# WIISTE

storaenso

# WM1-WAN
## INTERNET-INTEGRATED WOOD MOISTURE SENSOR

### Wiiste IoT

Wiiste **WM1-WAN** is a Finnish new generation sensor intended for measuring wood moisture content together with humidity and temperature of environment. The sensor is developed in co-operation of Wiiste Oy and Stora Enso Oyj.

The sensor is installed on surface of wood structures, for example CLT or LVL elements in construction sites. The WM1-WAN independently sends the measurement data to the internet, allowing for real-time remote monitoring of the wood moisure and environment humidity situation outside the site.

The features of the sensor developed for site conditions include automatic alerts for temperature, wood moisture content, relative humidity and battery charge. The WM1-WAN enables the building's use-phase automatic monitoring up to two years with a single battery change.

### Device operation

The WM1-WAN uses two individual electrode pairs to measure a wood sample's moisture content using electrical resistance. The eletrodes are also used to attach the device to the measured structure. The length of measurement electrodes can be selected to meet desired measurement depth. This way the the cross-sectional moisture distribution of structure can be monitored.

### Reading the results on a browser

The sensor sends the moisture content of measured wood together with environmental humidity and temperature data to cloud service in real-time. The browser-based web service scales for different terminal devices, and its other features including filing, reporting and sharing the data, and planning the measuring on the ground plans.

### Patented technology

WM1-WAN uses patented technology (Patent pending) for moisture content measurement together with a new W-tip sensor structure developed by Wiiste Oy. By combining these unique features a precise and reliable real-time monitoring of wood structures can be obtained.



## WM1-WAN FEATURES

- Measures moisture content of wood from two depths
- Standard measurement depth can be
   from 5mm to 48mm
- Can be permanently installed
- Wireless remote reading (LoRaWAN)
- Battery operating time up to 2 years
- Fast Wiiste W-Tip sensor
- Accuracy  +- 1 MC, +-2.5 %RH, 0.2°C

## TECHNICAL DATA

### Moisture content measurement

| | |
|---|---|
| Measurement range | 6 ... 30 MC |
| Measuring accuracy | +- 1 MC |
| Repeatability | 0.2 MC |
| Hysteresis | 0.2 MC |
| Resolution | 0.1 MC |
| Linearity error | 0.1 MC |
| Measurement type | Resistive |
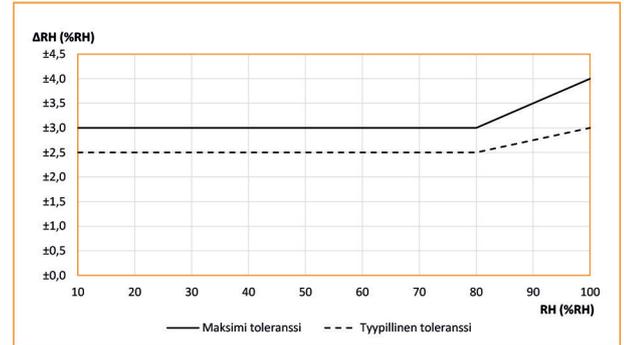
### Humidity measurement

| | |
|---|---|
| Measurement range | 10 ... 100 %RH |
| Measuring accuracy | (see picture 1)  ±2.5%RH (10 ... 80%RH) |
| Repeatability | ±0.2%RH |
| Hysteresis | < ±1%RH |
| Resolution | 0.1%RH |
| Linearity error | < ±1%RH |
| Response time (T10-90%) | < 20s |
| Transfer accuracy | < 0.5%RH/a |
| Sensor type | Capacitive polymer |
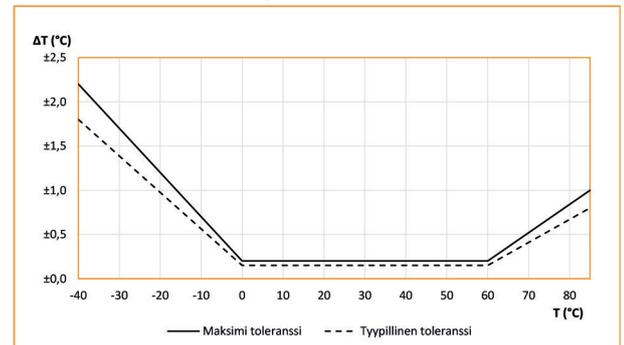
### Temperature measurement

| | |
|---|---|
| Measurement range | -40 ... 85°C |
| Measuring accuracy | (see picture 2) |
| Repeatability | ±0.1°C |
| Resolution | 0.1°C |
| Response time (T10-90%) | < 10min |
| Transfer accuracy | < 0.05°C/a |
| Sensor type | PTAT |

### Electrical properties
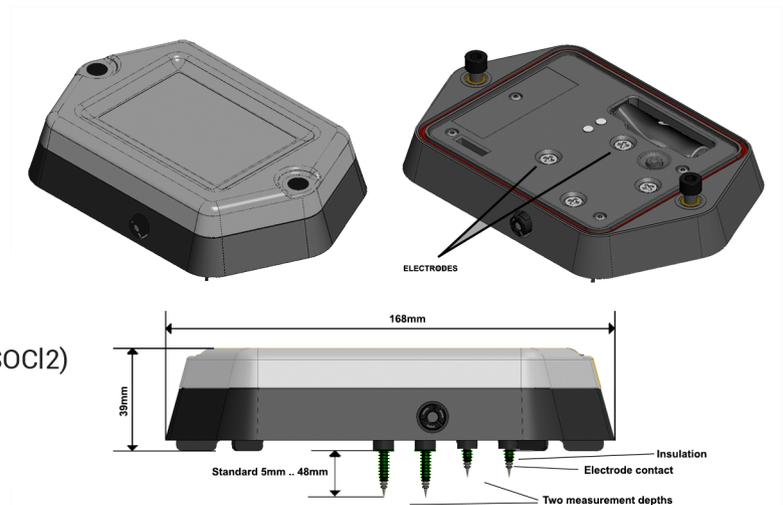
| | |
|---|---|
| Internal power supply | 3.6V / 1.2Ah / 4.32Wh (Li-SOCl2) |
| Network connection | LoRaWAN |
| Transmitter power | 25mW / 14dBm |

### Mechnical properties

| | |
|---|---|
| External dimensions | 168mm x 113mm x 39mm |
| Weight | 228g |
| IP rating | IP54 |

### Use and storage

| | |
|---|---|
| Operating temperature range | -40 ... 85°C |
| Storage conditions | 20 ... 30°C / 40 ... 60%RH |

picture 1



picture 2





**MANUFACTURING, SALES AND INFORMATION**