# instrument choice.com.au™

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## How dangerous is ultraviolet light? We did the experiment, find out here.

With the summer months rolling in and the holiday season upon us many of you will be spending more time outside in the UV light which can be dangerous. For this month's experiment we test the UV light outside the Instrument Choice HQ along with testing the effectiveness of ways we can protect ourselves from the light.

Also, weather stations are our most popular product line at this time of year, why not, they make a great present. Our scientists have written an article on the best way to mount a weather station, how to mount it, where to put the components to get the best results for you. Read on below.

This is our last newsletter for 2013. The team at Instrument Choice wish you and your family the best Christmas and New Year break, we hope it is filled with joy and fun.

Please remember if you have any questions regarding tests you need to conduct or specific instrumentation please give us a call on 1300 737 871.

Instrument Choice will be closed on the 24th of December, returning on the 6th of January 2014 ready for another fantastic year.

See you in 2014!
Tyson Grubb

## Product of the month: Davis Vantage Vue Wireless Weather Station


The Davis Vantage Vue Wireless weather station is a durable, accurate and compact option for weather enthusiasts. It measures and tracks 10 different weather variables at the same time.

For more information click here.

## How dangerous is ultraviolet light and how can you protect yourself?

Ultraviolet (UV) light is a form of invisible light produced by the sun and some other sources such as arc welders and black lights. UV light has a wavelength range of 400 to 100nm and can be broken up into UVA (315-400nm), UVB (280-315nm) and UVC (100-280nm). All forms of UV light can cause damage to human skin and eyes. UVA and UVB can also damage vitamin A which can lead to further skin damage. In this experiment we are going to test how effective different forms of skin and eye protection are at minimising UVA and UVB exposure.

### Equipment used:

UV340A – UV light meter – measures UV light from 290-390nm range (UVA and UVB)
Polarised sunglasses
Cheap Sunglasses
Regular Glasses
Rash vest
Business shirt
Car front windscreen
Car rear windscreen

### Method:

The UV340A UV meter was used to test the background UV levels coming from the sun and this was recorded. To take a reading the sensor was pointed towards the sun. The sensor from the UV340A was then placed underneath each of the methods of sun protection and the UV reading was recorded and a percentage reduction was calculated.

| | Polarised Sunglasses | Cheap Sunglasses | Regular Glasses | Rash Vest | Business Shirt | Front Windscreen | Rear Windscreen |
|---|---|---|---|---|---|---|---|
| Before ($\mu W/cm^2$) | 3700 | 3700 | 3700 | 3500 | 3400 | 3300 | 3500 |
| After ($\mu W/cm^2$) | 0 | 0 | 0 | 320 | 110 | 0 | 1180 |
| % reduction | 100 | 100 | 100 | 90.8 | 96.7 | 100 | 66.2 |

**Table 1.** This table shows the UV readings before each measurement was taken. As there were clouds about on the day of the test, the before readings did change slightly over time.


**Figure 1.** Background UV levels out the front of Instrument Choice (note that a 10x multiplier needs to be used when then meter is on the "high" setting).

**Figure 2.** The UV sensor was covered by the lens of the cheap sunglasses and it blocked all of the UV. The polarised sunglasses and regular glasses were measured in a similar manner.

**Figure 3.** The UV sensor was covered with a sleeve from a rash vest. The business shirt was measured in a similar way.

**Figure 4.** The UV sensor was placed underneath the glass of the front and rear windscreens of one of the staff members cars. The front windscreen is shown on the left and the rear windscreen is shown on the right.

**Discussions and conclusions:**
All of the items we tested reduced the UV levels so would be useful in reducing harmful UV exposure. Interestingly the cheap sunglasses and regular glasses were just as good as the polarised sunglasses in blocking UVA and UVB light. The business shirt and the rash vest both blocked a large percentage of UVA and UVB, however the business shirt did do slightly better. The front windscreen of the car was also effective at blocking all UVA and UVB radiation however the back windscreen only blocked 66.2% of the UVA and UVB radiation coming in meaning there is a good chance that you would get sunburnt if you are only protected by glass. It is also worth remembering that the meter we were using did not measure UVC which still has a capacity to cause skin damage.

**Have your say!**
What else do you think we could have tested?
Write an email to Tim at **tim@instrumentchoice.com.au** or give us a call on **1300 737 871.**

**The best way to mount your weather station to yield the most accurate data for your location:**

WS1516IT

WS2355

IC0348

IC0369

With Christmas coming up and weather stations being a popular gift, we thought we would cover mounting your weather station to obtain the most accurate data you can when you cannot meet the optimum mounting guidelines. The optimum position to mount a weather station is to have the temperature and humidity sensors at 1.2 to 2.0 m above ground level, and to have the anemometer (wind speed and direction sensor) at a height of 10 m. If your station has a rain gauge this is best mounted at a height no closer than four times the nearest obstruction. However, for most users these guidelines are nearly impossible to meet unless you are in an unobstructed field or paddock. This is particularly true for user's that live in built up residential areas where obstructions are hard to avoid. In saying this, it is best to try and mount your weather station as close to the guidelines as possible, however you may not be able to find the perfect site.

Therefore, you need to choose which data is most important to you and a site that will produce the best results. If your station is like the IC0369 or IC6250AU and has the anemometer combined with the rest of the outdoor sensors or the IC0346 or IC0348 where there are only short cables connecting the sensors to the transmitter you will need to compromise and choose which data is more important to you. If you are most interested in rainfall, temperature and humidity data for instance it would be best to mount the station 1.2 to 2 m above ground level in the area with the least obstructions as this will produce the most accurate results for these parameters, however your wind data will be affected. Therefore, if wind data is more important than rainfall, temperature and humidity data mounting the station on your roof 1.5 m above the roof line will yield the best results. However, the rainfall, temperature and humidity readings will suffer due to reflected energy from the roof increasing your temperature readings and the wind speed at that height producing lower than expected rainfall data.

If you have a station such as the WS1516IT, WS2355, IC6152AU, IC6153AU, IC6162AU or IC6163AU that has the capability to have the anemometer (wind sensor) separated from the rest of the sensors, you can more closely match the guidelines as you have the flexibility to mount sensors in different locations. If this is the case it is best to mount the anemometer 1.5 m above the roof line (to get as close as possible to the 10 m height guideline) and then have the rain gauge and temperature and humidity

sensors mounted at a height of 1.2 - 2 m above ground level in the area with the least obstructions. This setting will give you the most accurate information for your location and will get you as close as reasonably possible to meeting the guidelines for mounting a weather station.

If you need any assistance with mounting your weather station or selecting a weather station for your requirements please free to contact one of our friendly Scientists via **email** or phone on **1300 737 871.**

# Thank you

**from everyone at Instrument Choice - stay tuned for next months issue.**

**Contact us.**
Our experts are happy to help and discuss your project.
Call 1300 737 871 or write an email to customer-service@instrumentchoice.com.au

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