

FANS AND ENGINEERING FOR TUNNEL VENTILATION





Your Partner for Tunnel Ventilation

THE COMPANY

Founded in 1943, Baltogar is specialist in air and gas handling technology and develops, manufactures and installs jet and axial fans for tunnel ventilation.

Since the end of 2011, Baltogar is part of an internationally established industrial group with 5.000 employees and factories in USA, Mexico, Brasil and China among others.

The headquarters are located in Technology Park of Bizkaia. Baltogar operates two production centres with a total indoor area of 10.000 m² incorporating among other facilities two test benches of 400 and 1.000 kW f.

QUALITY GUARANTEE

Baltogar is ISO 9001 certified and applies a strict quality assurance program through all its departments, that seeks customer satisfaction with its products and services. During the manufacturing phase, comprehensive quality controls are performed in accordance with the technical specifications of each project



**ENGINEERING
JET FANS
AXIAL FANS
ERECTION
START-UP**



VENTILATION ENGINEERING

Ventilation is required for safety and to maintain acceptable temperatures and comfort.

Our experience, covers both road and rail or metro ventilation systems. Baltogar starts working with its customers from the initial calculation of the tunnel, in order to provide an optimal solution for each project.

The need for pollution ventilation is calculated based on the tunnel dimensions, and the expected usage.

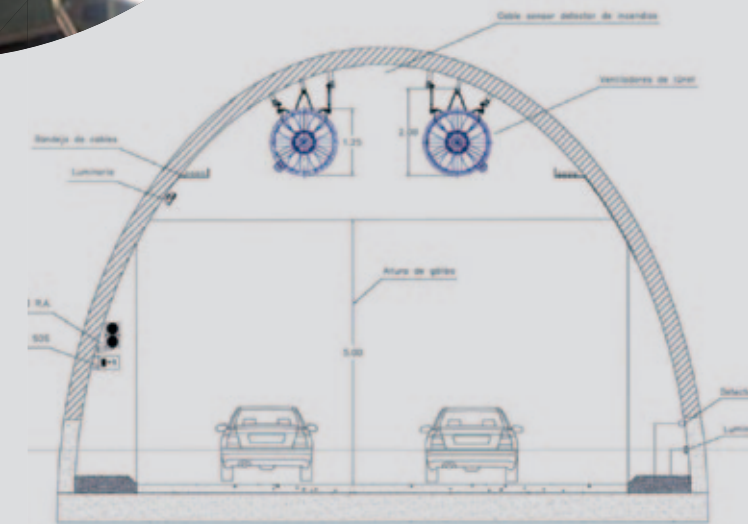
In case of fire, the system is calculated based on the worst case scenario as well as the architectural tunnel layout.

JET FANS AND AXIAL FLOW FANS

After the definition of the required equipments, developing the analysis and simulations, Baltogar designs ,manufactures and installs the fans across the world.

Baltogar holds a large experience in aerodynamical design and calculations for conditions of high mechanical requirements. Our technical department conducts studies on resistance, fatigue, creep and structural behaviour and CFD calculation to provide products of excellent performance.

A complete testing procedure ensures that Baltogar tunnel systems meet the required specifications.



JET FANS

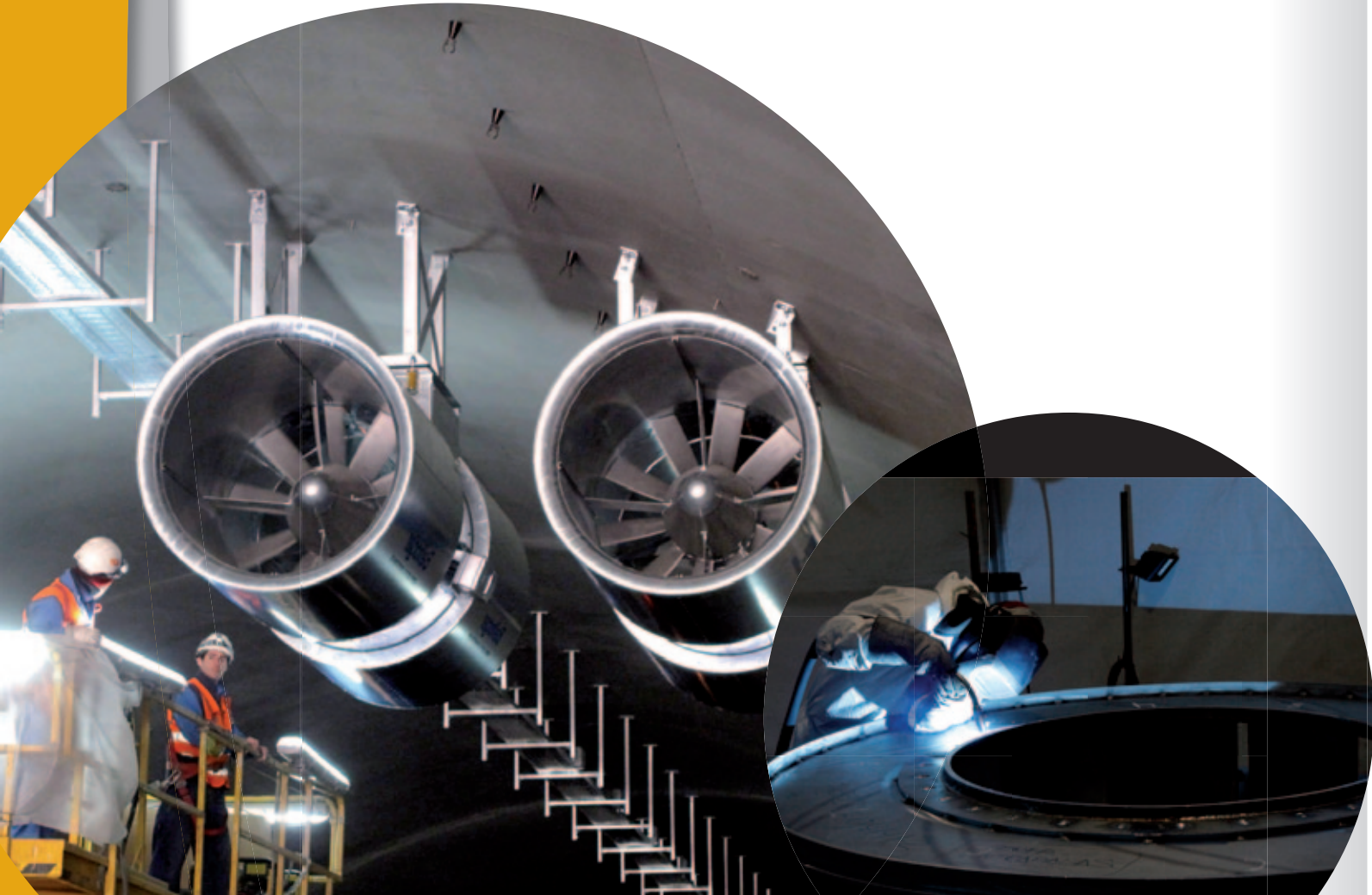
This kind of ventilation systems are required to give thrust (Newton , Pa/m2) being the total thrust the sum of each thrust generated by the active fans on each situation.

For the calculation, several inputs must be considered: position of the fans, resistance of the tunnel, traffic, wind, pressure drop over the source of the fire, required velocity of the airflow etc...

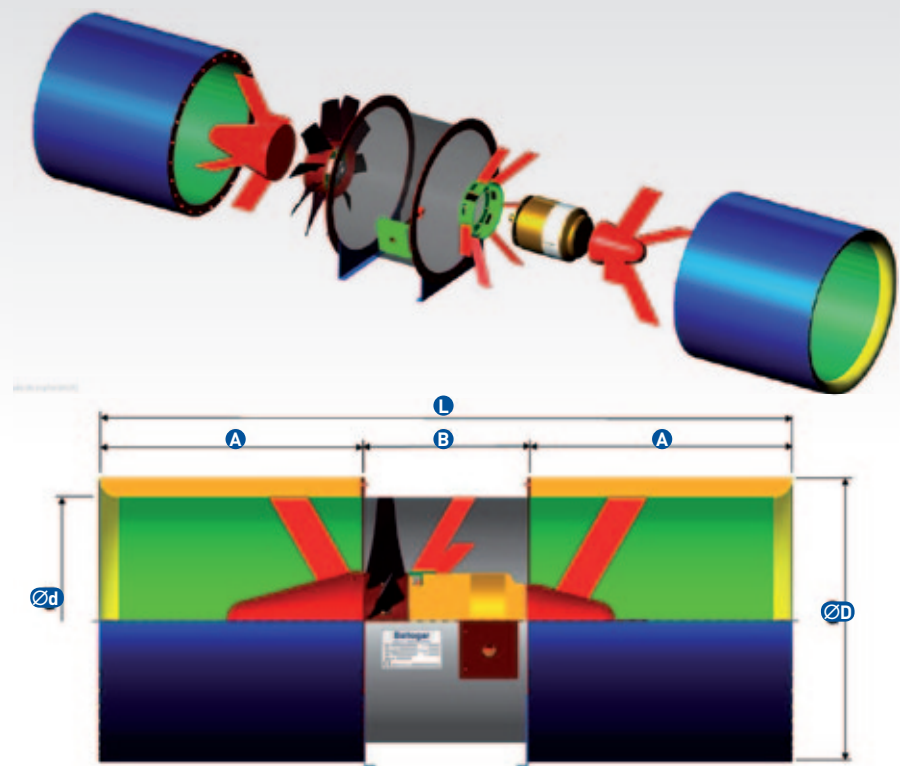
The jet fan type NVT goes from 500 mm to 1600 mm of impeller diameter with trust ranges which vary from 185 N up to 2810 N.

MAIN CHARACTERISTICS:

- Approved for operation at 400°C for 120 minutes tested and certified according to EN-12.101-3 standard. The certification of the fans is performed at independent laboratories with full size and speed tests.
- Tested according to ISO 13350.
- Depending on the ventilation requirements, Baltogar jet fans type NVT can be unidirectional or 100% reversible.
- Low sound levels due to an optimal aerodynamic design of the complete fan system.
- Range for electrical networks operating at frequencies of 50 Hz and 60 Hz.
- Impellers are balanced according to ISO-1940 1-1986 grade 2.5.



JET FANS DIMENSIONES



Fan type	Ød	D	A	B	L	Weight
	mm	mm	mm	mm	mm	kg
	550	750	700	400	1800	290
NVT 6.5	650	850	1125	650	2900	585
NVT 7	700	900	1125	650	2900	700
NVT 9.5	950	1150	1125	650	2900	825
NVT 10.5	1050	1250	1125	650	2900	945
NVT 12.5	1250	1450	1450	850	3750	1415
NVT 13.5	1350	1550	1450	900	3800	1600
NVT 16	1600	1800	1450	900	3800	1900

REVERSIBLE JET FANS

NVT 50 Hz

Fan Type	Airflow [m3/s]	Jet velocity [m/s]	Nominal Thrust [N]	Input Power [Kw]	Installed Power [Kw]	Speed [rpm]	Noise level @10 m dB(A)
NVT 5.5-5.5/2	6,2	26	185	5,3	5,5	2940	70
NVT 5.5-7.5/2	6,9	28,9	229	7,4	7,5	2940	71
NVT 6.5-7.5/2	8,65	26,1	260	7,1	7,5	2940	72
NVT 6.5-11/2	10	30,2	350	10,8	11	2940	72
NVT 6.5-15/2	11,3	33	428	15	15	2940	73
NVT 7-11/2	11,3	29,3	380	11	11	2940	72
NVT 7-15/2	12,7	33,1	485	14,8	15	2940	72
NVT 7-18.5/2	13,5	35,2	550	18,1	18,5	2940	72
NVT 7-22/2	14,5	36,55	615	22	22	2940	73
NVT 9.5-15/4	18,71	25,85	558	14,3	15	1480	71
NVT 9.5-18.5/4	20,1	27,84	647	17,5	18,5	1480	71
NVT 9.5-22/4	21,1	29,1	710	22	22	1480	72
NVT 10.5-15/4	21,88	24,8	626	14,9	15	1480	72
NVT 10.5-22/4	24,2	27,47	768	21,7	22	1480	72
NVT 10.5-30/4	27,1	30,7	960	30	30	1480	73
NVT 10.5-37/4	28,34	32,1	1050	37	37	1480	73
NVT 12.5-18.5/4	29,5	24	819	18,5	18,5	1480	72
NVT 12.5-22/4	31,9	26	954	22	22	1480	72
NVT 12.5-30/4	34,7	28,25	1130	29,8	30	1480	72
NVT 12.5-37/4	37,1	30,2	1292	35,5	37	1480	73
NVT 12.5-45/4	39,8	32,4	1487	44,4	45	1485	73
NVT 12.5-55/4	41,9	34,14	1650	55	55	1480	74
NVT 12.5-75/4	45,7	37,3	1965	75	75	1480	74
NVT 13.5-30/4	40,4	28,2	1314	30	30	1480	73
NVT 13.5-37/4	42	29,4	1422	37	37	1480	73
NVT 13.5-45/4	44,5	31,1	1597	45	45	1480	73
NVT 13.5-55/4	47,5	33,2	1820	54,8	55	1480	73
NVT 13.5-75/4	52	36,34	2180	74,9	75	1480	74
NVT 16.5-45/6	55,47	25,94	1660	45	45	990	72
NVT 16.5-55/6	59,04	27,61	1880	55	55	990	72
NVT 16.5-75/6	65	30,4	2530	70	75	990	72
NVT 16.5-90/6	68	31,8	2890	84	90	990	72

· Additional specific performances and diameters are also available according to customer´s requests

NVT 60 HZ

Fan Type	Airflow [m3/s]	Jet velocity [m/s]	Nominal Thrust [N]	Input Power [Kw]	Installed Power [Kw]	Speed [rpm]	Noise level @10 m dB(A)
NVT 5.5-6.3/2	6,13	25,72	181	6	6,3	3528	69
NVT 5.5-9/2	7,09	29,74	242	8,9	9	3528	73
NVT 6.5-9/2	9,15	27,61	291	8,2	9	3528	68
NVT 6.5-13/2	10,55	31,84	387	12,5	13	3528	71
NVT 6.5-17/2	11,64	35,13	471	16,7	17	3528	73
NVT 7-13/2	12,10	31,50	436	12,5	13	3528	70
NVT 7-17/2	13,51	35,10	543	17	17	3528	72
NVT 7-21/2	14,20	36,90	601	20	21	3528	73
NVT 7-25/2	15,20	39,50	688	24,5	25	3528	75
NVT 9.5-17/4	19,56	27,03	610	16	17	1776	72
NVT 9.5-21/4	21,21	29,30	717	20,5	21	1776	73
NVT 9.5-25/4	22,49	31,07	806	24	25	1776	75
NVT 10.5-17/4	22,62	25,64	669	16	17	1776	70
NVT 10.5-25/4	26,13	29,62	893	24,8	25	1776	73
NVT 10.5-34/4	29,04	32,97	1106	34	34	1776	75
NVT 10.5-41/4	30,51	34,64	1221	40	41	1776	76
NVT 12.5-21/4	30,44	24,76	872	20	21	1776	72
NVT 12.5-25/4	32,89	26,76	1018	24	25	1776	73
NVT 12.5-34/4	35,59	28,95	1192	31	34	1776	74
NVT 12.5-41/4	38,27	31,19	1373	38,5	41	1776	75
NVT 12.5-52/4	41,69	33,94	1631	50	52	1776	77
NVT 12.5-63/4	44,60	36,30	1867	61	63	1776	78
NVT 16.5-52/6	61,07	28,56	2012	51	52	1188	73
NVT 16.5-63/6	64,77	30,29	2263	60	63	1188	74
NVT 16.5-86/6	70,43	32,94	2676	76	86	1188	76
NVT 16.5-103/6	75,52	35,31	3076	94	103	1188	78



AXIAL FANS

Baltogar axial fans are used for the various types of tunnel ventilation systems:

- **Longitudinal – Injection**, using a large fan system outside the tunnel section with lower construction cost than the jet fan system. Aerodynamic design of the nozzle is key factor.
- **Transverse ventilation**, where the flow takes place across the tunnel space between the fresh air and exhaust airways. This system is able to manage the tunnel ventilation independently of its length.
- **Semi-transverse ventilation**, where only one duct is used to move either fresh air or exhaust air. The advantage of this system is the reduced construction cost in front of the transverse solution but having its limitation on the tunnel length.

EAV booster fans can reach up to 3000 mm diameter. Because of their high efficiency and low noise level with an optimal aerodynamic design, robust construction and resistance against corrosion. Main characteristics of these fans are:

- Diameters up to 3000 mm, approved for operation at 400°C for 120 minutes tested and certified according to EN-12.101-3 standard.
- Axial fans performance is certified with tests according to ISO 5801
- Depending on the ventilation requirements, Baltogar axial fans type EAV can be unidirectional or 100% reversible
- Impellers are inspected by X-raying to guarantee an optimal mechanical performance.
- Range for electrical networks operating at frequencies of 50 Hz and 60 Hz.
- Impellers are balanced according to ISO-1940 1-1986 grade 2.5.

ACCESSORIES

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Tunnel fans can be supplied with additional accessories upon request of the customer and depending on the characteristics of each project:

- Dampers, diffusers and grids.
- Shock absorbers.
- Anchoring devices.
- Monitoring Systems.
- Silencers.
- Protection grills Operation and control systems.

GLOBAL SERVICES

GLOBAL SERVICES

Baltogar has a technical assistance department available within a maximum of 48 hours with the following services:

- Erection.
- Commissioning.
- Diagnostics and Maintenance.
- Spare parts and upgrades.





5 minutes from the Bilbao Airport (6 km) 30 minutes
from the Port of Bilbao (30 km) 20 minutes from the
Center of Bilbao (16 km)

Baltogar

Industrial fans

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