

# JET FAN SYSTEMS



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# THE ROSENBERG GROUP

Air conditioning and ventilation technology  
is our world



Air is our element – moving it **intelligently and efficiently** is our passion. Since 1981 we have been developing and producing adjustable external rotor motors, fans and air handling units.

Our headquarters in Künzelsau is in the centre of the Heilbronn-Franken innovation area. **German Engineering skill** is the basis of our development work and drives our innovation. As a worldwide company we are represented where our customers need us.

With production sites and sales offices in more than 45 countries **we are present worldwide** – a strong and reliable partner always within reach of our customers.

The continuous exchange of information between customers and employees comes first with us. Consequently, we can permanently optimise products and quality to respond flexibly to all of our customers' needs.



<b>Established</b>	1981
<b>Employees</b>	350 in Germany approx. 1,400 worldwide
<b>Production sites</b>	Künzelsau (GER), Glaubitz (GER), Waldmünchen (GER), Hungary, Czech Republic, Italy, France, Slovakia, Turkey, Mexico, China
<b>Development centres (certified laboratory)</b>	Germany, France, Hungary and China
<b>Additional members of the Rosenberg Group</b>	ROX Klimatechnik GmbH ECOFIT, ETRI, Airtècnics

## AIR IS OUR ELEMENT

We offer intelligent solutions to move air efficiently - no matter whether it is hot or cold.

### Warranty Guidelines

The customer is responsible for the project design, selection and operation of the fans. The supplier gives warranty for faulty products, excluding further claims, in accordance with valid terms and conditions of business.

Warranty will not be given in the following instances:

(I)  
Unfitted or inappropriate usage, incorrect mounting or faulty installation by the purchaser or a third party, normal wear and tear, incorrect or negligent handling, improper maintenance, unsuitable operating material, unsuitable ground and chemical, electrochemical or electrical influence as long as they are not the responsibility of the supplier

(II)  
If the goods delivered from the manufacturer are faulty, the customer has the right to receive a replacement or replacement of the faulty parts to the maximum value of the purchase price. The manufacturer also has the right to get the product repaired within a reasonable time period. The manufacturer must be informed immediately in the case of damage

(III)  
The obligation to replace additional faults is herewith excluded. Our general terms of business are the basis for all further agreements for example: time periods to repair or replace. The general terms of business are available on our website [www.rosenberg.eu](http://www.rosenberg.eu) or direct from one of our sales representatives



Headquarter in Kunzelsau, Germany

### The Rosenberg Group

Since the company's foundation in 1981, **Rosenberg Ventilation GmbH** has developed into an important centre for the heat, ventilation and air conditioning industry in Europe through the development and manufacturing of speed controllable external rotor motors, fans, blowers, airhandling units, and motor speed control devices

Our aim is for high quality production backed by our top class service for our clients. Thus a continuous flow of information and good cooperation between you, dear customers, and us is important to jointly achieve a continuous evolution of our products and their quality

Modern test chambers and equipment, as well as computer controlled production handled by self-responsible working teams are part of our philosophy, as the control of high quality and environmental protection measures. 60% of Rosenberg's total revenue is in export sales. Currently Rosenberg has 240 employees at the company's headquarter in Kunzelsau and more than 1,400 worldwide

Further production facilities are located in Glaubitz (GER), Waldmünchen (GER), Hungary, Czech Republic, Slovakia, France, Italy and China

# JET FAN SYSTEMS

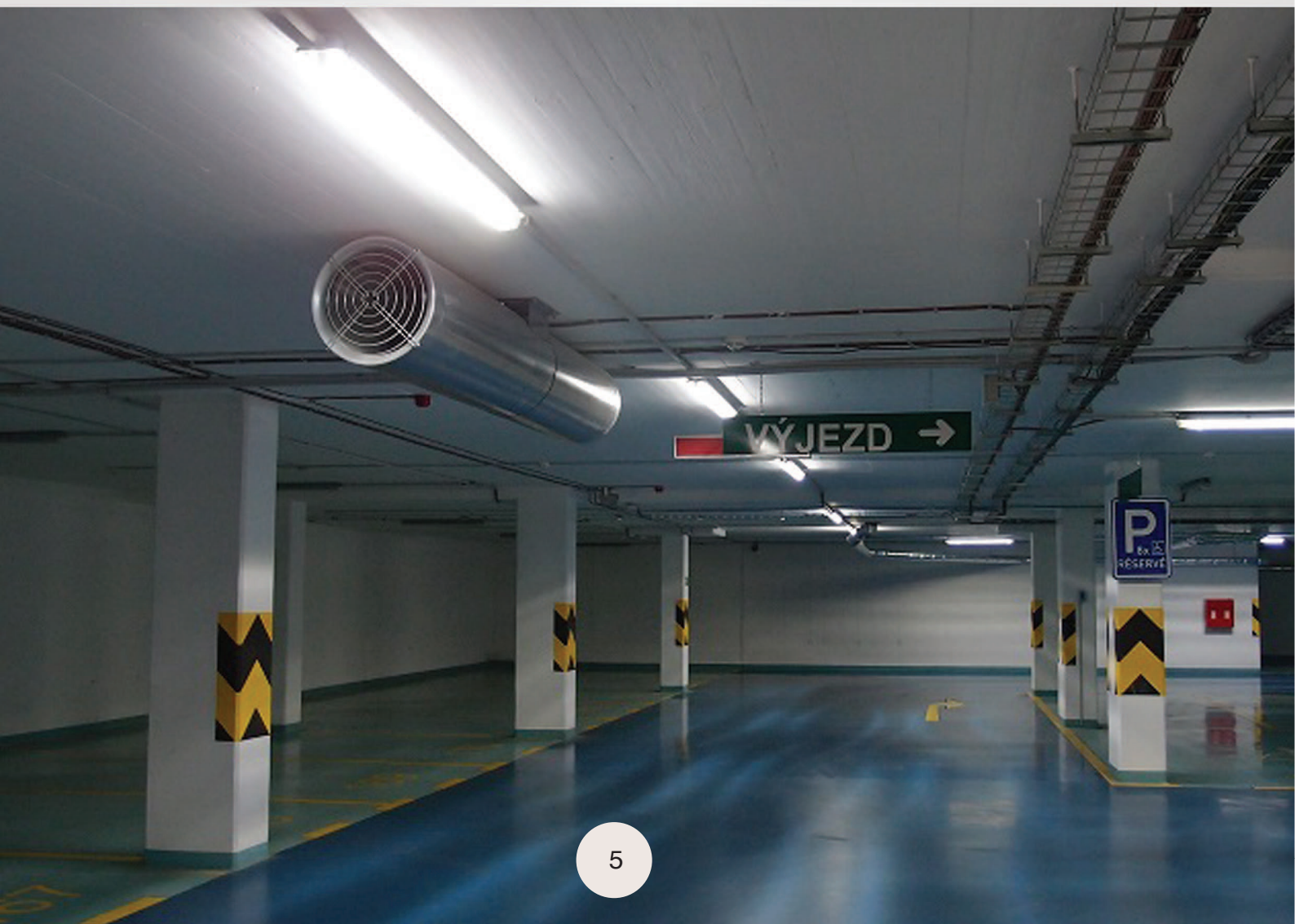
## Ventilation and smoke control for car parks

**The combination of CO ventilation and smoke control in underground car parks.**

Given the continuously rising volume of innercity 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. In Europe today, more than 2.500 jet fan systems are in operation in car parks of various sizes. As opposed to conventional ventilation concepts based on transverse ventilation and ducted systems, the concept of jet ventilation (frequently also referred to as impulse ventilation) is derived from the longitudinal ventilation systems found in most road tunnels, whereby a high-velocity stream of air is injected by a series of free-blowing silenced axial fans. Thus, jet fans effectively distribute and transport the air on each car park level from the supply to the exhaust points. The decisive design parameters being the air speed profile and the thrust generated by the fan





## Advantages of the jet ventilation system

### Smoke control in the event of a fire

Careful project planning allows to use the jet fan system not only as a means of CO ventilation and mechanical smoke exhaust, but also to effectively control the spreading of smoke. By utilising fully reversible impellers, the thrust direction of each individual fan can be changed in order to contain the smoke within the affected area and to transport it to the nearest exhaust point. This keeps emergency exits free of smoke and prevents smoke from contaminating nonaffected areas of the car park. Depending on the detected location of the fire within the car park, 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 Rosenberg. 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 propagation and occurring temperatures as well as the possibility of effective smoke control in case of a car fire in an enclosed space. It has been verified that the jet ventilation system, as opposed to a conventional ducted system which was subject to the same fire test, could effectively cool and contain the occurring fire gases. Air ducts, however, failed to provide sufficient exhaust capacity and even had the tendency to further the diffusion of smoke fumes in the worst case

### System controllability allows for efficient operation

The jet ventilation system can be automatically controlled in a way that adjusts the fan speed 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 consumption reduces operating costs

Given the almost continuous operation of the ventilation system throughout the year, the jet ventilation system taps 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 a ductless jet 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 duct system. The total amount of energy consumed by a jet ventilation system is therefore significantly lower

### Lower construction costs and more efficient use of floor space

Jet fans will require additional wiring and electronic controls, but this is more than compensated for by significant savings in installation costs, as air ducts become obsolete when using an impulse ventilation system. Furthermore, fan sizes and installed motor powers can be reduced. With increasing floor space, the cost advantage of the jet fan system becomes even more significant. The low profile of the jet fan allows to keep the ceiling height of the car park to a minimum

Jet fans will allow the creation of virtual fire compartments within the car park, as their air streams prevent smoke from spreading to adjacent areas of the car park not affected by the fire. The physical division of the floor space by fire walls is no longer necessary and even the use of a sprinkler system might become obsolete. Thus, the use of a jet fan system allows for a more open-plan design of the car park and enhances manoeuvrability. The overall number of parking spaces is increased, effectively enhancing operating results





## Improved air quality throughout the entire car park

In enclosed car parks, the induction effect of Wolter jet fans creates a constant movement of air from the supply to the exhaust points, keeping CO levels to a minimum. A well-designed distribution of jet fans throughout the car park will prevent the accumulation of exhaust fumes in dead spots

The high-velocity air stream along the ceiling level will induce a low-velocity air stream at floor level, ensuring the required mixing of low-level and high-level atmosphere which is generally insufficient in a ducted system, while keeping the air speed at walking height still comfortably low

The use of jet fans achieves ventilation results superior to the conventional ducted systems and offers substantial advantages. The additional capital cost of the jet fans is more than compensated by savings in construction and operating costs





# Project management

## from design stage to commissioning.

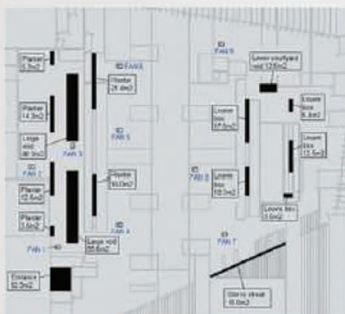
Rosenberg and its co-operation partner Burkhardt Projekt GmbH will assist you through all stages of your car-park project, from the initial layout to the final acceptance test. We will provide all documentation necessary to obtain a homolo gation from local authorities

### Planning Phase

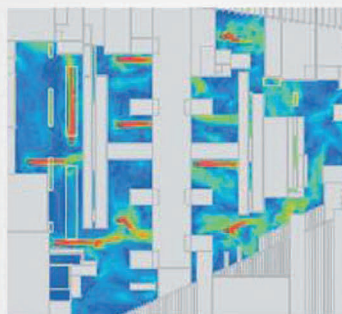
#### Design and layout by means of computational fluid dynamics analysis (CFD)

The initial step in the design of a jet ventilation system should always be a careful analysis of air distribution and movement based on computational fluid dynamics (CFD). Customised software allows us to create a 3-dimensional image of the car park. After determining all relevant parameters such as required air-change rates, exhaust volume and airflow direction, different ventilation scenarios for standard and emergency operation can be studied. Taking into account all relevant local regulations, the number, size and positioning of jet fans can be optimised

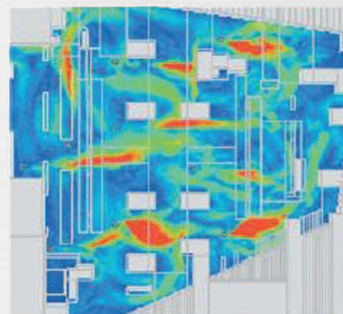
CFD software visualizes direction vectors of airflows and air distributions in all areas of the underground car park. CFD design can also be used to simulate smoke propagation for different fire scenarios and to study the smokecontrol effects of alternative jet fan distributions



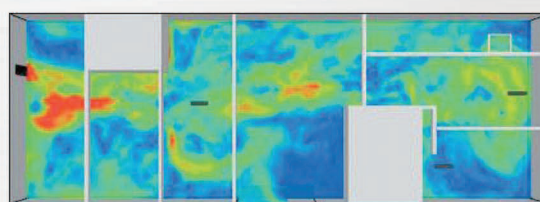
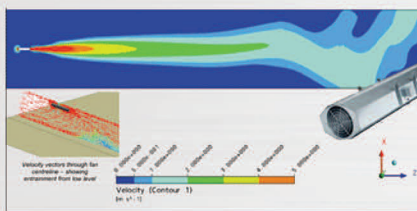
CFD plan of a typical car park showing Colt Cyclone fan locations, openings and areas



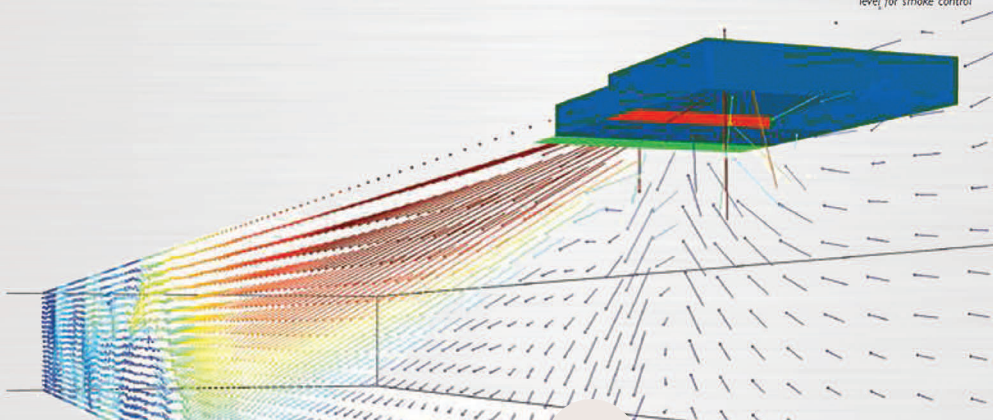
Air speed contours at high level, day-to-day ventilation



Air speed contours at low level, day-to-day ventilation



CFD showing air speed contours at low level for smoke control





### Installation Phase

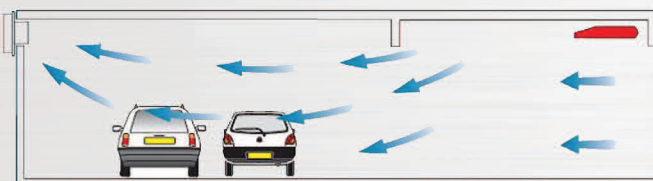
- ✎ Installation-ready supply of fans and ancillary equipment such as volume control dampers, guards and sound attenuators
- ✎ Delivery of CO-sensors, smoke detectors and control cabinet and integration with the central building control systems
- ✎ Implementation of the control cabinet PLC programming Testing of the CO monitoring system

### Commissioning and acceptance tests

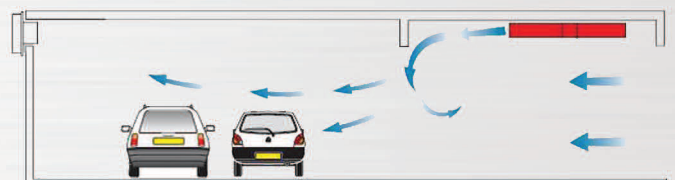
- ✎ Functional demonstration of the installation by means of hot or cold smoke tests, if required
- ✎ Complete system documentation for submittal to car park operators and civil protection authorities

### Service

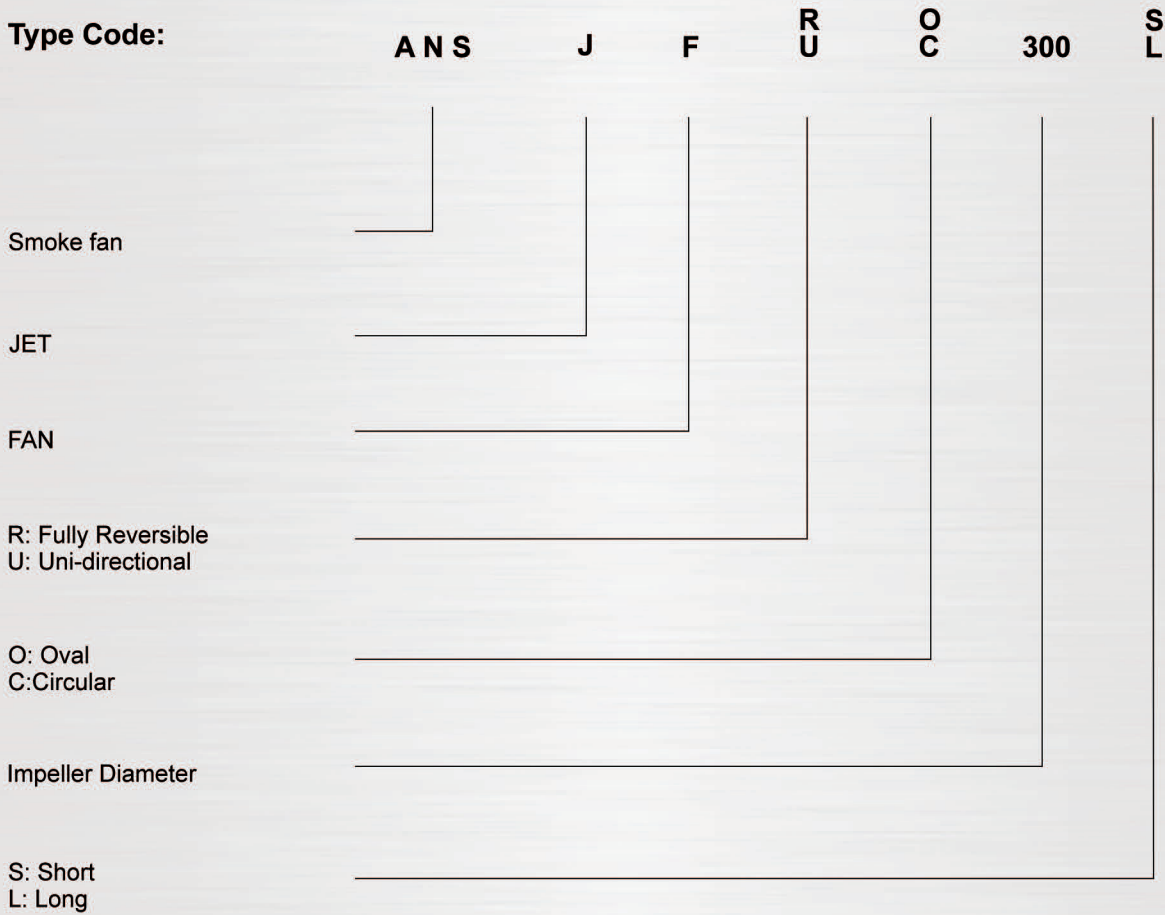
- ✎ Periodical inspections and maintenance
- ✎ Adjustment of running patterns according to changes in traffic volume



*Air turbulence is dramatically reduced when using a Colt Cyclone CPV fan*

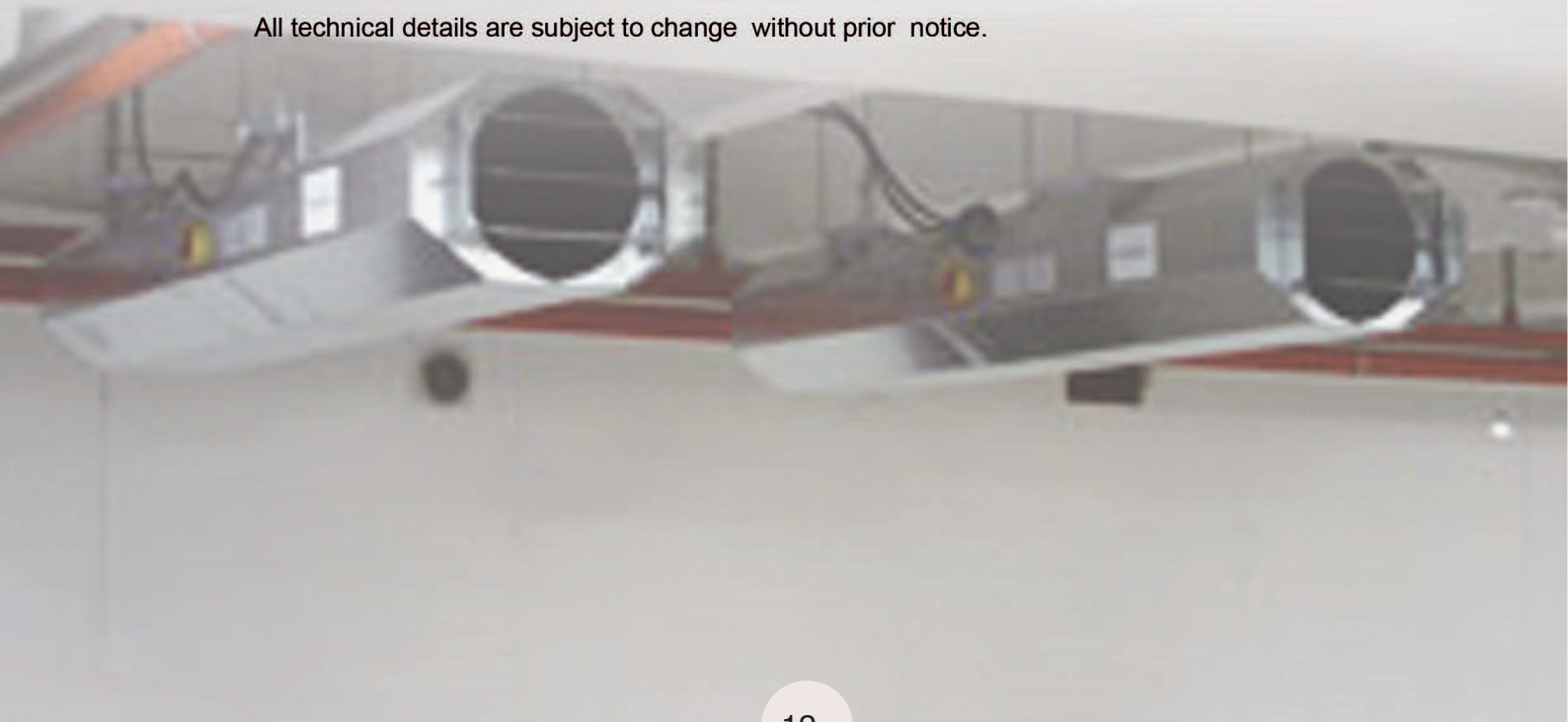


*Air turbulence created by the downstands when using a typical impulse fan*



Uni-directional jet fans JFUO/JFUC: inlet guard (dimension G) on inlet, discharge guide vanes (dimension F) on outlet; Fully reversible jet fans JFRO/JFRC: discharge guide vanes (dimension F) on both sides

All technical details are subject to change without prior notice.



**Technical Data**

Fan Type	Motor Power 300°C/2h [kW]	Nom. Current 300°C/2h [A]	Motor Power 40°C [kW]	Nom. Current 40°C [A]	Fan Speed [1 /min]	Volume Row [m3/s]	Thrust [N]	Sound Pressure [dB(A) 3m/45]	Weight [kg]
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**ANS JFUO L- Jet Fan, Uni-directional, Oval, Long**

JFUO 300 L	1,1/0,25	2,41/0,75	1,4/0,3	3,33/0,82	2.880/1.440	1,43/0,72	28/7	62/47	82
JFUO 315 L	1,23/0,28	2,86/0,81	1,4/0,3	3,33/0,82	2.880/1.440	1,72/0,85	45/12	66/50	111
JFUO 315 L	1,8/0,43	4,11/1,39	1,9/0,4	4,14/1,07	2.880/1.440	1,9/0,95	55/14	67/51	114
JFUO 355 L	1,8/0,43	4,11/1,39	1,9/0,4	4,14/1,07	2.880/1.440	2,20/1,10	56/14	71/53	114
JFUO 355 L	2,2/0,5	4,63/1,54	2,5/0,65	5,06/1,76	2.880/1.440	2,30/1,15	62/15	72/56	116
JFUO 370 L	1,8/0,43	4,11/1,39	1,9/0,4	4,14/1,07	2.880/1.440	2,42/1,2	58/14	70/53	106
JFUO 370 L	2,2/0,5	4,63/1,54	2,5/0,65	5,06/1,76	2.880/1.440	2,64/1,32	70/17	72/57	108

**ANS JFRO L- Jet Fan, Uni-directional, Oval, Long**

JFRO 300 L	1,1/0,25	2,41/0,75	1,4/0,3	3,33/0,82	2.880/1.440	1,3/0,65	25/6	62/46	83
JFRO 370 L	1,23/0,28	2,86/0,81	1,4/0,3	3,33/0,82	2.880/1.440	2,19/1,09	48/12	68/51	104
JFRO 370 L	1,8/0,43	4,11/1,39	1,9/0,4	4,14/1,07	2.880/1.440	2,36/1,16	55/13	69/52	107

**ANS JFUO S -Jet Fan, Uni-directional, Oval, Short**

JFUO 250	on request	on request	on request	on request	on request	on request	on request	on request	on request
JFUO 300 S	1,1/0,25	2,41/0,75	4/0,3 , 1	3,33/0,82	2.880/1.440	1,43/0,72	28/7	66/51	56
JFUO 315 S	1,23/0,28	2,86/0,81	1,4/0,3	3,33/0,82	2.880/1.440	1,72/0,85	45/12	70/54	82
JFUO 315 S	1,8/0,43	4,11/1,39	1,9/0,4	4,14/1,07	2.880/1.440	1,9/0,95	55/14	71/55	85
JFUO 355 S	1,8/0,43	4,11/1,39	1,9/0,4	4,14/1,07	2.880/1.440	2,20/1,10	56/14	75/57	85
JFUO 355 S	2,2/0,5	4,63/1,54	2,5/0,65	5,06/1,76	2.880/1.440	2,30/1,15	62/15	76/60	87
JFUO 370 S	1,8/0,43	4,11/1,39	1,9/0,4	4,14/1,07	2.880/1.440	2,42/1,2	58/14	74/57	79
JFUO 370 S	2,2/0,5	4,63/1,54	2,5/0,65	5,06/1,76	2.880/1.440	2,64/1,32	70/17	76/61	81

**ANS JFRO S - Jet Fan, Fully Reversible, Oval, Short**

JFRO 250	on request	on request	on request	on request	on request	on request	on request	on request	on request
JFRO 300 S	1,1/0,25	2,41/0,75	4/0,3 , 1	3,33/0,82	2.880/1.440	1,3/0,65	25/6	66/50	57
JFRO 370 S	1,23/0,28	2,86/0,81	1,4/0,3	3,33/0,82	2.880/1.440	2,19/1,09	48/12	72/55	77
JFRO 370 S	1,8/0,43	4,11/1,39	1,9/0,4	4,14/1,07	2.880/1.440	2,36/1,16	55/13	73/56	79

**ANS JFUC - Jet Fan, Uni-directional, Circular**

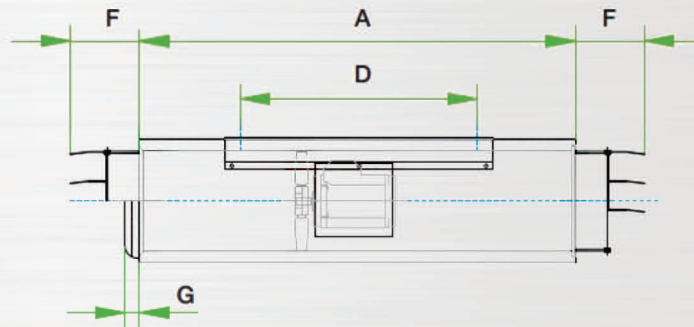
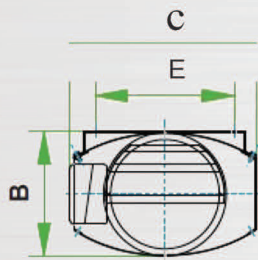
JFUC 355	1,23/0,28	2,86/0,81	1,4/0,3	3,33/0,82	2.880/1.440	2,09/1,04	51/13	68/53	69
JFUC 355	1,8/0,43	4,11/1,39	1,9/0,4	4,14/1,07	2.880/1.440	2,28/1,14	60/15	70/54	72
JFUC 400	1,8/0,43	4,11/1,39	1,9/0,4	4,14/1,07	2.880/1.440	2,84/1,42	76/19	73/55	77
JFUC 400	2,2/0,5	4,63/1,54	2,5/0,65	5,06/1,76	2.880/1.440	3,06/1,53	85/21	75/55	79

**ANS JFRC - Jet Fan, Fully Reversible, Circular**

JFRC 355	1,23/0,28	2,86/0,81	1,4/0,3	3,33/0,82	2.880/1.440	1,92/0,96	43/11	64/49	70
JFRC 355	1,8/0,43	4,11/1,39	1,9/0,4	4,14/1,07	2.880/1.440	2,18/1,09	55/14	66/50	73
JFRC 400	1,8/0,43	4,11/1,39	1,9/0,4	4,14/1,07	2.880/1.440	2,67/1,33	65/16	67/51	78
JFRC 400	2,2/0,5	4,63/1,54	2,5/0,65	5,06/1,76	2.880/1.440	2,82/1,41	76/19	73/55	80

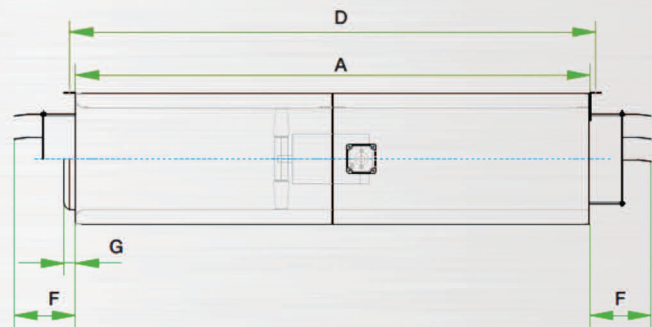
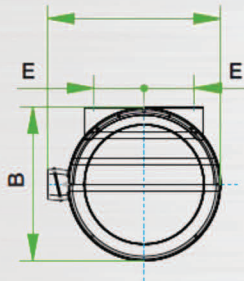
**ANS JFUO S - JET FAN, UNI-DIRECTIONAL, OVAL, SHORT**  
**ANS JFUO L - JET FAN, UNI-DIRECTIONAL, OVAL, LONG**

**ANS JFUO S - JET FAN, FULLY REVERSIBLE, OVAL, SHORT**  
**ANS JFUO L - JET FAN, FULLY REVERSIBLE, OVAL, LONG**



**ANS JFUCS - JET FAN, UNI-DIRECTIONAL, CIRCULAR**

**ANS JFRC - JET FAN, FULLY REVERSIBLE, CIRCULAR**



Type	A	B	C	D	E	F*	G*
ANS JFUO 250	1.200	270	395	450	255	170	46
ANS JFRO 250	1.200	270	395	450	255	170	-
ANS JFUO 300 L	2.250	343	530	650	380	190	46
ANS JFUO 300 S	1.200	343	530	650	380	190	46
ANS JFRO 300 L	2.250	343	530	650	380	190	-
ANS JFRO 300 S	1.200	343	530	650	380	190	-
ANS JFUO 315 L	2.250	415	600	650	450	190	46
ANS JFUO 315 S	1.200	415	600	650	450	190	46
ANS JFUO 355 L	2.250	415	600	650	450	190	46
ANS JFUO 355 S	1.200	415	600	650	450	190	46
ANS JFUO 370 L	2.250	415	600	650	450	190	46
ANS JFUO 370 S	1.200	415	600	650	450	190	46
ANS JFRO 370 L	2.250	415	600	650	450	190	-
ANS JFRO 370 S	1.200	415	600	650	450	190	-
ANS JFUC 355	1.800	460	518	1.840	150	190	46
ANS JFRC 355	1.800	460	518	1.840	150	190	-
ANS JFUC 400	1.800	506	562	1.840	175	190	46
ANS JFRC 400	1.800	506	562	1.840	175	190	-

Technical Data

Fan Type	Motor Power 300°C/2h [kW]	Nom. Current 300°C/2h [A]	Voltage/ connection [V]	Fan Speed [1 /min]	Volume Row [m3/s]	Thrust [N]	Weight [kg]
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ANS RGM 91-0600&0610, 300 °C- 120 MIN.

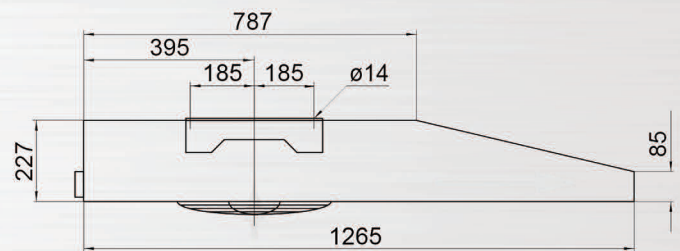
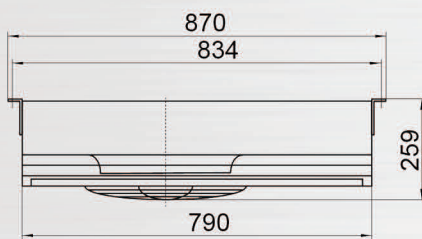
ANS RGM 91-0600-4D-15	1.5	5.80/3.30	230/400 Δ/Y	1435	1.68	50	130
ANS RGM 91-0600-ID-15	1.5/0.55	3.60/1.08	400 YY/Y	1425/955	1.68/1.14	50/23	130
ANS RGM 91-0600-GD-15	1.3/0.22	3.00/1.15	400 YY/Y	1420/720	1.68/0.87	50/13	130
ANS RGM 91-0610-4D-16	2.2	8.60/5.00	230/400 Δ/Y	1435	2.7	75	180
ANS RGM 91-0610-ID-16	2.2/0.75	5.00/2.60	400 YY/Y	1425/955	2.7/1.84	75/34	180
ANS RGM 91-0610-GD-16	2.2/0.37	5.10/1.60	400 YY/Y	1430/715	2.7/1.38	75/19	180

Sounds

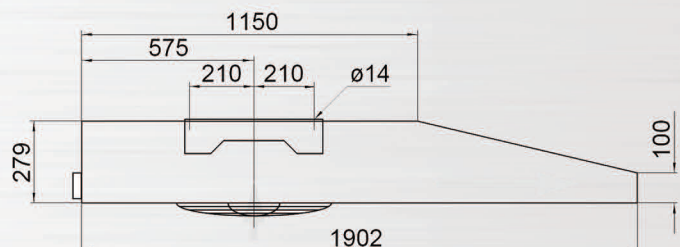
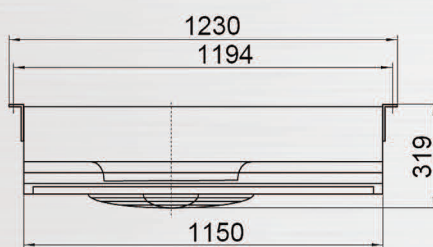
The sound pressure level was measured in a distance of 1 m in two positions. The average values are shown.

Fan Type	Poles	LpA, 1m dB	Lpfc, 1m at fc								
			63	125	250	500	1000	2000	4000	8000	Hz
ANS RGM 91-0600-...	4	77	64	79	75	75	71	69	66	60	dB
	6	66	66	70	65	64	61	57	54	48	dB
	8	59	68	62	58	57	54	49	46	39	dB
Fan Type	Poles	LpA, 1m dB	Lpfc, 1m at fc								
			63	125	250	500	1000	2000	4000	8000	Hz
ANS RGM 91-0610-...	4	83	74	87	81	80	77	75	68	63	dB
	6	71	72	79	71	68	66	62	55	50	dB
	8	63	74	68	61	61	58	52	45	40	dB

ANS RGM 91-0600-, 300 °C- 120 MIN



ANS RGM 91-0610-, 300 °C- 120 MIN







## **WE REMAIN AT YOUR DISPOSAL**

**Our employees will advise you personally.  
We are looking forward to receiving your enquiry!**



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 Indonesia  
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 Ireland  
 Italy  
 Kirgistan  
 Korea  
 Lithuania  
 Malaysia  
 Moldova  
 Netherlands  
 New Zealand  
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Your Sales Representative:

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