



# BIG ASS FANS®

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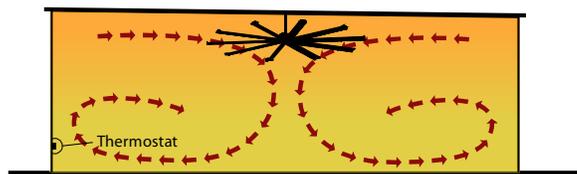
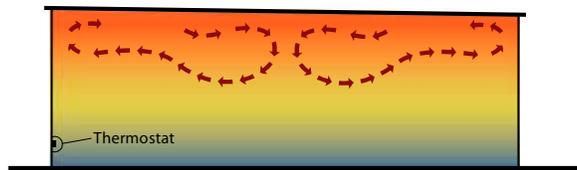
### Serving Comfort

Bars and restaurants tend to be a revolving door of activity. The daily lunch crowd might turn into a cocktail affair come nightfall, or a Sunday football crowd might dwindle rapidly depending on the score. An HVAC system serves its purpose in providing conditioned air to the environment, but it doesn't always account for the fluctuation in occupancy or outdoor temperatures. Taking into consideration climate, function and design, restaurants and bars need a way to maintain a certain ambiance by circulating the conditioned air within a space to establish a high level of patron comfort.

Incorporating the advanced technology of large diameter, low speed fans has proved beneficial in numerous hospitality settings, supplying the necessary comfort, minimizing energy consumption and most importantly, encouraging a high level of patronage. Re-engineered for commercial spaces, the Big Ass Fan Company's 12-20 ft Element® and 8-10 ft Isis®, take the guesswork out of comfort by slowly circulating the air within a space. With regular ceiling fans, the concept is similar, but Big Ass Fans work on a much larger scale and are significantly more effective<sup>1</sup> at circulating the air within.

### Indoor Fundamentals

When employing an HVAC system, the most important factor in achieving acceptable thermal comfort is a competent system design for appropriate climatic loads paired with provisions for control of local airflow.



Courtesy of Big Ass Fans®

The effectiveness of a large diameter, low speed fan lies in its ability to move large volumes of air slowly and gently without disrupting the atmosphere of the facility. During the cooling

season, with the fans operating between 60 to 100 percent of capacity, the additional air movement does not cool the air, but rather creates a cooling sensation as the breeze passes over occupants' skin.

Along with summer comfort, large diameter fans are capable of destratifying a space in the winter, reducing heat-energy consumption by as much as 30 percent. Considering hot air naturally rises as cold air falls, Big Ass Fans mix these two extremes, creating a more uniform temperature. Contrary to the typical method of reversing a high speed fan, a large diameter fan is slowed 10-30 percent of its maximum rotations per minute (RPM), redirecting warm air from the ceiling to the occupant level, further increasing comfort. Drafts occur at approximately 40 fpm of air velocity according to the American Society of Heating, Refrigerating, and Air-conditioning Engineers (ASHRAE) 55-2010, *Thermal Environmental Conditions for Human Occupancy*.



At **381 Main**, a former martini bar turned sports mecca in Little Falls, N. J., proprietor Steve Baskinger likes to maintain a uniform 70 F year round. Upon transforming the space, Baskinger installed two Element fans into his 15 ft high, 3,000 sq ft space simply for the aesthetic appeal. "Originally it wasn't for anything else but the look," he said. "Then I looked into the fans more closely and found out they could be more efficient in moving the air around." With a forced air heating system that pushes air through four vents around the bar, Baskinger left the fans running at 12 percent during the winter to help destratify the space.

Smaller fans are run in reverse at very high speeds, considering they are ineffective at low speed, pulling air across the ceiling and

down the walls to avoid causing a draft. Slowing a large diameter fan mixes all the air in the space and directs the warm air where it's needed. Savings accrue by slowly circulating this trapped heat down to the occupants. Even though the thermostat setpoint remains the same, the heating system does not have to work as hard to maintain the given setpoint. Designed for ceilings as low as 12-ft, large diameter, low speed fans aid in the thermal comfort of the occupants, providing the necessary airflow to create uniform temperatures.

### Energy Efficiency

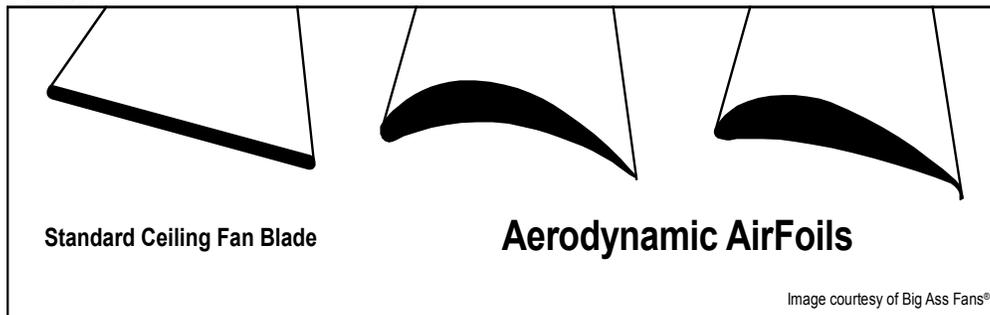
For a 5,000 sq. ft. scenario, Element operates at higher speeds during the summer to assist the cooling capacity of the HVAC system, consuming about 640 W. At lower speeds, or in typical winter destratification mode, the same-sized Element consumes approximately 40 W.

#### Estimated Annual Energy Cost

		12-foot Fan (Summer)	12-foot Fan (Winter)
<b>A</b>	<b>Hours of operation per week</b>	<b>50 hours</b>	<b>168 hours</b>
<b>B</b>	<b>Months in Cooling Season</b>	<b>6 months</b>	<b>6 months</b>
<b>C</b>	<b>Cooling Hours of Operation</b>	<b>1300 hours</b>	<b>4368 hours</b>
<b>D</b>	<b>Number of fans</b>	<b>1</b>	<b>1</b>
<b>E</b>	<b>Energy Use per fan (Watts)</b>	<b>300 W</b>	<b>150 W</b>
<b>F</b>	<b>Peak Energy Use (kW)</b>	<b>0.3 kW</b>	<b>0.15 kW</b>
<b>G</b>	<b>Cooling Energy Consumption (kWh)</b>	<b>390 kWh</b>	<b>655 kWh</b>
<b>H</b>	<b>Estimated Cost of Electricity (\$/kWh)</b>	<b>\$0.11/kWh</b>	<b>\$0.11/kWh</b>
<b>I</b>	<b>Yearly Cooling Cost</b>	<b>\$43</b>	<b>\$72</b>

The above table summarizes the energy consumption and costs for operating the Element fan. In the cooling mode, these fans only need to function during occupied hours because they largely impact user comfort. In destratification mode (during the cooler winter months), commercial-grade large diameter, low speed fans often operate for extended periods to prevent extreme temperature differences, alleviating the heating load on the HVAC system.

### Function



Properly designed, aerodynamic airfoils and winglets can move air efficiently at a wide range of operating speeds, covering large areas. Understanding the pitch, or angle of attack, at which the airfoil is positioned helps understand the effectiveness of the fans. An exaggerated pitch, airfoils with an almost vertical angle of attack, will either create increased drag or require more energy due to the increased drag, while a flat, mostly horizontal airfoil will typically not move much air at all. That said, it's important to observe airfoil width and pitch with the discerning knowledge that a narrow blade coupled with a moderate pitch will deliver far less drag than wider, improperly pitched blades.

### Sound Check

It's important that ceiling fans do not interfere with such electrical equipment as audio visual and sound systems. Fans with onboard controls cut down significantly on the amount of cabling required, which is often the cause of unwanted feedback. "As the distance between the motor and the variable speed drive increases, so does the likelihood that electrical noise will be problematic," said Christian Taber senior applications engineer and LEED AP for the Big Ass Fan Company. "By placing the variable speed drive and motor in close proximity to each other, electrical noise has been essentially eliminated," making this technology ideal for hospitality venues. The patented, direct-drive motor eliminates the audible mechanical noise ordinarily created by gearbox friction and the advanced onboard controls prevent electrical 'noise' such as radio frequency interference (RFI) that affects electromagnetic equipment (e.g.

sound systems and TVs). Re-engineered for commercial spaces, Big Ass Fans' Element and Isis produce less than 35 dBA at maximum operating speed, making them ideal for use in sound sensitive areas.

### Something Old, Something New

While new construction can figure in heating and air conditioning requirements along with the needed airflow from the onset, existing spaces can appreciate the same benefits from large diameter, low speed fans. Temperature, air quality and noise levels are all important factors for a successful venue and Big Ass Fans has worked fervently over the past decade to address these concerns while maintaining a fundamentally sustainable approach.

### Cost Savings

Consider a new, 5,000 sq ft restaurant in Lexington, Ky. with DX rooftop units (RTUs) that condition the space to 72 F in the summer. The cooling effect provided by the gentle breeze from three large diameter, low speed fans allows the thermostat setpoint to be increased by 5 F, which allows for a 10 percent reduction in the design capacity of RTUs without sacrificing occupant comfort. As a result, the bar/restaurant can realize a 15 percent annual reduction in energy costs due to the reduction in the size and run hours of the HVAC systems .

### Something Renewed

Previously a pet kennel and retail shop in St. Petersburg, Fla., it took the **NOVA 535** nightclub developers a fair amount of elbow grease to uncover the old charm hidden above the drop ceilings. "Our space had three dropped ceilings that were only 10 ft. high. We pulled off all three and now its 18-ft," said Owner Michael Novilla. This 7,000 sq ft, two story loft-style restaurant now accommodates weddings, receptions, seminars, film shoots and numerous other social events where silent air movement is essential to keeping a comfortable atmosphere.

High ceilings, ductwork and the hot Florida climate resulted in uneven temperatures and the ensuing increase in energy costs to maintain comfort. Novilla decided to address the issue by installing a 12-ft diameter Element fan, powder coated black to fit the design of the space, to accompany the two existing HVAC units. Since the installation of his Big Ass Fan, Novilla has been able to turn off his front AC unit, only running the back unit. Additionally, "in the morning we can just run the fan without using the AC at all," he said, significantly reducing his energy usage. Whether at full capacity or with just a handful of people, Element is able to evenly distribute the air throughout the space further enhancing the comfort of NOVA 535's guests. When not serving as host to weddings or dinner crowds, the venue is transformed into a film studio. Whereas noise output, or better yet, the absence of it, is important for all events, it is imperative on film sets where any ambient sound interferes with the recording process. "While shooting films, when it's quiet on the set, you have to turn the air conditioning off because it's noisy ... and it gets hot," said



NOVA 535

Novilla. "You can keep the fan on and it keeps everybody a lot cooler," he added, leaving the acoustics to the performers.

### Moving Outdoors

This silent operation carries over to the outdoors as well allowing patrons to enjoy patios well into the hot summer months. In unfavorably hot climates, where a little air movement can make the difference between agony and ecstasy, the breeze created by large diameter, low speed fans complements the allure of outdoor dining and binge drinking. Inspired by the beer and gastronomic essentials of a traditional British pub, **The Pub** in Lexington, Ky., replicated the important elements with the unfortunate addition of the humid climate and the ensuing insects. On its outdoor patio bar area, an 8-ft diameter UL-listed Isis fan was installed to enhance the atmosphere with silent, gentle air movement that holds its own against unwelcome bugs.



The Pub

Hospitality venue operators understand the importance of combining image and comfort. From a design standpoint, Big Ass Fans can be customized to complement the décor of any space, either making a bold statement or quietly blending in with the surroundings. To the same extent, these fans enhance comfort significantly, achieving this goal in a sustainable fashion regardless of the climate.

### (Endnotes)

1 Ansley, Richard. "Fan Size and Energy Efficiency." *International Journal of Ventilation* (vol.1, no.1) 2 Trane TRACE® v6.2.6.5