

## Impedance sensor



*Sensor and sample holder*

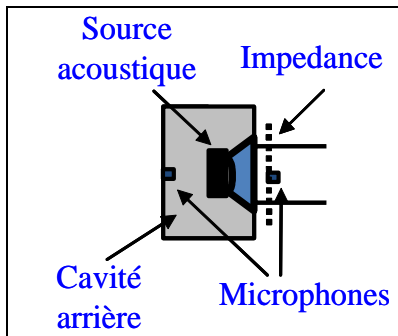
### Description

The impedance sensor measures the acoustic impedance of the object to which it is attached. Initially designed for the characterization of acoustic wave guides (such as wind musical instruments), it is also suitable to other applications:

- Acoustic materials characterization (surface impedance, sound absorption coefficient),
- Dimensional check,...

In specific configurations, the impedance sensor can perform low frequency measurements as low as 10Hz.

The design and development of the impedance sensor is the product of joint work by CTTM and LAUM (Laboratoire d'Acoustique de l'Université du Maine) and was patented.



*Principe*

### Principle

The impedance is computed analytically from a frequency response function between two microphones. The microphones are mounted onto the sensor on both sides of a sound transducer which provides the acoustic excitation.

Thanks to specific post-processing, the operation of the sensor only requires partial calibration (sensor closed by a rigid cap). Unlike the usual processes, it is therefore unnecessary to swap microphones, which is beneficial for low frequency performances. This ability makes the impedance sensor a reliable and robust product, which can be used for on-site production testing.



*Wind instrument characterization*

### Main characteristics

- Standard frequency range: 20 Hz - 6 kHz,
- Output diameter: 16mm,
- 2x3 bores for mounting of mating part,
- Possibility of on-request adaptation.

### Product

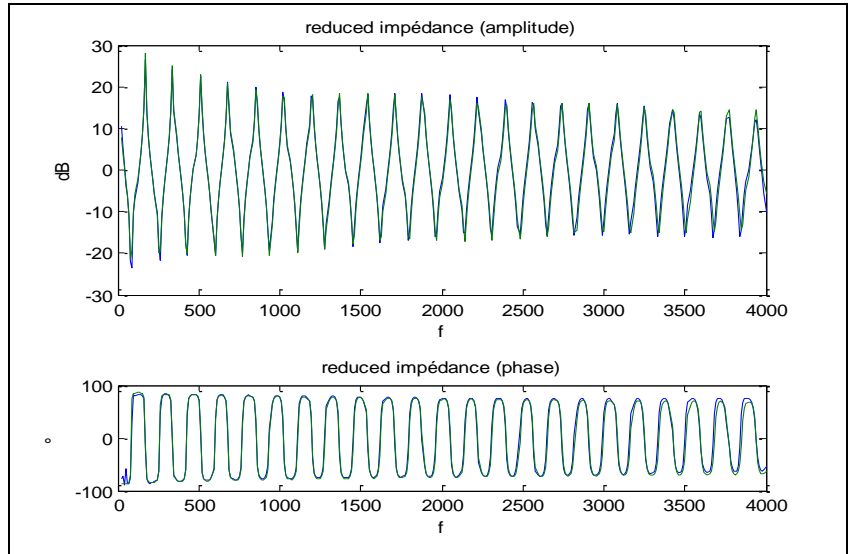
The impedance sensor is provided with measurement software and all accessories (except mating parts).

## Examples of measurements results

- Closed tube input impedance



Wave guide input impedance measurement



Blue : measurement performed with impedance sensor  
Green : theoretical impedance curve



Poroelastic materials characterization

- Acoustic material sound absorption coefficient measurement (tube  $\varnothing$  29mm)

