

AIR COMFORT

FIRE SAFETY

AIR MOVEMENT

## JTv 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

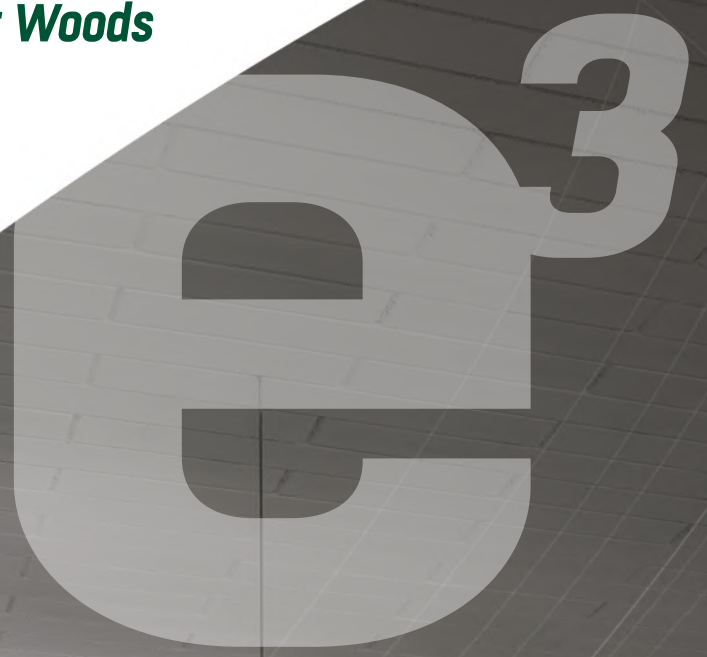


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## Save Energy & the Environment and Economise with Fläkt Woods

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 CO<sub>2</sub> 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.

Introducing the

# JTv JET THRUST RANGE

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:**

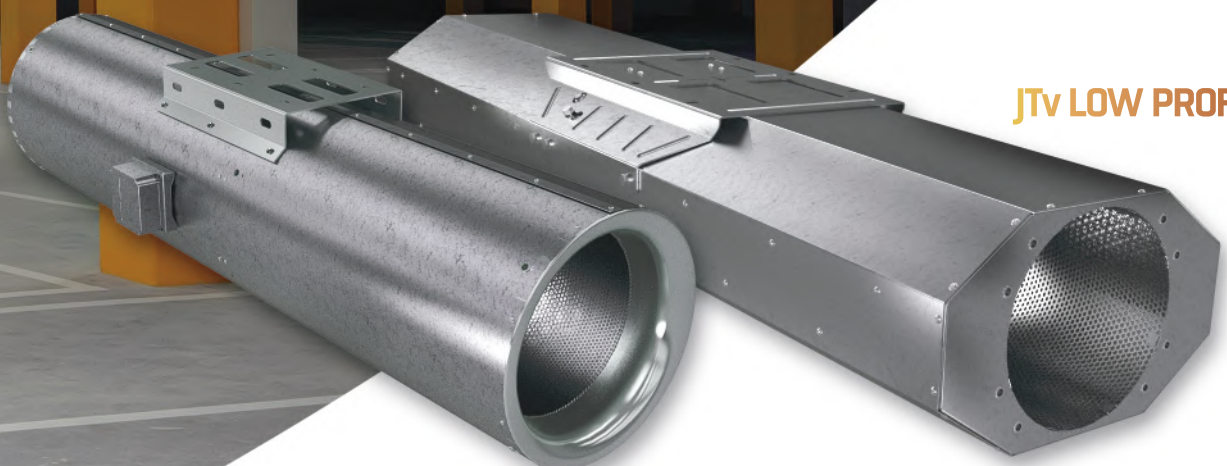
- Fewer fans required can save on fan costs and installation costs
- Smaller diameters can be used to save on cost and space as well as being easier to install
- Enhanced safety: Capable of handling larger design fires, where lower thrust fans can't cope
- Enhanced smoke control in difficult to ventilate 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



**JTv SLIM LINE**

**JTv LOW PROFILE**



# VORTEX CREATION CONTROL

by FLÄKT WOODS

*Innovation and  
VCC Technology  
gives you the  
aerodynamic  
advantage.*

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.



REDUCED TIP GAP CLEARANCE TO REDUCE LOSSES

CLOSER FIT TO HUB

AERODYNAMIC CURVED HUB PROFILE

HIGH TWIST DESIGN WITH UNIQUE AERODYNAMIC FEATURES DESIGNED TO WORK WITH A GUIDE VANE TO INCREASE THRUST

SINGLE-STAGE GUIDE VANES TO AID EFFICIENCY



VORTEX  
CREATION  
CONTROL

# JTv COMMERCIAL ADVANTAGES

## Case Study Summary - Project Build:

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).

### Single Floor Shopping Centre Car Park (pollution control design)

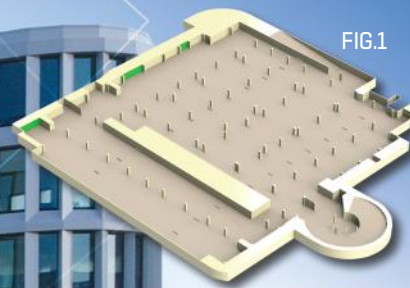


FIG.1

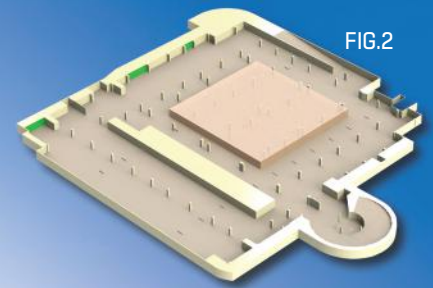


FIG.2



For full Case Study findings  
see pages 10-11.

	CONSULTANTS SPEC	FLÄKT WOODS JTv SOLUTION	PROJECT SAVINGS
Number of Fans	35	22	<b>37%</b> Install cost saving
Diameter of unit	400mm Jet Thrust Fans	355mm JTv Slim Line	<b>41%</b> Acquired cost saving
MWh per annum (pollution control mode at half speed)	26MWh	15MWh	<b>42%</b> Energy saving (11MWh)
CO <sub>2</sub>	13.6 tonnes per annum	7.9 tonnes per annum	<b>5.7 TONNES</b> per annum
Excavation saving if Low Profile JTv were used	<b>7.8 TONNES or 5800m<sup>3</sup> OF EARTH PER FLOOR</b>		

# JTv

FOR CONSULTANTS/SPECIFIERS

## FOR CONSULTANTS/ SPECIFIERS

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 THRUST
- REDUCED LIFE-CYCLE COSTS

# FOR CONTRACTORS

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.

## SIGNIFICANT PROJECT COST SAVINGS IN EQUIPMENT AND LABOUR



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 CONTRACTORS

JTv

## FOR BUILDING OPERATORS

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.



### LOWER RUNNING COSTS

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.

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



# FOR OCCUPANTS

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.

## INCREASED SAFETY & COMFORT



- **INCREASED FIRE SAFETY**
- **MODERN AESTHETIC DESIGN**
- **LOWER NOISE LEVELS**

FOR OCCUPANTS

**JTv**

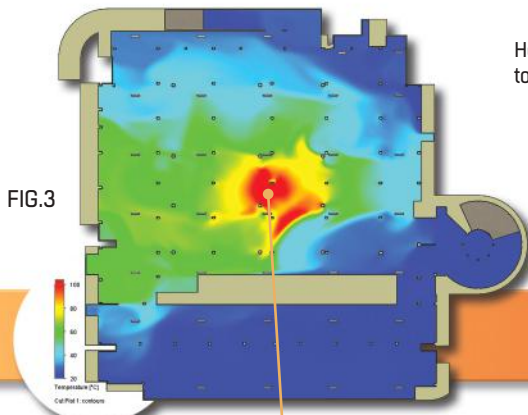
## CASE STUDY: Single Floor Basement Level Shopping Centre Car Park

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.

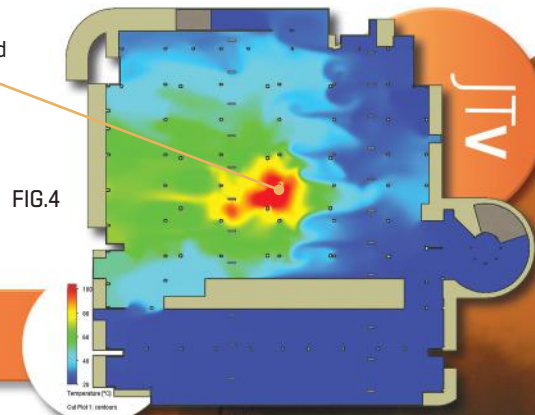
The generic design uses 35 40JT/3SL/UBD/TB 400mm Jet Thrust Fan units, where-as the Fläkt Woods Design uses only 22 35JTv/3SL/UBD/TB 355mm Jet Thrust Fan units. This provides a purchase cost saving to the customer compared to the generic design, but also a running-cost saving as the total energy load 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.



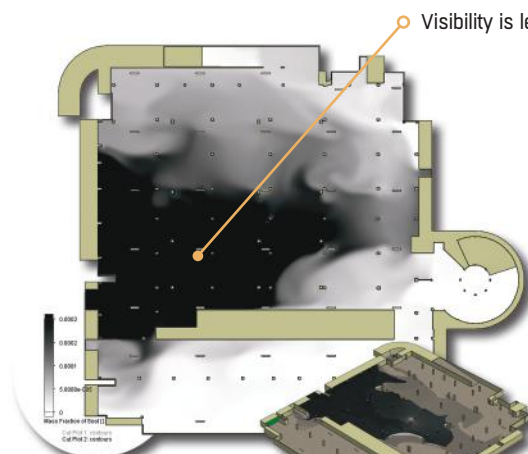
Hot region is pushed towards extract



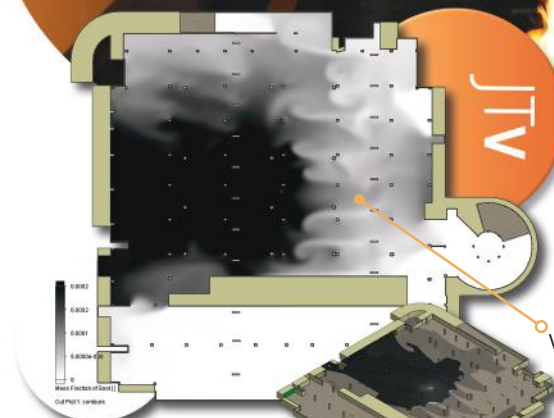
Larger region of high-temperature air

### 2. VISIBILITY:

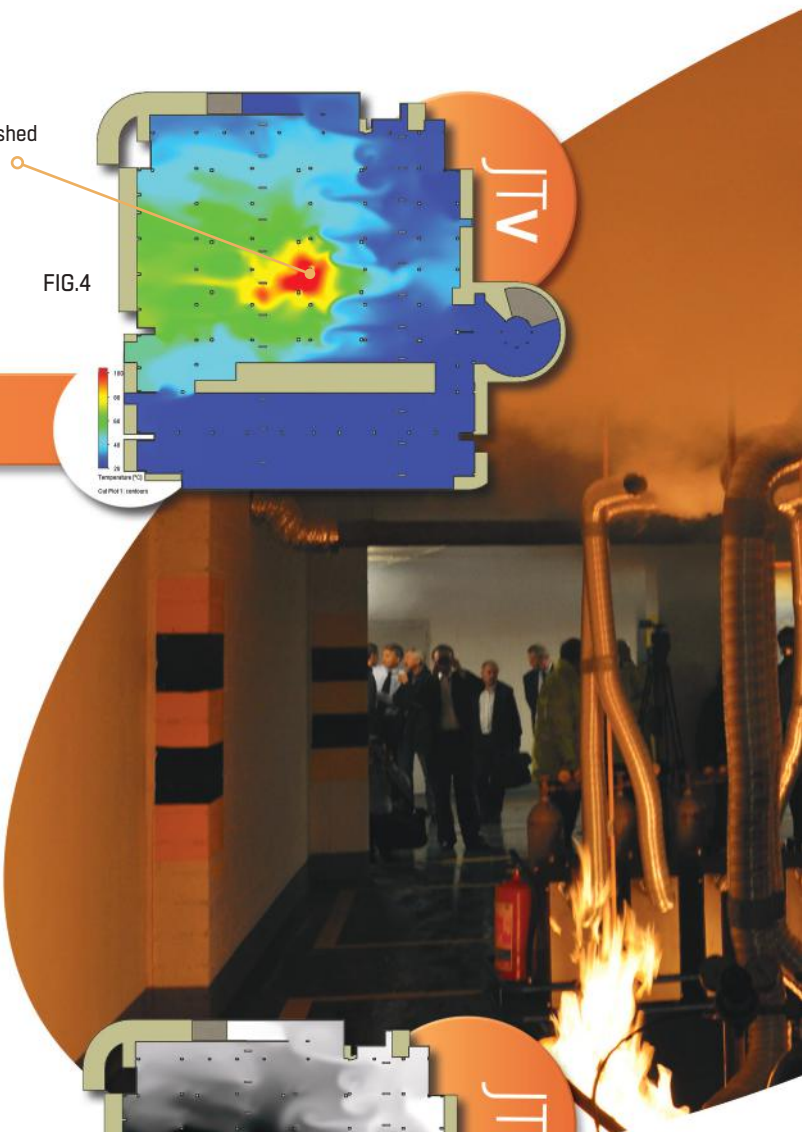
The generic design (FIG.5) shows a greater density of smoke spreading up-stream of the fire and also shows smoke leaking into the Southern area beyond the large central set of rooms. The Fläkt Woods design (FIG.6) shows a wider distribution of smoke within the Northern area, though allows for fire-fighter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



Visibility is less than 10m

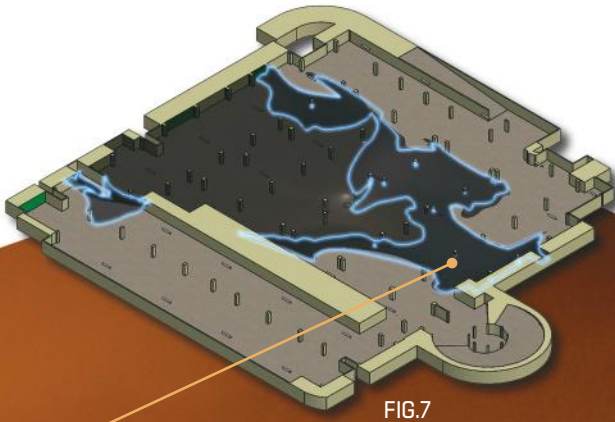


Visibility is more than 10m

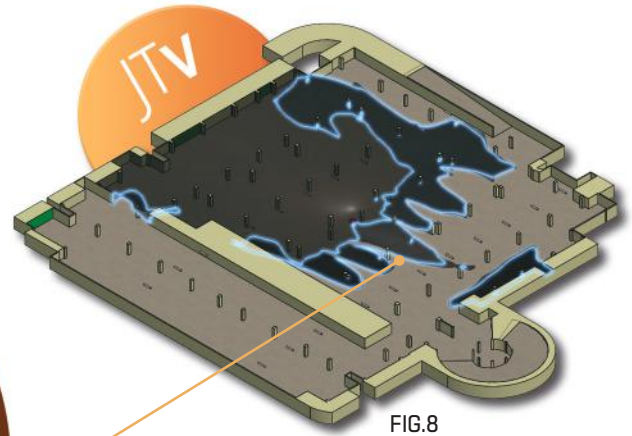


### 3. SMOKE SPREAD:

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)



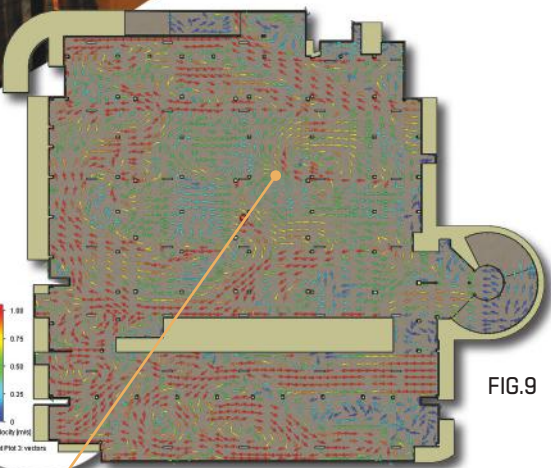
Smoke Spread back to Fire Fighter entrance point



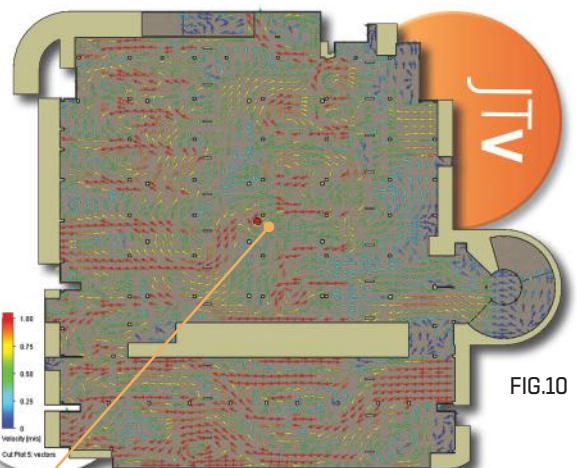
Visibility is more than 10m

### 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.

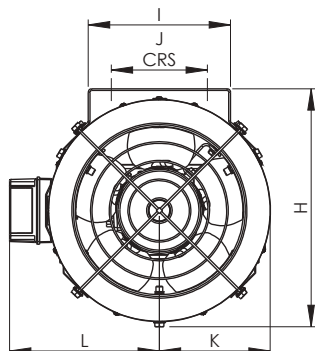
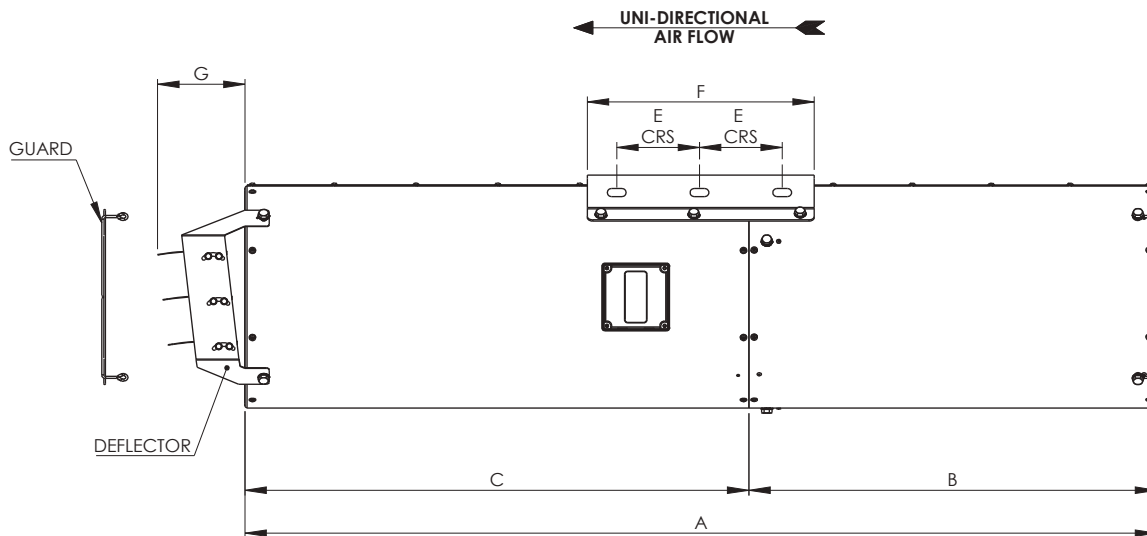


Jet Flows too spread out and being deflected

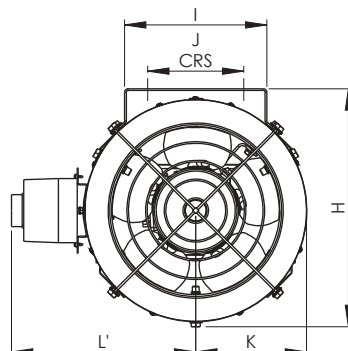


Jet Flows maintain direction towards extract through fire region

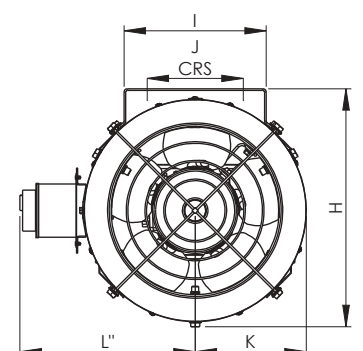
# JTV SLIM LINE



TERMINAL BOX 200, 300 & 400 DEG C FOR 2HRS



ISOLATOR SWITCH 200 DEG C FOR 2HRS

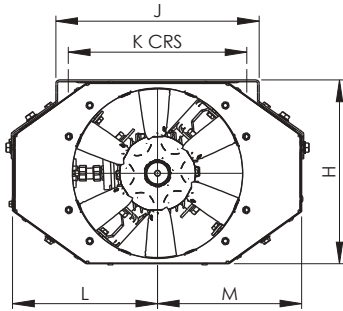
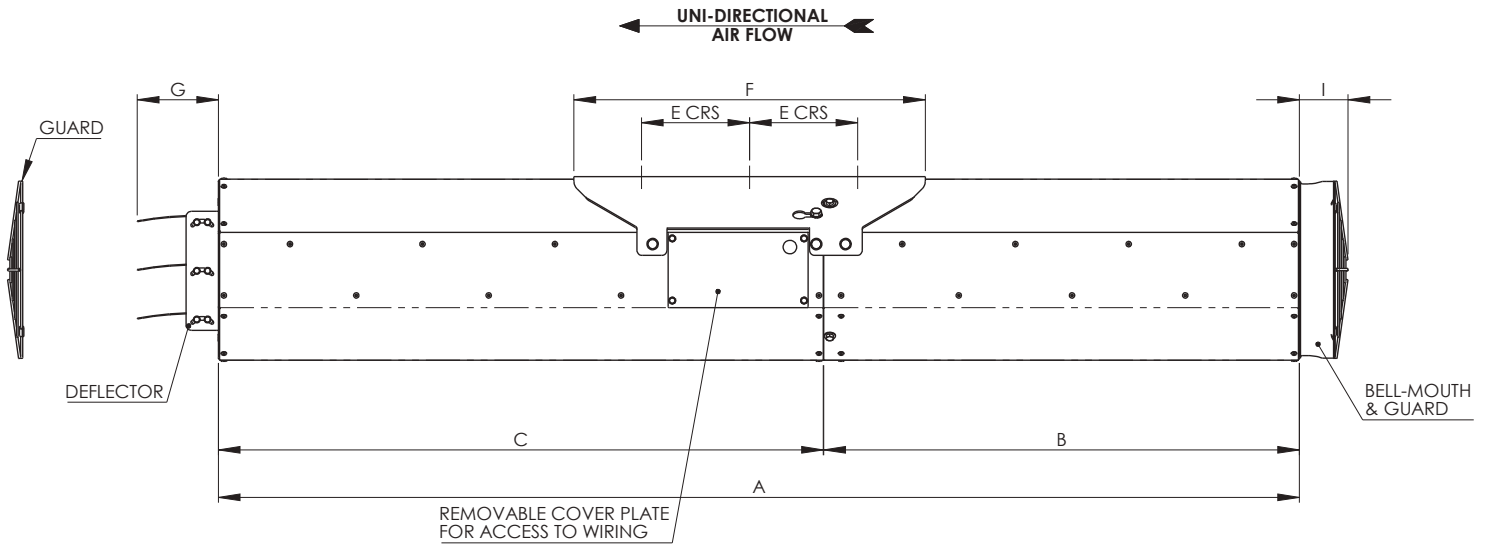


ISOLATOR SWITCH 300&400 DEG C FOR 2HRS

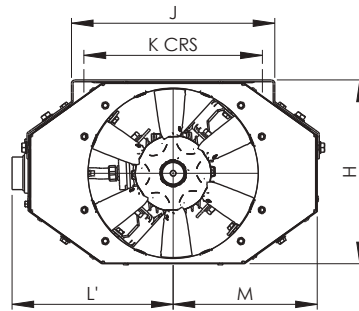
FAN SIZE	CONFIGURATION	INLET	OUTLET	A	B	C	E	F	G	H	I	J	K	L	L'	L''	APPROX MASS (Kg)
315	UNI-DIRECTIONAL	G	G/D	1708	764	944	155	425	164	446	266	180	208	281	345	328	55
355	UNI-DIRECTIONAL	G	G/D	1712	766	946	158	425	160	486	286	200	228	302	367	350	63
400	UNI-DIRECTIONAL	G	G/D	1814	827	987	185	450	161	531	306	220	250	324	388	371	70
400 Max Thrust	UNI-DIRECTIONAL	G	G/D	1814	827	987	185	450	161	531	306	220	250	324	388	371	72

**Key for Inlet/Outlet**  
 G = Guard  
 D = Deflector

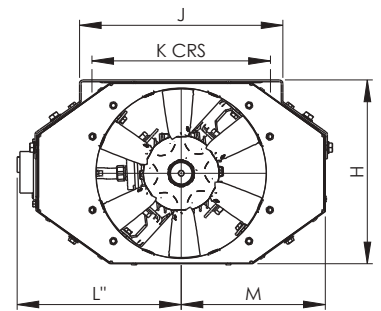
# JTV LOW PROFILE



TERMINAL BOX 200, 300 & 400 DEG C FOR 2HRS



ISOLATOR SWITCH 200 DEG C FOR 2HRS



ISOLATOR SWITCH 300 & 400 DEG C FOR 2HRS

FAN SIZE	CONFIGURATION	INLET	OUTLET	A	B	C	E	F	G	H	I	J	K	L	L'	L''	M	APPROX MASS (Kg)
315	UNI-DIRECTIONAL	BM&G	D/G	2000	880	1119	200	650	150	340	90	376	330	268	298	304	268	90
355	UNI-DIRECTIONAL	BM&G	D/G	2000	880	1119	200	650	150	380	105	411	360	288	316	324	288	95
400	UNI-DIRECTIONAL	BM&G	D/G	2000	880	1119	200	650	150	440	113	440	360	313	339	349	313	106
400 Max Thrust	UNI-DIRECTIONAL	BM&G	D/G	2000	880	1119	200	650	150	440	113	440	360	313	339	349	313	108

### Key for Inlet/Outlet

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

# JTV PERFORMANCE DATA

## 50Hz Performance and Acoustic data for F200 rated fans, with no accessories fitted (i.e. free inlet / free outlet)

Diameter (mm)	Thrust (N)	Volume (m3/s)	Sound Power (L <sub>WA</sub> )	Sound Power (L <sub>PA</sub> ) @ 3m	Pole Speed	Nominal Power (kW)	Full Load Current (A)	Starting Current (A)
	High / Low Speed	High / Low Speed	High / Low Speed	High / Low Speed	High / Low Speed	High / Low Speed	High / Low Speed	High / Low Speed
<b>Uni-Directional</b>								
<b>JTv Slim Line (50Hz)</b>								
<b>315</b>	33 / 8	1.45 / 0.72	75 / 59	54 / 38	2 / 4	0.95 / 0.21	2.23 / 0.71	15.0 / 3.47
<b>355</b>	51 / 12	2.06 / 1.02	75 / 59	54 / 38	2 / 4	1.27 / 0.29	2.86 / 0.87	15.0 / 3.47
<b>400</b>	77 / 20	2.85 / 1.44	79 / 65	58 / 44	2 / 4	1.73 / 0.43	3.91 / 1.33	22.5 / 5.43
<b>400 Max</b>	91 / 23	3.08 / 1.55	81 / 66	60 / 45	2 / 4	2.53 / 0.58	5.25 / 1.72	31.5 / 5.43
<b>JTv Low Profile (50Hz)</b>								
<b>315</b>	29 / 7	1.36 / 0.67	74 / 57	53 / 36	2 / 4	0.95 / 0.21	2.23 / 0.71	15.0 / 3.47
<b>355</b>	44 / 11	1.91 / 0.94	77 / 61	56 / 40	2 / 4	1.27 / 0.29	2.86 / 0.87	15.0 / 3.47
<b>400</b>	68 / 17	2.67 / 1.35	79 / 62	58 / 41	2 / 4	1.73 / 0.43	3.91 / 1.33	22.5 / 5.43
<b>400 Max</b>	89 / 23	3.06 / 1.54	80 / 65	59 / 44	2 / 4	2.53 / 0.58	5.25 / 1.72	31.5 / 5.43

## 60Hz Performance and Acoustic data for F200 rated fans, with no accessories fitted (i.e. free inlet / free outlet)

Diameter (mm)	Thrust (N)	Volume (m3/s)	Sound Power (L <sub>WA</sub> )	Sound Power (L <sub>PA</sub> ) @ 3m	Pole Speed	Nominal Power (kW)	Full Load Current (A)	Starting Current (A)
	High / Low Speed	High / Low Speed	High / Low Speed	High / Low Speed	High / Low Speed	High / Low Speed	High / Low Speed	High / Low Speed
<b>Uni-Directional</b>								
<b>JTv Slim Line (60Hz)</b>								
<b>315</b>	40 / 10	1.61 / 0.82	77 / 62	56 / 41	2 / 4	1.20 / 0.16	2.70 / 0.70	13.4 / 2.30
<b>355</b>	57 / 15	2.16 / 1.11	84 / 68	63 / 47	2 / 4	1.30 / 0.18	2.90 / 0.60	13.4 / 2.30
<b>400</b>	71 / 18	2.73 / 1.38	81 / 68	60 / 47	2 / 4	1.70 / 0.22	3.70 / 1.00	21.4 / 4.40
<b>400 Max</b>	88 / 23	3.03 / 1.54	81 / 68	60 / 47	2 / 4	2.39 / 0.32	5.20 / 1.40	30.1 / 6.20
<b>JTv Low Profile (60Hz)</b>								
<b>315</b>	34 / 9	1.49 / 0.76	77 / 61	56 / 40	2 / 4	1.20 / 0.16	2.70 / 0.70	13.4 / 2.30
<b>355</b>	48 / 13	1.98 / 1.02	77 / 61	56 / 40	2 / 4	1.30 / 0.18	2.90 / 0.60	13.4 / 2.30
<b>400</b>	66 / 17	2.64 / 1.34	81 / 65	60 / 44	2 / 4	1.70 / 0.22	3.70 / 1.00	21.4 / 4.40
<b>400 Max</b>	85 / 22	2.98 / 1.51	82 / 67	61 / 46	2 / 4	2.39 / 0.32	5.20 / 1.40	30.1 / 6.20