



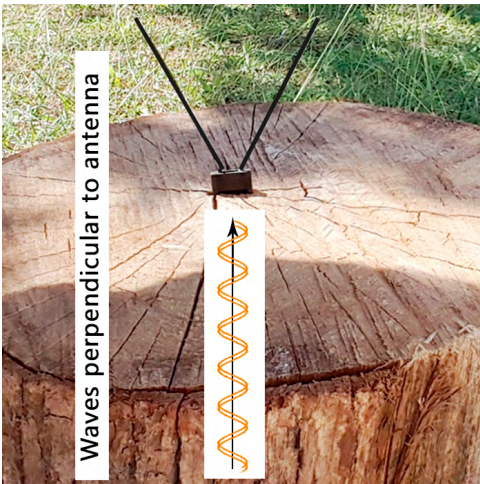
# SUNDOG RFID

## TECHNICAL INFORMATION

In this document you will find requirements and best practices for achieving optimal performance with SUNDOG® RFID tags as well as performance data and the results of high temperature exposure tests and water temperature soak tests.

### READ RANGE

Read range for SH/08-100RF US using handheld readers 30 dBm (Range in meters):



Circular Extended Scanner: 10.3 meters  
Linear Scanner: 7.7 meters

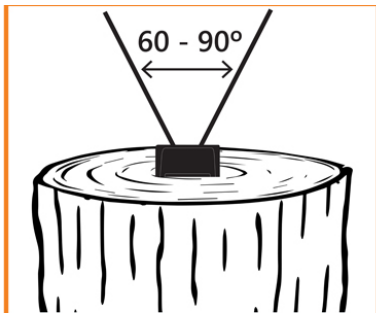


Circular Extended Scanner: 8 meters  
Linear Scanner: 6 meters

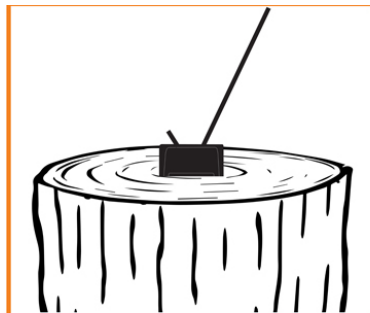


Circular Extended Scanner: 11.3 meters  
Linear Scanner: 8.3 meters

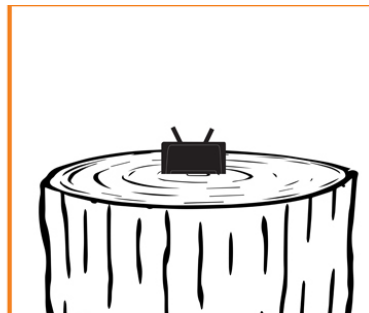
### ANTENNAE POSITIONING



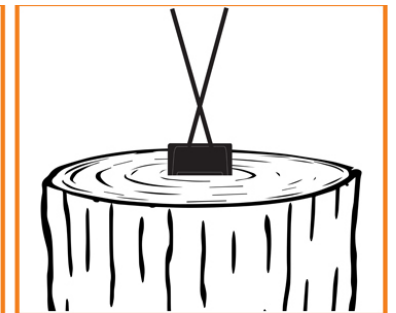
Ideal positioning



If one antenna is cut off at the staple crown, the readability is still quite good.



If both antennas are cut off at the staple crown, the readability is about 9 - 10 inches.



If the antennas are crossed, the readability is dramatically reduced.

# HIGH TEMPERATURE EXPOSURE

We found no measurable difference in readability before and after the following high temperature tests

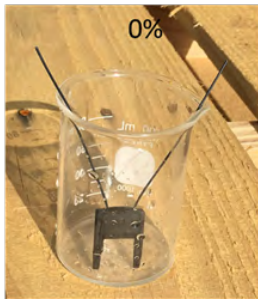
Type of Test	Temperature	Duration
Oven	250°	24 hrs.
Oven	400°F	4 hrs.
Oven	415°F	2 hrs.
Hot Water Submersion	160°F	100 hrs.

# WATER SUBMERSION READABILITY

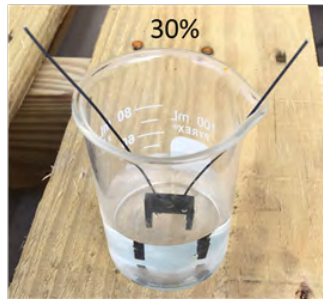
How well do SUND OG® RFID tags perform when submerged under water?

Read distance tests on SUND OG® RFID tags were conducted with varying water volumes and submersion levels as shown below.

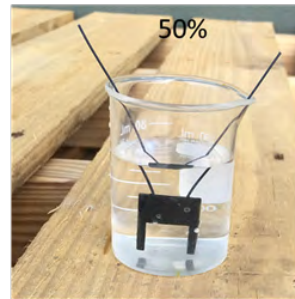
*%=Submersion Level*



28



27



14



3

Read Distance (ft)



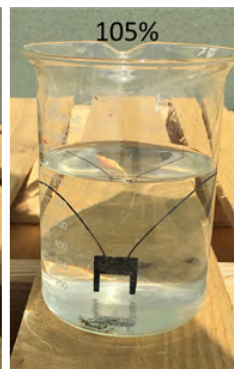
28



22



3



2.5



~0.60

Read Distance (ft)



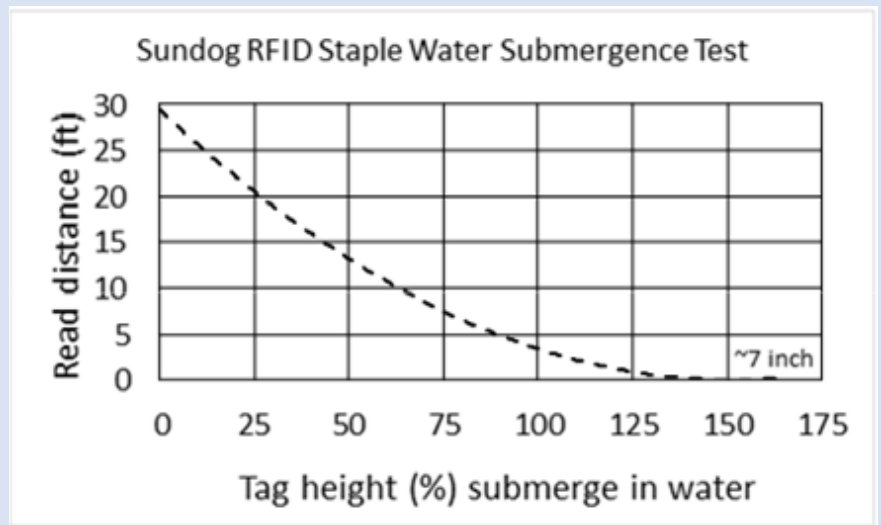
## WATER SUBMERSION READABILITY CONTINUED

The table below shows the X-direction read distance (see read direction information from READ RANGE section above) using a linear hand-held reader.

The large beaker data is also presented graphically. Surprisingly, when the tag and antenna are completely submerged, the SUNDOG® RFID tag is still readable at 2.5 feet.

Tests show that increasing depth of water reduces the read distance. While this experiment is noteworthy, it is expected that results will vary depending on the actual environment.

% submerged	Small beaker	Large beaker
0	28	28
30	27	22
50	14	--
80	3	--
90	--	3
105	--	2.5
160	--	0.6



## CREOSOTE TREATMENT & TAG READABILITY



SUNDOG® RFID tags were tested for readability before and after treating utility poles and railroad ties with creosote. The tags were installed on the ends of utility poles and successfully read at distances over 17 feet. The poles were then steamed at 240°F for 10 – 12 hours followed by a vacuum of 24 – 26 inches of Hg to pull the moisture from the wood. Next, the poles were covered in creosote and the pressure was repeatedly cycled between 25 psi and 150 psi for 3 – 4 hours to allow the preservative to penetrate. The following day, the tags in the poles were scanned and all the tags were successfully read at distances over 17 feet.

We are currently running accelerated weathering tests. Visit [www.sundog-rfid.com](http://www.sundog-rfid.com) to check for new tests report entries.