

Case Study

Air Force Base Parachute Drying Facility



The Opportunity

The parachute drying facility at Patrick Air Force Base in Cocoa Beach, FL is approximately a 30'x 30' x 60' building located on a strip of land between the Banana River and the Atlantic Ocean. The building is exposed to high humidity conditions year round and has an atmosphere that is highly corrosive to metal machinery.

The building is used for drying military parachutes that have been wet, washed with fresh water, and hung up to dry. The base weight of the personell chutes when dry is approximately 55 lbs and when wet they are approximately 130 lbs. There is capacity to hang, for drying, 50 chutes. Therefore the project required removal of approximately 3,750 lbs of water in a drying time requested at 36 hours. This requires a total moisture removal capacity of 104 lb/h.



Project Highlights:

Array Size:	9 Apricus AP-30C Collectors
Estimated Savings:	50% of existing electric bill

The current system, a conventional 34 ton air conditioning based cooling, with a heat strip to help with humidity, does not perform to the request of the scenario described above. The existing dry time was approximately 5 days or 120 hours, and there was a presentation of some mold growth in the building due to the amount of moisture in the air, and the existing use of the building. The present system was undersized to meet the total load of the space and lacked the capacity to remove the moisture and maintain the space temperature. The overwhelming evaporative effect of the chutes keeps the temperature down and the RH high- causing mold problems and increases to the drying time.

The United States Air Force is committed to finding energy conserving solutions that reduce the use of fossil fuels and increase the use of renewable solar energy. The existing system uses large amounts of electrical energy and was corroding under the high humidity conditions. The mission critical nature of drying parachutes required a solution that would be flexible enough to be able to run with renewable energy and be backed by a traditional energy source.

Site Description:

Property Name:	Patrick Air Force Base
Location:	Cocoa Beach, FL
Building Use:	54,000 sq ft Parachute Drying Facility
System Type:	Desiccant Dehumidification System
Displaced:	Electricity
Design & Installation:	Aquarii Services, Inc.

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The Solution

Aquarii Services, Inc. was contracted through AGL Energy Services to provide design and installation of the Aquarii System. The Aquarii System is a humidity control system that utilizes desiccant as a means to dry the building based on the scenario described above, and is explained in detail below. The equipment performs independent of the existing A/C system and doesn't provide additional cooling to the space. The equipment is solely used to dry the building and all of the items placed inside (parachutes).

The Aquarii System installed at Patrick Air Force Base is composed of three main components: a hot water desiccant wheel dehumidifier capable of removing 128lbs of moisture per hour from the building, a bank of nine solar thermal water collectors, and two gas fired tankless hot water heaters. This innovative system was designed to effectively remove over 3,750 lbs of moisture from the parachutes in less than 36 hours while incorporating renewable solar thermal energy.

To help maximise the amount of solar energy that can be used by the system we installed a 300 gallon insulated hot water storage tank.



The Results

The Aquarii System was commissioned in July of 2013 and is performing as designed, drying washed parachutes well within the 36 hour mission critical time frame. All components are working in conjunction to remove 128 lbs of moisture per hour using solar thermal energy to help reduce energy consumption. It is estimated that electrical energy savings of over 50% are being realized due to solar contribution and dramatic reduction of existing system run times.

Apricus APSE-30C:

Physical Specifications:

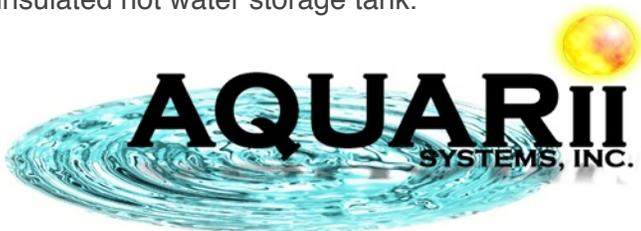
Dimensions:	2.0m x 2.2m / 78.9" x 86.4"
Aperture Area:	2.98m ² / 32.05ft ²
Gross Area:	4.15m ² / 44.76ft ²
Gross Dry Weight:	102kg / 255lb
Fluid Capacity:	710ml / 24 fl oz
Max Pressure:	800kPa / 116psi

Materials of Construction:

Evacuated Tubes:	Borosilicate 3.3. Glass
Absorber Coating:	Al-N on Al on Glass
Heat Pipes:	High Purity Copper
Mounting Frame:	304 Stainless Steel
Manifold Casing:	304 Stainless Steel

Warranty:

Manifold & Frame:	15 years
Tubes & Heat Pipes:	10 years



Contact Information:

Apricus Inc: 370 State Street, Unit 2
North Haven, CT 06473 USA
T: 1-800-458-2634

Aquarii Services Inc: 436 Woodcrest Street
Winter Springs, FL 32708 USA
T: 407-459-0053