AN AERODYNAMIC REVOLUTION
JET THRUST™ FANS FOR CAR PARK VENTILATION

GAIN THE AERODYNAMIC ADVANTAGE WITH THE NEW JTv
FEATURING VORTEX CREATION CONTROL FOR ULTIMATE EFFICIENCY
We improve and safeguard the Environment for people by delivering fire safety and pollution control within buildings. Our Expertise allows us to design efficient, optimised solutions that use the minimum amount of energy to achieve the design requirements, resulting in an Economical solution for both initial installation and whole-life costing.

**Environment:**
- We improve and safeguard the environment for people by delivering fire safety and pollution control within car parks and loading bays.
- Our efficiency leading VCC™ technology significantly reduces energy usage and associated CO₂ emissions.

**Economical:**
- Discrete Jet Thrust™ Fans, with intelligent design, allow for fast, cost-effective installation and ease coordination with other services.
- Significantly lower lifecycle running costs from improved electrical efficiency.

**Expertise:**
- With VCC™ technology and our easy-install mounting configuration, Fläkt Woods provide unrivalled expertise in Jet Thrust™ Fan technology.
- Our dedicated team can support project design by providing CFD analysis & tailored design reports.
Taking the technology developed for our high-performance, high efficiency JMv Axial Range of fans, Fläkt Woods have enhanced our family of car park ventilation axial Jet Thrust™ Fans. These enhancements provide improved aerodynamic efficiency, improved thrust per fan size and a simple installation system common between the two silencer variants; the high-thrust Slim Line and the more discrete, low noise Low Profile unit. These fans are available in 315, 355 and 400mm diameter at F200, F300 & F400 high temperature specification for 50Hz and 60Hz 3-phase supply.

**Increased Thrust:**
- Fewer fans required can save on fan costs and installation costs
- Smaller diameters can be used to save on cost and space as well as being easier to install
- Enhanced safety: Capable of handling larger design fires, where lower thrust fans can’t cope
- Enhanced smoke control in difficult to ventilate areas
- Potential to reduce insurance premiums due to increase in fire safety

**Increased Efficiency:**
- Lower running costs. **Up to 42% less energy used per year**
- Smaller backup power supply requirement, reducing project cost and freeing up space
- Buildings with lower carbon footprints and reduced energy usage can generate higher rental income as ownership costs are lower

**Aerodynamic Hub Design:**
- The JTv uses the radically improved JMv hub design
- Curved profile enables closer fitting components which reduces losses
Thanks to the innovative VCC technology, JTV is an extremely efficient fan, without the need for an expensive high efficiency motor. Of course, if customers need to enhance energy savings further, then we can offer fans fitted with increased efficiency motors or matched inverters which can be used to optimise both the running efficiency and power usage.

- CFD optimised blade design for increased performance
- Vortex generators on the trailing edge of impeller blades manage airflow and turbulence for optimum aerodynamic performance
- Total fan design optimised for increased efficiency
- Advanced technical components incorporating registered design features
- Single stage guide vanes boost efficiency further and also provide support for the motor which means less weight and complexity
- Average running cost savings are 17% (42% max)
- Look for the VCC logo on the blade to make sure that your new fan delivers optimum efficiency.

Innovation and VCC Technology gives you the aerodynamic advantage.
The project is a single basement level car park with two access ramps from street level above. Supply air is provided on the Eastern-edge of the car park via two Mechanical supply rooms [not shown], whilst air exhaust is provided by three Mechanical extract rooms on the Western-edge of the car park, shown in green (FIG.1 & FIG.2).

At the concept stage of project design it is possible to provide even greater assistance: Here we show a representative volume of excavated earth within the car park that could be saved should a Fläkt Woods system be added using smaller, Low Profile Jet Thrust Fans, compared to the generic design (FIG.2).

**Case Study Summary**

- **Project Build:**

<table>
<thead>
<tr>
<th>Number of Fans</th>
<th>CONSULTANTS SPEC</th>
<th>FLÄKT WOODS JTv SOLUTION</th>
<th>PROJECT SAVINGS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diameter of unit</td>
<td>400mm Jet Thrust Fans</td>
<td>355mm JTv Slim Line</td>
<td>37% Install cost saving</td>
</tr>
<tr>
<td>MWh per annum (pollution control mode at half speed)</td>
<td>26MWh</td>
<td>15MWh</td>
<td>41% Acquired cost saving</td>
</tr>
<tr>
<td>CO₂</td>
<td>13.6 tonnes per annum</td>
<td>7.9 tonnes per annum</td>
<td>42% Energy saving (11MWh)</td>
</tr>
<tr>
<td>Excavation saving if Low Profile JTv were used</td>
<td>7.8 TONNES or 5800m³ OF EARTH PER FLOOR</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*For full Case Study findings see pages 10-11.*
The increased thrust and efficiency of the JTv range gives greater flexibility to consultants and designers. The solution is simplified by reducing the number of jet fans required and also providing a higher performance system.

GREATER DESIGN FLEXIBILITY

A Fläkt Woods solution means that you and your client do not need to compromise on performance to save on costs. Fläkt Woods supports consultants and designers with a full design and CFD service.

- LOWER PROJECT COST
- UP TO 37.5% MORE EFFICIENT
- UP TO 39.5% MORE THURST
- REDUCED LIFE-CYCLE COSTS
A system with fewer fans means the total fan cost is less and so are all of the associated installation costs. The quantity of fans required can be reduced by up to 37% which translates to significant project cost savings in terms of time and equipment costs.

The JTv Low Profile can give further savings by reducing the required depth of excavation. The JTv Low Profile is between 90 & 110mm shallower (depending on diameter) than the Slim Line and is ideal for use on sites with restricted ceiling heights.

We have also made design improvements to the silencer construction of the JTv Low Profile, giving it the same easy install, two piece construction as the JTv Slim Line. This means faster and easier installation on site.

- UP TO 37% LOWER INSTALLATION COST
- FASTER INSTALLATION
- LOWER RELATED PROJECT COSTS
- EASY MAINTENANCE
For building operators the benefits of an energy efficient system are self-evident. We have seen a reduction in energy costs of up to 42%; saving 11MWh of energy every year on one project.

- **UP TO 42% LOWER RUNNING COSTS**
- **SAFER ENVIRONMENT**
- **EASY MAINTENANCE**
- **LOWER NOISE LEVELS**

The benefit of having a higher performance system is that it could reduce insurance premiums due to the increase in fire safety.

Easy maintenance, 2 piece assembly of all JTv fans also means maintenance time is reduced leading to a further cost saving and reduced disruption for occupants and tenants.
The more efficient and powerful JTv range of Jet Thrust Fans offers increased levels of safety for occupants in fire mode and enhanced comfort in pollution mode. With fewer fans in use, sound levels are also reduced. This is a major benefit in residential or office buildings where occupants can be located in close proximity to the car park.

For developments with tight noise constraints our JTv Low Profile offers up to a 6dB noise reduction, this combined with our intelligent system design ensures that operational noise is kept to a minimum.
The following CFD results compare fan designs within a large, basement car park designed to achieve 10 air changes/h and Smoke Clearance. The first set of results are a “generic” selection made by placing jet fans on a square grid at an assumed area coverage; this is not Fläkt Woods recommended method, but is seen in the marketplace as a common strategy for early-stage design. The second uses Fläkt Woods’ design expertise to select and position Jet Thrust Fans to provide an even distribution of airflow across the car park and minimise recirculation and the spread of smoke.

The generic design uses 35 40JT/3SL/UBD/TB 400mm Jet Thrust Fan units, whereas the Fläkt Woods Design uses only 22 35JTv/3SL/UBD/TB 355mm Jet Thrust Fan units. This provides a purchase cost saving to the customer compared to the generic design, but also a running-cost saving as the total energy load of the Jet Thrust Fans has reduced from 47kW to 28kW. Over the life of the project this can provide a significant whole-life saving as well as reducing the cost of other associated services such as High Temperature cabling, back-up power supplies, installation time and cost.

1. **TEMPERATURE:**

The Fläkt Woods design [FIG.4] shows a smaller spread of high temperature (60°C and above) than the generic design [FIG.3], the extent of heat spread towards the supply point is also much reduced which aids fire-fighter access from the Eastern-end of the car park.

2. **VISIBILITY:**

The generic design (FIG.5) shows a greater density of smoke spreading up-stream of the fire and also shows smoke leaking into the Southern area beyond the large central set of rooms. The Fläkt Woods design (FIG.6) shows a wider distribution of smoke within the Northern area, though allows for fire-fighter access from the East of the fire due to the improved visibility here at a close point to the fire.
3. **SMOKE SPREAD:**

Highlighted in blue is the extents of the 10m visibility mark, a common design criteria for smoke systems. This shows a deeper spread of smoke around the fire in the generic system (FIG.7) This smoke plume edge is greater than 10m from the source of the fire in the generic system, but has a shorter travel distance to the edge in the Fläkt Woods design (FIG.8)

4. **VELOCITY:**

The Fläkt Woods design allows for enhanced fire safety as the amount of recirculation has been significantly reduced; these velocity plots show that in the area closest to the fire the Fläkt Woods design is generally moving air towards the extract point, where-as the generic design has recirculating flow and air predominantly travelling back towards the supply points.
JT® SLIM LINE

Key for Inlet/Outlet
G = Guard  
D = Deflector

<table>
<thead>
<tr>
<th>FAN SIZE</th>
<th>CONFIGURATION</th>
<th>INLET</th>
<th>OUTLET</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
<th>I</th>
<th>J</th>
<th>K</th>
<th>L</th>
<th>L'</th>
<th>L&quot;</th>
<th>APPRX MASS (Kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>315</td>
<td>UNI-DIRECTIONAL</td>
<td>G/D</td>
<td></td>
<td>1708</td>
<td>764</td>
<td>944</td>
<td>155</td>
<td>425</td>
<td>164</td>
<td>446</td>
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<td>180</td>
<td>208</td>
<td>281</td>
<td>345</td>
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<td>55</td>
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<tr>
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<td>946</td>
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<td>486</td>
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<td>200</td>
<td>228</td>
<td>302</td>
<td>367</td>
<td>350</td>
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<tr>
<td>400</td>
<td>UNI-DIRECTIONAL</td>
<td>G/D</td>
<td></td>
<td>1814</td>
<td>827</td>
<td>987</td>
<td>185</td>
<td>450</td>
<td>161</td>
<td>531</td>
<td>306</td>
<td>220</td>
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<td>388</td>
<td>371</td>
<td>70</td>
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<tr>
<td>400 Max Thrust</td>
<td>UNI-DIRECTIONAL</td>
<td>G/D</td>
<td></td>
<td>1814</td>
<td>827</td>
<td>987</td>
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<td>324</td>
<td>388</td>
<td>371</td>
<td>72</td>
</tr>
</tbody>
</table>
**Key for Inlet/Outlet**

- **G** = Guard
- **D** = Deflector
- **BM** = Bell Mouth

**UNI-DIRECTIONAL AIR FLOW**

**REMOVABLE COVER PLATE FOR ACCESS TO WIRING**

<table>
<thead>
<tr>
<th>FAN SIZE</th>
<th>CONFIGURATION</th>
<th>INLET</th>
<th>OUTLET</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
<th>I</th>
<th>J</th>
<th>K</th>
<th>L</th>
<th>L'</th>
<th>L''</th>
<th>M</th>
<th>APPROX MASS (Kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>315</td>
<td>UNI-DIRECTIONAL</td>
<td>BM&amp;G</td>
<td>D/G</td>
<td>2000</td>
<td>880</td>
<td>1119</td>
<td>200</td>
<td>650</td>
<td>150</td>
<td>340</td>
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<td>330</td>
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<td>304</td>
<td>268</td>
<td>90</td>
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<tr>
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<td>BM&amp;G</td>
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<td>150</td>
<td>380</td>
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<td>288</td>
<td>95</td>
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<td>400</td>
<td>UNI-DIRECTIONAL</td>
<td>BM&amp;G</td>
<td>D/G</td>
<td>2000</td>
<td>880</td>
<td>1119</td>
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<td>360</td>
<td>313</td>
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<tr>
<td>400 Max Thrust</td>
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<td>880</td>
<td>1119</td>
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<td>440</td>
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<td>360</td>
<td>313</td>
<td>339</td>
<td>349</td>
<td>313</td>
<td>108</td>
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</tbody>
</table>
### 50Hz Performance and Acoustic Data for F200 Rated Fans, with no accessories fitted (i.e. free inlet / free outlet)

<table>
<thead>
<tr>
<th>Diameter (mm)</th>
<th>Thrust (N)</th>
<th>Volume (m³/s)</th>
<th>Sound Power (Lₘₐₜ) @ 3m</th>
<th>Sound Power (Lₚₐₚ) @ 3m</th>
<th>Pole Speed</th>
<th>Nominal Power (kW)</th>
<th>Full Load Current (A)</th>
<th>Starting Current (A)</th>
</tr>
</thead>
<tbody>
<tr>
<td>315</td>
<td>33 / 8</td>
<td>1.45 / 0.72</td>
<td>75 / 59</td>
<td>54 / 38</td>
<td>2 / 4</td>
<td>0.95 / 0.21</td>
<td>2.23 / 0.71</td>
<td>15.0 / 3.47</td>
</tr>
<tr>
<td>355</td>
<td>51 / 12</td>
<td>2.06 / 1.02</td>
<td>75 / 59</td>
<td>54 / 38</td>
<td>2 / 4</td>
<td>1.27 / 0.29</td>
<td>2.86 / 0.87</td>
<td>15.0 / 3.47</td>
</tr>
<tr>
<td>400</td>
<td>77 / 20</td>
<td>2.85 / 1.44</td>
<td>79 / 65</td>
<td>58 / 44</td>
<td>2 / 4</td>
<td>1.73 / 0.43</td>
<td>3.91 / 1.33</td>
<td>22.5 / 5.43</td>
</tr>
<tr>
<td>400 Max</td>
<td>91 / 23</td>
<td>3.08 / 1.55</td>
<td>81 / 66</td>
<td>60 / 45</td>
<td>2 / 4</td>
<td>2.53 / 0.58</td>
<td>5.25 / 1.72</td>
<td>31.5 / 5.43</td>
</tr>
</tbody>
</table>

#### JTv Slim Line (50Hz)

### JT Low Profile (50Hz)

<table>
<thead>
<tr>
<th>Diameter (mm)</th>
<th>Thrust (N)</th>
<th>Volume (m³/s)</th>
<th>Sound Power (Lₘₐₜ) @ 3m</th>
<th>Sound Power (Lₚₐₚ) @ 3m</th>
<th>Pole Speed</th>
<th>Nominal Power (kW)</th>
<th>Full Load Current (A)</th>
<th>Starting Current (A)</th>
</tr>
</thead>
<tbody>
<tr>
<td>315</td>
<td>29 / 7</td>
<td>1.36 / 0.67</td>
<td>74 / 57</td>
<td>53 / 36</td>
<td>2 / 4</td>
<td>0.95 / 0.21</td>
<td>2.23 / 0.71</td>
<td>15.0 / 3.47</td>
</tr>
<tr>
<td>355</td>
<td>44 / 11</td>
<td>1.91 / 0.94</td>
<td>77 / 61</td>
<td>56 / 40</td>
<td>2 / 4</td>
<td>1.27 / 0.29</td>
<td>2.86 / 0.87</td>
<td>15.0 / 3.47</td>
</tr>
<tr>
<td>400</td>
<td>68 / 17</td>
<td>2.67 / 1.35</td>
<td>79 / 62</td>
<td>58 / 41</td>
<td>2 / 4</td>
<td>1.73 / 0.43</td>
<td>3.91 / 1.33</td>
<td>22.5 / 5.43</td>
</tr>
<tr>
<td>400 Max</td>
<td>89 / 23</td>
<td>3.06 / 1.54</td>
<td>80 / 65</td>
<td>59 / 44</td>
<td>2 / 4</td>
<td>2.53 / 0.58</td>
<td>5.25 / 1.72</td>
<td>31.5 / 5.43</td>
</tr>
</tbody>
</table>

### 60Hz Performance and Acoustic Data for F200 Rated Fans, with no accessories fitted (i.e. free inlet / free outlet)

<table>
<thead>
<tr>
<th>Diameter (mm)</th>
<th>Thrust (N)</th>
<th>Volume (m³/s)</th>
<th>Sound Power (Lₘₐₜ) @ 3m</th>
<th>Sound Power (Lₚₐₚ) @ 3m</th>
<th>Pole Speed</th>
<th>Nominal Power (kW)</th>
<th>Full Load Current (A)</th>
<th>Starting Current (A)</th>
</tr>
</thead>
<tbody>
<tr>
<td>315</td>
<td>40 / 10</td>
<td>1.61 / 0.82</td>
<td>77 / 62</td>
<td>56 / 41</td>
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<td>13.4 / 2.30</td>
</tr>
<tr>
<td>355</td>
<td>57 / 15</td>
<td>2.16 / 1.11</td>
<td>84 / 68</td>
<td>63 / 47</td>
<td>2 / 4</td>
<td>1.30 / 0.18</td>
<td>2.90 / 0.60</td>
<td>13.4 / 2.30</td>
</tr>
<tr>
<td>400</td>
<td>71 / 18</td>
<td>2.73 / 1.38</td>
<td>81 / 68</td>
<td>60 / 47</td>
<td>2 / 4</td>
<td>1.70 / 0.22</td>
<td>3.70 / 1.00</td>
<td>21.4 / 4.40</td>
</tr>
<tr>
<td>400 Max</td>
<td>88 / 23</td>
<td>3.03 / 1.54</td>
<td>81 / 68</td>
<td>60 / 47</td>
<td>2 / 4</td>
<td>2.39 / 0.32</td>
<td>5.20 / 1.40</td>
<td>30.1 / 6.20</td>
</tr>
</tbody>
</table>

#### JTv Slim Line (60Hz)

### JT Low Profile (60Hz)
WE BRING BETTER AIR TO LIFE

With over a century of innovation and expertise to share with our customers, Fläkt Woods is a global leader in Air Technology products and solutions. We specialise in the design and manufacturing of a wide range of products and solutions for Air Movement, Air Treatment, Air Distribution, Air Management and Air Diffusion with focus on two major benefits – Air Comfort and Fire Safety. With market presence in 65 countries we are in a unique position to be a local supplier and an international partner in our customers’ projects.

Our product brands such as SEMCO®, eQ®, eQ Prime®, JM Aerofoil®, JMv Aerofoil®, VCC technology®, Econet®, Veloduct®, Optivent®, Optimix®, Econovent® and Clearvent® are well-known and trusted by customers all over the world to deliver high quality and energy efficient solutions.

» To learn more about our offering and get in contact with your nearest sales representative please visit www.flaktwoods.com

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