

# *Custom DX Package Units*





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## **Product Description**

Energy Labs offers air cooled and evaporatively cooled custom DX package units which can be configured to meet your air-conditioning application requirements. Air cooled condensing units are available from 15 to 300 TONS. Evaporatively cooled units are available from 50 to 300 TONS. Larger sizes are available. Please contact your sales representative.

## **Quality Engineering, Quality Product**

Energy Labs is committed to meeting customer needs. Our approach is to provide advanced Engineering, innovation and Quality Products. Energy Labs Custom DX Package unit components such as fans, coils, motors, dampers, compressors and pumps are of the highest quality. All refrigerant piping is installed and tested in the factory prior to shipment. Split systems are charged on the job site. All electrical and the temperature control systems, including sensors and actuators are installed and wired at factory.



# Leader <sup>in</sup> Custom HVAC Systems



## ETL Listing

All Energy Labs custom air handling units are ETL listed.



## Product Description

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### Air Cooled Condenser

Air-cooled condensers are available from 15 to 300 tons. Condenser coils are mounted in a VEE arrangement to maximize available coil surface area for a given unit height. Coils are counter flow with integral liquid sub cooling. Condenser Coils are a minimum three rows deep with a maximum twelve fins per inch fin spacing. Condenser coil guards are provided to protect the coil from weather related damage and vandalism. Standard condenser coils are with 5/8" or 3/8" O.D. Copper tubes with 0.020" tube thickness. Fins are aluminum. Copper fins and special coatings are available. Compressors, liquid line filters, pressure switches and service valves are located outside coil area for easy access.

### Evaporative Condenser

Evaporatively cooled condensers are available from 50 to 300 tons. Condenser coil is 5/8" or 3/8" O.D. Copper tubing. The tubes are supported by high temperature glass reinforced plastic tube sheets. The spray system is designed to evenly distribute the water over the coil. Spray nozzles are non-clogging design. Headers are schedule 80 PVC pipe. The recirculation pumps are close-coupled centrifugal type. The drift eliminators are PVC.

Water sump casing is 16 gauge, 304 stainless steel to offer maximum protection against corrosion and increase unit longevity.



### Condenser Fans

Direct drive propeller fans are used to provide airflow through the coils. The fans have an integral venturi ring for efficient performance.

Evaporative condenser fan, inlet ring and motor mounts are 304 stainless steel. Blades are made of industrial-quality fiberglass reinforced polypropylene with a die cast-aluminum hub. Fans are statically and dynamically balanced. This construction ensures long life within the wet environment in which the fans operate. Motors are rated for severe duty application. Air cooled condenser fan inlet ring and motor mounts are galvanized steel.



## Compressors



**Air cooled and evaporatively cooled units are available with either scroll or screw compressors, depending on project requirements.**

**On units with mechanical rooms, compressors, electrical panels and temperature control panels are located inside this room for maximum protection against weather and with ample space for service and maintenance.**

### Scroll

Energy Labs offers Copeland Compliant Scroll® line of hermetic compressors. These compressors are efficient, quiet and durable with few moving parts, very low vibration and sound levels. These compressors are tolerant of liquid slugging and flooded starts.

Energy Labs scroll compressor units operate with R-410A refrigerant.



### Screw

Energy Labs offers Screw compressors with twin patented screws to provide improved efficiency of operation. These compressors have few moving parts, low vibration and sound levels.

Energy Labs screw compressor units operate with R134A refrigerant.



## Options

Energy Labs offers water treatment and refrigeration specialty options. These are selected based on specific design and project requirements. Some optional components include water treatment systems, suction line accumulators, discharge line mufflers, head pressure control valves, receivers and vibration absorbers.



### Suction Line Accumulators

Suction line accumulators are suggested where there is an increased possibility of liquid slugging back to the compressor. The accumulator separates liquid from gas refrigerant and reduce the possibility of liquid refrigerant going back into the compressor.



### Head Pressure Control Valves

Certain applications require operation of compressors at low ambient conditions. For those applications head pressure control valves are required to maintain the condenser head pressure for proper operation of the thermostatic expansion valve.



## Water Treatment System

Bleed and feed Water Treatment can be provided as an option. The system consists of conductivity and chemical feed controller and three pumps. Utilizing one pump for scale inhibitor based on conductivity and two biocide pumps based on a time cycle.



### Discharge Mufflers

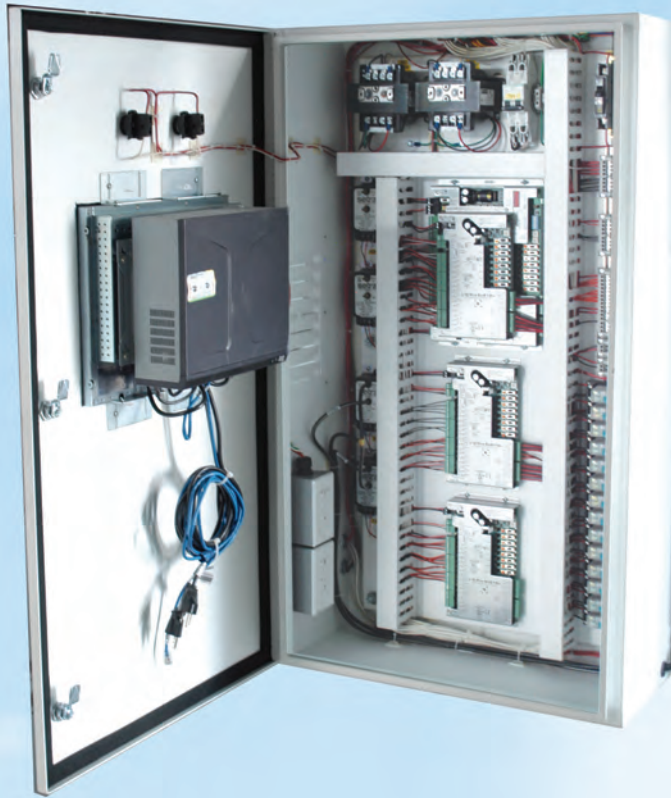
Where noise transmission must be reduced to a minimum, or where compressor pulsation might create vibration problems, a discharge muffler is used to dampen and reduce compressor discharge noise.



### Vibration Absorbers

Where semi-hermetic compressors are mounted on springs for special isolation requirements, the suction and the discharge lines of the compressor can be provided with vibration absorbers to prevent refrigerant line vibration.





## Temperature Control

Complete temperature and humidity control systems are installed and tested at the factory. These include factory installation and wiring of damper actuators, temperature and humidity sensors, pressure switches and control devices. Space thermostats and humidity sensors can be furnished for field installation. Proper job site operation is assured by factory testing. Typical temperature control systems include single-zone, multi-zone, economizer and variable air volume control.



## Variable Frequency Drives

Variable-frequency drives offer the most efficient method of air volume control. By varying fan speed the system can take advantage of fan laws to reduce the brake horsepower by the cube of the reduction in air volume. Significant reductions in sound power levels can also be expected.



## Single Source Power Panels

All Energy Labs Custom DX Package Units use U.L. 508 listed single-source power panels. This panel includes a main disconnect switch, fuses, starters, transformer, H-O-A switches, relays, and pilot lights. Single-source power panels allow the job-site electrician to simply connect main power to each unit at one point. NEMA 4 and NEMA 12 enclosures are available.



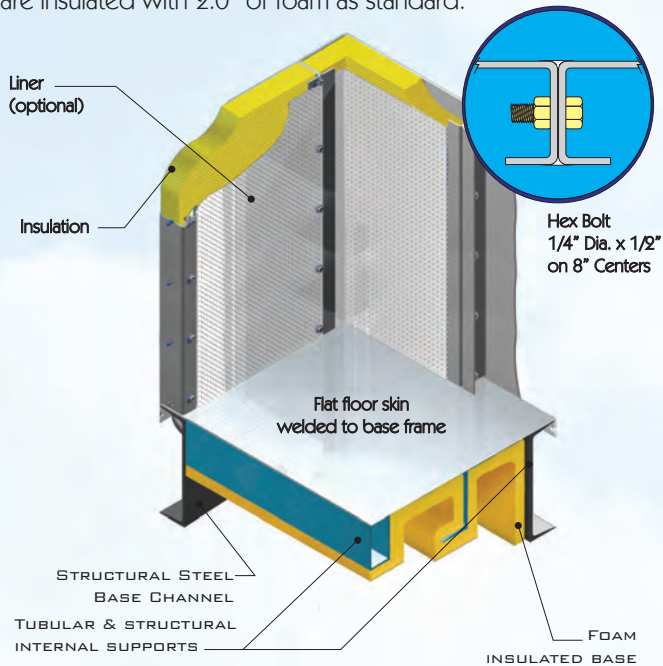


# Unit Construction

## Base Frame

The unit base frame is constructed of structural steel “C” channels welded for optimal strength to reduce unit deflection during manufacturing, rigging, and installation. Intermediate structural-steel cross members are located at critical junctions to further support components such as coils and fans. Unit distortion, racking of doors, air and water leaks, and many other issues are greatly minimized by the use of a true structural steel base in lieu of a formed steel channel.

Unit floors are constructed from a minimum of 14 gauge galvanized steel. Many other options are available. Unit bases are insulated with 2.0” of foam as standard.



## Casing

The standard air handler casing is fabricated from a minimum of 16-gauge paint-ready galvanized steel and features a bolted, standing-seam construction. Optional casing wall materials include aluminum and stainless steel. Each panel is pre-punched and securely bolted to provide both an air and water-tight seal. All panels have return break seams, which encapsulate the raw edges of the insulation and ensure cabinet rigidity. Unit casings are designed and manufactured for a maximum leakage rate of less than 1% , up to 1.5 times the design static pressure.

Casings with foam panels and full thermal brake construction are available as an option.



## Roof Construction

Roofs are reinforced with heavy-gauge steel channels to ensure rigidity. All panels feature bolted standing seam construction to permit complete disassembly of any section. To prevent water penetration, roof panels are bolted to outside casing flanges assuring no penetrations of the air tunnel. Drive cleats cover all roof panel seams. Roofs on outdoor units are sloped at 1/4” per foot to ensure proper water drainage.



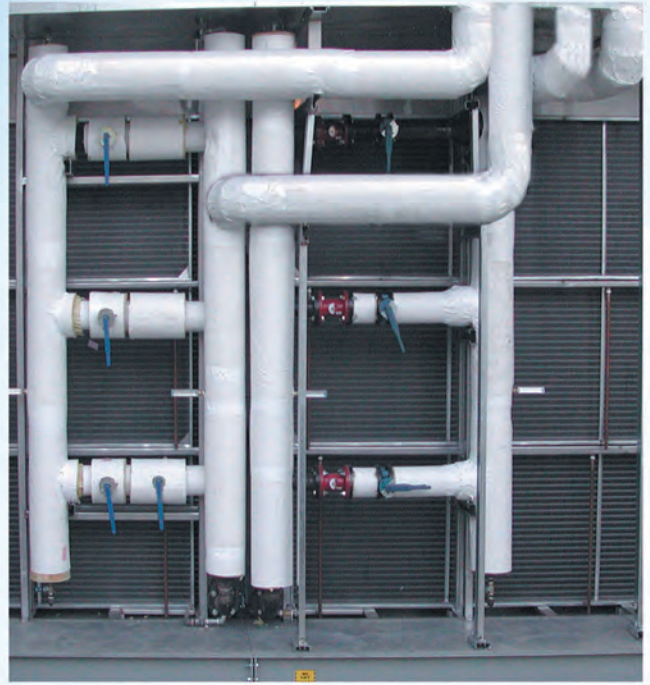
## Access Doors

Standard access doors are double wall 16 gauge galvanized steel, with fully encapsulated insulation, mounted in an extruded aluminum frame. Fully adjustable heavy-duty hinges and latches are supplied with non-corrosive hardware. The standard door is designed to be operable from the exterior and interior of the unit. Optional thermal brake doors are available.



## IAQ Condensate Drain Pans

IAQ drain pans have a double-sloped design that prevents standing water in the pan. Each drain pan is constructed of 16 gauge 304 stainless steel, with stainless steel drain connections for rapid condensate removal. The drain pan is insulated with 2", 1-1/2 lb/ft<sup>3</sup> density insulation to prevent condensation. A 20 gauge galvanized steel under liner provides protection from damages occurring from below the unit.

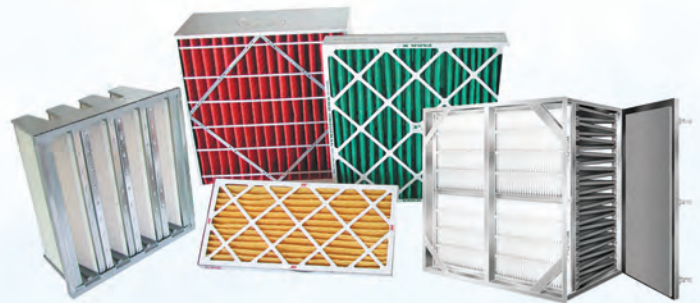


## Factory Piping

Factory piping that can include control valves, gauges, pumps, and balancing valves is available. Factory piping saves time, minimizes installed cost, reduces jobsite labor, and simplifies coordination by providing single source responsibility.

## Filters

Energy Labs offers a wide range of filters with varying efficiencies. Filter sections with side-access or face-load designs are available. Special filters such as carbon, HEPA, electronic or roll filters are available to meet any filtration requirement.



## Insulation

The unit casing walls are insulated with either NFPA 90A approved thermal or acoustic fiberglass insulation glued directly to the casing. Many different thicknesses and densities are available. All panels have return break seams so no raw insulation edges are ever exposed to the air stream.

Different thickness and densities are available as required.

Optional wall insulation choices also include 2.0" thick polyurethane foam insulation with an R value of 17 within a double wall panel. Composite walls utilizing both foam and fiberglass are also an option.



To protect interior insulation, perforated and solid interior metal liners are available in various gauges of galvanized steel, stainless steel or aluminum may be requested for any insulation system.



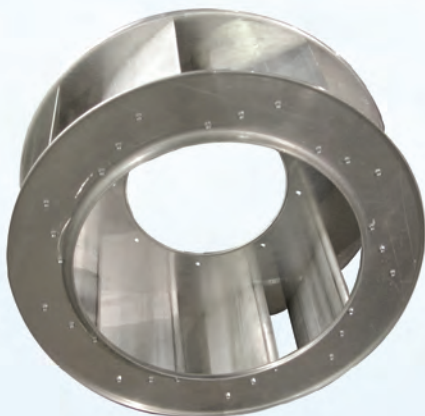
## Optiline Fan Array

Our in-house engineering talent, experience, AMCA accredited testing facilities and leading edge CFD tools are used to design each fan system to meet the optimum energy, sound, and redundancy requirements of any application.

Our Optiline Fan Array design offer's,

- Optimum Fan Efficiency - by utilizing the correct number of fans. We avoid the inherent inefficiency that results from simply using a large number of small fans. More is not always better when it comes to fan wall efficiency.
- Optimum Motor Efficiency - by utilizing designs which operate closer to the synchronous speed of motors and using premium efficiency motors Energy Labs' designs assure the minimum electrical power consumption.
- Optimum Sound Levels - result from utilizing multiple fans, operating at lower rpms and velocities, instead of one larger fan.
- Optimum System Reliability – can be achieved with fan selections possible that deliver 100% CFM with one or more fans inoperative.
- Optimum Motor Reliability - is ensured by avoiding the use of inexpensive and inefficient small horsepower fan motors that fail at rates far above those of more robust industrial design motors.
- Optimum Unit Footprint – Optiline Fan Array unit sections provide shorter overall unit lengths than single fan units.
- Optimum Air Flow - by providing more uniform air distribution across the unit cross sectional area than a single fan design.

As an experienced manufacturer of air handling units and AMCA certified plenum fans, Energy Labs provides truly advanced technology in ways that yield the lowest overall operating cost to its customers.



## Energy Labs High Efficiency Wheel

The Energy Labs ELP Fan Wheel features an airfoil blade design for the highest possible efficiency and quietest operation with a non-overloading horsepower curve. These fans are very stable due to a steeply rising pressure curve. The ELP Fan Wheel has been tested at the AMCA laboratory for both sound and air performance in accordance with AMCA standards 210 and 300.

The ELP Fan Wheel is manufactured utilizing 6000 series aluminum. All wheels feature fully welded construction and are designed to a minimum of AMCA Class II requirements. Every wheel is statically and dynamically balanced to grade G6.3 per ANSI 52.19 and ISO 1940/1. Vibration is measured in the X, Y and Z-axis with a maximum peak velocity of 0.125 in/sec: for direct drive applications, 0.050 in/sec is available.



## Fans

An important factor in the design of an efficient air handling system is the selection of the most appropriate and efficient fan. Energy Labs is an AMCA licensed fan manufacturer. We offer forward-curved fans for low pressure applications and backward inclined and airfoil fans (housed and plenum) for medium and higher pressure applications.

Fan cabinets are designed with ample clearances to ensure proper airflow into the fan wheel and provide for ease of maintenance. Energy Labs' standard plenum fans feature an AMCA arrangement 1 design which provides an open unobstructed inlet for lower sound levels and higher efficiency.

Fans are selected at peak efficiency to minimize power consumption and noise generation. All fans are statically and dynamically balanced before shipment. Fan performance is based on tests conducted in accordance with AMCA standard 210. All Energy Labs fans are licensed to bear the AMCA seal for air performance and sound.

All fans manufactured by Energy Labs have a minimum L-10 bearing life of 200,000 hours.



## Flo-Valve

When one fan fails in a fan wall, the performance of the system is significantly reduced, not only by the loss of that one fan, but also by air flowing back through the failed fan. Energy Labs' Flow Valve can prevent this efficiency loss. Automatic or manually operated versions of Flow Valve are available. Automatic versions are enabled through current monitoring controls.

For the best in fan isolation, specify the Energy Labs Flow Valve. This system consists of a high quality spun disk and machined hub that is designed to minimize airflow obstruction in the fan inlet. Testing in Energy Labs AMCA accredited lab\* shows that the Flow Valve provides lower sound power levels than a parallel blade shut off damper.



## Vibration Isolators

Fan assemblies are mounted on spring isolators to reduce the transmission of fan and motor vibration to the unit structure. This eliminates the need for spring isolated roof curbs and flex-connected piping, ductwork, and electrical conduits to the air handling unit. Energy Labs spring isolators are designed with seismic restraints to meet zone four requirements per the International Building Code (IBC).



\* "Product performance data based on tests in an AMCA Accredited Laboratory are not to be construed as being licensed to bear the AMCA Seal."



## Coils

Energy Labs is an ARI certified coil manufacturer featuring a complete line of chilled water, hot water, refrigerant, and steam coils. Options such as heavier tube walls, copper fins, or coated aluminum fins are available. Stainless steel casings are standard on all cooling coils. Coil end sheets are punched and finished in a method that eliminates raw edges; thus minimizing the possibility of leaks due to thermal expansion of the tubes at the casing tube sheet.



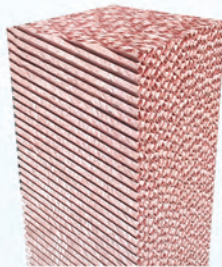
## UV Lights

Energy Labs offers flexible and effective high intensity UV disinfection using UV irradiation for air stream as well as surface disinfection. Air stream disinfection, also known as “on the fly kill”, is the application of high intensity UVC energy to disinfect a fast moving air stream and neutralize microbes including viruses, bacteria and mold spores.

Surface irradiation eliminates microbial buildup on HVAC system cooling coils, drain pans and ducting. The system not only provides for better IAQ, but can significantly reduce system maintenance requirements and maintain coil heat transfer efficiency.

## Heaters

Energy Labs offers a wide variety of designs to meet your heating requirements. Available heating sections include gas fired duct furnaces, high capacity drum and tube style heat exchangers, direct fired gas furnaces and electric heaters.



## Humidifiers

Energy Labs offers a wide variety of humidification options utilizing either external or internal sources of steam or water. Each humidifier section is supplied with a factory installed stainless steel drain pan. Air atomizing and ultrasonic types of humidifiers are also available.

## Direct Evaporative Cooling

Energy Labs' direct evaporative coolers are manufactured with 304 stainless steel casings and sumps to prevent corrosion and are efficient, trouble-free submersible or end-suction pumps.

Direct evaporative coolers utilize CELdek® or GLASdek® media from the Munters Corporation, which provides a highly wettable surface area and low pressure drop. Sizes are available from 2,000 to 100,000 CFM.



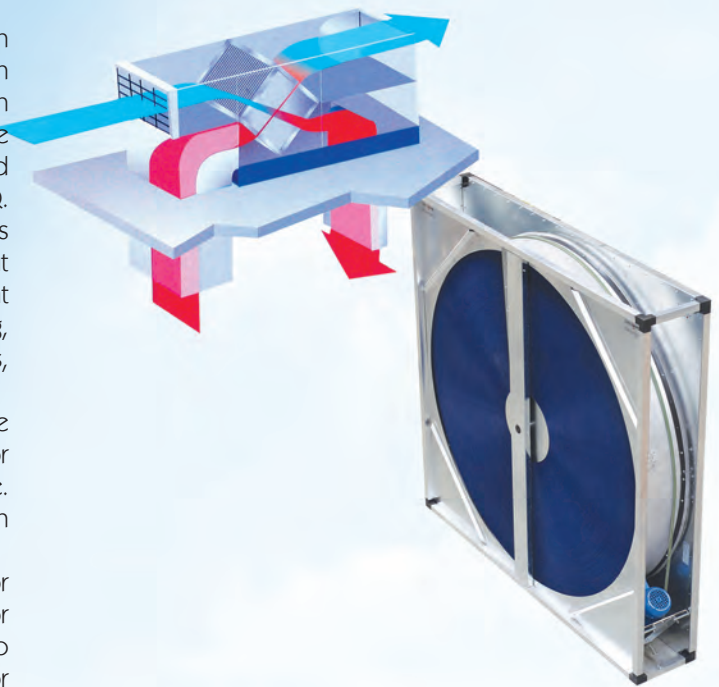


## Energy Recovery

Improved Indoor Air Quality (IAQ) is essential in modern buildings. Poor IAQ has been directly associated with “sick-building syndrome”, a condition that can result in high illness rates, absenteeism, reduced productivity, and employee turnover. Better ventilation systems, which provide increased amounts of outside air, can be an important part of better IAQ. The challenge for both building owners and system designers is to provide this important IAQ improvement without dramatically increasing energy consumption. Strategies used at Energy Labs include technologies such as evaporative cooling, energy-recovery coil loops, energy-recovery heat exchangers, and energy-recovery wheels.

Energy Labs can supply energy-recovery wheels to provide maximum energy efficiency in systems that exhaust heated or cooled air and introduce outdoor air in its place. Energy-recovery wheels are capable of transferring both sensible and latent heat between air streams.

Energy Labs can provide cross flow heat exchangers for heat recovery applications constructed of either aluminum or stainless steel. These heat exchangers are designed with two neighboring plates, which form a channel for either supply or exhaust air on the other side. The heat is transferred through the plates from the warmer air stream to the colder air stream. For additional information and sizing, contact your sales representative.



## Dampers and Louvers

Energy Labs’ standard damper blades feature an aluminum airfoil design to minimize pressure drop in the fully open damper position. This airfoil design minimizes noise levels due to air movement. The standard low leak design includes neoprene seals that are backed by the extruded damper blade. This provides excellent sealing when fully closed (see picture) the standard leak rate is a very low 5CFM/sqft of damper at 6” WG.

Damper frames are constructed of 16 gauge galvanized steel with stainless steel side seals for low leakage.

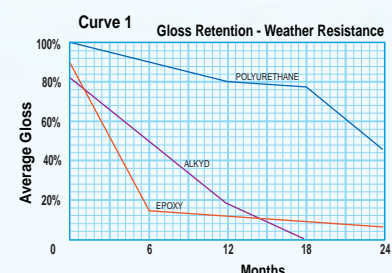
Dampers and louvers, manufactured by Energy Labs, have been tested and rated for pressure drop, leakage and water penetration by the AMCA laboratories.



## Paint & Finish

Energy Labs air handling units are electro-statically painted with two coats of industrial polyurethane paint. This offers superior appearance and performance in corrosive, tropical or marine environments. Polyurethane paint resists peeling or cracking under exposure to ultra violet rays. The polyurethane top coat dries to a hard, glossy, durable, “wet-look” finish and is superior to epoxies and alkyds for corrosion protection as well as color and gloss retention. Refer to Curve 1 for gloss retention of various paints.

Powder coating is available as an option when required.

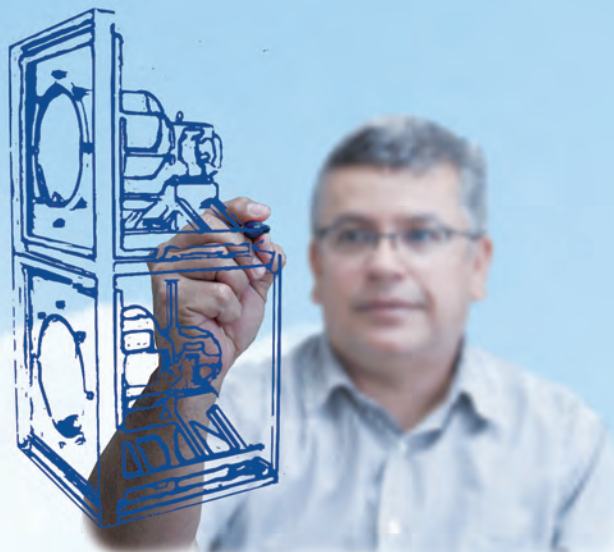




# Engineering

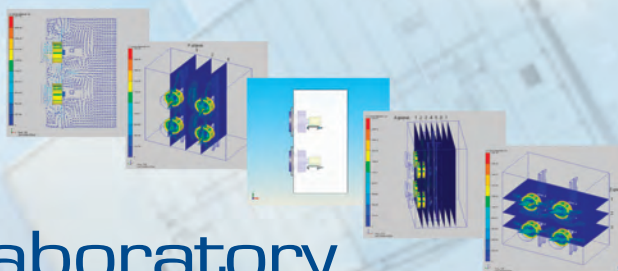
Before we actually build anything, we set product performance targets that stretch beyond typical requirements.

Energy Labs engineers use Fluid Dynamics software for modeling the airflow patterns of different configurations. This technology allows them to “see” how the air moves, its velocity, direction, and most importantly, the areas of turbulence. This modeling and analysis allows us to design a unit with complete assurance that all important criteria (such as the distance from the fan where uniform airflow begins) are always taken into consideration.



A byproduct of all air movement is noise and vibration. Another software tool is used to analyze each fan's design to minimize low frequency sound that can “travel” through a building's structural members. This allows our engineers to design the quietest, most efficient fan system for each individual application.

After completing computer simulations of alternative fan arrangements we test them extensively in our AMCA accredited test facility. Each prototype is carefully tested for airflow, power consumption, and sound levels. Extensive testing ensures accurate performance data for all Energy Labs fan systems.



## AMCA Accredited Laboratory

### AMCA 210 flow measurement AMCA 300 sound measurement

Energy Labs' 35,000 cubic foot reverberant room has been designed to test in accordance with AMCA Standard 300 “Reverberant Room Method for Sound Testing” and ARI Standard 260 “Sound Rating of Ducted Air Moving and Conditioning Equipment.” It is used to accurately measure air handling unit inlet, outlet, and radiated sound power levels. The room was designed to create a true diffuse environment and eliminate standing waves by angling the walls and ceiling. Precision Bruel & Kjaer microphones affixed to a rotating boom are fed to a 5 channel Bruel & Kjaer PULSE system. Data is collected and processed from the control room via a computer-based analysis platform.





## Sound Calculation Program

Energy Labs' sound power calculation software provides predicted sound power levels for air handling unit inlet, outlet, and casing radiation.

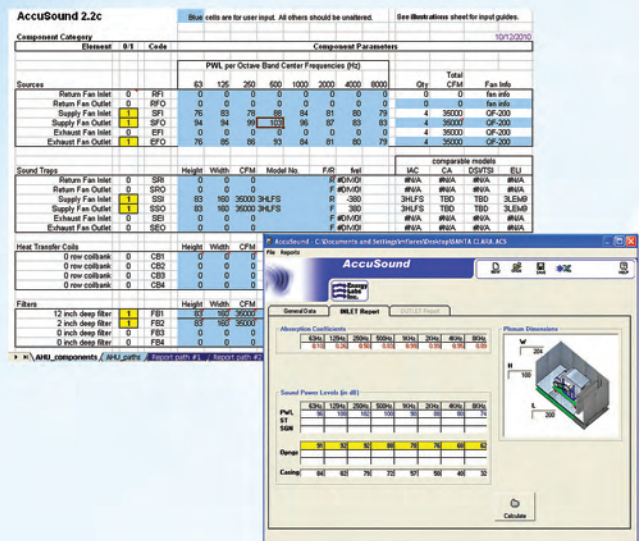
Our Sound predictions can be verified by actual testing of your air handling unit in our AMCA accredited laboratory.\*

## Air Flow Measurement

Energy Labs' test facility is equipped with a calibrated AMCA Air Flow Measuring Station to accurately measure airflow. The station is operated in strict accordance with AMCA Standard 210, "Laboratory Methods of Testing Fans for Rating." It has the capability of measuring airflow up to 65,000 CFM, in both AMCA Figure 12 (blow thru) and 15 (draw-thru) configurations.

## Leak Testing

Energy Labs' factory leak testing will verify that the air handler will not leak excessively under pressure. The test is performed by sealing all unit openings. A pressure blower, connected to a variable frequency drive, is used to pressurize the cabinet to the appropriate test pressure. Energy Labs' design standard allows a maximum leakage rate of less than 1% of the design airflow at 1.5 times the design static pressure, to a maximum of 12 inches w.g.



# Energy Labs Line Card

## Custom Air Handling Units

Capacities from 500 to 200,000 CFM; With Chilled water  
Glycol  
DX  
Hot water  
Steam coils



## Custom Air Handling Units

Thermal Brake construction  
Hi Efficiency injected foam panels.  
Capacities from 500 to 200,000 CFM.



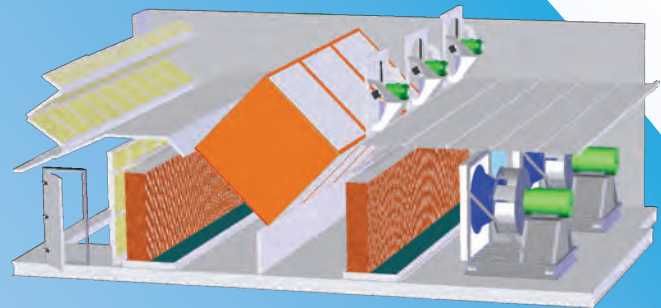
## Indirect / Direct Evaporative Cooling Systems

Capacities from 2,000 to 100,000 CFM.  
304 stainless-steel housing.  
High efficiency air to air heat exchanger.



## Energy Recovery Systems

With Heat Exchangers or Heat Wheels.



## Custom Air Cooled DX Units

Air cooled condensing units are available from 15 to 140 tons.  
Integrated controls.  
R410a and R134a refrigerants.  
Copeland Scroll  
and screw compressors.



## Custom Evap. Condensing Units

Available from 50 to 300 tons.  
Integrated controls.  
R410a and R134a refrigerants.  
Copeland Scroll and screw compressors.



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For more information including detailed product specifications, and specific requirements for special applications, please contact your local sales representatives.