

REDUCING ENERGY CONSUMPTION IN DATA CENTERS CHOOSING THE RIGHT FANS CAN LEAD TO A MASSIVE 10-15% IN ENERGY SAVINGS

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All over the world, data center owners or Cloud providers are looking for new ways to reduce energy consumption and carbon emissions to become a 'green

facility' as it is increasingly more important to achieve the lowest possible power usage effectiveness (PUE). No matter which cooling method is used, the one

key component that can truly make a difference in becoming more energy-efficient are the fans.

Data centers are using a variety of methods to cool the facility to the desired temperature of 20-29°C.

Some findings say that 3% of the world's energy consumption is today used for data centers. This underpins that the focus on PUE is a key concern with good reason.

Some of the most common cooling systems are free cooling, where outside air is brought directly into the data center through filters, liquid cooling because it is a simple, affordable way to keep temperatures down, and indirect evaporative cooling where outside air is brought indirectly into the data center through heat exchangers to avoid contact between moist, cooled air and the conditioned air. All cooling systems have one thing in common. They need fans to transport the air through the facility to keep temperatures at the desired level. The downside is that fans are a major contributor to the energy consumption in the various cooling solutions that are used in today's data centers.

Due to the fans' use of energy, data centers are continuously on the lookout

for energy-efficient fans that can help reduce the energy consumption of the facility and choosing the right fan can result in as much as 10-15% energy savings.

CHOOSING THE OPTIMUM FAN FOR DATA CENTERS

There are two types of fans used in data centers: axial fans and centrifugal fans. But what is the most reliable and energy-efficient fan? And what do you need to be aware of to obtain these massive reductions in energy consumption? You should assess a fan on three main points: 1) the fan's total efficiency level, 2) the sound level, and 3) the Total Cost of Ownership (TCO), typically calculated over the 20-year expected lifetime of the data center.

THE PROVEN WAY TO OBTAIN SIGNIFICANT ENERGY SAVINGS

The majority of centrifugal fans for data centers reach between 65-70% efficiency. Generally, axial fans can perform up to approximately 80%. One of the main reasons for the significant difference in efficiency is found in the way the air is

brought through the fan (figure 1).

In axial fans the air flows parallel to the axis of the fan whereas the air flows perpendicular to the fan axis in centrifugal fans causing loss of velocity energy. In axial fans, the loss is minimal due to the aerodynamic design which ensures a straight air flow with no or only very little turbulence compared to centrifugal fans. This difference in design generally provides higher efficiency levels on axial fans.

Even small improvements in fan efficiency can have a huge impact on a data center's overall energy spend. After years of dedicated research and development, NOVENCO Building & Industry has developed the ZerAx® axial fan which reaches an unmatched 92% efficiency.



This makes it the most energy-efficient fan on the market today and using a fan with this efficiency level is a crucial step in data centers' quest for low energy consumption.

SOUND LEVEL IMPACT ON HEALTH AND SAFETY

There are two main reasons for considering the fans' sound level in a data center. The first reason is the location of the data center. A data center is a 24/7 working facility operating every day, hour and minute of the year. When data centers are located in built-up areas, there is an obligation – either legally or ethically – to operate at a sound level which does not negatively impact the surrounding area. The other reason is that the sound level can have a negative influence on the well-being of the employees. Employers that take the health and safety of their employees seriously always aim to create a facility where sound levels are comfortable and provide a satisfying work environment.

Turbulence often influences a fan's sound level. Since the design of the ZerAx® fan ensures very limited or no turbulence at all, it can perform up to 10dBs quieter than other fans on the market. Furthermore, compared to centrifugal fans the sound on axial fans is in another frequency area which is easier to reduce to a level suitable for work settings.

FAN RELIABILITY AND AVAILABILITY IMPACT THE TOTAL COST OF OWNERSHIP

The fan's lifetime is a critical part of choosing the right fan, but it has to go hand in hand with fan availability and reliability to obtain the lowest possible TCO. The goal is always to have "zero downtime" for obvious reasons.



ZerAx® axial flow fans for cooling of data centers

The ZerAx® fan has an expected lifetime of 20 years; approximately the same as the lifetime of most data centers. This means that you will get a reliable fan with maximum availability operating for the entirety of the data center itself. Furthermore, there are low operating costs on the ZerAx® fan because the components last twice as long as competitors', the quality of design and construction ensures low service costs, and it has a lower

consumption of kWh compared to other fans on the market.

What may seem the most cost-effective way forward in the short term, can end up being the more expensive solution in the long run, if the operating costs are affected by high service costs, unscheduled maintenance or in worst case, unforeseen fan breakdowns.

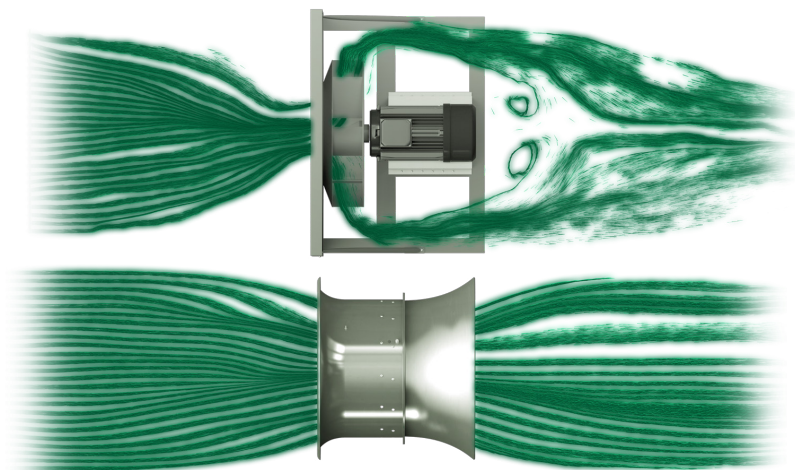


Figure 1 Graphic: Air flow of centrifugal and axial fans



Pure competence in air.

ENABLING DATA CENTERS TO MEET ENERGY REDUCTION OBJECTIVES

No matter what method is used to cool a data center, there is one critical component that can genuinely make a difference in reducing the energy consumption: The fans.

Right now, the ZerAx® axial fan is the most energy-efficient fan on the market with efficiency levels of 92%, and in spite of the unprecedented high performance it still has a 20-year lifetime and operates at sound levels 10dB lower than competitors' fans.

All in all, the unique ZerAx® fan will be the loyal data center companion that allows the facility to stay cool year after year – without interruptions.



NOVENCO fan array, configuration 3x3 with ZerAx® bricks



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