

## Timber drying

### Facts & figures:

One cubic metre of freshly felled oak contains approximately 540 litres of water.

Examples for air drying times:

**Softwoods.** 25mm thick Scots pine that is stacked in April can reach 20 % moisture content by July to August if the summer months are warm and dry.

**Hardwoods.** 25mm thick English oak if piled in early autumn can reach 20 % moisture content in about 10 months.

And a 75mm thick log of wood will even take 3 years to reach equilibrium moisture content.



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### Timber drying in general

Wood is probably one of the oldest building materials on the planet. But before wood can be used as a construction material whether it be a structural support in a building or to manufacture furniture, it has to undergo treatment to gain the required properties defined by the application where the wood is used. The first and most important treatment is the drying process.

The fastest and most effective way to drying timber is in Kilns. **Kilns drying** is done in a closed chamber in which air



temperature, relative humidity and airflow can be controlled to dry timber to a specified moisture content. The temperature for the drying is usually between 40-90°C depending on type, size and the later use of the timber. There are many different types of kilns such as vacuum systems, traditional heat and vent type kilns and radio frequency dryers. The cost of installing and maintaining kilns may often be prohibitive unless a large amount of timber can be processed. However, if the value of

specific species is high enough, it becomes more feasible to kiln dry green timber.

Some other options to try timber are: **Solar drying** where the green timber gets put into a glass house. This option is rather used for drying small amounts of timber. For bigger amounts the **Air drying** option is used more often. Both drying options are only controllable to a very limited extend since they strongly depend on weather conditions.

### Why the need to measure humidity?

Controlling humidity during the timber drying process is essential for many factors. An incorrect level of %ERH in wood will have the following effects on product and process:

#### Dimensional changes

A controlled drying process prevents the timber from unacceptable shrinkage after the installation.

But since wood is a natural hygroscopic product it will always change its size to a minor extend.

#### Strength

Drying the timber below a water contents of 25 % to 30 % will maximise the mechanical strength. It is nearly twice as strong and twice as stiff as green wood.

#### Decay

To reduce susceptibility to fungal decay. Timber maintaining less than 20 % moisture content is unlikely to be attacked by wood decaying fungus.

#### Preservation

To increase the effectiveness

of preservative treatments. Many preservatives should only be applied when the humidity of the timber has been reduced.

#### Corrosion

Dry timber prevents the corrosion of metal fixings such as metallic foundation, holders, nails and screws.

#### Weight

Dry wood is much lighter in weight than wet wood. For many species, dry wood is nearly half the weight of wet wood.

## What solution can Rotronic offer?

The heart of the latest humidity measurement equipment comes with the Rotronic capacitive foil sensor: HygroMer IN-1. This thick film sensor, with the best long term stability on the

market is ideal for the tough application of timber drying, where high temperatures and humidity levels are present.



All products with this logo contain an AirChip3000.

AirChip3000 advantages:

- Relative humidity, temperature and dew point outputs
- Can store 2'000 points
- Sensor self test function

And much, much more...



HF 5 wall mount transmitter in combination with:

## Rotronic products:

### Humidity and temperature probes:

- **HC2-IM402**  
-100...200°C,  
0...100%rh,  
Ø15mm,  
±0.8%rh and ±0.1K...
- **HC2-IC402**  
-100...200°C,  
0...100%rh,  
Ø15mm  
±0.8%rh and ±0.1K...
- **HC2-IC402-A**  
-100...200°C,  
0...100%rh,  
Ø15/25mm,  
±0.8%rh and ±0.1K...

### Transmitter:

- **HF5 series**  
For interchangeable probes,  
Various analogue and digital outputs, Display,  
All psychrometric calculations available...
- **HF7 series**  
Stainless steel probe,  
-100...200°C,  
3/4 wire configuration,  
Various analogue outputs,  
Display...
- **HF8 series**  
For 2 interchangeable probes,  
Various analogue and digital outputs, Relais outputs  
All psychrometric calculations available...

### Dataloggers: (e.g. for solar drier)

- **HL-NT range**  
For interchangeable probes  
(up to 7 probes with docking station)  
32MB flash card,  
Display,  
Conform to FDA21 CFR Part 11 and GAMP4...
- **LOG-HC2-RS**  
Wireless logger for one interchangeable probes.  
Stores up to 500000 data points  
6 Year battery lifetime  
Range 100m free field  
-40 to 85°C  
Conform to FDA21 CFR Part 11 and GAMP4...



HC2-IC402 probe HC2-IM402 probe

## Customer benefits:

### Accuracy:

Choosing Rotronic gives you the best accuracy on the market.

Precise humidity measurements enables the dryers to work at their maximum performance to try the timber as fast as possible but not too fast so structural damage in the wood can occur.

### Communication:

Networking with Rotronic is an easy affair! With all of the

different communication methods, from conventional analogue output signals to RS-485, Wireless or Ethernet RJ45, Rotronic can provide the needed interface to your drying control unit or any third party monitoring system.

### Long term stability:

With a long term stability of under 1%rh per year (depending on the environment), Rotronic offers the possibility to "plug & play":

install the device and leave it. We would recommend frequent spot checks in-between calibrations.

### Calibration:

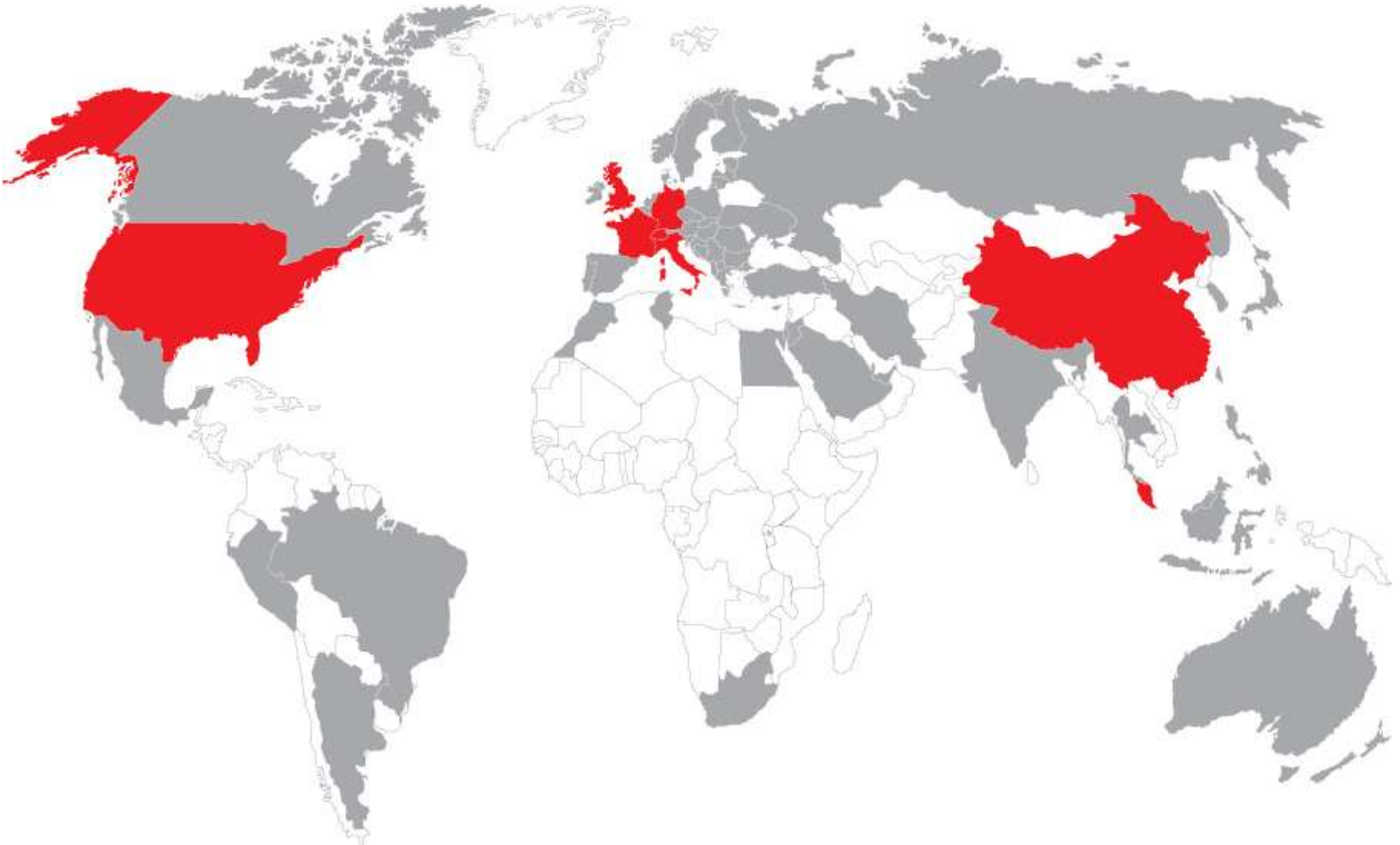
In order to calibrate humidity measurement devices, we can offer a factory calibration certificate or even an SCS certificate if this is required. We can also supply a humidity and temperature generator, the HG2-S as well as unsaturated salts for on-site calibration.



HF7 duct mount transmitter

## Contact us:

Rotronic is represented in more than 40 countries around the world. An up to date list of all our partners is available at [www.rotronic.com](http://www.rotronic.com)



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