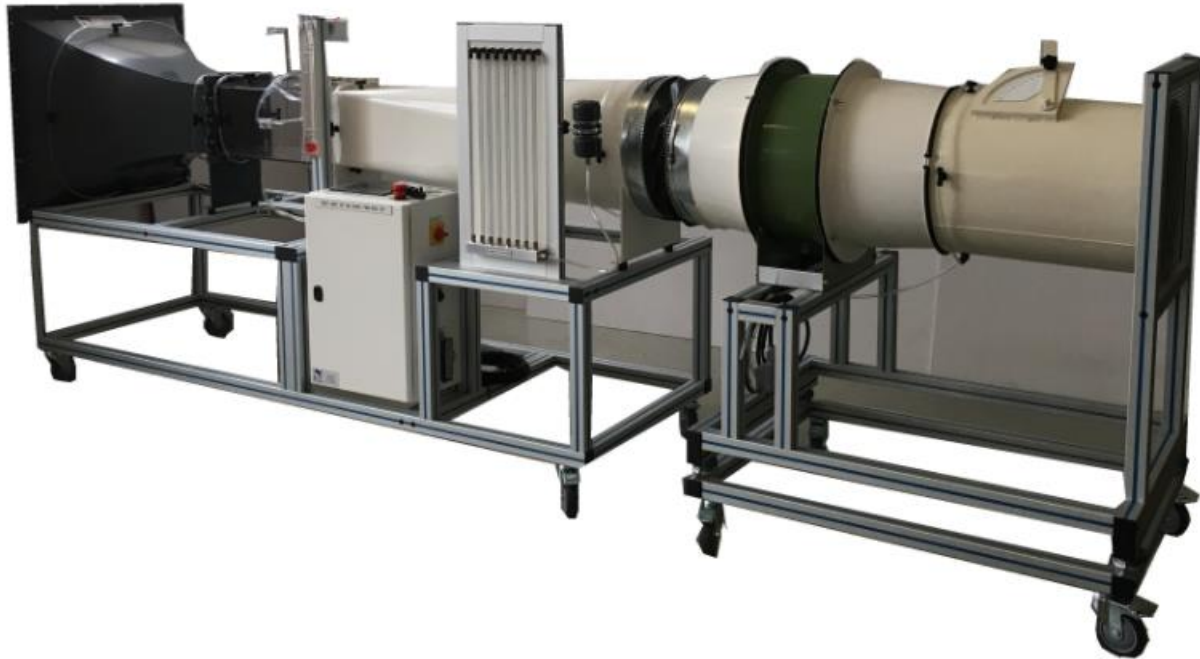


## ASPIRATION WIND TUNNEL



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### Experimental capabilities

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- Study of a fan as a function of rotational speed
- Comparison of a centrifugal fan and an axial fan
- Measurement of electrical power to the motor, determination of efficiency.
- Determination of pressure losses.
- Use of a column multi-manometer for pressure measurements.
- Measurement of pressures, flow rates and velocities for several points in the seam.
- Use of a pitot tube.
- Verification of the Bernoulli equation.
- Determination of the Reynolds number.
- Highlighting aerodynamic lines.
- Aerodynamic studies, measurements of lift, drag and pitch moment as a function of the incidence and air velocity on a profile.
- Study of the effects of stall on lift and on the pressures applied to the wing

The above educational applications are possible within the framework where all options are ordered with the VEA100 base bench.

## Operating principle

The **VEA 100** bench is an aerodynamic tunnel for studying aerodynamic systems. It can be connected to an **axial fan VEA 200** or **centrifugal fan VEA 300** (not included). It is possible to vary the speed of rotation of the fan and determine its characteristics according to the speed, suction and discharge pressures at the fan. The test vein and the fan are disconnectable, this allows to change the type of fan (axial or centrifugal). This bench will also measure electrical power, determine engine efficiency, measure pressure losses using a water column multi-manometer and measure air velocity with a pitot tube.

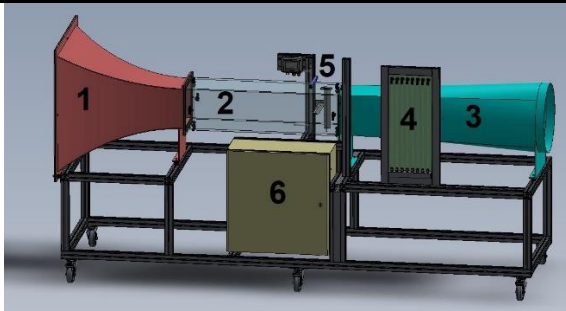
It is also possible to study wing profiles using a three-component balance with **VEA 400** force transducers (not included) with drag, lift and pitch measurement as a function of wing incidence and flow (two wings are provided, symmetrical and asymmetrical).

The VEA500 option is used to study pressure profiles on a symmetrical wing, including visualizing the effect of stall on wing lift. This option includes a water column pressure gauge displaying pressures at 18 measuring points spread over the intrados and extrados.

The rugged design of this equipment makes it perfectly suited for use in schools. Its anodized aluminum structure on multidirectional wheels with brakes gives it great robustness and flexibility of integration into your premises. The chassis is split into two parts with a flexible sleeve connection. The manufacture of this equipment complies with the European machinery directive.

## Illustrations

## Technical details



### 1. Suction cone

- PVC stabilization convergent
- protective grid at the entrance

### 2. Transparent measuring vein

- access hatch in the upper part

### 3. Divergent, square round painted steel duct

- connection to the fan by flexible sleeve

### 4. Multi-tube column pressure gauge

- transparent tubes with red dye
- rear graduation 0-490mm

### 5. Pitot tube

- height-adjustable position in the vein
- measurement of the dP by electronic sensor, display on the screen of the box

### 6. Electrical box

- Box containing all standard safety (power disconnecter, emergency stop button, thermal and differential circuit breaker, indicators, start buttons ...)
- the box includes a touch screen for displaying measurements
- Fan speed adjustment by potentiometer
- Display of the fan rotation speed on the screen
- Display of the power consumed by the fan motor on the screen

### 7. Chassis

- Support frame in screwed anodized aluminum profile
- chassis equipped with six directional casters with brake

## Services required

## Documentation

- Power supply : 400 VAC – 50 Hz – 20 A
- Electrical supply type : 3 phases + Neutral +Earth
- Dimensions: (LxWxH mm): 3700 x 785 x 1300
- Weight (Kg): 300



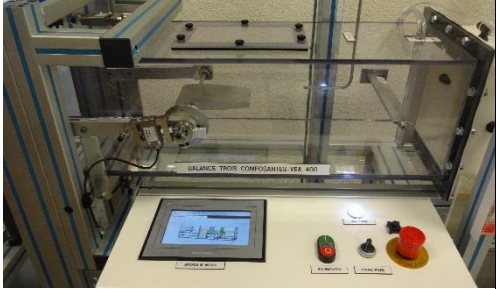

- User's manual
- Pedagogical manual
- Technical documentation of the components
- Lab exercises
- Certificate of conformity CE

Note : if the equipment installation is operated by our staff, all supplies and exhaust connections required must stand at less than 2m from the machine

# VEA100



## Options ( not included)

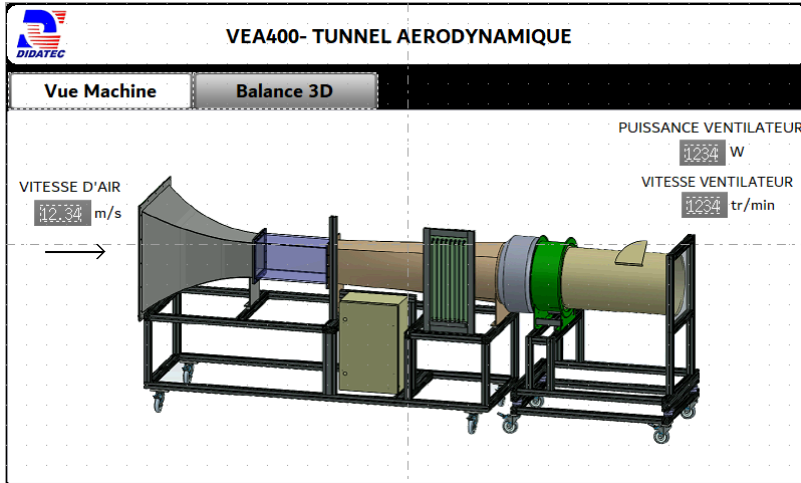
<p>VEA 200</p>	<p><i>Axial fan</i>  <i>-Engine 2.2KW</i>  <i>-Maximum flow rate: 180m3/min</i>  <i>-rotational speed: 2900rpm</i>  <i>-support chassis equipped with 4 directional casters with brake</i>  <i>-manual register at fan output</i>  <i>-connection to the VEA 100 bench by flexible sleeve (aeraulic) and quick connector type harting (electric)</i></p>	
<p>VEA 300</p>	<p><i>Centrifugal fan</i>  <i>-4KW motor</i>  <i>-Maximum flow rate: 160m3/min</i>  <i>-rotational speed: 2900rpm</i>  <i>-support chassis equipped with 4 directional casters with brake</i>  <i>-manual register at fan output</i>  <i>-connection to the VEA 100 bench by flexible sleeve (aeraulic) and quick connector type harting (electric)</i></p>	
<p>VEA 400</p>	<p><i>- Three-component balance with force transducers</i>  <i>- a symmetric profile and an asymmetric profile provided</i>  <i>- Display of balance measurements (lift, drag, pitch) on touch screen of the VEA100 module</i>  <i>- Numerical incidence indicator</i></p>	
<p>VEA 500</p>	<p><i>- Measuring wing equipped with pressure taps on the intrados and extrados (18 in total)</i>  <i>- Symmetrical wing profile</i>  <i>- tilting water column pressure gauge with transparent tubes and red liquid for measuring pressure on the wing</i></p>	

**Note:** The VEA100 tunnel must be associated with the VEA 200 or VEA300. Only the VEA400 module is a non mandatory.

# VEA100

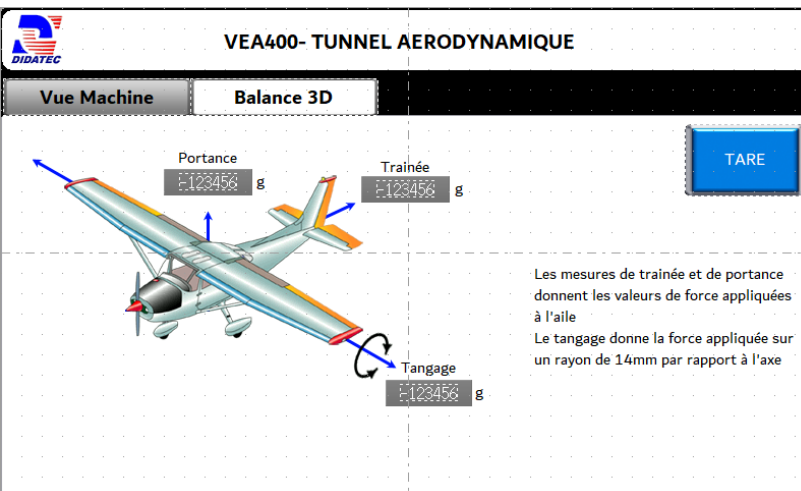


Included with the installation: Touch Pad of supervision



On the machine view page we find the following measures:

- Suction air velocity through pitot tube in m/s
- Measurement of fan speed in rpm
- Measurement of the electrical power of the fan in W



On the 3D Balance page we find the following measurements (if option VEA400):

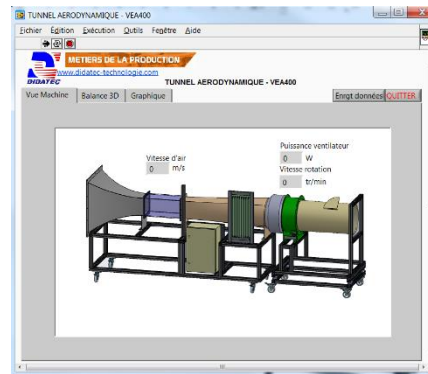
- Drag measurement in g
- Pitch measurement in g
- Lift measurement in g

The bench is also equipped with supervision and parameterization software. The connection to the PC is made by WIFI. The software is divided into three parts:



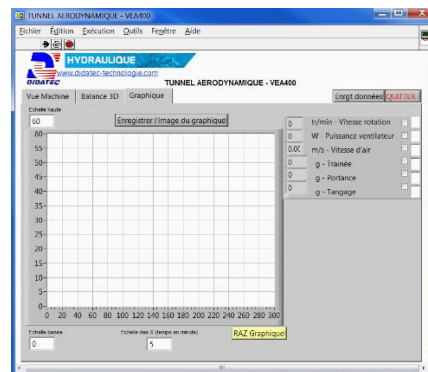
### **SYNOPTIC:**

We find in this window the diagram of the machine with the location of the different measurements of the process and their values.



### **GRAPHIC :**

We find in this graphical window, the possibility to draw measurement curves as a function of time by selecting the desired quantities.



### **3D BALANCE (if option VEA400):**

We find in this window, the three measurements of our three-dimensional balance.

It is enough to make a tare of the balance and to read the three parameters namely, the drag, the pitch and the lift exerted on the test measuring wing.

Only with the VEA400 option.

