



Agam

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AGAM ENERGY SYSTEMS LTD.

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Ultra-Efficient Dehumidifiers and Air Conditioners for Humid Areas

- HAC-CA (Hybrid Air Conditioner - Circulated Air)
- HAC-FA (Hybrid Air Conditioner - Fresh Air)
- DAC-FA (Direct Air Conditioner - Fresh Air)



Revolutionary dual-cycle air conditioning systems combining a traditional refrigerant heat pump with an innovative liquid desiccant system for unmatched cooling, heating and dehumidification cost performance, particularly in humid areas.



GENERAL TECHNOLOGY

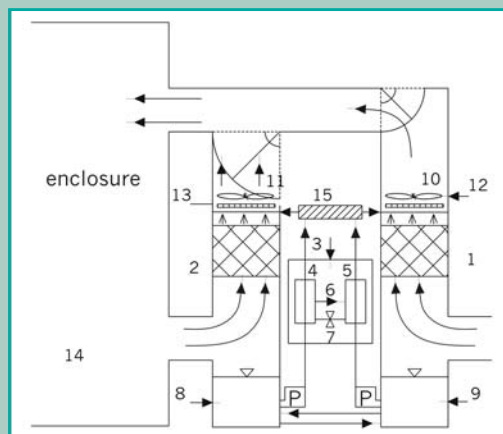
Redefining Efficiency

The Agam family of air conditioners redefines efficiency in agricultural, industrial, commercial and public building dehumidification, cooling and heating, particular in humid areas.

Based on field-tested, patented technology, Agam systems take air conditioning to the next level - delivering the highest quality clean and humidity-balanced air while dramatically reducing energy expenses.

Conventional air conditioning systems often achieve required relative humidity by first overcooling air, and then heating it back to the necessary temperature. Agam systems eliminate the need for this wasteful practice, reducing the fresh air energy load on conventional air conditioning by up to 80% (depending on ambient conditions) by removing excess humidity from the air with very low energy input.

The Agam difference is based on a unique dual-stage heat exchange cycle that relies on a revolutionary liquid desiccant heat exchanger, combined in some models with a traditional refrigerant heat pump system. This allows highly cost-effective and efficient humidity control through simple desiccant concentration adjustment, requiring minimal energy input. Further, the liquid-air exposure facilitates the absorption of dust particles - filtering the air. The combination of lower humidity and less dust significantly reduces the likelihood of airborne illness.



The end result - cleaner, healthier, cooler, drier air with less energy input. For a target comfort zone of 24°C and 50% humidity, Agam air conditioners far outperform traditional ones, with minimum COP of 3.5 and maximum of up to 15, depending on specific model and ambient conditions. For heating, Agam air conditioners produce cleaner, healthier, warmer, and more moist air with much less energy input, even in very cold ambient conditions.

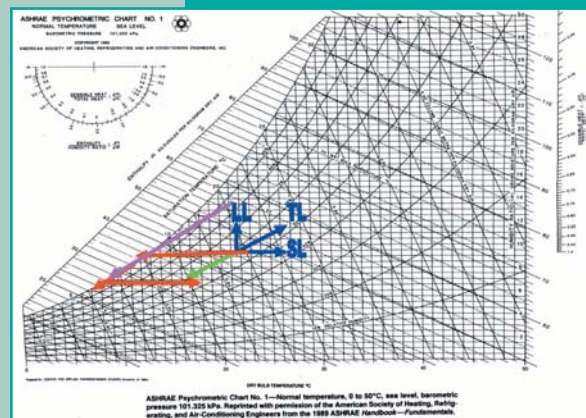
HAC-CA

Circulated Air Cooling and Heating Efficiency

For agricultural, industrial, and public facility applications where ambient humidity is high, or low humidity is mission-critical, the Agam Hybrid Air Conditioner - Circulated Air (HAC-CA) excels at lowering temperatures, humidity, disease, and - especially - energy costs.

With over five years of field experience, and based on standard off-the-shelf compressors and other moving parts, the innovative HAC-CA actually performs better in high-humidity ambient conditions. As the graph below illustrates, as the humidity goes up, so does the HAC-CA's efficiency.

Further, the HAC-CA delivers highly-efficient heating in cold climates (as low as -10°C), without problematic refrigerant pipe icing. Agam air conditioners also actually add water vapor to heated air - producing healthier and warmer air with much less energy input.



The Agam Air Conditioning Difference

- Ideal for humid climates
- Lower energy input - higher cooling and heating output
- Saves up to 80% energy
- COP up to 15
- Significantly reduces risk of airborne disease
- Maintains comfortable humidity levels - drier air when cooling, more humid air when heating

The Agam HAC-FA - Ideal for:

- Indoor pools and spas in humid climates
- Warehouses
- Greenhouses
- Heavily populated public spaces
- Enclosed sports arenas and halls



HAC-FA

Fresh Air Efficiency

For treating fresh air in humid climates, the Agam Hybrid Air Conditioner - Fresh Air (HAC-FA) includes an innovative mechanism that "recaptures energy" from already-cooled air as it is expelled. Through an innovative series of heat exchanges between air and liquid desiccant, the HAC-FA dramatically increases the efficiency of fresh-air cooling in hot, humid weather; and of fresh-air heating in cold climates - achieving a COP of 6 for cooling in tropical climates and a COP of 7 for heating.

Based on standard off-the-shelf compressors and other moving parts, the Agam HAC-FA can be installed as a standalone unit or as a fresh-air add-on to existing traditional air conditioning installations.

DAC-FA

Fresh-Air Conditioning in Humid Areas with No Compressor

For supplemental fresh-air conditioning in high ambient humidity climates, the Agam Direct Air Conditioner - Fresh Air (DAC-FA) delivers cold, dry air with no compressor energy overhead.

Based on the same technology as the HAC-FA but without the conventional refrigerant heat pump, the Agam DAC-FA supplements conventional air conditioning systems with sufficient cooling power, providing highly cost-effective dehumidification of incoming fresh air, and dramatically decreasing the load on the conventional air conditioning system.

With extremely low power consumption, the DAC-FA can achieve a COP of up to 15.

SAVINGS

Based on field-tested technology, Agam air conditioners have been providing energy savings to customers for over five years. Based on unique patented technology, the efficiency of Agam's systems increases when the difference between ambient and indoor humidity or temperature increases.

The table below presents a performance comparison for a tropical climate where ambient temperature is 30°C, relative humidity is 70%, and enthalpy is 79 kJ/kg. The inside air is at 24°C, with 50% relative humidity and enthalpy of 48 kJ/kg. Note that with low humidity load, a conventional air conditioner can achieve a COP of 3. The efficiency of a conventional air conditioner thus decreases as humidity is increased, whereas the efficiency of Agam air conditioners increases.

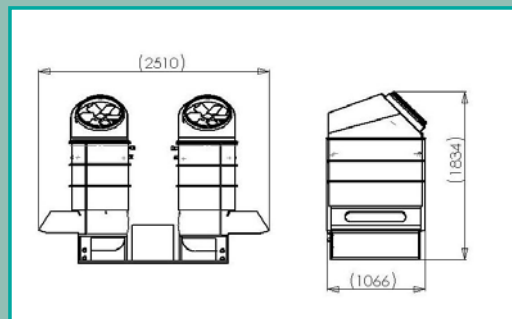
	Conventional AC	Agam HAC-CA	Agam HAC-FA	Agam DAC-FA
Capacity (kW)	16	21.5	40	24
Air Flow (CFM / (kg/sec))	1800/1	2500/1.36	2500/1.36	2500/1.36
Enthalpy Differential (kJ/kg)	16	16	30	18
Power Consumed (kW)	10	5.7	6.5	1.6
Water Removed (kg/hr)	9	13	44	29
COP	1.6	3.8	6.15	15
Exit air Enthalpy (kJ/kg)	32	32	49	61
Energy Savings (kW)	Reference	6.3	18.5	13



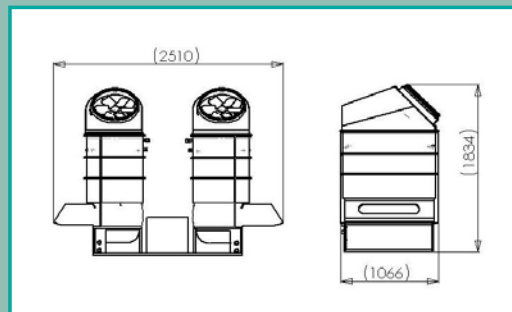
About Agam Energy Systems

Founded in 1998 by industry veterans, Agam develops and produces innovative, energy-conserving and environmentally-friendly cooling, heating and dehumidification systems. Agam's solutions serve the needs of the industrial, recreational and agricultural sectors, including greenhouses, hospitals, indoor swimming pools and spas. Based on patented heat-exchange technology, Agam's products are highly cost-effective and field proven, often saving more than 70% of energy expenses.

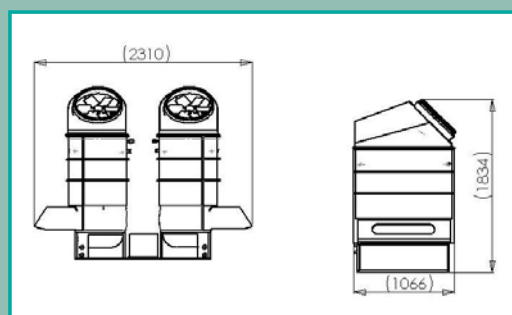
HAC-FA



HAC-CA



DHE-FA



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