

New Construction Program

Baseline HVAC system types selection

(For buildings complying to ASHRAE 90.1 2010 or NECB 2011)

Note: Baseline HVAC system types selection is based on the proposed building type and proposed building heating energy source (the first table).

Proposed building type		Proposed heating energy source		
		Fossil fuel & purchased heat ¹	Fossil/electric hybrid*	Electric and on-site renewables**
Residential	Heating and cooling	System 1	System 1a	System 2
	Heating only	System 1b	System 1c	System 2a
Nonresidential	3 floors or less & <25,000 ft ²	System 3	System 3a	System 4
	4 or 5 floors & <25,000 ft ² or 5 floors or less & 25,000 ft ² to 150,000 ft ²	System 5	System 5a	System 6
	More than 5 floors or >150,000 ft ²	System 7	System 7a	System 8
	Heated only storage	System 9	System 10	System 10

¹ If the proposed building uses purchased chilled water and purchased heat, then follow ASHRAE 90.1 2010 appendix g modification G3.1.1.3.3

* Fossil fuel based HVAC systems with heat pump pre-heat, or heat pump based HVAC systems with fossil fuel boost and/or backup

** On-site renewables: solar, geo thermal, wind


Baseline HVAC system descriptions


System no.	System type	Fan control	Cooling type	Heating type	Ventilation type	DWH system type
1. PTAC	Packaged terminal air conditioner with hydronic heating coil (high t-re)	Constant volume	Direct expansion	Hot water fossil fuel boiler	Fossil fuel rooftop make up air unit	Hot water fossil fuel boiler
1a. PTAC-GBHP	Packaged terminal air conditioner with hydronic heating coil (high t-re)	Constant volume	Direct expansion	Heat pump with fossil fuel backup / boost, fossil fuel boiler with heat pump pre-heating, or electric resistance***	Heat pump with fossil fuel backup / boost, fossil fuel boiler with heat pump pre-heating, or fossil fuel rooftop make up air unit***	Heat pump with fossil fuel backup / boost, fossil fuel boiler with heat pump pre-heating, or fossil fuel boiler***
1b. HBB	Hydronic baseboards (high t-re)	–	–	Hot water fossil fuel boiler	Fossil fuel rooftop make up air unit	Hot water fossil fuel boiler
1c. EBB-GB	Electric baseboards with gas ventilation and DWH	–	–	Electric resistance	Fossil fuel rooftop make up air unit	Hot water fossil fuel boiler
2. PTHP	Packaged terminal heat pump	Constant volume	Direct expansion	Electric heat pump	Electric heat pump	Electric heat pump
2a. EEB-HP	Electric baseboards with electric ventilation and DWH	–	–	Electric resistance****	Electric resistance****	Same type as proposed
3. PSZ-AC	Packaged rooftop air conditioner	Constant volume	Direct expansion	Fossil fuel furnace	Fossil fuel furnace	Same type as proposed
3a. PSZ-HPGB	Packaged rooftop air conditioner with heat pump and gas boost/backup	Constant volume	Direct expansion	Electric heat pump with fossil fuel boost/backup	Electric heat pump with fossil fuel boost/backup	Same type as proposed
4. PSZ-HP	Packaged rooftop heat pump	Constant volume	Direct expansion	Electric heat pump	Electric heat pump	Same type as proposed

5. Packaged VAV w/ reheat	Packaged rooftop variable air volume with reheat	VAV	Direct expansion	Hot water fossil fuel boiler	Hot water fossil fuel boiler	Hot water fossil fuel boiler
5a. packaged VAV w/reheat – HPGB	Packaged rooftop variable air volume with heat pump/gas boost/back-up high t-re heating and reheating system	VAV	Direct expansion	Electric heat pump with fossil fuel boost/back-up	Electric heat pump with fossil fuel boost/back-up	Same type as proposed
6. packaged VAV w/ PFP boxes	Packaged roof-top variable air volume with parallel fan-powered boxes and reheat	VAV	Direct expansion	Electric resistance****	Electric resistance****	Same type as proposed
7. VAV w/reheat	Variable air volume with reheat	VAV	Chilled water	Hot water fossil fuel boiler	Hot water fossil fuel boiler	Hot water fossil fuel boiler
7a. VAV w/reheat – HPGB	Variable air volume with central heat pump/gas boost/back-up high t-re heating and reheating system	VAV	Chilled water	Electric heat pump with fossil fuel boost/back-up	Electric heat pump with fossil fuel boost/back-up	Same type as proposed
8. VAV w/PFP boxes	Variable air volume with parallel fan-powered boxes and reheat	VAV	Chilled water	Electric resistance****	Electric resistance****	Same type as proposed
9. Heating and Ventilaiton	Warm air furnace, gas fired	Constant volume		Fossil fuel furnace	Fossil fuel furnace	Same type as proposed
10. Heating and ventilaiton	Warm air furnace, electric	Constant volume		Electric resistance****	Electric resistance****	Same type as proposed

***Baseline system selection depends on the proposed system type. Example: If GSHP system with gas boiler back-up is proposed heating plant for space heating, ventilation and DHW, the baseline heating plant will be a central heat pump (usually air to water) based system with gas boiler back-up with minimum efficiency levels as per ASHRAE 90.1 prescriptive requirements.

****If proposed heating system is a heat pump systems with electric resistance back-up, the baseline system will be a central heat pump (usually air to water) with electric resistance back-up.

 Identical system with ASHRAE 90.1 2010 appendix G table G3.1.1B

 New construction program specific baseline system

SPECIAL CASE NO.1:

The proposed building type: Heated/cooled MURBs or commercial building with gas fired distributed heat pump or water source VRF system and gas fired (or hybrid) ventilation (MAU) and DWH systems.

Program baseline: gas fired distributed heat pump system. Ventilation (MAU) and DHW systems heating source to match proposed.

SPECIAL CASE NO.2:

The proposed building type: 100,000 ft² heated/cooled warehouse-type retail store with constant volume rooftop units.

Program baseline: system 3, or system 3a when proposed design involves rooftop heat pumps.