

#### The Problem

Heat is no joke in West Texas. Workers at Samuel Jackson, Inc., an equipment manufacturing facility in Lubbock, struggled with hot, stagnant air in their large warehouses and assembly building. The ventilation exhaust system drew in outside air and kept employees adequately comfortable most of the year, but it couldn't compete with the oppressive heat of high summer. The conditions didn't just make employees uncomfortable — it hurt productivity as well. As company owner Chris Jackson said, "It's impossible to concentrate in there without air movement."

#### The Solution

Samuel Jackson installed three Powerfoil®X fans in its facilities. The company also installed a Yellow Jacket® fan in a tight corner of one warehouse for more targeted airflow. The fans immediately improved employee comfort and had a noticeable effect on productivity, increasing the assembly rate by 60 percent per week. As one worker said when a fan had to be turned off for a few minutes, "Big Ass Fans are not optional."

**"ONCE THE BIG ASS** FANS WERE INSTALLED. **OUR GUYS INCREASED PRODUCTION FROM 10 UNITS TO 16 UNITS** PER WEEK, A 60 PERCENT INCREASE. **IT'S UNBELIEVABLE."** 

Chris Jackson, owner Samuel Jackson, Inc.



## USING BIG ASS FANS TO IMPROVE ENERGY EFFICIENCY



### COOLING WITH AIR Conditioning

#### What is thermal comfort?

Thermal comfort is how comfortable an occupant feels in a space. Many factors influence thermal comfort some are in your control, and some are in ours.

THERMAL COMFORT		
Air Speed/Velocity	Air Temperature	
Radiant Temperature	Humidity	
Clothing Insulation	Metabolic Rate	
Environmental Factors	Personal Factors	

Six equally important factors determine your overall thermal comfort, as defined by Standard 55

#### Why add fans to conditioned spaces?

Air conditioning is great — but it's expensive and can be horrifically inefficient. Big Ass Fans® work with air conditioning systems to make them more effective. The fans use a fraction of the energy of an HVAC system, thereby reducing overall energy consumption.

By incorporating Big Ass Fans into building automation systems and using controls, energy savings become easy and automatic.

#### How does it work?

To comply with ANSI/ASHRAE Standard 55, you must be within the following ranges:

PMV: -0.5 to +0.5

Predicted Mean Vote: Most people in the room should say that they feel thermally neutral.

#### PPD: <10%

Predicted Percentage Dissatisfied: Less than 10 percent of occupants should be dissatisfied with the comfort level of the space.

A/C ONLY	A/C AND FANS	
Air Dry Bulb Temp = 75°F	Air Dry Bulb Temp = 80°F	
Mean Radiant Temp = 75°F	Mean Radiant Temp = 80°F	
Humidity Ratio = 0.009	Humidity Ratio = 0.009	
Air Speed = 20 fpm	Air Speed = 110 fpm	
Metabolic Rate = 1.1 met	Metabolic Rate = 1.1 met	
Clothing Insulation = 0.75 clo	Clothing Insulation = 0.75 clo	
PMV: -0.01 PPD: 5%	PMV: -0.01 PPD: 5%	

Source: CBE Thermal Comfort Tool

Combining A/C and fans means increased energy efficiency without sacrificing comfort

#### What does it mean?

Increased air movement from Big Ass Fans makes occupants feel cooler, allowing designers and users to raise thermostat setpoints without sacrificing comfort. Each degree offset reduces HVAC-related energy usage by 3 to 6 percent.\* Credit can also be earned for elevated air speed in designs that exceed the minimum requirements of Standards 90.1 and 189.1.\*\*



Pacific Aviation Museum Honolulu, Hawaii

"WE'RE VERY CAUTIOUS AND WE VALUE QUALITY – IT'S WHAT DEFINES OUR BRAND. WE HEARD BIG ASS FANS IS THE SAME WAY, SO WE TOOK A LEAP OF FAITH; IT HAS PAID OFF IMMENSELY. EMPLOYEES ARE MORE COMFORTABLE AND FOCUSED, AND OUR RE-FERMENTATION PROCESS IS NOW EFFORTLESS."

#### SEAN DIFFLEY

*Plant Engineer* Allagash Brewing Co. Portland, Maine Capital GMC Buick Cadillac Regina, Saskatchewan, Canada



"SINCE INSTALLING THE LIGHTS AND FANS, WE'RE SAVING \$700 A Month, which is a savings of 30 percent. And the Hangar is brighter and cooler on top of that."

#### MATTHEW DOBSON

Energy Manager North Carolina National Guard North Carolina



### **COOLING WITHOUT AIR CONDITIONING**

#### Why is heat a problem?

It's hard to work when you're too warm – health suffers, and so does productivity. It sounds intuitive, and it's backed up by science.

TEMP F	RELATIVE PRODUCTIVITY	PRODUCTIVITY LOSS
50	63.8%	-36.2%
55	80.6%	-19.4%
60	91.6%	-8.4%
65	97.8%	-2.2%
70	99.9%	-0.1%
75	99.0%	-1.0%
80	95.8%	-4.2%
85	91.2%	-8.8%
90	86.2%	-13.8%
95	81.5%	-18.5%
100	78.1%	-21.9%
105	76.9%	-23.1%

Source: Seppänen, O., Fisk, W. J. and Lei, Q. H. (2006)

#### Why do fans help?

Increased air speed takes advantage of the body's natural cooling process to create a cooling effect.

#### Why use Big Ass Fans for this?

Big Ass Fans are incredibly effective and efficient. Plus, they don't take up floor space like pedestal fans, and they're not loud like box fans.



#### Assumptions:

80F (27C) Air dry bulb and mean radiant temp

20 fpm air speed (base conditions)

0.010 Humidity Ratio

1.1 Metabolic Rate

0.5 Clo Clothing Level

Increased airflow can make you feel 4 to 5°F (2 to 3°C) cooler - without disrupting sensitive environments

### WINTER ENERGY Savings and Destratification

#### What happens in the winter?

In the winter, heat rises and can get trapped at the ceiling, leading to huge temperature differences and massive heating bills.

#### How does it work?

Fans aren't just for cooling. Big Ass Fans operate slowly in the forward direction, thoroughly mixing air without creating a draft. Air velocity at the floor does not exceed the limit for draft set in Standard 55 (30 feet per minute or less), so there's no need to reverse the fans. The result is up to 30 percent savings on winter heating bills.



Winter heating, with and without Big Ass Fans







Boone National Guard Center Frankfort, Kentucky

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"THE ESSENCE FANS WERE A CLEAR CHOICE IN THIS TALL SPACE. THEY DECREASED TEMPERATURE DIFFERENCES IN THE LIBRARY BY 72 PERCENT, AND THE HVAC SYSTEM RAN 16 PERCENT LESS WHEN THE FANS WERE ON."

#### ERIC P. STEVE

AIA, LEED BD+C Ross Tarrant Architects for Cassidy Elementary Lexington, Kentucky







West Covina, California

"BIG ASS FANS TIE NICELY INTO THE UNIVERSITY'S GREEN INITIATIVES. THEY ELIMINATED THE STUFFY SPOTS THAT PLAGUED OUR NATATORIUM AND PUSHED CHLORINE-LADEN AIR THROUGH THE VENTILATION SYSTEM, CREATING A HEALTHIER ATMOSPHERE FOR SWIMMERS AND SPECTATORS."

#### JIM HEFFEL

Aquatics and Safety Coordinator George Mason University Fairfax, Virginia

### IMPROVING Ventilation and IAQ

#### What's the deal with ventilation?

When supply and return vents are located at the ceiling, it's difficult to distribute heated air throughout a space.

#### How do Big Ass Fans help?

Big Ass Fans can improve zone air distribution effectiveness by pushing hot or heated air down to occupant level, helping reduce fresh air intake by 20 percent without a negative effect on indoor air quality (IAQ).



### ANSI/ASHRAE STD 62.1 & OVERHEAD HEATING

Without overhead fans (left), heating systems need to supply more outdoor air into a space to maintain adequate air quality. With fans (right), air is distributed more effectively into the breathing zone



### **ENERGY SAVINGS WITH LEDS**

#### Why LEDs?

Replacing fluorescent or metal halide lights with LED fixtures can result in serious savings. Not only do LEDs use much less energy than other light sources, they also last longer. Less energy, less maintenance, better light.

#### Why are Big Ass Light LEDs better?

Big Ass Light LEDs use half the energy of traditional metal halide bulbs and 20 percent less than fluorescents.



"IN 37 YEARS OF ENGINEERING AND CONSTRUCTION MANAGEMENT, I'VE NEVER SEEN A PRODUCT LIKE THE BIG ASS LIGHT FIXTURES. EVEN BETTER, THE FIXTURES ARE EXPECTED TO SAVE \$115,000 ANNUALLY IN ENERGY COSTS [COMPARED TO METAL HALIDES]."

#### **BRUCE AYCOCK**

Senior Manager of Facilities Engineering American Airlines Dallas, Texas



Big Ass Light LEDs last way, way, way longer than other light fixtures



# **GREEN RATING SYSTEMS**

Big Ass Fans can contribute to credit achievement in the following sustainable living programs:

#### LEED®

EA Prerequisite – Minimum Energy Performance EA Credit – Optimize Energy Performance EA Credit – Demand Response EA Credit – Enhanced Refrigerant Management EQ Prerequisite – Minimum Indoor Air Quality Performance EQ Credit – Enhanced Indoor Air Quality Strategies EQ Credit – Thermal Comfort IN Credit – Innovation

#### Living Building Challenge™

Imperative 06 – Net Positive Energy Imperative 08 – Healthy Indoor Environment Imperative 10 – Red List

#### Green Globes®

Section 3.3 – Energy, Path B Section 3.7.1 – Ventilation Requirements

Based on LEED v4 for BUILDING DESIGN AND CONSTRUCTION Updated April 6, 2018

# LET'S TALK!

Interested in free design assistance or learning more about how Big Ass Fans can benefit your projects? Our applications engineers and LEED accredited professionals would love to help! Visit **bigassfans.com/contact-us** or call **866-242-9124** to learn more.



