

ISO Ruling and the SPF-290AS™

ISO has recently published the document ISO 24443 Determination of sunscreen UVA photoprotection in vitro to address effectiveness testing for sunscreen products containing specified active ingredients. This ISO document contains specific sections that pertain to Sunscreen Protection Factor (SPF) testing and specifies criteria that relates to the use of the Solar Light® SPF-290AS™ Sunscreen Protection Factor instrument.

The following points address specific technical issues called out by the ISO document and how they compare with or parallel the SPF-290AS™ instrument and its capability.

The information to the right indicates that the SPF-290AS™ is suitable for the testing as outlined in the ISO document.

Measurements

The SPF-290AS™ is a recording UV spectrophotometer designed and optimized for the determination of SPF values on a variety of sunscreen and cosmetic products reducing the need for in-vivo testing.

Covering both the UVB and UVA spectral regions, the system automatically scans from 290nm to 400nm. The Monochromatic Protection Factor (MPF) is determined for each of the selected wavelengths and is used to calculate the SPF value, using solar irradiance and erythral constants that are programmed into the software but which can be easily modified. In addition to sunscreen products, the SPF-290AS™ also complies with the AATCC-183 Fabric Test Method, enabling its use in a number of testing environments.

The SPF-290AS™ provides highly repeatable results, and has a Windows software interface, allowing for ease of use and high throughput. This results in faster formulation and lower development costs due to the reduction in the need for expensive and time consuming in-vivo panel studies.

For additional information, consult factory.

Parameter	ISO Ruling	SPF-290AS™
Plate	Use optical-grade poly-methylmethacrylate (PMMA) plates suitable for UV transmittance measurements	The SPF-290AS™ can be used with any UV transmissive substrate including PMMA plates, using WinSP™ v.4.1
Term Spectroradiometer	Spectrophotometer	The SPF-290AS™ can be classified as a Spectrophotometer
Light Source	The light source should produce a continuous spectral distribution of UV radiation from 290nm to 400nm	The xenon lamp in the SPF-290AS™ continuously emits radiation over the 290-400nm range specified
UV Dose During 1 Measurement Cycle	0.2 J/cm ²	<0.2 J/cm ²
Input Optics Bandwidth	The spectrophotometer wavelength increment step shall be 1nm	1nm intervals in the input optics of the SPF-290AS™. Other commercially available machines operate at <4nm
Dynamic Range of the Spectrophotometer	The minimum required dynamic range of the spectrophotometer should be 2.2 AU transmittance accurately at all terrestrial solar UV wavelengths (290nm to 400nm)	The dynamic range of the SPF-290AS™ is 3.2AU, which meets and exceeds the ruling in the range of 290nm to 400nm and is assured by a system calibration test that can be performed prior to every use, if desired
Application of Sunscreen	The product is applied at 1.3 mg/cm ²	This parameter is controlled by the operator
Pre-Irradiation Dose	The irradiation dose should be 1.2 x UVAPFO in J/m ²	The pre-irradiation dose should be done with a calibrated solar simulator, such as Solar Light® LS1000, not with the SPF-290AS™
Area of Reading Site	At least 0.5cm ²	The reading site is 0.6cm ²
Calculation of Critical Wavelength	The critical wavelength is identified as the wavelength at which the integral of the spectral absorbance curve reaches 90 percent of the integral over the UV spectrum from 290nm to 400nm	This is the criteria the SPF-290AS™ uses to calculate critical wavelength