



# FANS FOR TUNNEL & METRO



**MICROELETTRICA**

## OUR COMPANY: EXPERIENCE AND WORLDWIDE PRESENCE

### Who we are

CometFans is a leading european company specialized in the design, manufacturing and sale of fan units and ventilation systems. In over 30 years, more than 140.000 CometFans units have been installed in the five continents, in the most severe environmental conditions, in critical services such as power plants, refineries, trains, ships, steel mills, mines and cement plants. We are based in Buccinasco, south-west of Milano, Italy.



**70**

Countries with  
products in service



**140.000**

Delivered Units



**1.200**

International projects



**14**

Product lines



### The group

Comet Fans is a sister company of Microelettrica, an international player in the electro-mechanical industry, with a wide product portfolio. We are part of the Knorr-Bremse Group, a global market leader in the mobility industry, with sites in more than 30 countries worldwide.

**29.500**  
employees

**108**  
locations

**30**  
countries

**6,150**  
Mio.€ sales in 2020

**11.000**  
patents





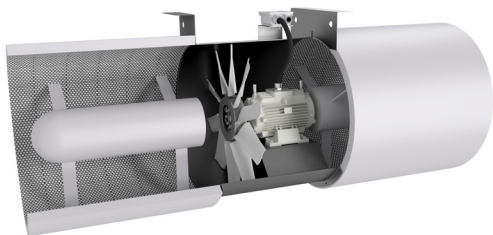
## TECHNOLOGY IN TUNNEL & METRO VENTILATION

The new range includes three dedicated series of products, for each ventilation need in Tunnel industry.

### Complete range of products, for every application

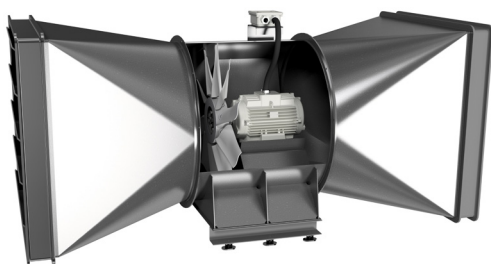
#### JET SERIES

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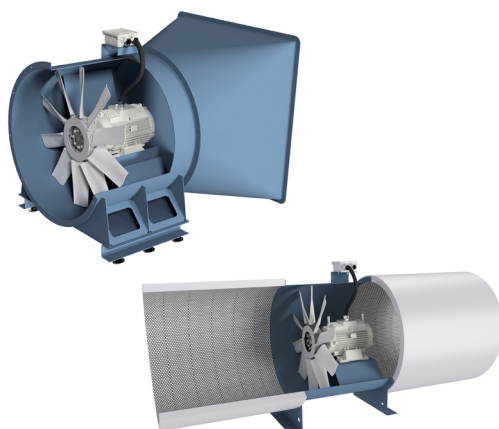
#### SAF SERIES

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#### ADF SERIES

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# TECHNOLOGY IN TUNNEL & METRO VENTILATION

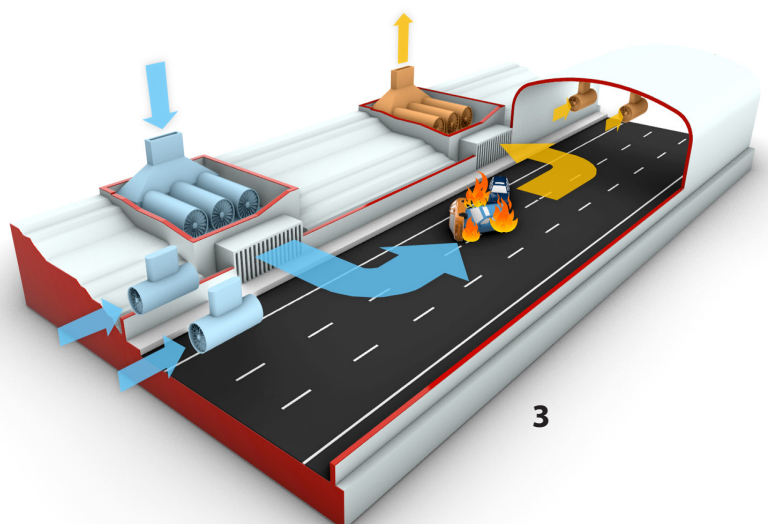
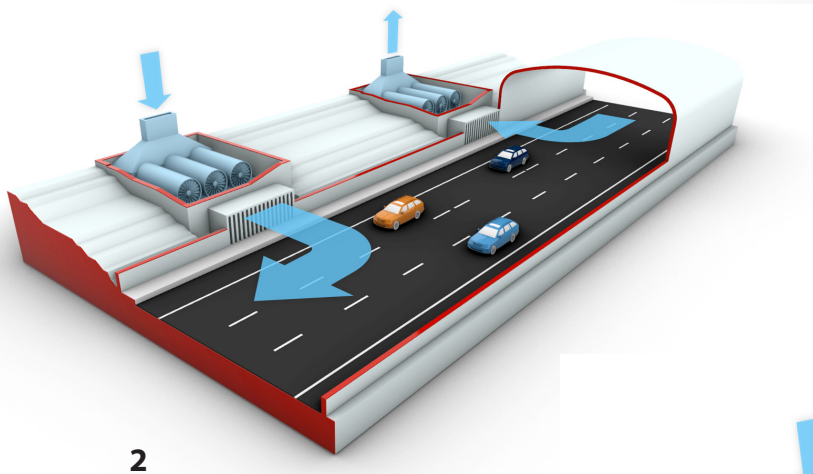
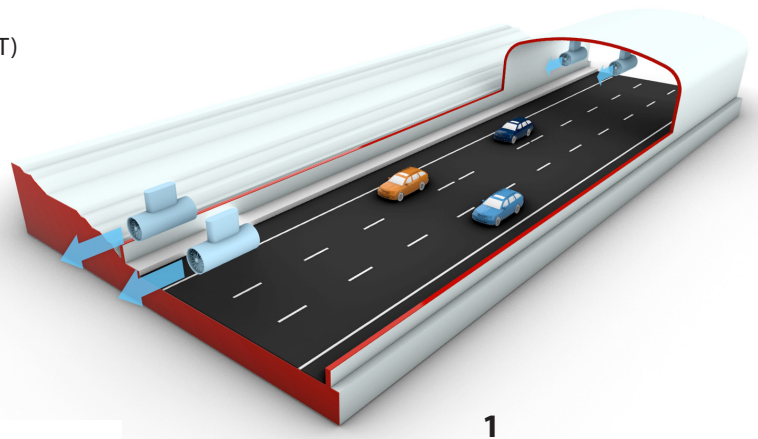
## Typical solutions

Our new dedicated line of axial fan units provides a reliable solution in all the main ventilation needs of tunnels and undergrounds:

- control of smoke and toxic gases in case of fire
- dilution and reduction of the concentration of pollutants (exhaust gases and dust particles)
- air temperature control
- dust concentration control in excavation phases
- dust extraction and filtration in excavation phases

With a very wide range of sizes and powers, we offer three product series (JET, SAF, ADF) which cover all the main types of Tunnel Ventilations Systems and Underground Applications:

1. longitudinal ventilation (JET only)
2. transversal ventilation (SAF only)
3. combined longitudinal + transversal ventilation (SAF+JET)



## TECHNOLOGY IN TUNNEL & METRO VENTILATION

### Certifications and Standards

All fan models of our range are in accordance with the three main classification categories of the EN12101-3 standard.

SAF Series	Class to EN12101-3	Temperature	Time	Jet Series
✓	F200	200°C	60'/120'	✓
✓	F300	300°C	60'/120'	✓
✓	F400	400°C	60'/120'	✓

The products are also designed and tested following several international standards:

- ISO 9001: Quality Management System
- ISO 5801: Performance Testing
- AMCA 210-99: Performance Testing
- ISO 13350: Jet Fans Performance Testing
- EN 294: Safety of Machineries
- EN 15085: Welding Quality System
- ISO 146945: Vibration Tests
- ISO 1940: Fan Balancing
- ISO 13347: Noise Test
- EN 60034: Electric Motors

### What we provide

- Wide range of standardized solutions
  - Customized versions
  - CFD and FEM calculations
  - Dedicated performance tests
  - Sensors, dampers, drives, special fittings
  - Control systems, monitoring systems
- ➔ 40 years experience in fan design
- ➔ Proven record of 140.000 fans installed worldwide
- ➔ Presence in 30 countries

### Service and Refurbishment

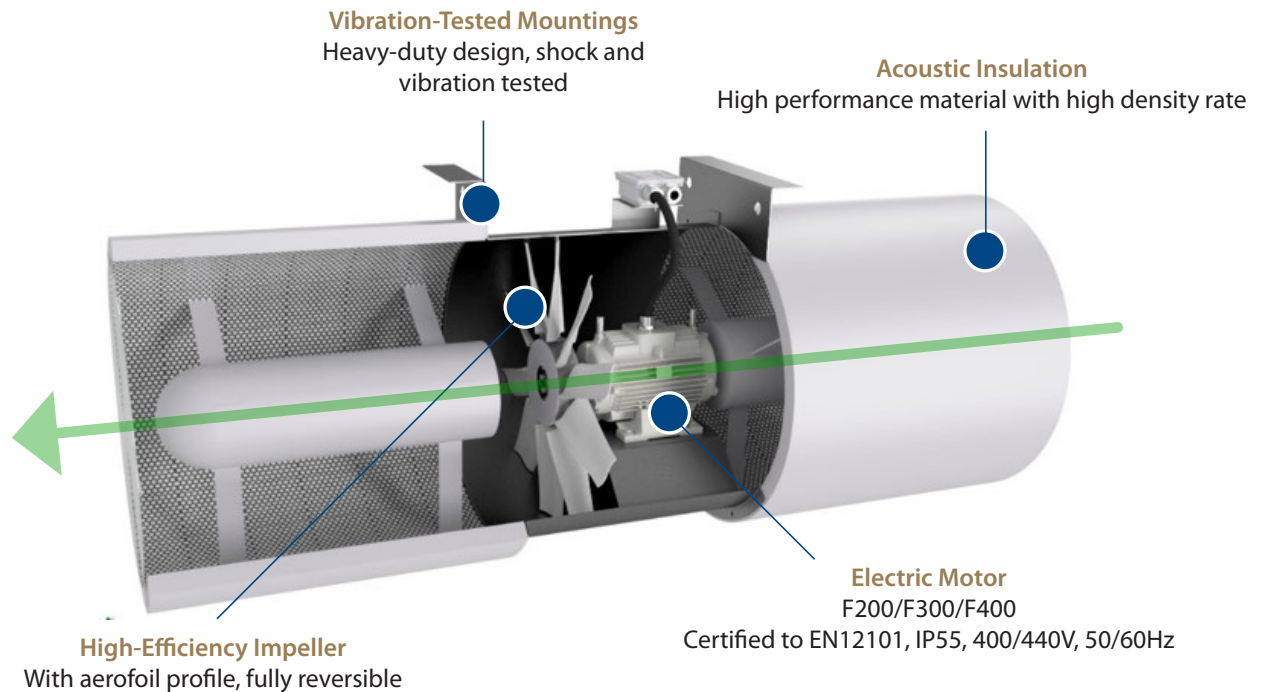
- Overhaul, repair, test of existing fans
- Upgrade or replacement of old units
- Installation and commissioning
- Onsite tests and measures
- Training sessions
- Special warranty packages
- Long-term maintenance contracts

## JET SERIES - PRODUCT DESCRIPTION

### Road tunnel smoke ectraction

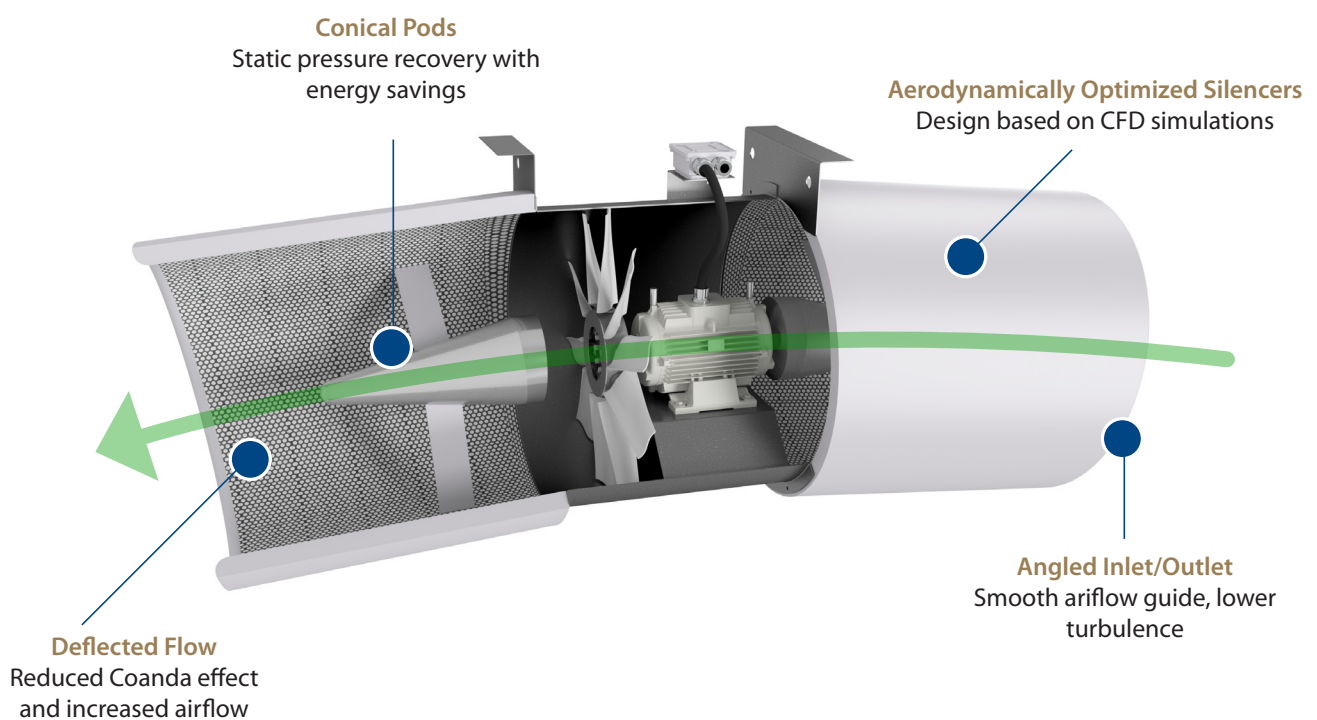
#### STRAIGHT VERSION

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#### ANGLED VERSION

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## JET SERIES - PRODUCT RANGE

### Road tunnel smoke ectraction

Product Range										
Size	Motor Size		EN12101-3 Certification		Fan size					
Power	4-pole	6-pole	Class		4-pole				6-pole	
					90	100	112	125	140	160
15kW	160	-	F200	F300	✓	✓	-	-	-	-
			F400		✓	✓	-	-	-	-
22kW	180	-	F200	F300	✓	✓	-	-	-	-
			F400		✓	✓	-	-	-	-
27kW	180	-	F200	F300	✓	✓	✓	-	-	-
			F400		✓	✓	✓	-	-	-
30kW	200	-	F200	F300	-	✓	✓	✓	-	-
			F400		-	✓	✓	✓	-	-
37kW	225	250	F200	F300	-	✓	✓	✓	✓	-
			F400		-	✓	✓	✓	✓	-
45kW	225	280	F200	F300	-	-	✓	✓	✓	✓
			F400		-	-	✓	✓	✓	✓
55kW	250	280	F200	F300	-	-	✓	✓	✓	✓
			F400		-	-	✓	✓	✓	✓
75kW	-	315	F200	F300	-	-	-	✓	✓	✓
			F400		-	-	-	✓	✓	✓
90kW	-	315	F200	F300	-	-	-	-	-	✓
			F400		-	-	-	-	-	✓

### Advantages

#### Straight version:

- Well-known, state-of-art design
- Extended air jet range
- Customized hanging / supporting system & interfaces

#### Angled version:

- Smaller units for the same air volume/thrust
- Lower power consumption
- Smaller clearance from walls – Closer to tunnel ceiling
- Less noise emission if slower speed is selected
- Less distance between consecutive units – less cabling

### Accessories

- Safety guards
- Bellmouths
- Vibration sensors
- External grease lines
- Vibration isolators
- Safety rope (anti-falling)
- Base frames / Special mountings
- Frequency converters
- Soft Starters

### Standard & Custom Features

#### Standard:

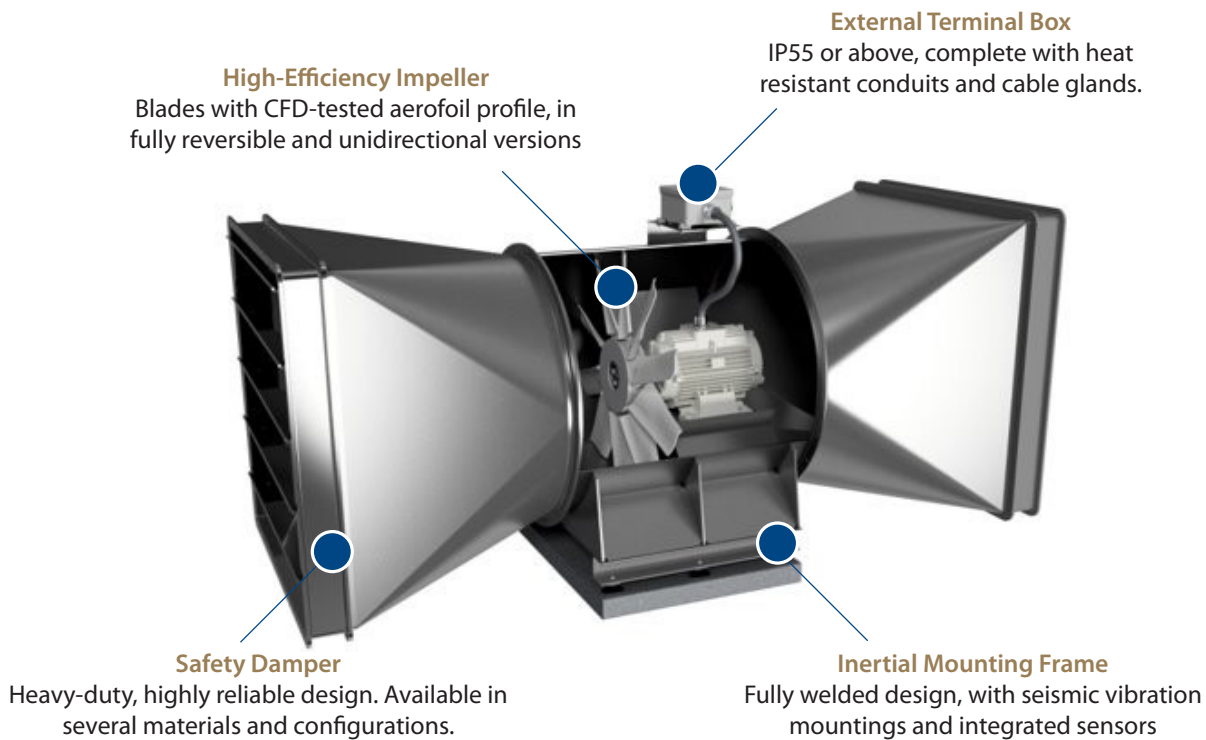
- 100% full-reversible air flow
- Operating Temperature range -20°C/+40°C
- Diameter range from 900mm to 1,600mm
- Impeller blades in alluminium alloy
- IP55, high-temperature resistant terminal box

#### Custom:

- Extended silencers up to 2xD
- Angled Version components for upgrades
- IE3 motors for strict efficiency regulations
- Galvanizing to ISO14713-1
- Stainless Steel construction
- C3 to C5 corrosion protection by Epoxy pack
- Wet paint pack
- Aerodynamically optimized silencers
- Unidirectional flow design (highest efficiency)
- Tailor-made arrangements and mountings

## SAF SERIES - PRODUCT DESCRIPTION

### Metro and road tunnel ventilation



### Standard & Custom Features

#### Standard:

- Diameter range from 1.000mm to 2.500mm
- 100% full-reversible air flow
- Operating Temperature range -20°C/+40°C
- Aerofoil impeller blades in aluminium alloy
- IP55, high-temperature resistant terminal box
- Heavy-Duty inertial mounting frame in carbon steel
- Welded diffusers / transition ducts in carbon steel
- Safety damper in galvanized carbon steel
- External grease lines

#### Custom:

- E3 motors for strict efficiency regulations
- Stainless Steel construction (fan/damper/frame)
- C3 to C5 class corrosion protection by Epoxy pack
- Wet paint pack
- Galvanization to ISO14713-1
- Unidirectional flow design (highest efficiency)
- Tailor-made arrangements and mountings
- Customized versions
- High-performance unidirectional versions with airflow straighteners
- CFD and FEM calculations
- Dedicated performance tests



## SAF SERIES - PRODUCT RANGE

### Metro and road tunnel ventilation

Product Range												
Size	Motor Size		EN12101-3 Certification	Fan size								
Power	4-pole	6-pole	Class	4-pole			6-pole					
				100	112	125	140	160	180	200	220	250
30kW	200	-	F200 F300	✓	✓	✓	✓	-	-	-	-	-
			F400	✓	✓	✓	✓	-	-	-	-	-
37kW	225	250	F200 F300	✓	✓	✓	✓	✓	-	-	-	-
			F400	✓	✓	✓	✓	✓	-	-	-	-
45kW	225	280	F200 F300	-	✓	✓	-	✓	-	-	-	-
			F400	-	✓	✓	-	✓	-	-	-	-
55kW	250	280	F200 F300	-	✓	✓	-	✓	-	-	-	-
			F400	-	✓	✓	-	✓	-	-	-	-
75kW	-	315	F200 F300	-	-	✓	-	✓	✓	-	-	-
			F400	-	-	✓	-	✓	✓	-	-	-
90kW	-	315	F200 F300	-	-	-	-	-	✓	-	-	-
			F400	-	-	-	-	-	✓	-	-	-
110kW	-	315	F200 F300	-	-	-	-	-	✓	-	-	-
			F400	-	-	-	-	-	✓	-	-	-
132kW	-	315	F200 F300	-	-	-	-	-	✓	✓	-	-
			F400	-	-	-	-	-	✓	✓	-	-
160kW	-	355	F200 F300	-	-	-	-	-	-	✓	-	-
			F400	-	-	-	-	-	-	✓	-	-
200kW	-	355	F200 F300	-	-	-	-	-	-	✓	✓	-
			F400	-	-	-	-	-	-	✓	✓	-
250kW	-	355	F200 F300	-	-	-	-	-	-	✓	✓	-
			F400	-	-	-	-	-	-	✓	✓	-
315kW	-	355	F200 F300	-	-	-	-	-	-	-	✓	-
			F400	-	-	-	-	-	-	-	✓	-
355kW	-	355	F200 F300	-	-	-	-	-	-	-	✓	✓
			F400	-	-	-	-	-	-	-	✓	✓
400kW	-	355	F200 F300	-	-	-	-	-	-	-	-	✓
			F400	-	-	-	-	-	-	-	-	✓

### Accessories

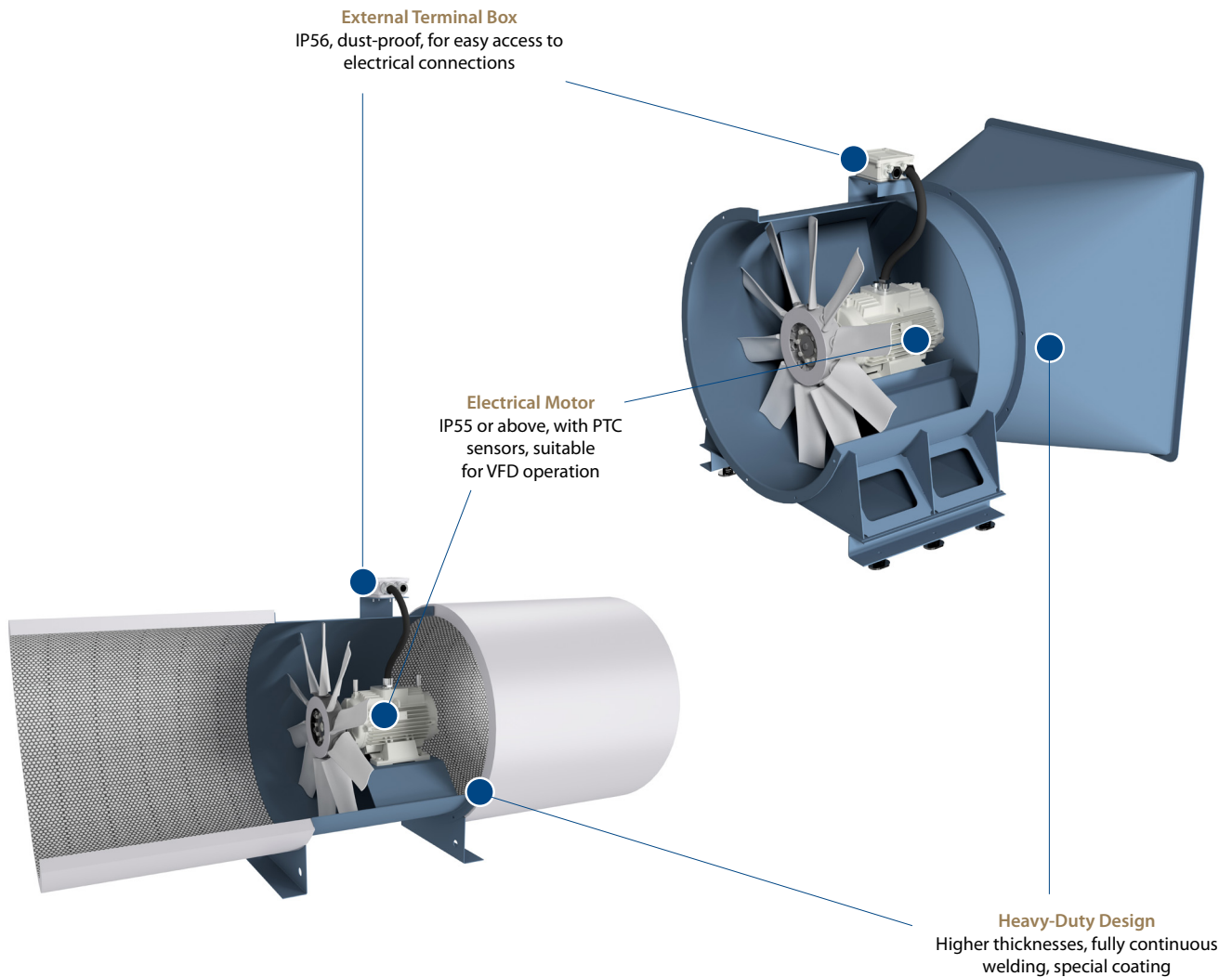
- Integral circular silencers
- Baffle silencers
- Safety guards
- Bellmouths
- Counterflanges
- Flexible connections
- Dampers with special design
- Vibration sensors
- External grease lines
- Automatic regreasing systems
- Drive systems and Inverters
- Control systems, monitoring systems
- Soft starters
- Vibration isolators in stainless steel or special materials
- Base frames with custom design
- Diffusers
- Extended ducting

## ADF SERIES

### Excavation & Dust Extraction

The ADF Series is designed to work in combination with filters and provide ventilation during the excavation works and in all phases of underground and tunnelling civil works.

Materials, design solutions and components are specifically selected to grant the highest level of reliability in the corrosive and demanding environments of excavation sites.



### Features and Accessories

- Diameter range from 1.000mm to 2.500mm
- Fully-reversible air flow or unidirectional
- Heavy-duty electrical motors
- Silencers, diffusers, dampers, guards, as requested
- Paint or galvanized finishing
- Custom arrangements and versions
- Wide set of dedicated ancillaries

## RELIABILITY + QUALITY + SERVICE

### Testing – Quality

Our products undergo intensive test programs to verify every critical aspect and ensure the maximum reliability level. Performances, mechanical strength, resistance to high temperatures, and many other aspects are thoroughly tested according to recognized international standards.



Overspeed and Vibration Test



Performance Test



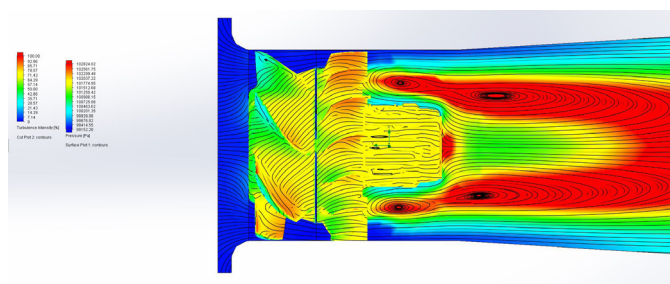
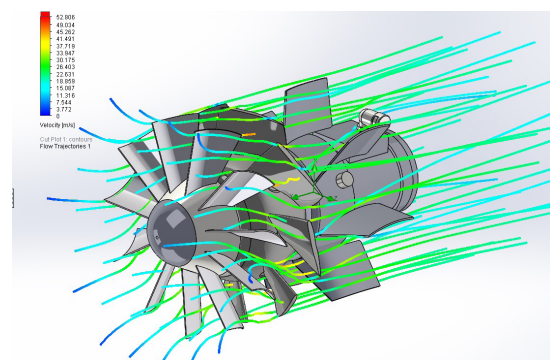
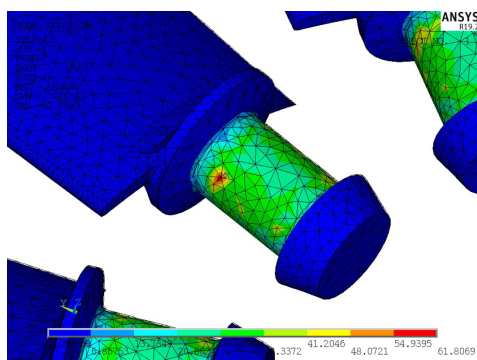
High Temperature Test

### Manufacturing

The production processes benefit from state-of-art machinery and from the fundamental principles of the Knorr-Bremse Production System (KPS), being one of the most efficient on the market and characterized by concepts such as 5S, Visual Management, Value Stream Mapping. Together with a constant attention to the details, this ensures a very high quality level of every product manufactured by Comet Fans.

### Engineering

The design and validation of our products is supported by strong processes and dedicated tools, which includes full 3D modeling, static and dynamic FEM analysis, CFD simulations.



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