WIND TUNNELS

Wind tunnels in any size

Subsonic & supersonic

Eiffel and closed-circuit

Aerodynamic characteristics to suit your application

AERODYNAMIC PERFORMANCE TO MEET ALL TEST REQUIREMENTS

D2T manufactures all types of subsonic and supersonic wind tunnels for use in industry and education. D2T wind tunnels are used in many fields including the automobile, aerospace, building and environmental protection industries.

D2T designs and builds wind tunnels to meet all size and performance specifications.

WIND TUNNELS

EIFFEL SUBSONIC WIND TUNNELS

CHARACTERISTICS

- Size of test section to customer requirements.
- Tunnel types include closed (if not enclosed), adjustable free jet, semi-guided and guided with enclosure.
- Plywood tunnel floor and ceiling profiles are easily interchanged and modified.
- Transparent side walls can easily be removed and the divergence angle can be adjusted to compensate for boundary layer effects or to achieve a given pressure gradient.
- Aerodynamic characteristics to suit customer requirements, including the contraction ratio, number of screens and acoustic behaviour.
- Air velocity to customer specification (normally up to a limit of 50 m/s imposed by the design of the sealing enclosure).

ADVANTAGES

- Lower cost than a closed circuit wind tunnel for a given size and air velocity.
- Contraction ratio may be increased without major cost penalty.

RECOMMENDATIONS

- The blower power required is greater than that of a closed circuit tunnel for a given performance. The additional cost is usually marginal.
- The static pressure in the test section is less than atmospheric pressure. The side walls of the test section must therefore be airtight, or an airtight enclosure must be installed around the test section. The latter is a more flexible solution from a practical point of view.

Eiffel subsonic wind tunnel
Test section:
800 mm by 800 mm
Air velocity (max.):
30 m/s

Eiffel subsonic wind tunnel
Test section:
400 mm by 400 mm
Air velocity (max.):
30 m/s

CLOSED SUBSONIC WIND TUNNEL

CHARACTERISTICS

- Size of test section to customer requirements.
- Tunnel types include adjustable free jet, semi-guided and guided.
- Plywood tunnel floor and ceiling profiles are easily interchanged and modified.
- Transparent side walls can easily be removed and the divergence angle can be adjusted to compensate for boundary layer effects or to achieve a given pressure gradient.
- Aerodynamic characteristics to suit customer requirements, including the contraction ratio, number of screens and acoustic behaviour.
- Air velocity to customer specification.

ADVANTAGES

- The blower power required is significantly less than that of an Eiffel tunnel for a given level of performance.
- The static pressure in the test section is equal to the atmospheric pressure. An airtight test section is therefore not necessary and it is easier to change the configuration between closed, semi-guided and free jet.
- The aerodynamic characteristics are generally better than those of an Eiffel wind tunnel.
- Lower cost than a closed circuit wind tunnel for a given size and air velocity.
- Contraction ratio may be increased without major cost penalty.

RECOMMENDATIONS

- More expensive than a corresponding Eiffel wind tunnel.
- More space required than a corresponding Eiffel wind tunnel.

Closed-circuit subsonic wind tunnel

Test section:
500 mm by 500 mm

Air velocity (max.):
50 m/s

Closed-circuit subsonic wind tunnel

Test section:
200 mm by 300 mm

Air velocity (max.)
50 m/s

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WIND TUNNELS

LOW-TURBULENCE WIND TUNNELS

CHARACTERISTICS

- Wooden closed circuit wind tunnel.
- Long, moveable test section.
- Contraction ratio = 9.17.
- One honeycomb plus 5 moveable grills.
- Single blower with 86 kW motor (anti-hunting device, silencer and anti-vibration mountings).
- Acoustic treatment to test section walls.
- Four elbows with aluminium profile splitter vanes.
- Cooling system (Finned elliptic tube hot circuit plus cold plate heat exchanger or cooling tower).

SPECIFICATIONS

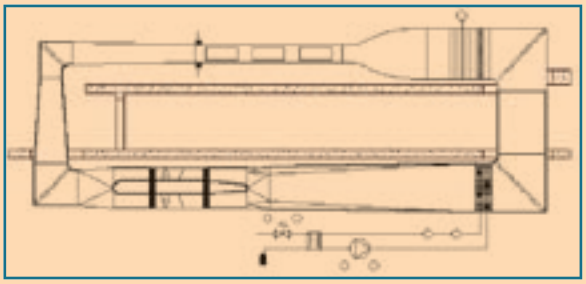
- Test section length = 7 m. Adjustable floor and ceiling.
- Longitudinal turbulence factor < 0.02 %
- Transversal turbulence factor < 0.03 %
- Temperature variation < 0.2 C°
- Temperature stability < 0.3 C°
- Velocity regulation < 0.1 %
- Angle to axis of test section < 0.1 %

Low-turbulence subsonic wind tunnel

Test section: 1200 mm by 800 mm

Air velocity (max.): 70 m/s

Overall view



TEST WIND TUNNEL WITH CASCADE

CHARACTERISTICS

- Mach number adjustable in the test section (measured upstream of the cascade).
- Mmin = 0.16
- Mmax = 0.5 (limited by the first cascade).
- Transonic and supersonic conditions in the cascade.
- Operating modes:
- Continuous: 3700 Nm3/h (compressors)
- Gust: Source = 15 bar absolute, capacity = 10 m3.
- Instrumentation within the cascade (flush mounted micro-sensors on active and passive surfaces).
- High visibility for laser air velocity measurement.

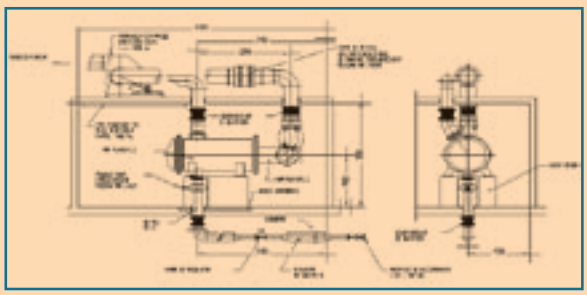
TEST SECTION DIMENSIONS

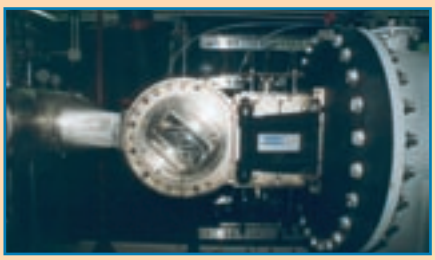
– Width: 58 mm

– Height: Adjustable from 35 mm to 200 mm

– Angular adjustment range: 190 °

Block diagram





The wind tunnels illustrated are shown as examples only. All sizes and performance specifications available to request.

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WIND TUNNELS

SMVS: 30 mm by 60 mm. Mach number continually variable during operation.

SUBSONIC, TRANSONIC AND SUPERSONIC WIND TUNNEL

CHARACTERISTICS

- This wind tunnel may be used to achieve air velocities of between Mach 0.5 and 2.2, including transonic tests, in a single test section.
- The air velocity may be set to any Mach number in seconds using a simple manual control.

Test section

PRINCIPLE OF OPERATION

The Mach number is varied by positioning a profiled section against one of the side walls in the first constrictor section. As the upper and lower walls converge in the direction of the air flow, the position of this profiled section determines the effective cross-sectional area of the constrictor section. The floor and ceiling in the test section are perforated in order to allow air to pass through improving performance in the transonic region. The perforations are closed during supersonic operation.

A second constrictor section is used to control the air velocity during subsonic operation and to improve pressure recovery in the supersonic region.

The dimensions of the test section have been chosen in order to allow continuous operation using a standard motor and blower.

Note: We are also able to supply other types of supersonic wind tunnels, including:

- Larger sizes
- Continuous air supply at the inlet (compressor)
- Intermittent (gust) operation using air from a pressurized receiver and a high-speed regulator valve or hot water siphon.

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