

5.11 Technical Specification: Premium Efficiency Electric Air Conditioning

Small Premium Project Type:

For Premium Air Conditioning Retrofit Projects: Projects that voluntarily replace existing unitary AC units in existing buildings. The replaced equipment must have been in service for at least ten years but not exceed the current American Society of Heating Refrigeration and Air Conditioning (ASHRAE) defined service life. The project will install new AC equipment that meets the performance standards defined below in lieu of existing AC equipment older than 10 years but less than service life.

Eligible projects must install equipment and AC controls that meet Oregon Energy Efficiency Specialty Code (OEESC). The installation must include: multi-stage programmable thermostat, air-side economizer and carbon dioxide (CO₂) sensor based demand control ventilation (DCV) as required by the OEESC for new installation.

For Premium AC Project in New Buildings: Projects that elect to install premium energy efficiency equipment (as defined in the Unitary Energy Performance Tables within this document) in lieu of installing conventional efficiency equipment. Equipment meeting the Oregon REACH code for mechanical AC equipment is considered premium efficiency and thus included in this specification.

Description:

Eligible equipment will be unitary packaged AC equipment with compressorized, direct expansion (DX) electric cooling system and controls. The equipment must be serving commercial spaces (i.e. office, retail) that operate during typical business hours. The equipment will be sized and installed using industry accepted best practices as defined in this specification.

Minimum Operation:

All eligible AC system types must operate a minimum of 2,000 hours per year.

Equipment Type, Capacity and Performance:

The capacity of eligible equipment must not exceed the ranges defined within this specification.

ENERGY PERFORMANCE REQUIREMENTS

Unitary AC equipment must meet or exceed the following energy performance standards achieved at Air Conditioning Heating and Refrigeration Institute (AHRI) testing conditions.

Unitary AC Units (including AC units with combustion fired heating) –must meet or exceed the performance requirements on the Unitary AC Energy Performance Requirements table or the energy performance requirements in the Oregon REACH code.

Unitary Heat Pumps – Split or single packaged units must meet or exceed the performance requirements on Unitary Heat Pump Energy Performance Requirements table or the energy performance requirements in the Oregon REACH code.

Unitary AC Energy Performance Requirements

Equipment Type	Size Category	Heating Section Type	Subcategory or Rating Condition	Minimum Efficiency
Air Conditioners, Air cooled	< 65,000 btu/hr	All	Split System	15 SEER 12.5 EER
			Single Package	15 SEER 12.0 EER
	>= 65,000 btu/hr and < 135,000 btu/hr	Electric Resistance (or None)	Split System and Single Package	11.7 EER 12.9 IEER
		All other	Split System and Single Package	11.5 EER 12.7 IEER
	>= 135,000 btu/hr and < 240,000 btu/hr	Electric Resistance (or None)	Split System and Single Package	11.7 EER 12.4 IEER
		All other	Split System and Single Package	11.5 EER 12.2 IEER
Air Conditioners, Water cooled	< 65,000 btu/hr	All	Split System and Single Package	14 EER
			Split System and Single Package	14 EER 15.3 IEER
	>= 65,000 btu/hr and < 135,000 btu/hr	Electric Resistance (or None)	Split System and Single Package	14 EER 15.3 IEER
		All other	Split System and Single Package	13.8 EER 15.1 IEER
	>= 135,000 btu/hr and < 240,000 btu/hr	Electric Resistance (or None)	Split System and Single Package	14 EER 14.8 IEER
		All other	Split System and Single Package	13.8 EER 14.6 IEER
Air Conditioners, Evaporatively Cooled	< 65,000 btu/hr	All	Split System and Single Package	14 EER
			Split System and Single Package	14 EER 15.3 IEER
	>= 65,000 btu/hr and < 135,000 btu/hr	Electric Resistance (or None)	Split System and Single Package	14 EER 15.3 IEER
		All other	Split System and Single Package	13.8 EER 15.1 IEER
	>= 135,000 btu/hr and < 240,000 btu/hr	Electric Resistance (or None)	Split System and Single Package	13.5 EER 14.3 IEER
		All other	Split System and Single Package	13.3 EER 14.1 IEER

* All listed performance ratings are stated at AHRI test conditions as defined in OEESC Chapter 6.

Unitary Heat Pump Energy Performance Requirements

Equipment Type	Size Category	Heating Section Type	Subcategory or Rating Condition	Minimum Efficiency
Heat Pump, Air cooled (cooling mode)	< 65,000 btu/hr	All	Split System	15 SEER 12.5 EER
			Single Package	15 SEER 12 EER
Heat Pump, Air cooled (cooling mode)	>= 65,000 btu/hr and < 135,000 btu/hr	Electric Resistance (or None)	Split System and Single Package	11.3 EER 12.2 IEER
		All other	Split System and Single Package	11.1 EER 12.0 IEER
	>= 135,000 btu/hr and < 240,000 btu/hr	Electric Resistance (or None)	Split System and Single Package	10.9 EER 11.6 IEER
		All other	Split System and Single Package	10.7 EER 11.4 IEER
Water to Air: Water Loop (cooling mode)	< 17,000 btu/hr	All	86F entering water	14 EER
	>= 17,000 btu/hr and < 65,000 btu/hr	All	86F entering water	14 EER
	>= 65,000 btu/hr and < 135,000 btu/hr	All	86F entering water	14 EER

Heat Pump, Air cooled (heating mode)	< 65,000 btu/hr	All	Split System	9.0 HSPF
			Single Package	9.0 HSPF
Heat Pump, Air cooled (heating mode)	>= 65,000 btu/hr and < 135,000 btu/hr (cooling capacity)		47F db / 43F wb outdoor air	3.4 COP
			17F db / 15F wb outdoor air	2.4 COP
	>= 135,000 btu/hr (cooling capacity)		47F db / 43F wb outdoor air	3.2 COP
			17F db / 15F wb outdoor air	2.1 COP
Water to Air: Water Loop (heating mode)	< 135,000 btu/hr (cooling capacity)		68F entering water	4.6 COP

* All listed performance ratings are stated at AHRI test conditions as defined in OEESC Chapter 6.

Eligible AC equipment must demonstrate that it meets or exceeds the performance of the energy performance ratings required in this technical specification. All eligible projects must demonstrate performance compliance by submitting an AHRI certificate of performance for the manufacturer make and model of the equipment that has been installed.

EQUIPMENT CONTROL REQUIREMENTS FOR PREMIUM EFFICIENCY AC PROJECTS

A commercial-grade, programmable thermostat is required. Eligible thermostats must include the following features:

1. Separate heating and cooling setpoints (“dual” setpoints).
2. A deadband of at least 5 degrees between the heating and cooling setpoints.
3. Prevent reheat of previously cooled air (except in humidity control applications).
4. Prevent re-cooling of previously heated air– mixing or simultaneously supplying air that has been previously heated mechanically and air that has been previously cooled, either by mechanical cooling or by economizer systems.
5. Solid state electronics.
6. Available continuous fan operation during occupied hours.
7. Time-of-day schedules (night setback /setup) and multiple day types (weekday, weekend).
8. Individual holiday schedules.
9. Temporary occupied-mode override.
10. Two-stages of cooling.
11. A dedicated relay output for the outside air damper (occupied versus unoccupied).
12. Capable of interfacing with an occupancy sensor, switching the unit to intermediate temperature settings when no occupants are present during normally occupied hours.

Units with a nominal cooling capacity greater than 54,000 Btu/hr must include an air-side economizer. The controls must allow the air-side economizer and DX compressor to be used simultaneously (i.e. an “integrated economizer”). While in cooling mode, the integrated economizer must use 100% outdoor air as long as the outdoor air temperature is below return air temperature when the compressor is operating. The installed economizer must not be “fixed enthalpy” controlled. The economizer is required to include the following features:

1. Fully modulating dampers.
2. DX compressor capacity control.
3. Sensors for both outdoor and return air temperature conditions.
4. Economizer systems (sensors, dampers, actuators and controller) must be under factory warranted for parts and labor by the manufacturer for at least one year.
5. Systems without power exhaust, relief dampers (barometric pressure relief) must allow 100% relief air flow not to exceed 10% of internal pressure drop (external static pressure of the air handling unit). A barometric relief damper (external to the air handler) can be used in concert with the factory mounted relief damper to satisfy this requirement.

Sensors for outdoor air and return air conditions must meet the following performance conditions:

1. CO₂ sensors must have an accuracy of ± 50 ppm (0 - 2000- ppm range).
2. CO₂ sensors must not require recalibration earlier than 5 years after installation.
3. Temperature sensors must have an accuracy of $\pm 1^\circ\text{F}$.
4. Enthalpy and humidity sensors must be solid state and have an accuracy of $\pm 5\%$.

Where DCV is required by the OEESC, a carbon dioxide (CO₂) sensor based system must be installed. The DCV system must work in conjunction with the airside economizer and sensor requirements listed previously in this specification.

QUALITY SYSTEM DESIGN AND INSTALLATION REQUIREMENTS FOR BUILDING AC PROJECTS

All installed AC systems must be sized, selected and installed per the requirements detailed in ANSI/ACCA 5 QI – 2010 (HVAC Quality Installation Specification; see www.acca.org/quality for a free PDF copy).

Building heat gain/loss load calculations must be performed in accordance with OEESC by the installing contractor or a qualified third party, based on post-construction conditions. Such load calculations must be per the Air Conditioning Contractors of America (ACCA) Manual N or ASHRAE approved load calculation methodology. ODOE will require a copy of the building load calculations (used to size/select the installed equipment capacity) as part of the documentation submitted.

Incentive Estimate Worksheet:

The incentive worksheets shown in the following tables are the prescribed tax credit amounts that small premium projects can receive. The tax credit amount is based on unitary AC type, size and system configuration as detailed in the incentive worksheet tables.

For Premium AC Retrofit Projects replacing existing equipment (see qualifications for replacement previously stated) with premium efficiency equipment meeting the equipment type, capacity and performance (specified previously) will receive the incentives as identified in column A of the Incentives Worksheet for Premium AC Retrofit Projects in Existing Buildings table.

For Premium AC Projects in New Buildings with premium efficiency units meeting the Equipment Type, Capacity and Performance specified previously will receive the incentives as identified in column D of the Incentives Worksheet for Premium AC Projects in New Building table.

Unitary AC equipment not identified in the following tables will not be eligible for a tax credit under small premium projects.

The open boxes used in columns B, C, E and F are provided for the applicant to complete. This worksheet format will allow the applicant to easily calculate the tax credit they will receive

upon completing their final certification for the installed equipment. The total from this worksheet is intended to be used to complete the expected incentive for informational filing.

Incentives Worksheet for Premium AC Retrofit Projects in Existing Buildings

Unitary AC Unit	Size Range	System Configuration	A. Incentive for Retrofit/Replace AC Project (\$/Ton)	B. Number of nominal tons installed	C. Total Eligible Incentive (\$) A x B = C
Air Conditioners (Air Cooled)	<65,000 Btu/h	Split System	\$131.25		
		Single Package	\$102.20		
	≥65,000 Btu/h through <135,000 Btu/h	Split System and Single Package	\$135.80		
	≥135,000 Btu/h through <240,000 Btu/h	Split System and Single Package			
Air Conditioners (Water and Evaporatively Cooled)	<65,000 Btu/h	Split System and Single Package	\$157.20		
	≥65,000 Btu/h through <135,000 Btu/h	Split System and Single Package	\$119.15		
	≥135,000 Btu/h through <240,000 Btu/h	Split System and Single Package	\$158.70		
Air Cooled Heat Pump	<65,000 Btu/h	Split System	\$119.35		
		Single Package			
	≥65,000 Btu/h through <135,000 Btu/h	Split System and Single Package	\$153.65		
	135,000 Btu/h through <240,000 Btu/h	Split System and Single Package			
Water Source Heat Pump	<135,000 Btu/h	85°F Entering Water Temperature	\$158.90		

Total From
Column C

Incentives Worksheet for Premium AC Projects in New Buildings

Unitary AC Unit	Size Range	System Configuration	D. Incentive for New Construction AC Project (\$/Ton)	E. Number of nominal tons installed	F. Total Incentive Received (\$) D x E = F
Air Conditioners (Air Cooled)	<65,000 Btu/h	Split System	\$36.05		
		Single Package			
	≥65,000 Btu/h through <135,000 Btu/h	Split System and Single Package	\$30.10		
	≥135,000 Btu/h through <240,000 Btu/h	Split System and Single Package			
Air Conditioners (Water and Evaporatively Cooled)	<65,000 Btu/h	Split System and Single Package	\$62.00		
	≥65,000 Btu/h through <135,000 Btu/h	Split System and Single Package			
	≥135,000 Btu/h through <240,000 Btu/h	Split System and Single Package	\$53.00		
Air Cooled Heat Pump	<65,000 Btu/h	Split System	\$53.20		
		Single Package			
	≥65,000 Btu/h through <135,000 Btu/h	Split System and Single Package	\$47.95		
	135,000 Btu/h through <240,000 Btu/h	Split System and Single Package			
Water Source Heat Pump	<135,000 Btu/h	85°F Entering Water Temperature	\$53.20		

Total From Column F