

Fan Array Systems



Fan Array

- > 10,000 CFM and up
- > Up to 16 IN W.G
- > Adjust to any air tunnel geometry
- > Multiple Control Options
- > Retrofit and New Construction

Fan Array Concept

The Fan Array arrangement has gained popularity due to the benefits of this system:

1. Reduced footprint of unit
2. System Redundancy
3. Improved acoustical benefits
4. Reduced connected load for larger systems
5. Improved Maintenance

The modular construction, utilizing multiple small fan/motor assemblies, versus single large fan/motor assembly, allows end

users the flexibility to retrofit the Fan Array into existing Air Handlers. Retrofitting with Fan Arrays can provide many benefits, such as: immediate redundancy, reduced brake horsepower, and improved acoustics.

The modular Fan Cell construction works well within constraints of the typical mechanical room, offering easy handling logistics during the shut down . Overall space savings are provided once installed.

Similar advantages can also be achieved in new construction. Built-in redundancy in the fan array systems ensures uninterrupted continuous air-flow. Better sound signature, reduced connected load for large systems and space savings have proven to be the major points considered by engineers and end users.

Inside this issue:

Benefits in Retrofits	2
New Construction	2
Design Considerations	2
Control Options	3
Reduced Maintenance	4
Sound and Vibration	5
Special Features	6

Benefits in Retrofits



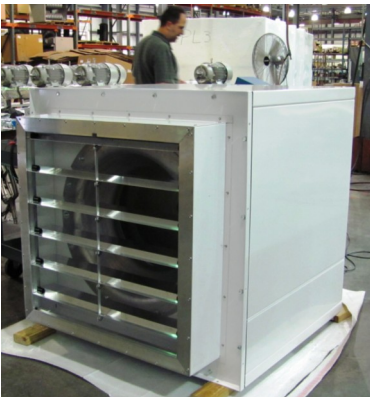
Fan cells can be transported without heavy lifting equipment.

The ease of handling and installation of the Fan Array System into an existing Air Handler minimizes the downtime of the system being retrofitted. Due to the utilization of smaller Fan Cells, the construction crew can avoid the need for heavy duty lifting equipment.

The additional energy savings of the new system are achieved by reducing the connected load through using more efficient fans and motors, thereby improving the motor horse power utilization.

More even airflow distribution patterns and possible reduction in sound power levels can also lead to energy savings through the elimination of equalizer plates and/or sound traps.

The mechanical redundancy of the fan array can be improved by using the multi-VFD control schemes to ensure the redundancy of the controls also.



Backdraft damper installation.

New Construction

The Fan Array provides significant reduction in the length of the Air Handling Units, giving back valuable real estate to the owner in mechanical equipment rooms. The utilization of multiple small fans/motors requires shorter airway space in the unit.

As an additional benefit, the smaller components require shorter maintenance clearances. Direct drive construction with use of multiple fans can allow for lower connected load on larger systems (50,000 CFM and above). Eliminating sound traps or reducing their length, pro-

vides reduction in the Total Static Pressure of the system with additional savings in motor horse power.

The redundancy feature is a great additional benefit for stand alone air-handlers.

Design Consideration



Fan cells in cleanroom application.

Most retrofit installations will benefit from systems designed with smaller fan cells and motors in order to provide ease of handling and minimize the tear down. Nevertheless, larger fans typically have higher efficiency than smaller ones and larger motors will have higher efficiency than smaller ones. Therefore, fan arrays with fewer fans should be considered for the new construction based on the following:

- Fewer components within the assembly will increase the reliability of the system. The smaller quantity of larger motors will also have higher peak load at part load operation relative to the smaller ones.
- Full redundancy can be achieved in most cases

with four to six-cell fan array systems while maintaining the lowest connected load for the specific system.

- Selecting the larger size fans will allow for the use of motors with lower RPM, effectively extending the time between scheduled bearing lubrication.
- Motors selected in the operating range above 60 Hz will eliminate the need for the de-rating.
- For systems that require fan redundancy, the use of blank-off plates in lieu of back-draft dampers to prevent the additional pressure drop throughout the life of the system should be considered.

Control Options

The most commonly used approach to control the Fan Array is to operate all fan cells with one Variable Frequency Drive. Each motor in the Fan Array will have individual motor circuit protection and a motor status indicating light. The indicator light will allow the maintenance personnel to identify the failed motor. The VFD will be controlled by an airflow or a static pressure sensor in the ductwork in order to maintain system set

point in the event of a fan failure. In critical applications a redundant Variable Frequency Drive can be provided.

The Redundant Variable Frequency Drive will start upon failure of the primary drive. The system will immediately resume the last set-point of the primary Variable Frequency Drive.

The other most common configuration has each motor wired to

an individual VFD. This configuration offers full redundancy of motors and VFD's. The signal repeater will deliver the common speed reference signal from the Building Management System or Air Flow Measurement System to all VFD's simultaneously .



Control cabinets for 18-cell fan array.

Reduced Maintenance

With built-in redundancy, the failed motor replacement can be postponed to the next facility shut down without disrupting the airflow.

Direct drive fan designs eliminate the need for the belt replacements and adjustments.

Smaller motor sizes allow for

improved serviceability and eliminates the need for additional lifting equipment.

Optional use of sealed isolated bearings will eliminate the need for routine bearing maintenance.



Factory acceptance testing.

Sound and Vibration

Precise balance of the smaller fans along with the vibration isolation of each individual fan, ensures vibration levels acceptable for the most critical applications. Neoprene vibration isolation mounts are selected to ensure low material stress levels, thereby guaranteeing the lifespan of the isolator is in line

with the lifespan of the building.

Sound power levels produced by smaller fans effectively shift the peak noise generation by one or two octave bands higher, allowing for easier attenuation with shorted sound traps. Selecting fans with 11 or 12 blades will provide additional improvement

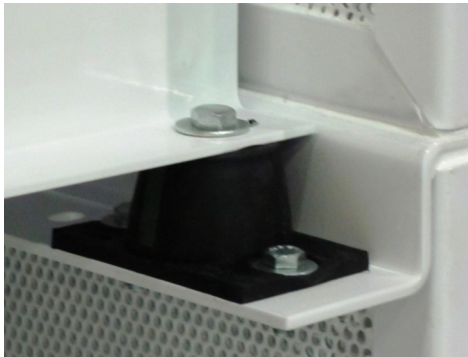
of the sound quality relative to the fans with 9-blade arrangement.



Fan balancing at the factory.



Fan cell assembly area.



Neoprene vibration isolator.



Shaft grounding system installation.

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Contact your local representative for additional information and design assistance.

Special features

- Fan cells can be manufactured using fan wheel sizes ranging from 12" to 36". Larger fan cell sizes, up to 49", can be built in knock-down construction.
- Aluminum or steel wheels are available. Each configuration is carefully selected and provided with wheel Class (I, II or III) to match the capacity requirements.
- In addition to being able to size fan cells to match the specific air tunnel geometry, the knock-down feature allows for additional flexibility in fan retrofit systems with access restrictions.
- Fan Cell can be manufactured with or without insulation to satisfy applications with wash-down requirements.
- The fan cell construction will allow for systems with up to 16 IN. WG in total static pressure requirements.



5 fan cell installation.