**RB V2019.1.005 Change Notes**

**ResCommon base schema**

* All U-factor references – make ***Decimal3PlacesNonnegative***
  + *FenestrationConstructionUFactor*
  + *UFactor*
  + *UFactorCenterOfGlass*
  + *UFactorFenestrationAverage*
  + *UFactorLimit*
  + *UFactorLimitSkylight*

**ResCompliance base schema**

* *DuctLeakageTestExemption* – remove value
  + DuctLessThan40FeetInUnconditionedSpaces
* All U-factor references – make ***Decimal3PlacesNonnegative***
  + *AreaWeightedAverageUfactor*
  + *UfactorProposedAllFenestration*
  + *UfactorProposedAllSkylightFenestration*
  + *UfactorProposedAllWindowFenestration*
* *ProjectScopeAlterations* – typo
  + <dtyp:displayterm value="KitchenHoodNewReplace">Kitchen Range Hood Installation (new or ~~reploacement~~ **replacement**)</dtyp:displayterm>

**ResHVAC base schema**

* New simulation group
  + ***AOSmithCAHP120SimulationGroup***
    - Add ***AOSmithCAHP120 (120 gal)***
* *LoopTankType* – add new value
  + ***CommercialHPWH***
* *HeatPumpWaterHeaterModel and* – add new models and fix typos
  + ***WhirlpoolHPSE2K80> HPSE2K80HD045V (80 gal)***
  + ***WhirlpoolHPSE2K80C> HPSE2K80HD045VC (80 gal)***
  + ***AOSmithCAHP 120 (120 gal)***
  + <dtyp:displayterm value="AmericanHPHE10250">HPHE10250H045DV ~~102~~ **120** (50 gal)</dtyp:displayterm>
  + <dtyp:displayterm value="AmericanHPHE10250N">HPHE10250H045DVN ~~102~~ **120** (50 gal)</dtyp:displayterm>
* *HeatPumpWaterHeaterSimulationGroup* – add new value
  + ***AOSmithCAHP 120 (120 gal)***
* *AOSmithPHPT80SimulationGroup -* add new models
  + ***WhirlpoolHPSE2K80> HPSE2K80HD045V (80 gal)***
  + ***WhirlpoolHPSE2K80C> HPSE2K80HD045VC (80 gal)***
* *AOSmithHPTU50SimulationGroup* – fix typos
  + <dtyp:displayterm value="AmericanHPHE10250">HPHE10250H045DV ~~102~~ **120** (50 gal)</dtyp:displayterm>
  + <dtyp:displayterm value="AmericanHPHE10250N">HPHE10250H045DVN ~~102~~ **120** (50 gal)</dtyp:displayterm>

**CF1R-ALT-01**

* J03 – revised pseudo code (only on .003 table)
  + <<user pick from list: \*DHW; ~~\*Central;~~ \*Hydronic; \*Combined Hydronic;

**If A11=Multifamily or Multifamily with central water heating then add to list: \*Central**>>

**CF1R-ALT-02**

* E03 – revised pseudo code
  + <<user pick one from list: \*central gas furnace; \*central split HP; \*central packaged HP \*central large packaged HP \*ductless split HP; \*room HP; \*boiler; \*hydronic; \*combined hydronic; \*hydronic+forced air; \*combined hydronic+forced air; \*hydronic HP, \*hydronic HP+forced air; \*gas wall furnace; \*gas space heater; \*electric \* no heating; \*Wood Heat; \*Packaged gas furnace; **\*non-air-source HP;** **\*Small duct high velocity HP; \*Ductless VRF HP; \*multisplit HP-ducted; \*multisplit HP-ductless; \*multisplit HP-ducted+ductless; \*ducted mini-split HP;** **\*SPVHP; \*PTHP**>>
* E07 - revised pseudo code
  + <<user pick one from list: \*central split AC;\*central split HP; \*central packaged AC \*central packaged HP \* central large packaged AC; \*central large packaged HP \*ductless split AC; \*ductless split HP; \*gas absorption AC \*room AC; \*room HP; \*hydronic HP, \*hydronic HP+forced air \*evaporative – direct \*evaporative – indirect \*evaporative – indirectdirect \*evaporatively cooled condenser \*Ice Storage AC \*no cooling **\*Ductless VRF HP; \*Ductless VRF AC; \*multisplit AC-ducted \*multisplit AC-ductless \*multisplit AC-ducted+ductless \*multisplit HP-ducted \*multisplit HP-ductless \*multisplit HP-ducted+ductless; \*non-air-source heat pump; \*non-air-cooled air conditioner; \*Small duct high velocity HP; \*Small duct high velocity AC; \*ducted mini-split AC; \*ducted mini-split HP; \*SPVAC; \*SPVHP; \*PTAC; \*PTHP** >>
* F03 – revised pseudo code
  + <<user pick one from list: \*central gas furnace;\*central split HP; \*central packaged HP \*central large packaged HP \*ductless split HP; \*room HP; \*boiler; \*hydronic; \*hydronic+forced air; \*combined hydronic+forced air; \*hydronic HP, \*hydronic HP+forced air; \*combined hydronic; \*gas wall furnace; \*gas space heater; \*electric \*no heating; \*Wood Heat; \*Packaged gas furnace; **\*non-air-source HP; \*Small duct high velocity HP; \*Ductless VRF HP; \*multisplit HP-ducted; \*multisplit HP-ductless; \*multisplit HP-ducted+ductless; \*ducted mini-split HP; \*SPVHP; \*PTHP** >>
* F07 – revised pseudo code
  + <<user pick one from list: \*central split AC;\*central split HP; \*central packaged AC \*central packaged HP \* central large packaged AC; \*central large packaged HP \*ductless split AC; \*ductless split HP; \*gas absorption AC \*room AC; \*room HP; \*hydronic HP, \*hydronic HP+forced air \*evaporative – direct \*evaporative – indirect \*evaporative – indirectdirect \*evaporatively cooled condenser \*Ice Storage AC \*no cooling **\*Ductless VRF HP; \*Ductless VRF AC; \*multisplit AC-ducted \*multisplit AC-ductless \*multisplit AC-ducted+ductless \*multisplit HP-ducted \*multisplit HP-ductless \*multisplit HP-ducted+ductless; \*non-air-source heat pump; \*non-air-cooled air conditioner; \*Small duct high velocity HP; \*Small duct high velocity AC; \*ducted mini-split AC; \*ducted mini-split HP; \*SPVAC; \*SPVHP; \*PTAC; \*PTHP** >>

**CF2R-MCH-01a**

* B06 – revised pseudo code
  + <<**If on the CF1R-PRF Y02\_ResidentialHeatingSystemType = VCHP\_IndoorUnitDucted, VCHP\_IndoorUnitDuctless, or VCHP\_IndoorUnitDuctedandDuctless, then report N/A; else** auto-filled text referenced from CF1R>>
* C07 – revised static text (correct in schema)
  + Minimum Cooling Efficiency EER**/CEER**
* D04 – revised pseudo code (correct in schema)
  + << … \*Packaged gas furnace; **\*SPVHP; \*PTHP;**

flag non-default values and report in project status notes field; a revised CF1R may be required >>

* D05 – revised pseudo code (correct in schema)
  + << … \*ground-source HP; **\*SPVAC; \*SPVHP; \*PTAC; \*PTHP;**

note: cooling system type "No Cooling" is the flag for heating-only system type>>

* D06 – revised field name
  + Number of Indoor Units ~~Connected to the System's Outdoor Unit~~ **for this System**
* F04 – revised pseudo code
  + << if value in C07=N/A, then result=NA; else prompt user to input, numeric value, xx.x; **if B04 = central packaged AC, value must be ≥ 11.0 and ≥ C07, then the system complies;**

**elseif B04 = "central split AC", and F10 < 45000, then value must be ≥ 12.2 and ≥ C07, then the system complies;**

**elseif B04 = "central split AC", and F10 ≥ 45000, value must be ≥ 11.7 and ≥ C07, then the system complies;**

**else (for all other systems) if value is ≥ C07, then the system complies;**

~~and check value must be ≥ value in C07, to comply; except if one of the following two conditions are applicable:~~

~~cond 1: if B04 = {central packaged AC}, and 12.2 > value ≥11.0, then the system complies;~~

~~cond 2: if B04 = "central split AC", and F10 < 45000, then value must be ≥ 12.2 to comply.~~

else flag non-compliant value and do not allow registration to proceed>>

* M04 – revised pseudo code
  + <<**If D04 or D05 = VCHP-Ducted or VCHP-Ducted+Ductless, then result = yes; else reference information from the CF1R (**if the CF1R flags the requirement for HERS verification of duct leakage for the system ID/Name in M01, then display result = yes**)**>>
* M09 – revised pseudo code
  + <<**If D04 or D05 = VCHP-Ducted or VCHP-Ducted+Ductless, then result = no; else reference information from the CF1R (**if the CF1R flags the requirement for HERS verified duct design (Supply Duct Surface Area, R-value, or Buried Ducts) then result = yes; else result = no**)**>>

**CF2R-MCH-01b**

* Section C – revised schema
  + <xsd:element name="Section\_C" minOccurs="~~1~~**0**">
* C03 – revised pseudo code (correct in schema)
  + << … \*no heating; **\*SPVHP; \*PTHP;**

if value =no heating, then check: there must be at least one heating system entered in this section in column C04 to comply, else flag noncompliant condition (no heating installed) and do not allow registration to continue.

flag non-default values and report in project status notes field; a revised CF1R may be required >>

* C07 – revised pseudo code (correct in schema)
  + << … \*ducted mini-split HP; **\*SPVAC; \*SPVHP; \*PTAC; \*PTHP;**

flag non-default values and report in project status notes field; a revised CF1R may be required >>

* C12 – revised field name
  + Number of Indoor Units ~~Connected to the System's Outdoor Unit~~ **for this System**
* C13 – revised field name
  + Number of Ducted Indoor Units ~~Connected to the System's Outdoor Unit~~ **for this System**
* Section K – revised schema
  + <xsd:element name="Section\_K" minOccurs="~~1~~**0**">

**CF2R-MCH-01c**

* C04 – revised pseudo code (correct in schema)
  + << … \*no heating; **\*SPVHP; \*PTHP;**

if value =no heating, then check: there must be at least one heating system entered in this section in column C04 to comply, else flag noncompliant condition (no heating installed) and do not allow registration to continue.

flag non-default values and report in project status notes field; a revised CF1R may be required >>

* C05 – revised pseudo code (correct in schema)
  + << … \*ducted mini-split HP **\*SPVAC; \*SPVHP; \*PTAC; \*PTHP;**

note: cooling system type "No Cooling" is the flag for heating-only system type;

\*flag non-default values and report in project status notes field; a revised CF1R may be required >>

* C11 – revised field name
  + Number of Indoor Units ~~Connected to the System's Outdoor Unit~~ **for this System**

**CF2R-MCH-01d**

* B06 – revised pseudo code
  + <<**If on the CF1R-PRF Y02\_ResidentialHeatingSystemType = VCHP\_IndoorUnitDucted, VCHP\_IndoorUnitDuctless, or VCHP\_IndoorUnitDuctedandDuctless, then report N/A; else** auto-filled text referenced from CF1R>>
* B11 – revised schema. **Change to StatusEAA.** (remove different CF1R references. CF1R now reports New, Altered, and Existing)
  + <xsd:element name="B11\_EAA\_SpaceConditionSystemStatus" type="comp:EAA\_SpaceConditionSystemStatus"> <xsd:annotation> <xsd:documentation source="FieldText">SC System Status</xsd:documentation>

<xsd:documentation source="CalculationsAndRules">Auto filled reference value from CF1R for this system; Values are: New ~~display text New~~, ~~ExistingAlteration display text~~ Altered, ~~ExistingUnchanged display text~~ Existing</xsd:documentation>

<xsd:appinfo source="displayterm">

<dtyp:displayterm value="~~ExistingAlteration">Altered~~</dtyp:displayterm>

* C07 – revised static text (correct in schema)
  + Minimum Cooling Efficiency EER**/CEER**
* D04 – revised pseudo code (correct in schema)
  + << … List A: \*VCHP-Ducted \*VCHP-Ductless \*VCHP-Ducted+Ductless \*ductless mini-split HP; \*ductless VRF HP; \*ducted mini-split HP \*small duct high velocity HP; \*multisplit HP-ducted \*multisplit HP-ductless \*multisplit HP-ducted+ductless \*room HP; \*air-to-water HP \*ground-source HP **\*SPVHP; \*PTHP;** otherwise allow user to override the default and pick one from list B below … >>
* D05 – revised pseudo code (correct in schema)
  + << … \*multisplit HP-ducted+ductless; **\*SPVAC; \*SPVHP; \*PTAC; \*PTHP**>>
* D06 – revised field name
  + Number of Indoor Units ~~Connected to the System's Outdoor Unit~~ **for this System**
* D13 – revised field name
  + Number of Ducted Indoor Units ~~Connected to the System's Outdoor Unit~~ **for this System**
* G04 – revised pseudo code
  + <<if SC system is NOT shown in section C, then prompt user to input, numeric value, xx.x; elseif SC system IS shown in section C, and value in C07=N/A, then result=NA; else require user to input, numeric value, xx.x;

**if B04 = central packaged AC, value must be ≥ 11.0 and ≥ C07, then the system complies;**

**elseif B04 = "central split AC", and F10 < 45000, then value must be ≥ 12.2 and ≥ C07, then the system complies;**

**elseif B04 = "central split AC", and F10 ≥ 45000, value must be ≥ 11.7 and ≥ C07, then the system complies;**

**else (for all other systems) if value is ≥ C07, then the system complies;**

~~and check value entered by user in this field (G04) must be ≥ value in C07, to comply except if one of the following two conditions are applicable:~~

~~cond 1; if B04 = {central packaged AC}, and 12.2 > value ≥11.0 then the system complies;~~

~~cond 2: if B04 = "central split AC", and G10 < 45000, then value must be ≥ 12.2 to comply.~~

else flag non-compliant values and do not allow registration to proceed>>

* O05 – revised pseudo code
  + <<calculated field: if O04 ≠ No Exemptions, then value = no; **elseif D04 or D05 = VCHPDucted or VCHP-Ducted+Ductless AND D11 = new, then result = yes;** elseif the CF1R flags the requirement…>>
* O10 – revised pseudo code
  + <<calculated field: **if D04 or D05 = VCHP-Ducted or VCHPDucted+Ductless AND D11 = new, then result = no; else**if the CF1R flags the requirement…>>

**CF2R-MCH-20**

* A05 – revised pseudo code
  + <<**If on the CF1R-PRF Y02\_ResidentialHeatingSystemType = VCHP\_IndoorUnitDucted, VCHP\_IndoorUnitDuctless, or VCHP\_IndoorUnitDuctedandDuctless, then result = true; else** calculated result: (= true or false depending on CF1R data: if true display message directing use of VLLDCS method 20b)>>
* A06 – revised pseudo code
  + <<**If on the CF1R-PRF Y02\_ResidentialHeatingSystemType = VCHP\_IndoorUnitDucted, VCHP\_IndoorUnitDuctless, or VCHP\_IndoorUnitDuctedandDuctless, then result = false; else** calculated result: (= true or false depending on CF1R data: if true =>display message directing use of VLLAHU method 20c)>>

**CF2R-MCH-20b**

* A09 (A10) – revised static text (correct in schema)
  + **10** ~~09.~~ Determine compliance method for this document; display applicable tables below; (this row not visible to user)

**CF2R/3R-MCH-22**

* A09 – revised schema
  + Allow N/A

**CF2R/3R-MCH-29**

* E09 – revised schema
  + Allow N/A

**CF2R/3R-MCH-32**

* C04 (on 2R)/B04 (on 3R) – revised field name
  + HVI **or AHAM** Directory Listed Model Number
* C05 (on 2R)/B05 (on 3R) – revised field name
  + HVI **or AHAM** Directory Listed Rated Airflow
* C06 (on 2R)/B06 (on 3R) – revised field name
  + HVI **or AHAM** Directory Listed Sound Rating

**CF2R-PLB-02a**

* A05 – revised field name
  + # of **Like (or Identical)** Water Heaters in System
* B05 – revised field name
  + # of **Like (or Identical)** Water Heaters in System
* C03 – revised schema
  + Add *EnergyFactor* to allowed values

**CF2R-PLB-02b**

* A04 – revised field name
  + # of **Like (or Identical)** Water Heaters in System
* B04 – revised field name
  + # of **Like (or Identical)** Water Heaters in System

**CF2R/3R-PLB-22a**

* A05 – revised field name
  + # of **Like (or Identical)** Water Heaters in System
* B05 – revised field name
  + # of **Like (or Identical)** Water Heaters in System

**CF2R/3R-PLB-22b**

* A04 – revised field name
  + # of **Like (or Identical)** Water Heaters in System
* B04 – revised field name
  + # of **Like (or Identical)** Water Heaters in System

**CF2R-PVB-01**

* A05 – revised pseudo code
  + <<user pick from list: No PV – limited solar access (Trigger CF2R-SRA-01), CZ15 reduced PV size, 2 habitable stories, 3 habitable stories, Plan approved before 1/1/20, Battery storage (Trigger CF2R-PVB-02), Community Solar, **Declared emergency area before, 1/1/20, No PV – Snow loads, Section 10-109(k) PV determination,** NA>>
* Section B header – revised pseudo code
  + <<if A05 = “No PV – limited solar access”, ~~or~~ ”Community Solar”, **“Declared emergency area before 1/1/20”, “No PV – Snow loads”, or “No PV - Section 10-109(k) PV determination”**, then display the "section does not apply" message; else display this entire table>>
* B08 – revised pseudo code only (correct in schema)
  + <<If prescriptive and B07=Deg and (B06≤59 or B06≥301), then user input 0 ≤B08≤ 10; **else**if prescriptive and B07=Deg and 90≤B06≤300, then user input 0 ≤B08<90;

**else**if prescriptive and B07=Pitch and (B06≤59 or B06≥301), then user input 0 ≤B08≤ 2;

**else**if prescriptive and B07=Pitch and 90≤B06≤300, then user input 0 ≤B08≤50;

elseif performance and CFI = Yes, then value from CF1R-PRF and ≤ 7;

**else**if performance and CFI = No, then value from CF1R-PRF>>

* Section C header – revised pseudo code
  + <<if A05 = “No PV – limited solar access”, ~~or~~ ”Community Solar”, **“Declared emergency area before 1/1/20”, “No PV – Snow loads”, or “No PV - Section 10-109(k) PV determination”**, then display the "section does not apply" message; else display this entire table>>
* C02 – revised pseudo code
  + <<If B05=No, then autofill from B03 but allow user to override ~~only if ≥ B03~~; Else user input >>
* Section D header – revised pseudo code
  + <<if A05 = “No PV – limited solar access”, ~~or~~ ”Community Solar”, **“Declared emergency area before 1/1/20”, “No PV – Snow loads”, or “No PV - Section 10-109(k) PV determination”**, then display the "section does not apply" message; else display this entire table>>
* Section E header – revised pseudo code
  + <<if A05 = “No PV – limited solar access”, ~~or~~ ”Community Solar”, **“Declared emergency area before 1/1/20”, “No PV – Snow loads”, or “No PV - Section 10-109(k) PV determination”**, then display the "section does not apply" message; else display this entire table>>
* E01 – revised static text
  + The installer shall provide documentation that demonstrates the shading condition of the actual installation of the PV module is consistent with the shading requirement in Table D. The verification must be done by measurements from an approved solar assessment tool or other CEC approved alternative methods. The satellite, drone or other digital image of the obstructions that cast shadows on the PV array must be created and dated after the installation of the photovoltaic system. **If the image is dated before the installation, then additional on-site pictures must be attached to clearly show that the installed system matches the system modeled in the solar assessment report.**
* Section F header – revised pseudo code
  + <<if A05 = “No PV – limited solar access”, ~~or~~ ”Community Solar”, **“Declared emergency area before 1/1/20”, “No PV – Snow loads”, or “No PV - Section 10-109(k) PV determination”**, then display the "section does not apply" message; else display this entire table>>
* Section G – fully revised table

|  |
| --- |
| **G. Qualifying Exception Requirement**  <<If A05 “Qualifying Exceptions” = “NA” or “Community Solar”, then display the "section does not apply" message;  Else If A05 “Qualifying Exceptions” = “No PV – limited solar access”, “CZ15 reduced PV size”, “2 habitable stories”, “3 habitable stories”, or “Plan approved before 1/1/20” then display row “Limited Solar Access” below;  Else if A05 “Qualifying Exceptions” = “Declared emergency area before 1/1/20” then display row “Declared emergency area” below;  Else if A05 “Qualifying Exceptions” = No PV – Snow Load” then display row “Snow load” below;  Else if A05 “Qualifying Exceptions” = “Section 10-109(k) PV determination” then display row “Section 10-109(k) PV Requirement Determination”>> |
| **Limited Solar Access** |
| The installer shall provide documentation of the roof area limitations that justify the exception. Documentation may include roof plans, aerial photos, satellite images, 3D model, or other documentation that clearly shows the available roof areas that meets the solar access requirements. |
| **Declared emergency area** |
| If a building is damaged or destroyed in a declared emergency area prior to 1/1/2020 (AB-178), it must comply with PV requirement applicable on originally constructed permit date. Eligibility for this exception, such as income or insurance requirements, shall be confirmed by the enforcement agency. |
| **Snow Load** |
| The installer shall provide roof design, PV system design, and/or ASCE Standard 7-16, Chapter 7, Snow Loads calculation to the enforcement authority. The enforcement authority must determine that it is not possible for the PV system, including panels, modules, components, supports, and attachments to the roof, to meet ASCE Standard 7-16, Chapter 7, Snow Loads. |
| **10-109(k) PV Requirement Determination** |
| Only buildings within the jurisdiction of Trinity Public Utility District or the City of Needles qualify for this exception. |
| **The responsible person’s signature on this compliance document affirms that all applicable requirements in this table have been met.** |

**CF2R-SRA-02**

* C04 – revised static text
  + What is the total area of steep-sloped roofs oriented between ~~110~~ **90** and ~~270~~ **300** degrees relative to true north, where the annual solar access is 70% or greater? (ft2)

**CF3R-EXC-20**

* Section C table name – revised static text
  + C. ~~Attic~~ **Roofs**

**CF3R-MCH-20a & e**

* A09 (A10) – revised static text (correct in schema)
  + **10** ~~09.~~ Determine compliance method for this document; display applicable tables below; (this row not visible to user)

**CF3R-MCH-22a & b**

* Revised header – Word doc only (correct in schema)
  + CF**3**~~2~~R-MCH-22-H

**CF3R-MCH-23a, b, c, d**

* Revised header – Word doc only (correct in schema)
  + CF**3**~~2~~R-MCH-23-H