JET-FAN CLASS
SMOKE VENTING FAN

Rev.01
27-05-2015

GMC SVF-621:

Jet Ventilation Systems are the combination of CO ventilation and smoke control in underground car parks

Given the continuously rising volume of inner-city traffic, it is virtually mandatory to provide for adequately sized car parks as a part of every major real-estate development project, whether it be private or public, such as office buildings or shopping malls, museums or theatres. As these locations are frequented by a large number of individuals, high standards apply with respect to building services engineering and public safety. More often than not, conventional car park ventilation systems fail to meet these requirements.

Functional principle

In recent years, jet fan technology has established itself as the new standard in car park ventilation in many countries all over the world. As opposed to conventional ventilation concepts based on transverse ventilation and ducted systems, the concept of impulse ventilation is derived from the longitudinal ventilation systems found in most road tunnels. Here, a high-velocity stream of air is injected into the tunnel by a series of free-blowing silenced axial fans, inducing an air movement in addition to the natural ventilation. The decisive parameters of capacity are air volume and velocity and therefore the thrust of the jet fan.

Advantages of the impulse ventilation system

Smoke control in the event of a fire

Careful project planning allows us to use the jet fan system not only as a means of CO ventilation and mechanical smoke exhaust, but also as an effective means of smoke control. By utilising fully reversible impellers, the thrust direction of each individual fan can be controlled in order to contain the smoke within the affected area and to direct it to the nearest exhaust point. This keeps emergency exits free of smoke and prevents smoke from contaminating non-affected areas of the car park. Depending on where in the car park a fire is detected, the standard direction of airflow can automatically be reversed so that the air supply inlets can serve as fume exhaust points should they be nearer to the location of the fire. If required, the control logics for this emergency ventilation mode can be designed and programmed by Wolter. This direction-controlled containment of fire gases allows for effective fire-fighting, as the location of the fire remains visible and can be safely approached by fire-fighters from the upstream side of the airflow.

As early as 1998 the TNO institute (Delft) examined the effectiveness of the impulse ventilation system in a series of 18 real fire tests in an underground car park in Amsterdam. The results of this test series have been published in a research paper, which, among other aspects, addresses smoke production, smoke propagandation and occuring temperatures as well as the possibility of effective smoke control in case of a car fire in an enclosed space. It has been found that the jet ventilation system, as opposed to a conventional ducted system, which was subject to the same fire test, could effectively cool and cointain the occuring fire gases. Air ducts, however, could not provide sufficient exhaust capacity and even had the tendency to advance the diffusion of smoke fumes in the worst case.

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System controllability allows efficient operation
The Impulse Ventilation System can be automatically controlled in a way that it adjusts the required ventilation volume contingent on the current occupancy level of the car park. CO concentration is continually monitored by an adequate number of CO detection heads spread throughout the car park. As long as pollution limits are not exceeded, individual fans in designated areas of the car park may be switched off, thus saving energy and lowering the noise level within the building.

Lower energy consumpion reduces operating costs
Given the almost continuous operation of the ventilation system throughout the year, a possible reduction of energy consuption represents a considerable potential for lowering operational costs. Ducted ventilation systems, usually designed as a compromise between required air volume, installation space and installation cost, cause high air velocities and subsequently high pressure losses in the ducted system. The ventilation fans must operate against this pressure drop and will consequently absorb more power. In the context of a ductless Impulse Ventilation System, the architecture of the car park itself serves as the air duct. Air velocities are much lower and there is no resistance caused by a ducted system. The total amount of energy consumed by an Impulse Ventilation System is therefore comparatively low.

Application

- Jet Fans are available with uni-directional as well as fully-reversible impellers of diameters 300, 315, 355 and 370mm, providing almost the same thrust performance in either direction

Composition

Impellers
- Impellers with pitch adjustable blades are made of injectionmoulded aluminium and pre-set for the required duty
- Class Q6.3 balanced in accordance with VDI 2060 / ISO 1940/1-1986

Airflow direction
- Discharge guide vanes allow to adjust the airflow direction according to architectural requirements

Temperature rating
- All fans are are manufactured as smoke-extraction fans of class F300 (300°C/1h)
- All fans are tested and certified according to DIN EN 12101-T3
- The manufacturing process is subject to third-party CE surveillance by an notified body

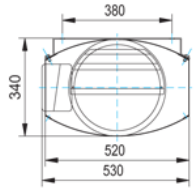
Motor / Isolator switch
- All motors are 2/4-pole dual-speed motors in Dahlander connection, designed for 400V 50Hz supply
- Protection class IP55 according to IEC 34-5
- The motors are connected to an outside junction box or lockable isolator switch suitable for either 40°C standard temperature or 300°C/1h smoke-extraction operation
- High-temperature isolator switches tested to comply with the F300 standard
- Terminal box and isolator switch are inserted into the silencer casing and are accessed by a removable panel

Housing
- All fan casings are manufactured as one integral sound attenuator of 2250mm or 1200mm length
- All casings are oval-shaped in order to minimise headroom obstruction
- The fan-motor-assembly is designed as a slide-in tube which can easily be fitted and retracted through the attenuator inlet
- In case of servicing or pitch angle adjustment it is therefore possible to simply pull out the fan unit without dismounting the complete attenuator from the ceiling
- Rigid mounted brackets are fitted as standard

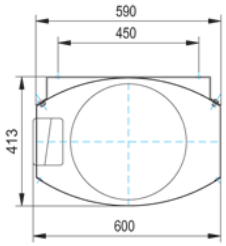
Technical data

Fan Type		Motor Power [kW]	Nominal Current [A]	Fan Speed [1/min]	Volume Flow [m3/s]	Thrust [N]	Sound Pressure [dB(A) 3m/45°]	Weight [kg]
Impulse Jet Fan JFUO, uni-directional, 300°C/2h, casing length 2250mm								
Mk.	JFUO 300L-300°	1,3/0,3	3,3/0,8	2800/1400	1,45/0,74	32/8	54/44	108
	JFUO 315L-300°	2,0/0,5	4,8/1,3	2800/1400	2,02/1,02	63/18	63/49	142
	JFUO 355L-300°	2,0/0,5	4,8/1,3	2800/1400	2,50/1,25	75/19	70/54	142
	JFUO 370L-300°	2,4/0,6	5,3/1,4	2800/1400	2,80/1,40	82/21	72/56	153
Impulse Jet Fan JFRO, fully reversible, 300°C/2h, casing length 2250mm								
Mk.	JFRO 300L-300°	1,3/0,3	3,3/0,8	2800/1400	1,35/0,68	40021	54/44	108
	JFRO 355L-300°	1,3/0,3	3,3/0,8	2800/1400	2,25/1,15	62/16	64/48	142
	JFRO 370L-300°	2,4/0,6	5,3/1,4	2800/1400	2,63/1,30	72/18	68/52	150
Impulse Jet Fan JFUO, uni-directional, 300°C/2h, casing length 1200mm								
Mk.	JFUO 300S-300°	1,3/0,3	3,3/0,8	2800/1400	1,45/0,74	32/8	57/47	78
	JFUO 315S-300°	2,0/0,5	4,8/1,3	2800/1400	2,02/1,02	63/18	66/52	99
	JFUO 355S-300°	2,0/0,5	4,8/1,3	2800/1400	2,50/1,25	70/17	73/57	96
	JFUO 370S-300°	2,4/0,6	5,3/1,4	2800/1400	2,80/1,40	82/21	74/58	102
Impulse Jet Fan JFRO, fully reversible, 300°C/2h, casing length 1200mm								
Mk.	JFRO 300S-300°	1,3/0,3	3,3/0,8	2800/1400	1,35/0,68	40021	57/47	78
	JFRO 355S-300°	1,3/0,3	3,3/0,8	2800/1400	2,25/1,15	62/16	67/52	96
	JFRO 370S-300°	2,4/0,6	5,3/1,4	2800/1400	2,63/1,30	72/18	71/55	102
Impulse Jet Fan JFUO, uni-directional,40°C, casing length 2250mm								
Mk.	JFUO 300L-40°	1,1/0,25	3,1/0,6	2800/1400	1,45/0,74	32/8	54/44	105
	JFUO 315L-40°	2,0/0,5	4,8/1,1	2800/1400	2,02/1,02	63/18	63/49	139
	JFUO 355L-40°	2,0/0,5	4,8/1,1	2800/1400	2,50/1,25	75/19	70/54	139
	JFUO 370L-40°	2,0/0,5	4,8/1,1	2800/1400	2,70/1,35	80/20	72/56	145
Impulse Jet Fan JFRO, fully reversible, 40°C, casing length 2250mm								
Mk.	JFRO 300L-40°	1,1/0,3	3,1/0,6	2800/1400	1,35/0,68	40021	54/44	105
	JFRO 355L-40°	1,4/0,33	3,5/0,76	2800/1400	2,25/1,15	62/16	64/48	139
	JFRO 370L-40°	2,0/0,5	4,8/1,1	2800/1400	2,50/1,25	70/18	67/51	145

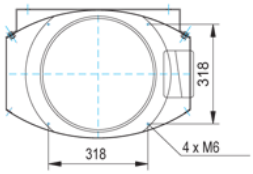
JFUO 300



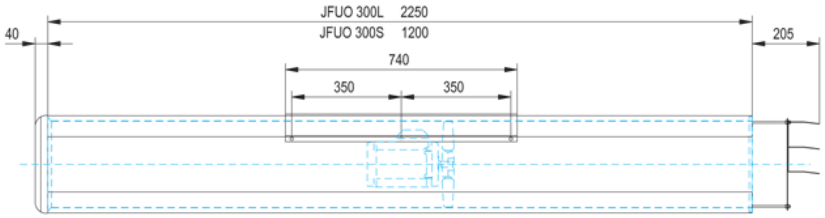
JFUO 315/355/370

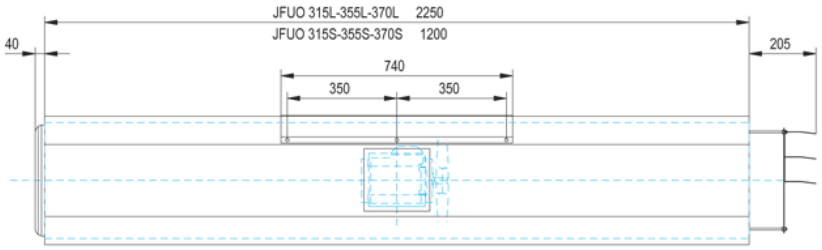


Inlet side JFUO 315/355/370



SVF-621: Mk. JFUO 300/315/355/370





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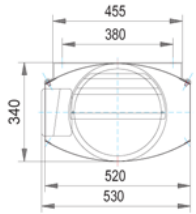
JFRO 300



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