



Sylvatest 4

User guide

www.sylvatest.com



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1 FIELDS OF APPLICATION

1.1 Aim of the document

The purpose of this user guide is to explain the use of the Sylvatest 4 on the different applications for which the technology has been developed.

This document does not replace the specific training on the technology.

The user of Sylvatest 4 must be properly trained.

Reminder: Sylvatest 4 is a tool to be used by dedicated industry experts.

1.2 Fields of application

Sylvatest 4 is the 4th generation of Sylvatest devices.

Sylvatest is a technology based on the measurement of the propagation speed of low frequency ultrasonic waves for the evaluation of wood quality. The main applications are:

- Mechanical characterization of structural wood
 - Round wood
 - Squared wood
 - Manufactured wood
- Biodegradation characterization of a stranding tree

If other applications are possible, they are dealt with on a case-by-case basis directly with the developers of the technology. In this document, only the applications mentioned above are discussed.

If you have any further questions, support is available at: sylvatest@sylvatest.com

1.3 Expression of results

Sylvatest 4 is managed by a software application - Sylvius - to be installed on a handheld computer or smartphone (refer to the Sylvius user guide for more details).

Sylvius is available either in a generic version (Sylvius Generic) or in a custom-developed version.

Sylvius expresses the results of the Sylvatest 4 according to the chosen application and the parameters filled in the software.

Sylvatest 4 does not work without Sylvius.

1.4 Guaranty

Sylvatest 4 is guaranteed for one year from the date of delivery.

Any defect due to improper handling or improper use of the device is not covered by the warranty.

1.5 Limitations of use and precautions

Sylvatest 4 should be used and stored under the following conditions:

- **Temperature:** Sylvatest 4 can be used at temperatures ranging from -5°C to 40°C.
(Caution, low temperatures limit battery duration and frozen wood may impact moisture content readings).
- **Humidity:** Sylvatest 4 is IP62. After any use in a humid environment, it is strongly recommended to wipe the transducers and store them in a dry and ventilated area.
- **Environment:** Sylvatest 4 must be used in an environment free of noise and vibration.
- **Storage:** Sylvatest 4 should be stored in a dry, temperate, ventilated and UV protected environment.
- **Autonomy:** Sylvatest 4 batteries, fully charged and used at a temperature of 20°C, allow the device to be used for up to 8 hours.
- **Measured lengths range:** Sylvatest 4 operates in the following length ranges:
 - **Longitudinal measurements:** up to 15m
 - **Transversal measurements:** up to 2m
 - **Radial measurements:** up to 1m

In some cases, it is possible to operate Sylvatest 4 beyond the ranges mentioned above (to be checked on a case-by-case basis).

2 PRESENTATION OF THE EQUIPMENT

2.1 Transducers

Sylvatest 4 consists of a pair of transducers: a "master" transducer and a "slave" transducer.

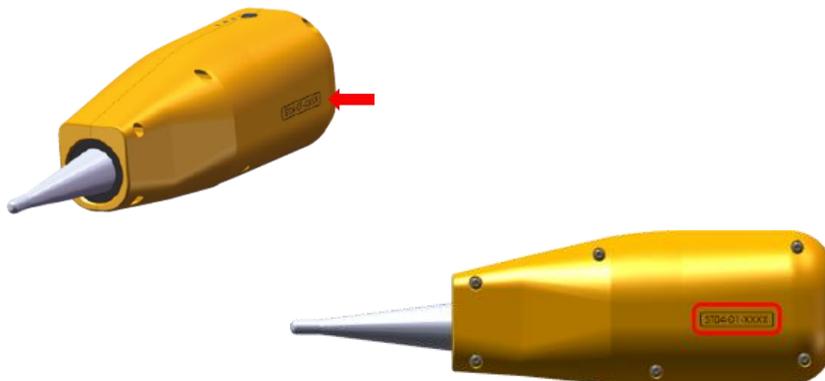
The supplier informs the user which transducer is the "master" one and which is the "slave" one.



2.1.1 Transducer serial number

Each probe has a unique serial number marked on the side of the transducer. The serial number is a string of characters beginning with ST04:

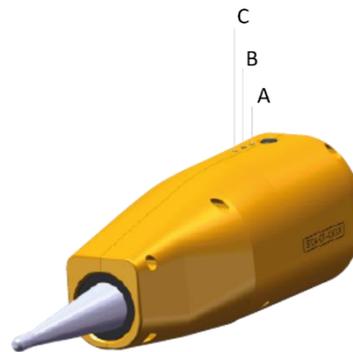
ST04-xx-xxxx with x a digit from 0 to 9.



To operate, the "master" transducer must be coupled to the handheld computer equipped with Sylvius software (see Sylvius user guide).

2.1.2 Indicator lights on the transducer

Three indicator lights (leds) are located on top of the transducer. All the leds are off if the probe is off.



A light can have three different states:

- Off
- Continuous on
- Flashing



A: Two-color Red/Green light: Battery level status

When charging:

-  Flashing red: < 30% of capacity
-  Flashing orange: between 30% and 60% of capacity
-  Flashing green: > 60% of capacity
-  Green : 100% of capacity

When the transducer is on:

-  Red: < 30% of capacity
-  Orange: between 30% and 60% of capacity
-  Green: > 60% of capacity

Note: if the battery drops below a critical threshold (2.9V), the probe switches off automatically. The probe refuses to switch on until the voltage rises and the red LED flashes rapidly (5HZ).

B: Yellow light: Measurement status

Transducer is switched off, and briefly press the button:

-  Blank: transducer is in slave mode
-  Yellow: transducer is in master mode

Transducer is switched on:

-  Flashing yellow: measurement is running
-  Yellow: transducer is on, ready for a measurement

C: Blue light: Bluetooth status

-  Flashing blue: Waiting for a connection with the handheld computer
-  Blue: Connected

Note: The blue LED on the "slave" transducer goes out automatically after one minute.

2.1.3 Checking the battery level

A short press on the button located on the top of the transducer allows you to check the battery level without having to turn it on.


Light A

-  Red: < 30% of capacity
-  Orange: between 30% and 60% of capacity
-  Green: > 60% of capacity

2.1.4 Switching transducers ON/OFF

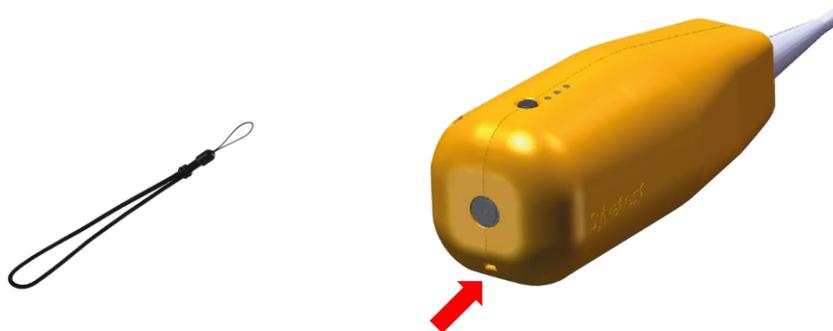
To switch the probes on and off, press the button on top of the transducer for two seconds.



After five minutes of inactivity, the probe switches off automatically.

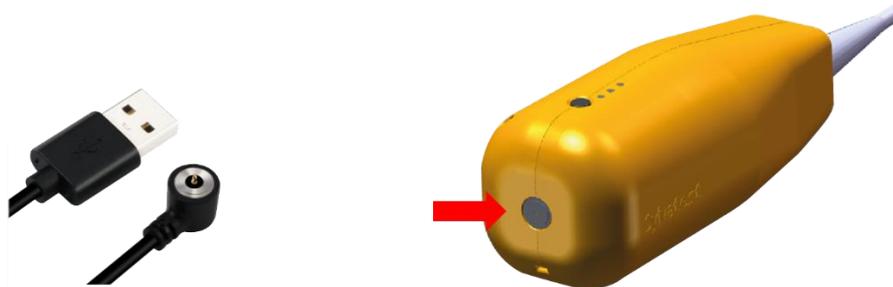
2.1.5 Hand strap

Each probe is delivered with a hand strap that the user is free to use to manipulate the probe. A dedicated notch is located on the back of the probe.



2.2 Transducer charging cable

The transducers are charged via a USB cable. The cable is positioned on the back of the probe by magnetic contact.



It is possible to use the probes while charging.

During charging, an indicator light shows the status of the charge level (ref. 2.1.2).

It may take about 8 hours to fully charge the battery.

2.3 Sylvatest 4 drill bit

In order to guarantee the coupling between the transducer and the wood, a drill bit is supplied with the equipment. Its shape follows the shape of the probe.



The drill bit can be used with any standard drill.

2.4 Carrying case

The equipment is delivered in a carrying case that protects the Sylvatest 4 during travel and storage.

The interior of the bag is modular.



2.5 Sylvius

Sylvius is the software application that allows you to control the probes and express the results according to the chosen field of expertise.



Sylvius is installed on a handheld computer or smartphone.

Sylvius is mandatory for the operation of the equipment.

Sylvius is proposed in a generic version (Sylvius Generic) or in a specific version according to the user's needs.

For more information, please refer to the user guide of the application.

3 OPERATING PROCEDURE

This chapter describes the standard operating procedure for a measurement with Sylvatest 4.

Beforehand, the "master" probe must be connected to the handheld computer on which Sylvius is installed.

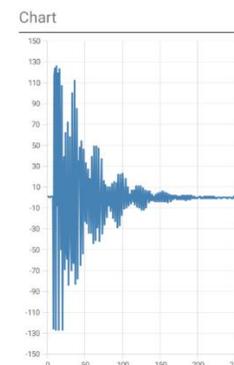
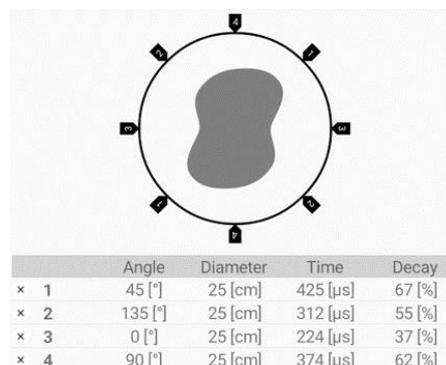
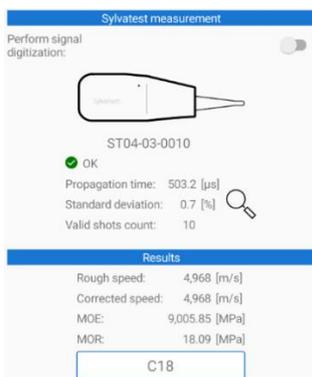
1. Drill the holes to position the probes using the drill bit provided
2. Install properly the transducers on the element to be measured
3. Switch the transducers on
Erreur ! Liaison incorrecte.
4. Launch the measurement from Sylvius

Transducer	Light B status	Light C status
Master		
Slave		

5. Wait for the measurement to be completed

Transducer	Light B status	Light C status
Master		
Slave		

6. The data is automatically loaded into the handheld computer and evaluated according to the selected application.



7. Do another measurement or switch the transducers off

4 APPLICATIONS

Sylvatest technology can be used for several applications depending on the expertise to be done.

- Longitudinal measurements:

They are used to express a result on the mechanics of structural wood. Longitudinal measurements are carried out either by direct measurements (probes in the same plane facing each other) or indirect measurements (probes on the same face but with an angle).

- Radial measurements:

They are used on standing trees to assess a potential rate of trunk degradation.

- Comparative measurements:

They are used according to protocols to be defined in order to detect possible singularities.

Erreur ! Liaison incorrecte.

4.1 Longitudinal measurements

Longitudinal measurements - in the direction of the wood grain - are used to obtain a mechanical expression of the structural timber.

Depending on the case, the measurements are carried out in a "direct" mode with the probes facing each other or in an "indirect" mode with the probes on the same side but inclined.

If the "direct" mode is to be preferred, the "indirect" mode is chosen in particular in the expertise of a building when the "direct" mode is impossible (because the ends of the element to be measured are inaccessible for example).

4.1.1 Direct mode



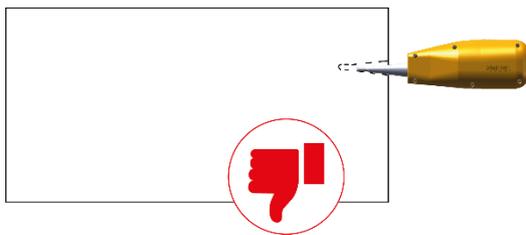
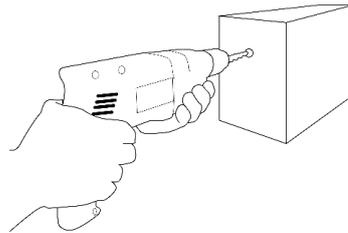
To evaluate the mechanical properties of structural wood, longitudinal measurements in direct mode are to be preferred.

They concern both squared timber and round timber.

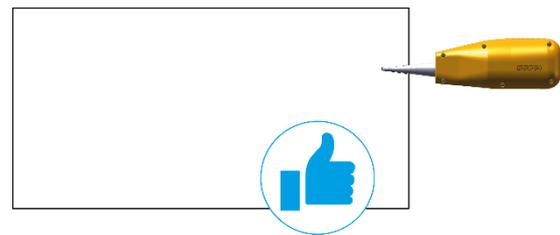
The probes are positioned opposite to each other on the same axis.

The first step consists of drilling the element to be measured using the drill bit supplied. It is essential that the end of the probe touches the wood (no gap) and that the probes are pressed down firmly without excessive force.

It is also advisable to avoid drilling in the singularities (knots, cracks...), too close to the edge, as well as in the heartwood.



The transducer « swims » in the hole



The transducer is properly installed in the hole

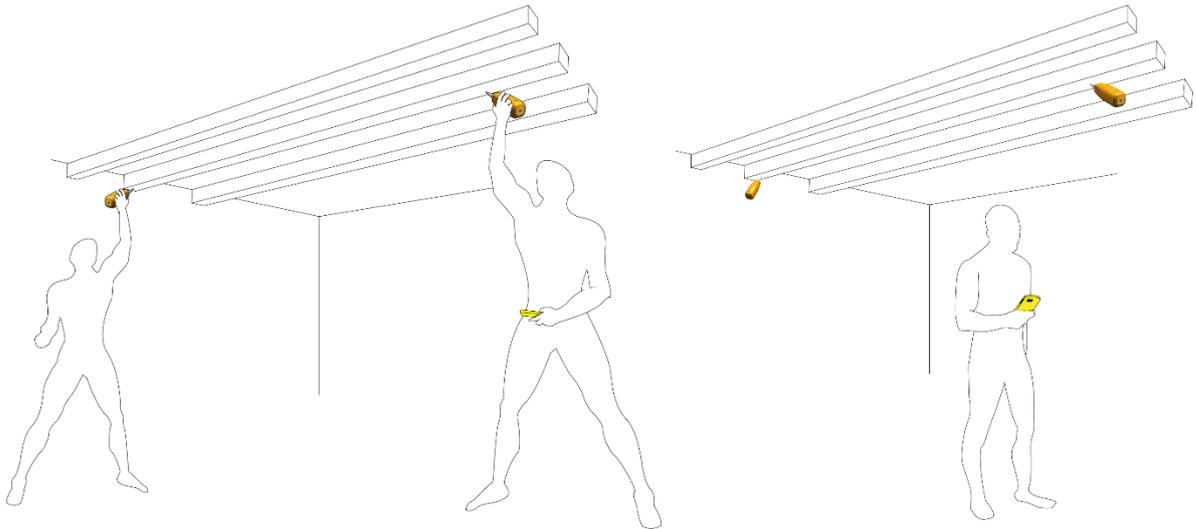
The probe is well embedded in the wood and supports its own weight.



The probe has difficulty holding its own weight



4.1.2 Indirect mode



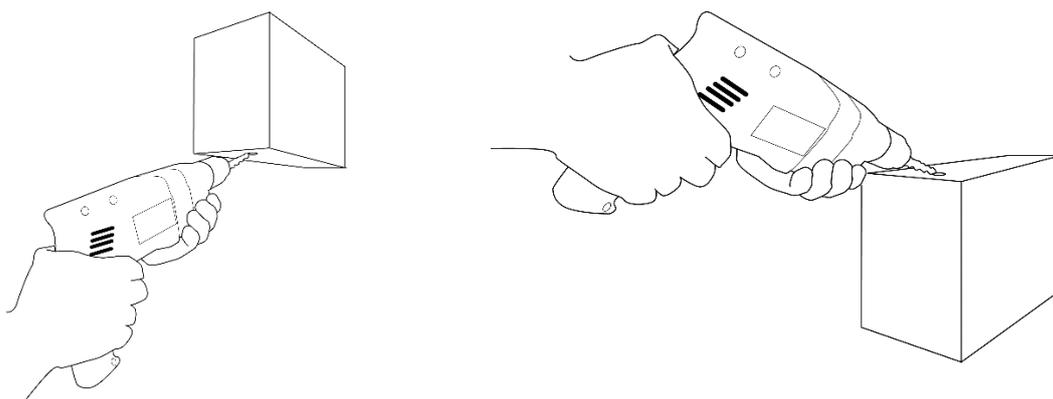
The indirect mode is used, for example, in building surveys when the ends of the wood are not accessible for direct measurements.

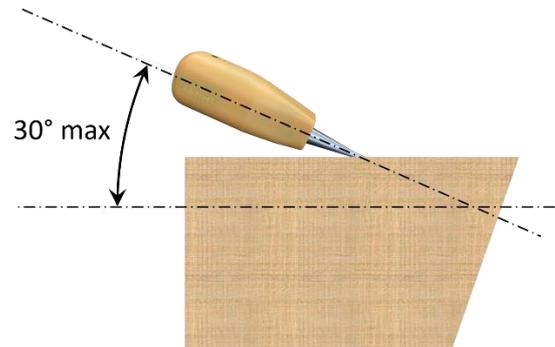
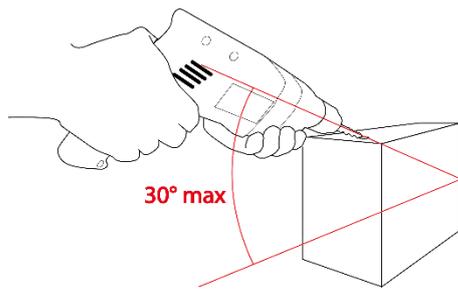
The special precaution for indirect measurements is to limit the angle of inclination of the probes to max. 30°.

As with the direct mode or any other measuring mode, the contact between the transducers and the wood is important.

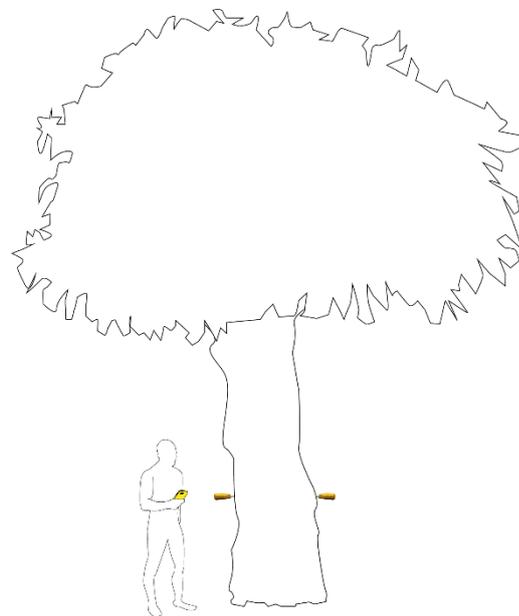
The hole for coupling the probes to the wood is drilled with the special drill bit supplied with the equipment.

In the case of log measurements, the transducers must be inserted in the wood and not in the bark.





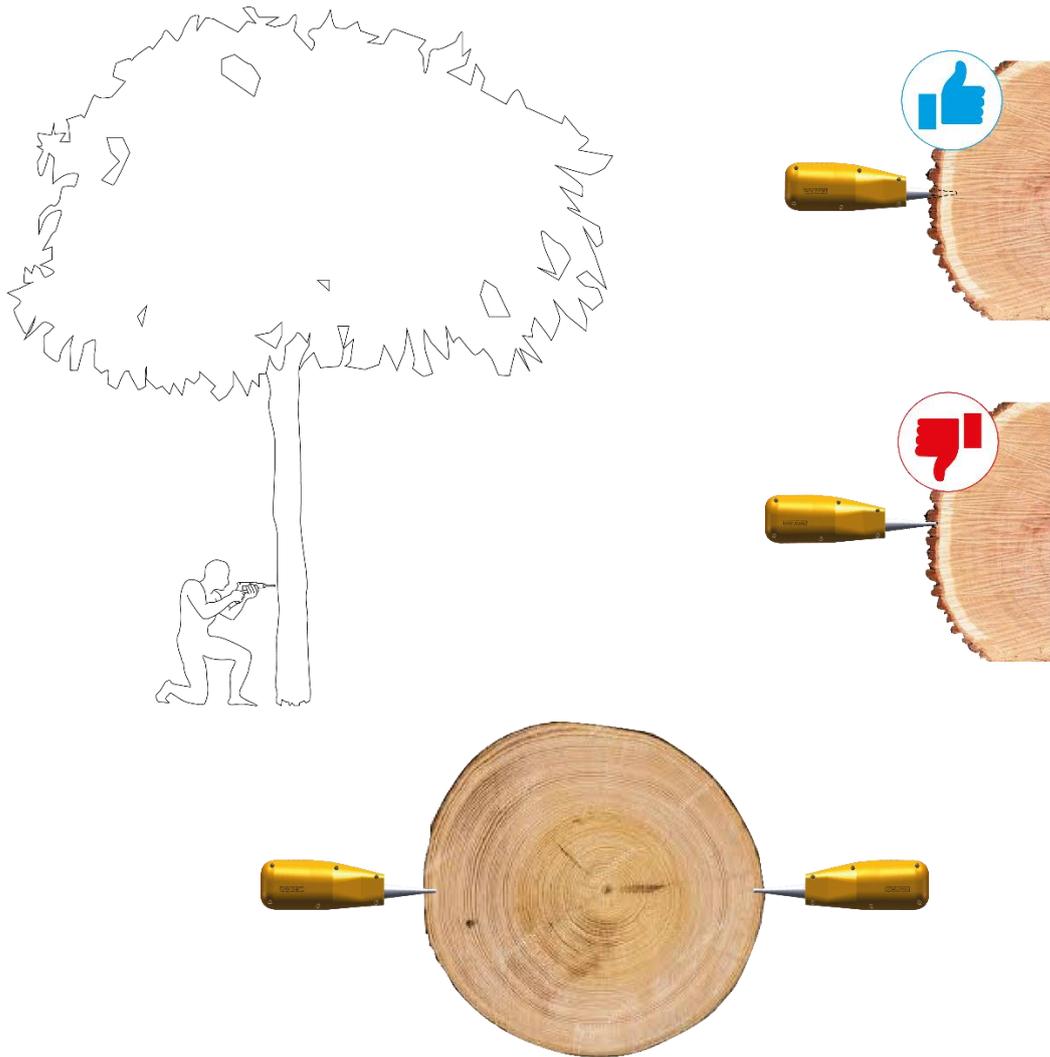
4.2 Radial measurements



Radial measurements are made on standing trees to assess the rate of degradation in the trunk.

The probes are placed diametrically opposite to each other. They must pass through the bark barrier and their ends must touch the wood.

Measurements can be taken at any height of the trunk. However, the usual measurements are made at human height, between 1m and 1.5m above ground level.



4.3 Comparative measurements

The Sylvatest can be used for special applications such as the detection of singularities in wood, for example, the evaluation of the quality of glue planes in reconstituted wood, the evaluation of the cracks or the evaluation of the grain quality of standing trees.

Each case is unique. The most important thing is to first establish a precise and reproducible protocol in order to be able to compare the results with each other.

Certain parameters are also essential for the analyses, such as the type of wood and its moisture content, for example.

Sylvatest's experts are available to help the users to define the adequate protocols (sylvatest@sylvatest.com).

5 SYLVATEST 4 CALIBRATION

As any metrological instrument, it is advisable to have the calibration of the instrument checked once per year.

This calibration check is carried out by the manufacturer (sylvatest@sylvatest.com).