

UV Index



DERIVING THE UV INDEX FROM FIELD MEASUREMENTS

UV Radiation

The ultraviolet (UV) part of the solar spectrum has several beneficial effects but it may also be very harmful if UV radiation exceeds “safe” limits. An indicator of UV exposures, the UV Index, warns for UV radiation and its possible detrimental effects. The calculation method of the UV Index is given on the right hand side. Because skin types differ considerably in their sensitivity to UV doses, different groups were established according to the skin’s ability to tan. This classification is shown in Table 1.

SKIN TYPE CLASSIFICATION	BURNS IN THE SUN	TANS AFTER HAVING BEEN IN THE SUN
I Melano-compromised	Always	Seldom
II Melano-compromised	Usually	Sometimes
III Melano-competent	Sometimes	Usually
IV Melano-competent	Seldom	Always
V Melano-protected	Naturally brown skin	
VI Melano-protected	Naturally black skin	

Table 1. Classification of skin types (adopted from TB Fitzpatrick and JL Bologna, 1995)
Source: Global Solar UV Index, A Practical Guide, World Health Organisation 2002

The Global Solar UV Index (UVI) described in Table 1 was developed in an international effort by WHO in collaboration with WMO, UNEP and ICNIRP, and is a simple measure of the UV radiation level at the Earth’s surface. It serves as an important vehicle to raise public awareness and to alert people about the need to adopt protective measures when exposed to UV radiation.

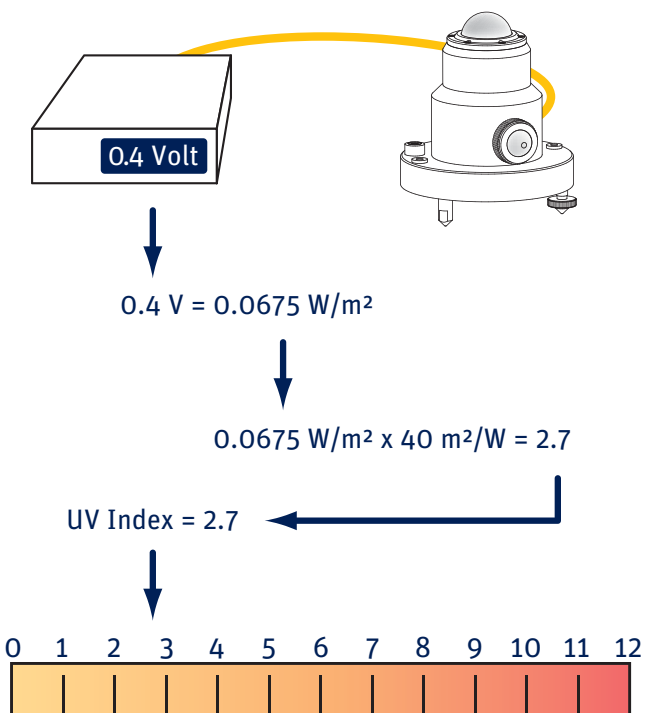
UV Radiometers

For the measurement of the Erythemally weighted UV radiation, Kipp & Zonen offers UV-S-E-T precision radiometers. Equipped with quartz domes and Teflon™ diffusors the radiometers provide a uniform cosine response function for accurate radiative energy measurements. The thermostat control of the detection system guarantees the highest accuracy. Rugged construction allows the radiometers to be used under all weather conditions as well as in very hot and cold regions. The UV-S-E-T radiometer has an output of 0- 3 VDC which corresponds to 0 - 0.6 W/m² of Erythemal radiation. The UV Index can be calculated according to the method illustrated below.

UV index

From UV-E radiation measurements, the UV-Index is calculated as follow:

Take the output from the UV-E radiometer according to ISDO 17166:1999/CIE S007/E-1998. Transform the output voltage to W/m² with the instruments sensitivity.



Erythema Action Spectrum

As sunburn is a consequence of excessive UV radiation exposure the UV radiometer should mimic the human skin. Therefore a special Erythema action spectrum was defined which corresponds to the sensitivity of the human skin on UV radiation. The UV-S-E-T radiometers are equipped with special filters which match the Erythema action spectrum.