

# Novel Liquid Desiccant Systems

---

*-For more comfortable and energy efficient air-conditioning applications*



*Breeding a better environment into your building*

*Air T&D Pte. Ltd*

## Introduction

We provide the most energy efficient Liquid Desiccant Dehumidification System (LDDS) and Liquid Desiccant Air-Conditioning (LDAC) on the world market. Through the breakthrough on the design and operation of LDDS & LDAC technologies, our products can achieve 30% to 50% energy savings when applied to residential and commercial building HVAC systems.

## Our Products

**LDDS:** a series of standard products with single unit air treatment capacities ranging from 500 m<sup>3</sup>/h to 4,000m<sup>3</sup>/h. Since the products are modular designed, we can meet all users need through module combination. Our professional design team can also tailor the design for any special requirements from customers.



Figure 1 LDDS

**LDAC:** The LDAC are designed for general building HVAC applications to realize independent control of air temperature and humidity, with air flow ranging from 1000 m<sup>3</sup>/h to 40,000m<sup>3</sup>/h. LDAC can integrate with existing HAVC components easily to supply cool, dry and clean air into occupied space.



Figure 2 Absorption Regenerator

Both LDDS & LDAC have been effectively integrated with the following energy sources:

- Utilize two-way heat pump to supply cooling and heating energy for dehumidifier and regenerator simultaneously. This integration enables the system to operate independently and is suitable for the application that renewable and cooling energy are not conveniently available. They are very flexible for temporary and mobile dehumidification applications.
- Integrate the LDDS with existing HVAC systems to employ chilled water and condensation heat as external energy to drive the dehumidifier and regenerator, respectively. The high COP of this integration makes it economically viable in commercial and residential building applications. This integration can also improve the COP of existing chiller plant.
- Combine the renewable energy and grid power to drive LDDS operation. Our intelligent control technology enables the system to operate in hybrid mode and seek a maximum usage of renewable energy while taking the grid power as an auxiliary.



Figure 3 Vertical LDAC



Figure 4 Horizontal LDAC

## Key Innovations

**Hybrid Operation:** In conventional system, desiccant solutions continuously exchange between dehumidification and regeneration columns in order to maintain the pre-specified concentrations. Our patented hybrid operation technology makes the desiccant solutions cycling inside each tower for a specified concentration range, and exchanges the solutions once the limit is reached to avoid the energy waste and improve the system efficiency.

**Energy Recovery:** Conventional systems require a large amount of heat energy for solution regeneration. Most of the heat energy is waste as the regeneration air is discharged directly. Our LDDS & LDAC are able to recover most of the heat with a heat pipe energy recovery device.

This structure innovation results in 60% regeneration energy saving compared the current technologies.

**Vacuum Regeneration:** High desiccant solution regeneration temperature has been become a key barrier for wide application of LDDS & LDAC. Our novel designed absorption-based liquid desiccant regeneration can drastically reduce the regeneration temperature from 80°C (conventional type) to 40°C, thus most low grade energy, such as solar energy, wasted heat from chiller etc, can be utilized effectively to concentration the desiccant solution. Moreover, no fan is equipped so that the system is energy efficient and more reliable.

**Intelligent Control:** The ability of liquid desiccant to remove water vapor from the air is determined by the temperature, flow rate and concentration of the solution. Air humidity ratio of the dehumidifiers can be controlled by regulating the three variables. We have developed an integrated controller with intelligent control algorithm. Though the advanced control technologies, the humidity ratio of supply air can be accurately controlled from 3gwater/kg dry air to 10gwater/kg dry air.

**Distributed Operation:** In commercial and residential building applications, dehumidifiers are usually inside the AHU rooms located in different floors. The heating sources, either waste heat from chiller or solar energy, are available in plant room or on the roof top. The hybrid operation provides a possibility for dehumidifier and regenerator running in different places which offers an opportunity for LDDS 7 LDAC being efficiently applied in building ACMV systems.

**Zero Crossover:** Our innovative designed on solution Distribution Nozzle and Vane Type Mist Eliminator can achieve both zero solution crossover with minimal pressure drop.





## Contact Information

Air T&D LTE. LTD

Address: 86 Phoenix Garden, Phoenix Heights, Singapore 668336

Phone: 0065-67906538

Fax: 0065-67933318

Website: [www.airtd.com.sg](http://www.airtd.com.sg)

Since the founding in Singapore in 2014, Air T&D LTE. LTD. has aimed to be a market leader and supplier in air treatment and distribution technology and providing energy-efficient solutions and services in Southeast Asia. We hope to act as a catalyst to build a more sustainable society and create value for our communities, partners, customers and investors alike and we sincerely hope that our products and services will benefit to you.