

# Model 520 Slope-Of-Grain Indicator

- Determines general grain angle and local grain angle.
- Determines the amount of alignment in wood and composite material like flakeboard.
- Sensor mounts in any attitude to meet a wide range of needs.



Model 520 Slope-of-Grain Detector head

## Description

The Metriguard Model 520 Slope-of-Grain Indicator measures grain angle and signal amplitude in wood and other aligned dielectric materials. Grain angle in wood is the direction of the wood fibers projected onto a flat wood surface relative to a preferred zero direction. Signal amplitude is a measure of how well the wood fibers are aligned in a common direction (the amount or degree of alignment).

Grain angle measurement is one of the newest and most innovative methods available to wood scientists for evaluating and characterizing wood products. Structural property values of wood are strongly dependent upon grain angle. Modulus of elasticity (E) and strength are greatest along the wood fibers. Furthermore, these structural property values are greatest if the wood fibers are well aligned in a common preferred direction.

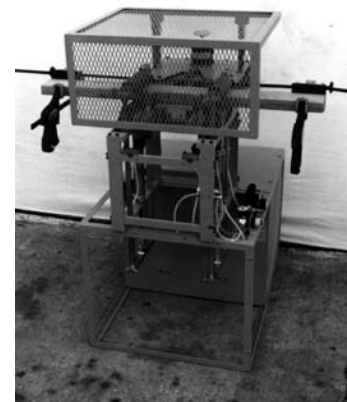
The stationary sensor offers very high-speed, non-contacting measurement capabilities and may be mounted in any attitude. The Model 520 consists of a stationary sensor unit, a control unit, an industrial microcomputer, and specially designed computer programs. An optional transport system can be used to position specimen material relative to the sensor unit for automated measurements over a grid of points on the material surface.

The sensor unit generates radio frequency electric fields and applies them to specimen material adjacent to the sensor unit. The control unit and computer process the sensed signal to obtain grain angle and signal amplitude. These measurements are useful in determining how well the material fibers are aligned and their general direction of alignment.

The Model 520 is being used in research applications. Experiments on flakeboard have demonstrated the potential for in-line, high-speed measurement of grain angle and amount of flake alignment in the production of



A desktop computer comes standard with the Model 520. (Previous computer style shown. A more modern version will be supplied).



The Model 520 Grain Angle Indicator, shown here with an optional specimen-transport system.

# Model 520 Grain Angle Indicator

## Specifications: 520

### SYSTEM CONFIGURATION

The Model 520 System includes sensor unit, electronic unit and computer connected via cables. Sensor may be mounted in any attitude. Grain angle and signal amplitude are obtained from dielectric material adjacent to the sensor. Signal amplitude is strongly dependent on spacing between sensor and test specimen. Measurements are recorded and displayed by computer.

### MATERIAL SIZE CAPACITY

Can measure any dielectric material with a flat surface area equal to or greater than that of the Model 520 sensor.

Sensed Area Diameter ..... 1.0 in [25 mm] standard.  
Other sizes available.

Maximum Moisture Content..... Approximately 20%.

### SPECIFICATIONS

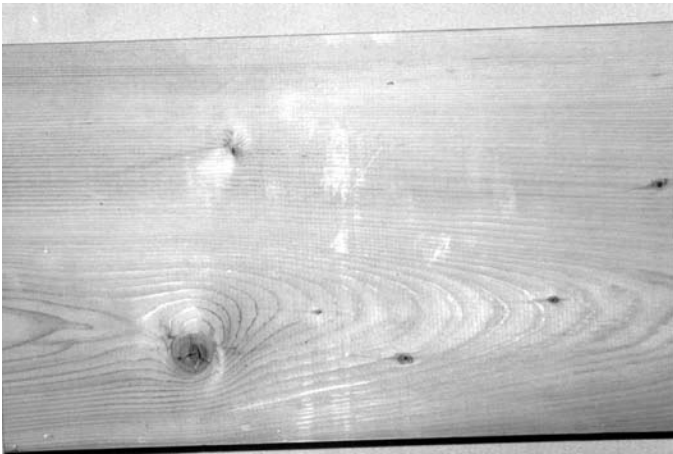
Computer..... Call for details.  
Power ..... 115 Vac standard or 230 Vac  
(please specify) 50/60 Hz,  
single phase.  
Detector implementation ..... Non-contacting, stationary  
electrode array.  
Probing frequency ..... 500 kHz.

Analog signal outputs ..... SIN and COS.  
SIN, COS update rate..... Approximately 8000 Hz  
update rate for grain angle  
and signal amplitude (com-  
puter-dependent). About  
500 per second maximum  
with system computer.  
Sensor/wood spacing ..... Non-contacting, up to ap-  
proximately 5 mm (depends  
on sensed area diameter).  
Grain Angle Display ..... Computer monitor.  
Grain Angle Range ..... +/- 90 degrees.  
Grain Angle Resolution..... 0.1 degree.  
Grain Angle Accuracy ..... +/- 1 degree.  
Operating Temperature..... 41 to 104°F [5 to 40°C].  
Operating Humidity..... Up to 90% noncondensing.

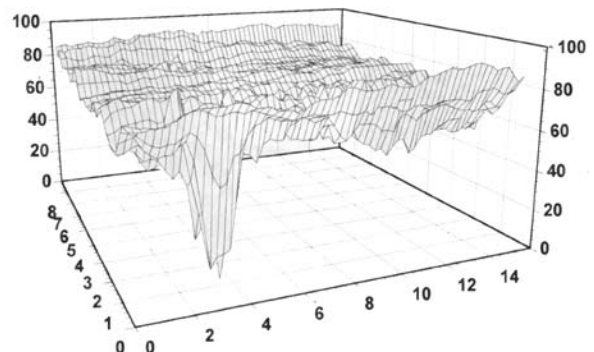
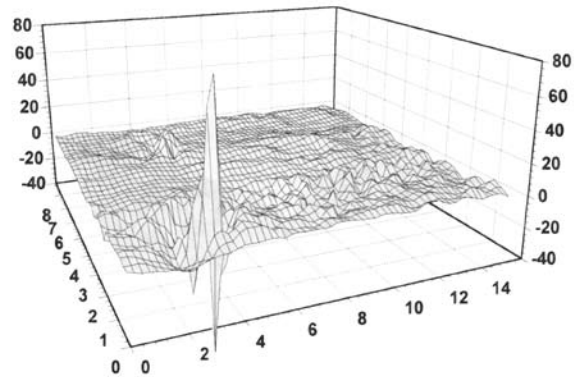
### SHIPPING DIMENSIONS

L x W x H ..... 50 x 30 x 35 in  
[1270 x 760 x 890 mm].  
Weight ..... 240 pounds [110 kg].

## Example



This specimen (above) was measured for grain angle on 33 longitudinal tracks. It contains one large knot and five pin knots. Plots of data (at left) derived from the specimen illustrate grain angle (left, top) and signal strength (left, bottom).



# Model 511 Slope-Of-Grain Indicator

## Model 511 Hand-Held Slope-of-grain Indicator



Prototype Model 511 Slope-Of-Grain measurement device is configured as a battery powered hand-held unit that gives a direct digital reading of grain angle in degrees with a table on the front panel for converting the angle measurement into slope-of-grain format. This instrument can be used on any wood material with a flat face wide enough to cover the detector head area.

Contact Metriguard for more information.