**Draft PDS-01**

**RESNET/ICC 301-2022 Addendum F-202x**

**Integrated Heat Pump Water Heater (iHPWH)**

***Modify Standard ANSI/RESNET/ICC 301-2022 as follows. Note: Where sections, tables and equations are added or deleted affecting existing section, table or equation numbers respectively and the references to those numbers, the renumbering will be established editorially upon the finalization of the addendum.***

1. ***Add definitions to Section 3.2 Definitions***

***Heat Pump Water Heater (HPWH)***- A Heat Pump that is typically used to heat water for service hot water use. It may also be used for space heating.

***Integrated Heat Pump Water Heater (iHPWH)*** - A Heat Pump Water Heater where all the components of the system are packaged in a single unit. This is distinct from a Split-System Heat Pump Water Heater. Most residential Heat Pump Water Heaters are Integrated.

***Split-System Heat Pump Water Heater*** - A Heat Pump Water Heater where some components are separated from each other, connected by refrigerant lines. These systems typically have a compressor and fan outside and a storage water tank inside.

1. ***Add acronym to Section 3.3 Acronyms***

***HPWH –*** Heat pump water heater

***iHPWH –*** Integrated heat pump water heater

1. ***Add new footnote ‘ac’ to ‘Service water heating systems’ section from Table 4.2.2(1)****:*

|  |  |  |
| --- | --- | --- |
| **Building Component** | **Energy Rating Reference Home** | **Rated Home** |
| Service water heating systems p, t, u, v | Fuel type: same as Rated HomeEfficiency:Electric: EF = 0.97 - (0.00132 \* store gal)Fossil fuel: EF = 0.67 - (0.0019 \* store gal)Use (gal/day): Determined in accordance with Section 4.2.2.6.1.4Tank temperature: 125°FLocation:IECC Climate Zones 1-3: Attached garage if present, otherwise Conditioned Space VolumeIECC Climate Zones: 4-8: Unconditioned basement if present, otherwise Conditioned Space Volume | Same as Rated HometSame as Rated HomeacSame as Rated HomeDetermined in accordance with Section 4.2.2.6.2.11Same as Energy Rating Reference HomeSame as Rated Home |

***2. Modify the footnote ‘u’ in ‘Table 4.2.2(1)’ as follows:***

u. The Uniform Energy Factor (UEF) or Energy Factor (EF) shall be obtained for residential hot water equipment.~~, or~~ For commercial hot water equipment, COP or the Thermal Efficiency (TE) and Standby Loss (SL) shall be obtained ~~for commercial hot water equipment~~ from manufacturer’s literature or from AHRI directory for equipment being used where available. When UEF is obtained, the First Hour Rating (FHR) shall also be obtained. For commercial water heaters where EF or UEF is not available, an Approved commercial hot water system calculator shall be used to determine the EF or UEF.

Where a manufacturer provided or AHRI published EF or UEF is not available for the residential hot water equipment, the guidance provided in Item 1 below shall be used to determine the effective EF of the water heater. Where a manufacturer provided or AHRI published TE or SL is not available for commercial hot water equipment, the guidance provided in Item 2 below shall be used to determine the effective TE and SL of the water heater.

 1. For residential oil, gas and electric water heaters or Heat Pumps, default EF values provided in Table 4.5.2(3) for age-based efficiency or Table 4.5.2(4) for non-age-based efficiency shall be used.

 2. For commercial water heaters, values provided in Table C404.2 “Minimum Performance of Water-Heating Equipment” in the IECC shall be used.

***3. Add new footnote ‘ac’ language***

ac. Where an Integrated Heat Pump Water Heater is installed and does not have a ducted intake and exhaust, if the volume of the space containing the water heater is not verified to be at least 450 cubic feet or greater, the maximum allowable UEF shall be 2.0 unless the space containing the water heater is verified to have a total net free opening area of no less than 250 in2, using grilles, louvers, door undercuts, or a louvered door.

***4. Modify ‘Service Hot Water Equipment’ section from ‘Table 4.5.2(1)’ as follows:***

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| --- |
| **Table 4.5.2(1) Minimum Rated Features** |
| **Building Element** | **Minimum Rated Feature** |
| 15. Service Hot Water Equipment  | For Residential Equipment - Equipment type, location, efficiency (Uniform Energy Factor and First Hour Rating; or Energy Factor), extra tank insulation R-Value, flow rates of showers and Bathroom sink faucets. For Integrated Heat Pump Water Heaters - volume or the net free opening area of the space containing the water heater.For Commercial Equipment - Equipment type, location, Uniform Energy Factor, COP, or Thermal Efficiency and Standby Loss, extra tank insulation value, flow rates of showers and Bathroom sink faucets.Distribution Related:Distribution System Type (standard, recirculation), Recirculation System controls [none, timer, temperature, demand (manual) or demand (sensor)], pipe insulation R-Value, pipe length for standard distribution, branch length for recirculation, supply + return loop length, pump power (Watts, HP). |

***5. Modify ‘Building Element: Service Hot Water (SHW) Equipment’ table within Normative Appendix B as follows:***

|  |  |  |
| --- | --- | --- |
| Location | Determine and record location of service hot water equipment | Determine and record whether the water heater is in Conditioned or Unconditioned Space Volume, Unrated Heated Space or Unrated Conditioned Space.  |
| Efficiency  | Determine and record the Energy Factor, Uniform Energy Factor or thermal efficiency of the service hot water equipment | Look for the water heater's nameplate and product literature. Record the manufacturer, model number and if listed directly on the nameplate, the efficiency rating. Search for the model number in the manufacturer’s data sheets or ~~an~~ appropriate efficiency rating directory to determine and record the EF, UEF or thermal efficiency rating. When UEF is recorded, also record the First Hour Rating. When thermal efficiency is recorded, also record the standby loss if available.When the efficiency rating cannot be determined, approximate the age of the unit and use a default efficiency.  |
| Extra tank insulation value  | Determine and record the insulation value of any exterior wrap  | Visually determine and record whether the water heater is or is not wrapped with exterior insulation. When insulation is present, look for the labeled/stamped R-value or measure the thickness of the wrap and determine and record the R-Value.  |
| Individual service hot water equipment type  | Determine and record type, capacity, and fuel source of standalone water heater serving single Dwelling Unit | Identify whether the equipment is storage or instantaneous, identify its fuel source and record storage tank capacity in gallons. Also record whether the SHW equipment is an Integrated Heat Pump Water Heater, or supplemented by a desuperheater and/or if it is integrated with the space heating system.*Integrated Heat Pump Water Heater* – For Integrated Heat Pump Water Heaters, record whether the system has a ducted intake and exhaust. If not, for the space that contains the Integrated Heat Pump Water Heater, measure dimensions of the room to calculate its volume or record the net free opening area of any grilles/louvers. |
| Central service hot water equipment type | Determine and record type, capacity, fuel source and pump power of shared service hot water equipment serving more than one Dwelling Unit | Identify if equipment is: a Boiler or water heater, residential or commercial grade; its fuel source; and pump power. Record storage tank capacity in gallons. Also record whether the SHW equipment is integrated with the space heating system and how many Dwelling Units it serves. *Central Boiler with indirect fired storage tanks –* Record the number of Boilers and tanks. Record the fuel source and the model number, capacity and insulation value, when present, of the unfired storage tanks. *Central service hot water heater –* Record the number of water heaters, the fuel source, capacity and insulation value when present.*Central pump power -* In addition, record the horsepower and model number of all primary and secondary pumps that are associated with the service hot water distribution loop, excluding any pumps on standby. If not listed on the nameplate, use the pump model number to determine the pump motor efficiency from the manufacturer’s data sheet. |
| Laundry service hot water equipment type | Determine and record type, capacity, and fuel source of laundry SHW equipment | Where a separate service hot water system provides hot water to clothes washers, but does not provide other service hot water to the Dwelling Unit, follow guidance for individual service hot water systems above to identify system type, capacity, and fuel source.  |
| Drain Water Heat Recovery (DWHR) | Determine and record efficiency and performance factors  | Where DWHR units are installed and serve the Rated Home, record the model number of the DWHR unit, its efficiency and the number of showers in the Rated Home that are connected to the unit.A performance factor shall be determined and recorded based on its installation location. Determine and record if the DWHR unit supplies pre-heated water to the cold water piping, hot water heater potable supply piping or to both. |