CASE STUDY

REDUCING THE ECOLOGICAL FOOTPRINT OF DATA CENTER COOLING

APPLICATION

Use of Fan Arrays for Supply Air and Exhaust Air in Data Center Cooling

CHALLENGE

- Reduce Ecological Footprint of Data Center
- Increase Static Efficiency in Operating Point
- Lower Operational Cost of Data Center Cooling

SOLUTION

- Fan Wheel optimized for operational area of Data Center Cooling
- Aluminum Fan Wheel
- Airfoil Blade Geometry

RESULTS

- up to 10% higher efficiency
- up to 3.5 dB[A] noise reduction
- up to 12% annual savings in operating cost
- lower fire load than plastic wheel
- 100% recyclable fan wheel

PROJECT OVERVIEW

Cooling data centers generate enormously high energy costs. Around 30% of the energy consumption of a data center, which is not generated by the actual IT, is accounted for by the fans used for cooling. The correct selection of the fans used can therefore make a significant contribution to reducing the operating costs of a data center. However, most of the fans do not achieve their maximum efficiency in the aerodynamic operating area of data center cooling.

punker has developed a fan wheel that achieves significantly higher efficiency in the actual aerodynamic application area of data center cooling than competitor products. It can therefore contribute to a significant reduction in operating costs. Compared to plastic impellers, punker's aluminum impeller is also 100% recyclable and has a lower fire load.

APPLICATION CASE

In the case considered here, a data center is to be supplied with a constant 70° F supply air temperature by means of a fan array in order to ensure optimum functionality. The fans arranged in a fan array are to dissipate a large amount of heat without additional cooling, i.e. a high volume flow rate has to be realized with low pressure. The operating points are therefore typically on the right-hand side of the fan curve.

CASE STUDY

REDUCING THE ECOLOGICAL FOOTPRINT OF DATA CENTER COOLING

CHALLENGE

The correct design of the fans used to cool data centers can make a significant contribution to reducing the overall operating cost: around 30% of the energy consumption of a data center, which is not generated by the actual IT, is accounted for by the fans used for cooling.

However, most of the fans used for supply and exhaust air in data centers do not achieve their maximum efficiency in the aerodynamic operating area of data center cooling. Most standard HVAC fans reach their maximum efficiency towards the left of the fan curve. The fans arranged in a fan array, however, are to dissipate a large amount of heat without additional cooling, i.e. a high volume flow rate has to be realized with low pressure. The operating points are therefore typically on the right-hand side of the fan curve.

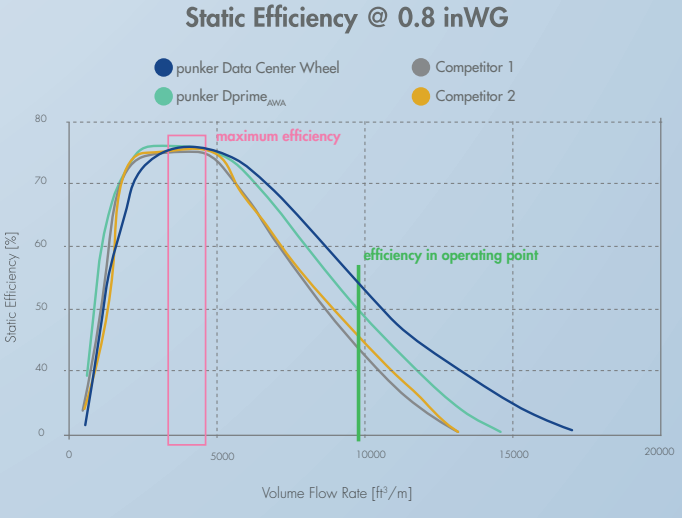
SOLUTION

punker developed a fan wheel specifically for supply and exhaust air in data centers, where very high volume flows of up to 30,000 cfm are required at low pressure. The new data center impeller achieves significantly higher efficiency than competitor products in this area of application. The following case study shows how the **operating costs of a data center can be reduced by around US$ 7,000 per year** with the new Data Center fan wheel by punker. Another positive side effect is a **reduction in noise emission of 1.4 dB[A]**.

Assumption: Data Center shall be supplied with constant 70 °F supply air using a fan array to ensure optimum functionality.

Operating point: 0.8 inWG | 9,420 cfm
Electricity rate: 0.15 $US / kWh
Fan Array: 5 x 3 fans
Operation: 24/7/365

Product:	**punker Data Center Wheel**	**punker Dprime AWA**	**Competitor**
Speed:	791 rpm	909 rpm	886 rpm
Power consumption in operating point:	1,585 W | 2.12 hp	1,707 W | 2.29 hp	1,936 W | 2.56 hp
Operating cost p.a.	$US 31,240	$US 33,645	$US 38,158
Sound power level:	82.2 dB(A)	83.6 dB(A)	no data available



The New Data Center Fan Wheel

- **Diameter range 560 - 710 mm**
- **Aluminum impeller**
- **Airfoil blade geometry**

Visit the product page for technical information:

https://qrco.de/bcbZMS