

# Comparison by Energy Use

	Conventional Rooftop Unit <sup>(1)</sup>	Customized DX Outdoor Air Unit <sup>(2)</sup>	All Electric Active Desiccant	SEMCO Revolution	Key Advantages Offered by the Revolution Technology
<b>System Refrigeration EER Range</b> Peak conditions (100% OA) <sup>(5)</sup> Part Load conditions (30% Capacity) <sup>(5)</sup>	8.4 7.5	8.7 7.3	8.5 6.2	12.4 16	Far more energy efficient at peak conditions More than twice as efficient during part load
<b>System KW input required (per 1000 Supply cfm)</b> (Supply 65°F/47°F dew point/48 grains) 100% OA 50% OA	11.1 KW <sup>(7)</sup> 7.3 KW	14.3 KW 9.5 KW	10.6 KW 9.3 KW	6.9 KW 3.7 KW	Greatly reduced peak electrical demand Higher efficiency results in much lower energy consumption at peak and part load conditions
<b>Parasitic fan energy due to desiccant wheel <sup>(5)</sup></b> Supply fan energy (per 1000 supply cfm) Regeneration fan energy (per 1000 supply cfm) Desiccant wheel drive motor Total parasitic energy (per 1000 cfm)	n/a n/a n/a n/a	n/a n/a n/a n/a	.28 KW .79 KW .002 KW 1.07 KW	.046 KW .055 KW .002 KW .10 KW	Much lower parasitic energy than other active desiccant based outdoor air systems Less than 10% of that used by previous active desiccant technologies
<b>Regen/Reheat Energy (per 1000 Supply cfm)</b> 100% OA <sup>(5)</sup> 30% OA <sup>(5)</sup>	16,200 16,200	0 0	0 0	16,741 16,741	Regeneration energy used on par with reheat energy required by over-cool reheat systems
<b>Cost of Operation (per 1,000 Supply cfm) <sup>(9)</sup></b> At peak cooling condition (100% OA) At peak load cooling condition (50% OA) Heating per Therm delivered (100,000 BTU)	\$0.89 \$0.62 \$0.86	\$1.00 \$0.67 \$0.86	\$0.74 \$0.65 \$0.86	\$0.60 \$0.38 \$0.59	19% lower than the next best technology 39% lower than the next best technology 31% lower than the next best technology
<b>Estimated Annual Operating Cost (\$/1000 cfm) <sup>(5,9,10)</sup></b>	\$4,185	\$3,905	\$3,289	\$1,994	39% lower than the next best technology
<b>Approximate Equipment First Cost (\$/cfm) <sup>(5,9,11)</sup></b>	\$9.10 <sup>(3,7)</sup>	\$12.00	\$13.20	\$9.90	Best first cost vs. performance ratio

Footnotes:

- (1) Conventional rooftop is provided for comparison only and should not be used as shown. The manufactures recommend against use as a high percentage outdoor air or low dew point system.
- (2) Typical of a refrigeration based outdoor air dehumidification system. Analysis is based upon the Trane FADA unit. This type of unit over-cools to reach the desired dew point. The supply dew point attainable is limited by leaving coil temperature. Reheat is provided by condenser heat, as available, but is not easily varied or controlled.
- (3) Hot gas bypass is available as a field installed capacity control option. Cooling output is reduced but energy consumption remains high.
- (4) The ASHRAE Energy Standard 90.1 requires the use of total enthalpy recovery having an efficiency of at least 50% for systems greater than 5,000 cfm with more than 70% outdoor air.
- (5) This analysis used the nominal airflow rating set by the manufacturer, assumes outdoor air conditions of 95°F and 120 grains and supply air at 65°F/47°F dew point/48 grains
- (6) This analysis used the nominal airflow rating set by the manufacturer, assumes outdoor air conditions of 95°F and 120 grains and a supply dew point mentioned.
- (7) Operating below about 300 cfm/ton is not recommended by the manufactures of conventional packaged equipment and can result in serious equipment failure.
- (8) This system pre-cools air then passes all of it through the active desiccant wheel. The leaving air temperature at a given humidity level can not be controlled and is often hotter than desired.
- (9) Energy cost estimates assume the delivery of air in accordance with note 5 during the cooling season. Energy costs used were \$.07/KWH and gas at \$7.00/million BTU.
- (10) Continuous operation is assumed for this analysis and is provided per 1,000 cfm of supply air
- (11) Cost/cfm based on flow required to reach conditions listed in note 5. Unit cost is based upon the best available data obtained in the marketplace and is provided for comparison only.