

Design Criteria for Energy-Efficient Cooling Equipment

The objective of this document is to create a standard of increased energy-efficiency and cost effectiveness for multiple applications for HVAC cooling equipment.

I. AIR CONDITIONERS AND HEAT PUMPS

It is recommended that newly-purchased air conditioners and heat pumps meet the “high-efficiency” rating specified in the following table. At a minimum, new air conditioners and heat pumps should meet the “mid-efficiency” rating. The efficiency ratings presented are based on commercially-available products from most manufacturers. The table also presents the increased SCORE incentive and annual electricity cost savings for each efficiency option.

AC or Heat Pump Size	SCORE SM Baseline Cooling Efficiency	Typical Standard-Efficiency Cooling Rating	Typical Mid-Efficiency Cooling Rating	Typical High-Efficiency Cooling Rating	Estimated SCORE Incentive per Ton ^a			Estimated Annual Electricity Cost Savings Over Baseline, per Ton ^{b,c}		
					Standard-Efficiency Unit	Mid-Efficiency Unit	High-Efficiency Unit	Standard-Efficiency Unit	Mid-Efficiency Unit	High-Efficiency Unit
1 - 5 tons	13 SEER	13 - 13.5 SEER	13.5 - 14.5 SEER	14.5 - 16 SEER	\$0 - \$6	\$6 - \$16	\$16 - \$29	\$0 - \$3	\$3 - \$8	\$8 - \$15
6 - 10 tons	10.1 EER	10 - 10.5 EER	10.5 - 11.5 EER	11.5 - 12.5 EER	\$0 - \$8	\$8 - \$24	\$24 - \$38	\$0 - \$4	\$4 - \$12	\$12 - \$19
12.5 - 18 tons	9.5 EER	9.5 - 10.5 EER	10.5 - 11.5 EER	11.5 - 12.4 EER	\$0 - \$20	\$20 - \$37	\$37 - \$50	\$0 - \$10	\$10 - \$19	\$19 - \$25
20 tons +	9.3 EER	9.5 - 10 EER	10 - 11 EER	11 - 11.6 EER	\$5 - \$15	\$15 - \$34	\$34 - \$43	\$2 - \$8	\$8 - \$17	\$17 - \$22

^aThe SCORE incentive is \$185 per kW saved.

^bThe estimated annual electricity cost savings is based on UTEP's electric rate of \$0.04338/kWh.

^cEquipment is assumed to operate at 1,955 annual full-load hours, as deemed by the Texas PUC for DX equipment in college buildings.

II. CHILLERS

It is recommended that newly-purchased chillers meet the “high-efficiency” rating specified in the following table. The efficiency ratings presented are based on commercially-available products from most manufacturers. The table also presents the increased SCORE incentive and annual electricity cost savings for each efficiency option.

Chiller Type	Chiller Size	SCORE SM Baseline Full- Load Rating (kW/ton)	Typical Standard- Efficiency Chillers		Typical High-Efficiency Chillers		Estimated SCORE Incentive per Ton ^a		Estimated Annual Electricity Cost Savings Over Baseline, per Ton ^{b,c}	
			Full-Load Rating (kW/ton)	IPLV (kW/ton)	Full-Load Rating (kW/ton)	IPLV* (kW/ton)	Standard- Efficiency Chiller	High- Efficiency Chiller	Standard- Efficiency Chiller	High- Efficiency Chiller
Air-Cooled	All Sizes	1.256	1.21 - 1.255	0.80 - 0.91	1.10 - 1.18	0.78 - 0.86	\$0 - \$8	\$13 - \$26	\$0 - \$3	\$5 - \$11
Water-Cooled Scroll or Screw	Less than 90 tons	0.790	0.74 - 0.79	0.53 - 0.60	0.68 - 0.73	0.51 - 0.59	\$0 - \$7	\$9 - \$16	\$0 - \$4	\$5 - \$8
	90 - 150 tons	0.790	0.73 - 0.75	0.51 - 0.57	0.66 - 0.72	0.50 - 0.52	\$6 - \$9	\$10 - \$19	\$3 - \$5	\$5 - \$10
Water-Cooled Centrifugal	150 - 300 tons	0.634	0.59 - 0.68	0.50 - 0.59	0.53 - 0.58	0.48 - 0.54	\$0 - \$7	\$8 - \$16	\$0 - \$3	\$4 - \$8
	300 tons +	0.577	0.56 - 0.65	0.47 - 0.56	0.50 - 0.55	0.45 - 0.51	\$0 - \$3	\$4 - \$12	\$0 - \$1	\$2 - \$6

*When equipped with a VFD, a water-cooled centrifugal or screw chiller often achieves an IPLV of around 0.35 kW/ton.

^aThe SCORE incentive is \$185 per kW saved.

^bThe estimated annual electricity cost savings is based on UTEP's electric rate of \$0.04338/kWh.

^cAnnual full-load operating hours are assumed to be 1,587 hours for air-cooled chillers and 1,761 hours for water-cooled chillers, as deemed by the Texas PUC for college buildings.