated by at least 2 inches from any other hot water supply piping, and at least 6 inches from any cold water supply piping. Alternatively, the hot water supply piping must be insulated to the thicknesses shown in TABLE 120.3-A. (RA 4.4.4) | |
| 05 | Verification Status: | <<user pick from list:   * Pass - all applicable requirements are met; or * Fail - one or more applicable requirements are not met. Enter reason for failure in corrections notes field below; or * All N/A - This entire table is not applicable |
| 06 | Correction Notes: <<if Verification Status= Fail, then text entry in this Corrections Notes field is required; user input text>> | |
| **The responsible person’s signature on this compliance document affirms that all applicable requirements in this table have been met unless otherwise noted in the Verification Status and the Corrections Notes in this table.** | | |

| **L. Parallel Piping Requirements (PP) (RA4.4.4)**  Systems that utilize this distribution type shall comply with these requirements. <<If A10 “Dwelling Unit DHW System Distribution Type” = “Parallel Piping”, then display this entire table, else display “section does not apply" message>> | |
| --- | --- |
| 01 | Each central manifold has 15 feet or less of pipe between manifold and water heater |
| 02 | For manifolds that include valves, the manifold must be readily accessible in accordance with the plumbing code. |
| 03 | Hot water distribution system piping from the manifold to the fixtures and appliances must take the most direct path. For instance, piping from a second story manifold cannot supply the first floor |
| 04 | The hot water distribution piping must be separated by at least 2 inches from any other hot water supply piping, and at least 6 inches from any cold water supply piping. Alternatively, the hot water supply piping must be insulated to the thicknesses shown in TABLE 120.3-A. |
| **The responsible person’s signature on this compliance document affirms that all applicable requirements in this table have been met.** | |

| **M. Point of Use Requirements (POU) (RA4.4.5)**  Systems that utilize this distribution type shall comply with these requirements <<If A10 “Dwelling Unit DHW System Distribution Type” = “Point of Use”, then display this entire table, else display “section does not apply" message>> | |
| --- | --- |
| 01 | All hot water supply pipe run lengths are equal to or less than the maximum values shown below, based on the pipe diameter. If a combination of piping is used in a single run, then one half the allowed length of each size is the maximum installed length.  The maximum allowed length of piping for the longest run terminating in:  3/8 inch - For only one pipe size - max length allowed is 15 feet  For combination pipe sizes the max allowed length of 3/8-inch piping is 7.5 feet, of ½ inch piping is 5 feet, and ¾ inch piping is 2.5 feet.  ½ inch - For only one pipe size – max length allowed is 10 feet  For combination pipe sizes the allowed length of ½ inch piping is 5 feet, and ¾ inch piping is 2.5 feet.  ¾ inch - For only one pipe size = 5 feet |
| **The responsible person’s signature on this compliance document affirms that all applicable requirements in this table have been met.** | |

| **N. Mandatory Requirements for all Recirculation System (RA4.4.7)**  Systems that utilize this distribution type shall comply with these requirements. <<If A10 “Dwelling Unit DHW System Distribution Type” = “Recirculation System Non-Demand Control”, “Demand Recirculation Manual Control”, “Demand Recirculation Sensor Control”, “HERS-Verified Demand Recirculation Manual Control”, or “HERS-Verified Demand Recirculation Sensor Control”, then display this entire table, else display “section does not apply" message>> | |
| --- | --- |
| 01 | A check valve located between the recirculation pump and the water heater to prevent unintentional recirculation. |
| 02 | Piping must take most direct path between water heater and fixtures. |
| 03 | Insulation is not required on the cold water line when it is used as the return. |
| 04 | If more than one loop installed each loop shall have its own pump and controls. |
| **The responsible person’s signature on this compliance document affirms that all applicable requirements in this table have been met** | |

| **O. Recirculation Non-Demand Controls Requirements (R-ND) (RA4.4.8)**  Systems that utilize this distribution type shall comply with these requirements. <<If A10 “Dwelling Unit DHW System  Distribution Type” = “Recirculation System Non-Demand Control, then display this entire table, else display “section does not apply" message >> | |
| --- | --- |
| 01 | The active control shall be either: timer, temperature, or time and temperature. Timers shall be set to less than 24 hours. The temperature sensor shall be connected to the piping and to the controls for the pump. |
| **The responsible person’s signature on this compliance document affirms that all applicable requirements in this table have been met.** | |

| **P. Demand Recirculation Manual Control (R-DRmc) (RA4.4.9)/Sensor Control Requirements (RDRsc) (RA4.4.10)**  Systems that utilize this distribution type shall comply with these requirements. <<If A10 “Dwelling Unit DHW System Distribution Type” = “Demand Recirculation Manual Control”, “Demand Recirculation Sensor Control”, “HERS-Verified Demand Recirculation Manual Control”, or “HERS-Verified Demand Recirculation Sensor Control”, then display this entire table, else display “section does not apply" message >> | |
| --- | --- |
| 01 | The system operates “on-demand”, meaning that the pump begins to operate shortly before or immediately after hot water draw begins, and stops when the return water temperature reaches a certain threshold value. For Demand Recirculation Manual Control, the pump shall be turned on using a manual switch system. For Demand Recirculation Sensor Control, the pump shall be turned on using a sensor system. |
| 02 | The controls shall be located in the kitchen, bathroom, and any hot water fixture location that is at least 20 feet from the water heater. |
| 03 | Manual controls may be activated by wired or wireless mechanisms. |
| 04 | Sensor Controls may be activated by wired or wireless mechanisms, including buttons, motion sensors, door switches and flow switches. Each control shall have standby power of 1 Watt or less. |
| 05 | Pump and control placement shall meet one of the following criteria:   * When a dedicated return line has been installed the pump, controls and thermo-sensor are installed at the end of the supply portion of the recirculation loop; or * The pump and controls are installed on the dedicated return line near the water heater and the thermo-sensor is installed in an accessible location as close to the end of the supply portion of the recirculation loop as possible; or * When the cold water line is used as the return, the pump, demand controls and thermo-sensor shall be installed in an accessible location at the end of supply portion of the hot water distribution line (typically under a sink). |
| 06 | After the pump has been activated, the controls shall allow the pump to operate until the water temperature at the thermo-sensor rises to one of the following values:   * Not more than 10°F (5.6°C) above the initial temperature of the water in the pipe * Not more than 102°F (38.9°C). |
| 07 | Controls shall limit operation to no more than 5 minutes following activation. |
| **The responsible person’s signature on this compliance document affirms that all applicable requirements in this table have been met.** | |

| **Q. HERS-Verified Demand Recirculation Manual Control (RDRmc-H) (RA3.6.6)/Sensor Control (RDRsc-H) (RA3.6.7) Requirements**  Systems that utilize this distribution type shall comply with these requirements. <<If A10 “Dwelling Unit DHW System Distribution Type” = “HERS-Verified Demand Recirculation Manual Control” or “HERS-Verified Demand Recirculation Sensor Control”, then display this entire table, else display “section does not apply" message >> | | |
| --- | --- | --- |
| 01 | HERS rater shall perform a visual inspection to verify that the demand pump, manual/sensor controls and thermo-sensor are present and operating properly consistent with the applicable requirements of RA4.4.9 and RA4.4.10 | |
| 02 | Verification Status: | <<user pick from list:   * Pass - all applicable requirements are met; or * Fail - one or more applicable requirements are not met. Enter reason for failure in corrections notes field below; or * All N/A - This entire table is not applicable |
| 03 | Correction Notes: <<if Verification Status= Fail, then text entry in this Corrections Notes field is required; user input text>> | |
| **The responsible person’s signature on this compliance document affirms that all applicable requirements in this table have been met unless otherwise noted in the Verification Status and the Corrections Notes in this table.** | | |

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| **R. Determination of HERS Verification Compliance** |
| << if D08 result = System Complies, and results for all applicable sections F, G, I, J, K, and Q ≠ fail, then display: Complies: All specified verification protocol requirements on this document are met; else display: Does not comply: One or more specified verification protocol requirements on this document are not met.>> |