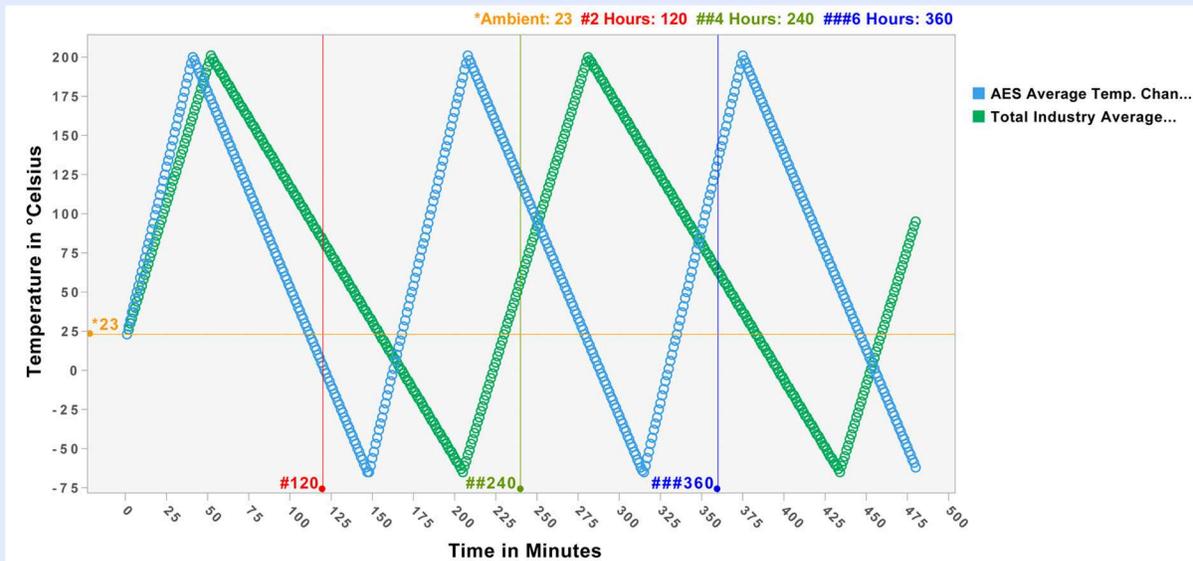


Time is Money...

Associated Environmental Systems SD-300 Series Chambers have the fastest standard change rates in the industry. SD chambers feature powerful cascade refrigeration systems driven by Copland compressors. With average pull down rates of 2.5°C/minute and average ramp times of 4.4°C/min, AES Chambers allow you to accomplish more in less time.

Average Temperature Change Rates

AES vs. Industry Standard



SD-302

Volume: 2 Cubic Feet
Temp. Range: -65°C to 200°C
Average Rate of Change:
4.425°C/ Min Heating
2.5°C/ Min Cooling

Refrigeration:

- (1) 3/4 HP Copeland Compressor
- (1) 1/2 HP Copeland Compressor



ASSOCIATED
ENVIRONMENTAL SYSTEMS

" Temperature Where You Need It "

www.AssociatedEnvironmentalSystems.com
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Time is Money

March 2013

Summary:

In the age of modern technology, speed is king. Business is dictated by a simple rule: **Time is Money**. The Environmental Test Chamber industry is no exception to this rule. In fact, in many ways Test Chambers are the foundation on which this rule is built, as companies race to bring reliable products to market. This document will demonstrate the ways in which **Associated Environmental Systems (AES)** is leading the Test Chamber Industry to meet the demanding speed of business.

Direct, Timely Communication:

Test chambers are used in just about every industry imaginable. This diversity, in regards to a customer base, creates an interesting challenge for test chamber manufactures. When every customer is different, almost every chamber sold must be modified to accommodate a unique sample or test design. Whether it's a simple customization, such as an extra port, or a complex one requiring re-engineering, prompt communication between the customer and the build team is crucial.

AES end-users are in direct contact with our engineering design team to formulate their specific chamber specification within a timely and efficient process. The benefit to the customer is a test chamber solution that truly optimizes their test resources, processes and goals, ultimately getting them the information they need, when they need it.

Efficient Manufacturing Processes:

Often, the decision to purchase an environmental test chamber must be made quickly to keep up with testing demands. Customers cannot afford to wait several months for a chamber to be built. However, stocking a large volume of chambers runs in conflict with customization requirements for individual end users.

To meet lead-time demands, the AES factory floor picks up directly where the sales team

leaves off. AES has invested in some impressive manufacturing technology, as evidenced by the following:

- A state of the art sheet metal fabrication facility which includes a sheet metal CNC laser machine which can cut half inch steel with precision and speed.
- A robotic welding machine capable of producing welds at 12X the speed of conventional TIG welders.
- A more efficient powder coating oven to speed up parts coating while maintaining high quality coverage.

LEAN training, combined with our new process procedures and shop floor shape layout, allow the AES manufacturing teams to pull orders through the systems quickly while remaining flexible to customization.

The combination of technological upgrades, and efficient shop floor processing help to speed up manufacturing and decrease lead time, while staying true to the commitment of producing a quality product.

High Performance Products:

Customers require the ability to reliably test as much product as possible in as little time as possible. AES standard cascade refrigeration systems have the fastest standard change rates of any environmental chamber manufacturer. With average pull down times of 2.5°C/ minute and average ramp rates of 4.4°C/ minute, AES chambers allow you to accomplish more in less time.

In the following example, we compared one of our most popular chambers, the SD-302, with chambers from our top competitors:

OEM	AES	ESPEC	TENNEY
Model	SD-302	SU-661	Tenney Junior
Volume	2 Cubic Feet	2.2 Cubic Feet	1.2 Cubic Feet
Temp. Range:	-65°C to 200°C	-60°C to 150°C	-73°C to 200°C
Average Rate of Change:			
Heating	4.4°C/ Min	2.5°C/ Min	2.9°C/ Min
Cooling	2.5°C/ Min	.8°C/ Min	2.2°C/ Min

This data speaks for itself. In testing situations that require continuous thermal cycling, such as semiconductor reliability testing, AES chambers will provide up to 42% more cycles annually.

The Advantages of AES Performance:

Increased Production Rates for an AES customer (semiconductor OEM)

Case Study:

Customer:

A New England based, leading manufacturer of high performance signal processing devices

Challenge:

The Lab Manager oversees the testing of integrated circuits. He explains, "Each circuit produced by our company must be run through a temperature cycle that begins at -45°C, ramps up to 85°C and then pulls back down to 25°C as quickly as possible."

*He had purchased a variety of different test chambers to meet his demanding and rigorous test schedule. His purchasing decisions were based, primarily, on the initial price of the chambers-with no attention paid to a **total cost of ownership** model. However, the rate at which his chambers were able to perform the testing limited the amount of circuits the company could produce and sell.*

Solution:

*After discovering the performance specifications of AES cascade refrigeration systems, He decided to replace the Tenney Junior chambers he uses in his lab with standard AES FD-202 chambers. Although the FD-202 was slightly more expensive than the Tenney Junior (~\$1000), it was able to cycle through the test requirement (test profile) about 29 times in a single day, while the Tenney Junior chamber could accomplish only 22 cycles. **In annualizing the AES FD-202 performance advantage, the company production yield increased by 32%!***

Results:

The company sells one other their circuits sells \$6.92ea. For the sake of example, let's assume the company tests 10 circuits in a single chamber, per test cycle. Each test cycle would have a sale value of \$69.20.

*With the Tenney chamber the maximum allowable production would be 80,300 circuits per year at a value of **\$555,676**. By using an AES chamber would be able to produce 105,850 circuits worth **\$732,482 (an additional \$176,806 of revenue per chamber!!)** in the same amount of time. Therefore in this example, spending an extra \$1,000.00 on an AES chamber pays for itself in just over 2 days!; **while total cost of ownership has been significantly reduced!***

Further AES Total Cost of Ownership Considerations:

Not all time is equal:

Often the thermal testing portion of a product development schedule comes at or near the end of the product development timeline. Unforeseen problems that crop up can be very costly, causing the product ship date to slip. In this scenario a test chamber with a faster ramp rate can directly address this problem. If a problem is discovered late in the cycle, to remedy an entire battery of tests needs to be re-run. With multiple iterations, this can take days. A faster chamber can cut this time significantly.

Direct Labor Savings:

Faster ramp rates can sometimes translate directly into a labor savings. When testing can be reduced by 30% this can mean 30% less time a lab technician or engineer spends in this phase of the cycle and frees them for other projects. With a \$50 an hour labor cost, a 30% reduction in time would result in a \$600 savings over a 5 day test phase.. Even if the technician or engineer is not full time on these projects, the cost savings continue to grow, eventually exceeding the initial cost savings of a lower power chamber.

Increase your lab space:

In a production environment where thermal cycle testing requirements increase beyond the capabilities of an existing lab there are typically two solutions; the first, being an increase in the size of the facility to accommodate more test chambers. However this solution poses obvious financial and logistic challenges. The second solution is simpler; replace existing test chambers with test chambers that have a faster ramp rate. This allows more products to be tested in the same amount of time.

Limited Down-Time:

AES takes it's commitment to quality seriously. That being said, an environmental chamber is an electrical/ mechanical tool, and malfunctions will inevitably occur. If Time is Money then down-time is money lost and no business can afford that.

AES offers customer service on an international basis. Through our team, customers gain access to trouble shooting experts, engineers and factory technicians as well as chamber specific manuals, wiring schematics and refrigeration diagrams.

In addition, AES has world wide coverage with reliable service providers who can support our complete product line. AES offers factory training seminars for service providers to keep service companies up do date with the latest product offerings. When needed, AES factory

technicians travel world wide to install and or service chambers and walk in rooms. The goal of AES is to keep down-time to an absolute minimum.

Technology at your Fingertips:

The rise of touch screens, smart phones and tablet technology has continued to push the pace of business. It's no longer a luxury to have information at your fingertips; it's expected.

Test chambers of the (very near) future will require wireless control and data collection accessible from anywhere and any device. AES currently offers touch screen controllers as well as chambers that can be remotely controlled via Ethernet connection. However, for AES, the aim is to take this technology several steps further. AES has developed web enabled chambers that can be remotely controlled from mobile devices. In addition, these chambers run self diagnostics and report any malfunctions to the end user in real time.

Conclusion:

Business continues to move at an increasingly fast rate. In order to keep up with testing demands, test chamber manufacturers need to adapt their products and practices. AES is an industry leader by opening direct communication lines with customers and finding efficient manufacturing paths to provide customers with the chambers they need quickly. AES is committed to high quality, high performance products and actively supports those products to minimize down time. AES has a continuous commitment to searching for ways to save customers time and money.