Jet Tunnel Fans

Matthews & Yates

by Systemair

www.systemair.de

AJ (T)

Systemair Division

Matthews & Yates

Tunnel Jet Fans

Standard features:

- Thrust efficiency in excess of 40 N/kW
- Adjustable aluminium impellers for maximum efficiency
- Terminal box on the casing for easy on-site wiring
- IEC standard motors as specified in IEC 34; high temperature motors for smoke removal
- Motors can be supplied to suit 50 Hz and 60 Hz supplies.
- Standard bearings are sealed for life, extended lubricators as an option
- Unidirectional or fully reversible in either direction

The Systemair Matthews & Yates Division has been involved with specialist fan engineering in tunnel ventilation for more than 25 years. A number of important references all over the world prove our competence.

Depending on the tunnel design, size and traffic flow, various solutions for ventilation are available.

These are generally:

a) Fully Transverse

Air is supplied from one side of the tunnel and extracted from the other, picking up fumes in the process. Most suited to long tunnels but costly due to the large sized ducts required.

b) Semi Transverse

Fresh air is supplied uniformly over the length of the tunnel causing the foul air to escape longitudinally from the tunnel.

Semi transverse ventilation systems use ducting for supply and often in conjunction with jet fans for certain sensitive areas.

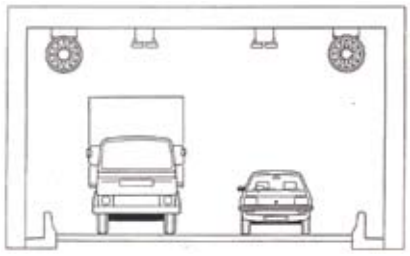
c) Longitudinal

Widely accepted as the most economical of the three systems and normally used for tunnels up to approximately 1 km in length, depending on traffic flow. Jet fans mounted in the tunnel roof will provide positive longitudinal ventilation and have the ability for reversal in emergencies or to work with prevailing winds.

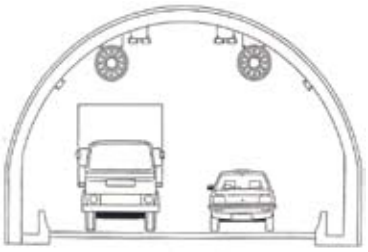
The number and size of fans depends on the maximum air flow required to maintain the level of carbon monoxide and diesel smoke at acceptable levels.

The complete design and manufacture of the entire range is backed up by the latest resources including CAD/CAM systems and CFD software in accordance with AMCA. Quality is to the highest international standard and we are fully certified to ISO 9001. EN 12101-3 certification is in progress.

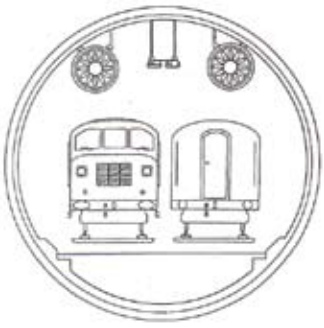
Types of Tunnel Design



Cut & Cover Tunnel



Ring Road Tunnel



Circular Tunnel

Sturdy casing

Casings are heavy gauge, hot dip galvanized upon completion, with spun flanges for high rigidity. Additionally painted or in stainless steel as an option. Silencers are offered with standard length 1 x fan diameter. Other lengths are available on request.

Motors

Standard or high temperature motors for periods of 1 or 2 hours at temperatures of 250°C, 300°C or as may be specified in the design of the tunnel.

Accessories

Drop rods for fixing to tunnel ceiling that will suit the customer's requirements.

Anti-vibration-hangers to suit the degree of isolation required.

Quality

Systemair is ISO 9001: 2000 approved. The Systemair quality is regularly monitored by TÜV Süd.

Warranty

Systemair offers a three year warranty on all AJ (T) fan models. The Systemair warranty conditions apply.

Ordering code

AJ 1000-10 / 22° - 4 (T...)

- Temperature class
- 4-pole motor
- Pitch angle
- Number of blades
- Impeller diameter
- Jet tunnel fan

TYPICAL CAPACITIES AVAILABLE

Jet Fan Size mm	Max. Thrust N	Max. Motor Power kW	Motor Speed rpm (50Hz)	Max. Velocity m/s
500	235	6,5	2880	31,1
560	360	13,5	2880	33,3
630	640	27,0	2880	42,0
710	950	40,0	2880	42,9
800	452	13,0	1440	13,9
900	725	25,0	1440	30,3
1000	1100	35,0	1440	35,3
1120	1690	65,0	1440	37,8
1250	2110	75,0	1440	39,6
1400	1766	50,0	960	30,9
1600	1989	50,0	960	30,2

The above details are for **Uni-Directional** jet fans.
Truly Reversible jet fans will give approximately 5% lower thrust than those shown in the table.

Systemair

Division

Matthews & Yates

Tunnel Jet Fans

Jet Fans provide Ventilation which reduces the Carbon Monoxide (CO) to acceptable levels and cover all other likely pollutants generated by petrol engines, i.e. nitric oxide (NO), nitrogen dioxide (NO_2), sulphur dioxide (SO_2).

Jet Fans can limit the concentration of CO (in parts per million by volume) to suit requirements i.e.

- 250 parts/mill: Extreme traffic conditions
- 150 parts/mill: Peak traffic flow
- 100 parts/mill: Off peak traffic flow (this is the maximum exposure for full time tunnel staff).

With diesel-engined traffic the exhaust smoke affects visibility within the tunnel and is the limiting factor rather than CO.

Visibility levels (Diesel smoke particles per cubic metre of air) are normally defined as follows:

- 1 Dmg/m^3: clear for practical purposes
- 9 Dmg/m^3: visibility very poor, traffic must move slowly.

Thrust Measurement

Continuous research and development is our major consideration and our goal is to satisfy worldwide demand for our ventilation products. Jet fan measurements are carried out in accordance with ISO 13350. To further develop our jet fan technology and for customers witness testing, a new rig was commissioned to the latest international standards. This accurately determines the actual thrust by the suspended configuration method.

Incorporated within the rig is an adjustable position transducer measuring system.
High temperature smoke spill testing is carried out to satisfy the wide range of demands for our export markets. Testing to the EN 12101-3 is in progress.

ROAD TUNNEL INFORMATION REQUEST

Please provide the following information (if available)

Tunnel Length (m)	
Cross Sectional Area (m^2)	
Hydraulic Diameter (m)	
Dimensions / Drawing	
Number of Lanes	
Direction of Traffic Flow (Uni-directional or Bi-directional)	
Type of Wall Construction (Rough or Smooth)	
Altitude Above Sea Level (m)	
Tunnel Gradient (Slope)	
Wind Velocity Outside Tunnel (m/s)	
Tunnel Location (Urban or Rural)	
Number of Vehicles Using Tunnel (per hour, per day)	
Ratio of Cars to Heavy Goods Vehicles (%)	
Design Size of Fire (MW)	
Year of Tunnel Opening	

For the purposes of calculation. If any of the following are not known, then those from PIARC (1995) will be used.

Concentration of CO (ppm)	
Concentration of NO_2 (ppm)	
Concentration of Smoke (ppm)	
Average of CO Emissions (ppm)	
Average of NO_2 Emissions (ppm)	
Ambient Temperature Levels (°C)	

Please provide any further details that may be available and could be of assistance in relation to the tunnel design.