TWIN FAN LAB EXHAUST
For Contaminated Exhaust Applications
Introducing Twin Fan Technology
By Twin City Fan & Blower

Twin City Fan & Blower is a leading supplier of induced flow fans used in laboratories, universities, hospitals and pharmaceuticals. These exhaust applications require that our fan system dilute contaminated air, and project a plume high into the air, functioning like a tall stack. The idea is to dilute the exhaust air and project it upwards, so that by the time pollutants reach the ground they are very highly diluted.

Most installations require 100% redundancy, so that if one fan fails, the other takes over automatically. So, two fans draw from the same plenum – but only one operates at a time.

In search of a more efficient solution, the engineering team at Twin City Fan & Blower developed a new method of feeding two fans into a common stack and selected the fans to operate at their peak efficiency at 50% flow and re-optimized the wind band aerodynamics.

The Results

Redundancy: Full redundancy is retained. If either fan fails, the remaining fan automatically speeds up to deliver the full flow. But the transition is faster, since the “good” fan is already running at 50% flow. When one fan fails, the other simply ramps up its speed. This is quicker, and therefore the safety of the application is enhanced. Further, the use of one stack means that all the important operating parameters of the stack (entrainment ratio, plume height, induction effects) are identical when either one or two fans are running. No compromise.

More Efficient: On a recent Singapore project, selections at the duty point called for two 36” fans, each operating with a separate nozzle and windband. When Twin City Fan & Blower considered the 36” fan operating a 50% flow, it was in surge. So, we selected two smaller 30” fans because the combination placed the twin 30” fans at their peak efficiency. The convergence of the two fan airstreams was then configured to provide a favorable system effect on the fan discharge. Energy savings can be up to 10% for full and part load operation with two smaller fans running together feeding a merged section. Of course, each smaller fan is less efficient when it runs at full flow by itself, but this will happen only if the other fan fails, i.e. emergency mode.

Low Noise: Since the fans run slower, they produce less sound. Less attenuation is required. They can be up to 8 dBA quieter than single fans.

Better Reliability: Since the small fans run slower, they experience less wear stresses. Bearing wear and metal fatigue are reduced dramatically. Reliability increases, and product life is lengthened.

Model TFIFE is available with UL/cUL 705 listing, for electrical, File No. E158680.
When 100% back-up is required, our new Twin Fan Technology represents a new standard in lab exhaust systems. When our customer asked us if it was possible to improve operations without compromise, by running the fans at 50% of their rated flow, we found a way to do just what they asked for.

That's what we do at Twin City Fan & Blower – whether in the USA, Singapore or anywhere in the world. We behave differently than our competitors – we innovate to provide more value to our customers.

The new Twin Fan Lab Exhaust System serves as a great example – greater safety, lower energy, lower sound and higher reliability – thanks to the way our team members think.

We encourage you to evaluate our twin fan system for your fume exhaust applications – and to challenge us to fill your needs with our unique innovative approach to air movement and control applications.

**Competitive Advantages of Twin Fan Technology**

**Compared to Single Fan Design (Size 300)**

- Up to 8 dBA quieter
- Up to 10% more efficient
- Significant energy savings in normal mode with easy switch-over emergency mode
- Can operate up to 20% lower speed
  - 40% less stress on the impeller
  - Extends reliability
- Low vibration energy due to low speed
- Full flow, high energy "jet" plume maintained at design and part load conditions

**Competitor's Design**

- Requires two separate fans at 50% flow
- Although the minimum velocity ~ 3,000 fpm (15 m/s) may be maintained per ANSI Z.9 std, the variable nozzle design (shown above) creates low energy "pencil" plumes that are easily broken up by crosswinds at 50% flow
### 300LV TFIFE, Class III

<table>
<thead>
<tr>
<th>Building/ Bypass</th>
<th>Fan Inlet CFM</th>
<th>Nozzle OV FPM</th>
<th>Fan Config.</th>
<th>AMCA Certified Data</th>
<th>Motor and Transmission</th>
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<tbody>
<tr>
<td></td>
<td>Measured</td>
<td></td>
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<tr>
<td></td>
<td>RPM</td>
<td>BHP</td>
<td>FEP kW</td>
<td>LwA dBA</td>
<td>RPM</td>
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### 330LV TFIFE, Class III

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<th>Nozzle OV FPM</th>
<th>Fan Config.</th>
<th>AMCA Certified Data</th>
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### Other Parameters of Interest

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<th>6° SP</th>
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<td>wire to air T%</td>
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<td>Single</td>
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Performance certified is for installation type C - Ducted inlet, Free outlet
Power rating (BHP) does not include transmission losses.
Performance ratings do not include the effects of appurtenances (accessories).
Values shown are for outlet LwOA sound power levels for Installation Type C: ducted inlet, free outlet.
The A-weighted sound ratings shown have been calculated per AMCA International Standards 207 & 208.
## PERFORMANCE DATA

### 365LV TFIFE, Class III

<table>
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<tr>
<th>Building/Bypass</th>
<th>Fan Inlet CFM</th>
<th>Nozzle OV FPM</th>
<th>Fan Config.</th>
<th>AMCA Certified Data</th>
<th>Motor and Transmission</th>
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<td>6.25&quot; SP</td>
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<td>Single</td>
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<td>61.96</td>
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**Fan & Blower Technology by Twin City Fan & Blower**

Performance certified is for installation type C - Ducted inlet, Free outlet. Power rating (BHP) does not include transmission losses. Performance ratings do not include the effects of appurtenances (accessories).

Values shown are for outlet LWoA sound power levels for Installation Type C: ducted inlet, free outlet. The A-weighted sound ratings shown have been calculated per AMCA International Standard 301.

Fan Electric Power (FEP kW) has been calculated according to AMCA International Standards 207 & 208.
## DIMENSIONAL DATA

| Fan Size | Wheel Dia. | OAL  | OAW  | OAH  | A    | B    | C    | D    | E    | F    | G    | H    | J    | K    | L    | M    | N    | P    | Q    | R    |
|----------|------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 300      | 30.00      | 196.76 | 130.41 | 174.06 | 136.90 | 92.90 | 46.45 | 29.93 | 22.00 | 33.50 | 136.90 | 92.90 | 46.45 | 29.93 | 22.00 | 33.50 | 136.90 | 92.90 | 46.45 | 29.93 | 22.00 |
| 330      | 33.00      | 206.05 | 143.45 | 188.62 | 150.59 | 102.19 | 51.10 | 32.92 | 24.20 | 34.00 | 150.59 | 102.19 | 51.10 | 32.92 | 24.20 | 34.00 | 150.59 | 102.19 | 51.10 | 32.92 | 24.20 |
| 365      | 36.50      | 232.87 | 158.67 | 208.51 | 166.56 | 113.03 | 56.51 | 36.41 | 26.77 | 37.50 | 166.56 | 113.03 | 56.51 | 36.41 | 26.77 | 37.50 | 166.56 | 113.03 | 56.51 | 36.41 | 26.77 |

### INSIDE BOX

<table>
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<tr>
<th>Fan Size</th>
<th>Wheel Dia.</th>
<th>S</th>
<th>T</th>
<th>U</th>
<th>V</th>
<th>W</th>
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</table>
In the Twin Fan application, the “Y” section that enables one or two fans to operate as required is an appurtenance that is not considered in the AMCA 260 rating certification. When either one or two fans are running, the performance of the Twin Fan Induced Flow Exhaust system has been AMCA 211 certified for air and AMCA 311 for sound performance. Currently, this certification covers fans that are 30”, 33” and 36”. This certification required independent tests that were performed at the AMCA International laboratory in Arlington Heights, Illinois USA. The TCF ratings of each individual fan in the Twin Fan Induced Flow Exhaust system are AMCA 260 certified when operating as ‘stand alone’ BAIFE fans. The AMCA 260-13 standard does not cover a twin fan arrangement. Instead, it describes a single fan to be tested in accordance with AMCA 210 for air and AMCA 300 for sound (which was performed and certified), and another test with the wind band discharging horizontally into a flow measurement chamber to measure induced flow. This horizontal configuration required for the induced flow test was not physically possible with two single width centrifugal fans feeding a common wind band. For this reason, the AMCA 260 certification of the Twin Fan Induced Flow Exhaust system applies only when one fan is operating as ‘stand alone’, while the AMCA 211 certification applies to the air and AMCA 311 certification for the sound performance of the system with one fan only or with two fans operating at the same time. The induced flow performance with two fans operating at the same time in the Twin Fan System has been confirmed in the Twin City Fan’s laboratory using a pitot-tube traverse at the windband discharge per AMCA Standard 203 to match the performance of the AMCA 260 Certified ‘standalone’ fan arrangement within allowable test tolerances.