



**ISO 23698**

**Cosmetics — Measurement of  
the sunscreen efficacy by diffuse  
reflectance spectroscopy**

*Cosmétiques — Mesurage de l'efficacité des produits de  
protection solaire par spectroscopie de réflectance diffuse*

**First edition  
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<b>Foreword</b> .....	<b>v</b>
<b>Introduction</b> .....	<b>vi</b>
<b>1 Scope</b> .....	<b>1</b>
<b>2 Normative references</b> .....	<b>1</b>
<b>3 Terms, definitions and symbols</b> .....	<b>1</b>
3.1 Terms and definitions.....	1
3.2 Symbols.....	4
<b>4 Principle</b> .....	<b>5</b>
<b>5 Apparatus and test method</b> .....	<b>5</b>
5.1 In vitro UV spectrophotometer.....	5
5.2 In vitro substrate/plate.....	6
5.3 In vivo diffuse reflectance spectrometers (DRS) specifications.....	6
5.4 Monitoring the DRS systems.....	7
5.4.1 Monochromatic system.....	7
5.4.2 Polychromatic system.....	7
5.5 Test method.....	7
5.5.1 General.....	7
5.5.2 Subject exclusion criteria.....	7
5.5.3 Skin colour of the test subjects.....	8
5.5.4 Frequency of participation in tests.....	8
5.5.5 Number of test subjects.....	8
5.5.6 Ethics and consent.....	8
5.5.7 Study preparations.....	8
5.5.8 Unprotected skin remittance measurement.....	8
5.5.9 Training for Technician performing sunscreen application.....	9
5.5.10 Sunscreen application to test subject.....	9
5.5.11 Protected skin remittance measurements.....	9
<b>6 In vitro spectrophotometer measurements</b> .....	<b>11</b>
6.1 General.....	11
6.2 In vitro measurement preparation.....	12
6.2.1 Blank reference PMMA plate.....	12
6.2.2 Product application.....	12
6.2.3 Product spreading.....	12
6.2.4 Spreading for alcoholic products.....	12
6.3 In vitro measurement.....	13
6.4 Determination of $A_{vt0}$ .....	13
6.5 Determination of the UV exposure dose.....	13
6.6 Measurement of in vitro sunscreen-treated plates post-irradiation.....	14
6.6.1 General.....	14
6.6.2 Calculation of the $A_{vt1}(\lambda)$ post irradiated spectrum.....	14
6.7 Determination of the hybridization wavelength.....	14
6.7.1 Monochromatic system.....	14
6.7.2 Polychromatic system.....	15
<b>7 Spectral ratio of photo-degradation (<math>S_{RPD}</math>)</b> .....	<b>15</b>
7.1 General.....	15
7.2 Determination of $S_{RPD}(\lambda)$ .....	15
<b>8 Calculations to estimate SPF and UVA-PF</b> .....	<b>16</b>
8.1 Determination of $A_{HDRSi}(\lambda)$ .....	16
8.1.1 Determination of $A_{DRSi}(\lambda)$ (monochromatic system).....	16
8.1.2 Determination of the $A_{DRSi}$ (polychromatic system).....	16
8.1.3 Determination of the individual hybridization scalar value - $C_{Ai}$ .....	17
8.1.4 Calculation of final hybrid absorbance spectrum.....	17

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8.4	Critical wavelength calculation.....	18
8.5	Calculation of the mean and standard deviations for SPF and UVA-PF.....	19
8.6	Statistical criterion.....	20
8.7	Reference standards for SPF and UVA-PF.....	20
	8.7.1 Establishment of SPF and UVA-PF for product claim:.....	20
	8.7.2 Other calculations.....	20
8.8	Data rejection criteria.....	20
	8.8.1 Subject data rejection criterion.....	20
	8.8.2 Site-specific data rejection criterion.....	21
8.9	Test failure criteria.....	21
<b>9</b>	<b>Test report.....</b>	<b>21</b>
	9.1 General.....	21
	9.2 Data in tabular form for each test subject.....	22
	<b>Annex A (informative) Test flow chart monochromatic and polychromatic DRS.....</b>	<b>23</b>
	<b>Annex B (normative) Calibration check of UV spectrophotometer and plate transmittance test (in vitro measurements).....</b>	<b>25</b>
	<b>Annex C (normative) Calibration of solar simulator irradiance and radiometer procedure.....</b>	<b>29</b>
	<b>Annex D (normative) Test plate and surface specifications.....</b>	<b>35</b>
	<b>Annex E (normative) Computation values — PPD and erythema action spectra and UVA and UV-SSR spectral irradiances.....</b>	<b>37</b>
	<b>Annex F (normative) Statistics and calculations.....</b>	<b>40</b>
	<b>Annex G (normative) SPF, UVA-PF and CW reference sunscreen formulations.....</b>	<b>43</b>
	<b>Annex H (informative) Definition and examples of valid skin DRS results.....</b>	<b>44</b>
	<b>Annex I (normative) Optical fibres and calibration.....</b>	<b>46</b>
	<b>Annex J (normative) Product application.....</b>	<b>47</b>
	<b>Annex K (normative) ISO 23698 test report.....</b>	<b>50</b>
	<b>Bibliography.....</b>	<b>52</b>

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Exposure to solar ultraviolet radiation (UVR) is the main environmental source of acute and chronic damage to human skin. Skin cancer is the most prevalent form of cancer of the body and is primarily driven by exposure to sunlight. Protection against exposure to solar UVB and UVA radiation is, therefore, an important public health issue. The use of topically applied sunscreens is a critical part of holistic programs of consumer UVR protection, including the use of appropriate clothing, hats and minimizing exposure to the sun.

The sun protection factor (SPF) has historically been measured by an *in vivo* method (see ISO 24444) to communicate the magnitude of the protection provided by sunscreens from sunburning UVR. Other test methods have been developed and provided to assess the breadth and magnitude of the protection in the UVA portion of the sun's spectrum (see ISO 24442 and ISO 24443).

This test method given in this document is an alternative to ISO 24443 and ISO 24444 methods.

Invasive methods based on tests conducted on human beings are ethically problematic, time-consuming and very costly. Therefore, it has long been desired to develop alternative methods to assess both the magnitude and breadth of protection afforded by sunscreens that do not require invasive procedures and that reliably provide equivalent testing sensitivity and accuracy as the existing invasive *in vivo* testing methods.

The hybrid diffuse reflectance spectroscopy method described herein, provides a non-invasive optical assessment of the protection provided by topically applied sunscreen products as measured *in situ* on human skin as used by consumers, without requiring physiological responses and causing no physical harm to the test subject. By combining full spectrum *in vitro* spectroscopic measurements of the sunscreen, with optical measurements of the sunscreen transmission in the UVA on human skin, a hybrid spectrum is derived that provides full assessment of both magnitude and breadth of sunscreen protection in both the UVB and UVA regions of the sun's spectrum, correlating closely with *in vivo* SPF, *in vitro* UVA-PF and critical wavelength test results demonstrating equivalence of this test method against ISO 24444 and ISO 24443 methods.