

18.0 Residential HVAC Deemed Tables

Table 18.0.1: Effective Full Load Hours, Altitude	EFLH Cooling		EFLH Heat		EFLH_Heating_HP (Heat Pump Impacted heating hours) ****		Altitude Adjustment Factor	HSPF Climate Zone Adjustment Factor
	Single Family	Multi-Family	Single Family	Multi-Family	Single Family	Multi-Family		
Zone 1 - CO Front Range *	590	699	1,825	1,409	1,409	1,088	0.177	100%
Zone 2 - CO Western Slope **	837	992	1,971	1,522	1,495	1,154	0.163	100%
Zone 3 - CO Mountain Areas ***	210	249	2,104	1,625	920	710	0.244	85%
Zone 4 - CO Very High Altitude Areas ****	0	0	2,739	2,115	1,360	1,050	0.303	85%

* Zone 1 (Front Range as represented by Denver International Airport TMY3 data);
 ** Zone 2 (Western Slope as represented by Grand Junction TMY3 Data)
 *** Zone 3 (Mountain Areas as represented by Alamosa TMY3 Data)
 **** the heat pump impacted hours are determined at a cutoff temperature of 25 F.
 **** Zone 4 (Very High Altitude Areas as represented by Lake CO Airport TMY3 Data)

Table 18.0.1a: Effective Full Load Hours Cold Climate Heat Pumps	EFLH_ccHP_Heat (Cold Climate Heat Pump Impacted heating hours) *****	
	Single Family	Multi-Family
Zone 1 - CO Front Range	1,809	1,397
Zone 2 - CO Western Slope	1,971	1,522
Zone 3 - CO Mountain Areas	1,748	1,349
Zone 4 - CO Very High Altitude Areas	2,521	1,946

***** the cold climate heat pump impacted hours are determined at a cutoff temperature of 5 F.

Table 18.0.2: Minimum Qualifying Efficiency

Measure	Code Minimum						
	SEER	EER	HSPF	Heating COP	Minimum Qualifying SEER	Minimum Qualifying EER	Minimum qualifying HSPF / Full Load COP
High Efficiency Air Conditioner - Split System	13.00	11.18	N/A	N/A	15.00	12.50	N/A
High Efficiency Air Conditioner - Packaged System	14.00	11.76	N/A	N/A	15.00	12.50	N/A
Air Source Heat Pump - Split System	14.00	11.76	8.20	N/A	15.00	11.50 12.50	9.00
Air Source Heat Pump - Packaged System	14.00	11.76	8.00	N/A	15.00	11.50 12.50	9.00
Mini-Split & Multi-Split Heat Pumps	14.00	11.76	8.20	N/A	16.00	11.00	9.00
Cold Climate Air Source Heat Pumps	14.00	11.76	8.20 10.50	N/A	18.00	11.50 12.50	9.50 10.50
Cold Climate Mini-Split & Multi-Split Heat Pumps	14.00	11.76	8.20	N/A	18.00	11.00	9.50 10.50
Ground Source Heat Pump **	14.10	14.10	N/A	3.20	N/A	16.00	3.30

** Ground Loop Brine to Air with entering temperatures of 77 F cooling mode and 32 F heating mode

Table 18.0.3: Coincidence Factors, Baseline Efficiencies and Lifetimes

Equipment Type	Deemed Equipment Coincidence Factor	Deemed QI Coincidence Factor	SEER Baseline	EER Baseline	HSPF Baseline	Baseline Heating COP (Gas Fired)	Lifetime	Notes
High Efficiency Air Conditioner - Split System *	90%	100%	13.00	11.18	N/A	N/A	18	(Reference 17)
Air Source Heat Pump - Split System	90%	100%	13.00 14.00	11.18 11.76	8.20	0.80	18	(Reference 17)
Mini-Split & Multi-Split Heat Pumps	90%	N/A	14.00	Varies	8.20	0.80	15	
Cold Climate Air Source Heat Pump - Split System	90%	100%	13.00 14.00	11.18 11.76	8.20	0.80	18	(Reference 17)
Cold Climate Mini-Split & Multi-Split Heat Pumps	90%	N/A	14.00	Varies	8.20	0.80	15	
Ground Source Heat Pump **	90%	100%	13.00	11.18	N/A	0.80	20	

** Baseline for GSHP is Code minimum AC and Gas Fired Furnace.

Table 18.0.4: QI Factors (Reference 4, Reference 6, Reference 7, Reference 14)

Home Type - equipment type	Sizing Loss	Refrigeration Charge	Improper Airflow	Duct Leakage	Loss NO Field QI	Loss_Uncorr
New Home - AC/ASHP	0%	7.0%	2.0%	0.0%	9.00%	0.0%
Existing Home - AC/ASHP	2.0%	7.0%	2.0%	8.3%	17.30%	3.7%
New Home - GSHP	0%	0.0%	2.0%	0.0%	2.00%	0.0%
Existing Home - GSHP	2.0%	0.0%	2.0%	8.3%	10.30%	3.7%
New Home MSHP	0.0%	0.0%	0.0%	0.0%	0.00%	0.0%
Existing Home MSHP	0.0%	0.0%	0.0%	0.0%	0.00%	0.0%

Table 18.0.5: Conversion Factors and Constants

Conversion Factor from BTUH to kW	3,412	BTU/kW-hr
Btu to Dth	1,000,000	BTU/Dth
Therm to Dth	10	Therm/Dth
Btu to Therm	100,000	Btu/Therm
Convert from Btu/wh to kW/ton	12	Btu/wh per kW/ton
Conversion between Watts and kilowatts	1,000	watts/kilowatt
Conversion between BTU/h and tons	12,000	BTU/h / ton
Water Lb/gallon	8.34	lb/gal
Water h_fg	1,059	BTU/lb (Evaporative energy / lb water)

Table 18.0.6: Cooling & Heating Weather Data for Load Estimates	Maximum Outside Air Temperature (F)	Minimum Outside Air Temperature (F)	Balance Point OSA Temperature (F)	Balance Point Load (BTUH)
Zone 1 - CO Front Range	104	-3	60	0
Zone 2 - CO Western Slope	99	7	60	0
Zone 3 - CO Mountain Areas	87	-26	60	0
Zone 4 - CO Mountain Areas	81	-17	60	0