

## Vaisala DRS511 Road & Runway Sensor

The Vaisala DRS511 Road and Runway Sensor is a sensor system that takes a variety of measurements and observations of the road or runway surface. The sensor is embedded directly into the pavement and gathers its readings by being installed flush with the surface. The sensor design features open-end carbon fiber electrodes and optical fiber technology. These are molded into a solid sensor block consisting of an epoxy compound with properties matching the surface for thermal conductivity and emissivity. The sensor contains two PT-100 elements to measure the temperature of the road or surface. This reading is a key decision factor for the formation of ice and snow on the pavement, and is used before an event to determine if snow or ice will stick to the surface. The temperature of the road and runway surface is also key to determining how effective winter maintenance chemicals will work at the desired temperature, as air temperature can be many degrees different and is not a good decision point for determining chemical effectiveness. Lastly, the surface temperature when used with dew point, can accurately indicate when hoar frost formation is possible.

### State of the Surface

The DRS511 not only provides the temperature of the surface, but it also detects the presence of moisture on the surface, and thus provides a road state such as dry, wet, ice, and snow. The DRS511 provides this value to give you an estimate of surface conditions on the roadway or runway. The DRS511 provides its raw readings

to the weather station. Using other sensors readings, when possible, the weather station then estimates the surface condition. This is why the sensor is not typically provided stand-alone because it works in conjunction with the weather station.

### Chemical Knowledge

A characteristic that is unique to the DRS511 over all other embedded road and runway sensors is its ability to provide a calculation of the amount of chemical on the sensor's surface. The value is provided in the form of grams per meter squared and pounds per lane mile, which is a very effective way to determine how chemicals will perform if additional moisture is introduced. The greater the quantity of chemical present means the surface has a better chance of remaining unfrozen with the introduction of more ice or snow. In addition to providing the amount of chemical present, the DRS511 also calculates the freeze point of the current solution as another decision point used by many winter maintenance decision makers.

### Tried and True

The Vaisala DRS511 offers many advantages as a surface sensor system, with the biggest being its location. The DRS511 is placed directly where the tires of vehicles and aircraft interact with the surface of the road or runway. This means the sensor is directly measuring its environment, which ensures accuracy. The DRS511 is known as a passive sensor, which means it does not change or alter the environment that it resides in. This type of road



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### Benefits of DRS511

- Amount of Deicing chemicals measurement
- Identifies Road Condition
- Water amount measurement
- Surface temperature measurement
- Ground temperature measurement (-6cm)
- Freeze Point
- Hoar frost detection

and runway technology has been around for decades. Thus when using the DRS511 the risk of failure or ineffectiveness in your operations is minimal. The passive technology found in the DRS511 has been tested by institutions and authorities for years, so you know exactly how the sensor can aid in your operational decision making.

# Technical Data

## Performance

Temperature measurement range -40 °C to +60 °C

### Water layer thickness detection

Measuring range 0...7 mm

Accuracy 0.1 mm in the range 0.0...1.0 mm

Note: The accuracy of 0.1 mm applies to an even layer of water on the sensor. The detection accuracy of the average water layer thickness on the road depends on sensor installation, pavement material and water impurities.

Surface States (when used with Vaisala weather station)

- Dry
- Moist
- Moist with Chemicals
- Wet
- Wet with Chemicals
- Frost
- Snow
- Ice

## Materials:

Epoxy compound Araldit D, HY 956  
lamp black for color

Cable tubing Stainless steel

Cable 4 × (2 × 0.22 mm<sup>2</sup> + shield)  
high density polyethylene lead isolation

Sensing electrodes Carbon fiber in epoxy

Optical sensor Acrylic optical fibers

Temperature sensors Two Pt-100 elements,  
1/3 Class B DIN IEC 751

Sensor Wear Sensor can wear up to 3.5 cm  
from vehicles to ensure it  
remains even with surface

## Environmental

Temperature -40 °C to +60 °C

EMC Directive 2014/35/EU

EN 61326-1 Immunity test requirements for equipment intended to be used in an industrial electromagnetic environment

EN 55022 class B electromagnetic emissions

FCC part 15 class B

## Mechanical

Dimensions  
DRS511AA 75x84x30 (bottom 38) mm<sup>3</sup>

Dimensions  
DRS511BB 50x84x30 (bottom 38) mm<sup>3</sup>  
(For Bridge Applications)

Cable length 20, 30, 50, 100, 150, 200 or 300 m

Weight including 50 m cable 3.1 kg

# VAISALA

[www.vaisala.com](http://www.vaisala.com)

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