



Cosmetics &
Personal Care

SPF DETERMINATION

New norms alternative methods

ISO 23675: Double plate

ISO 23698: HDRS

2025

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Introduction

CONTEXT

In recent years, a number of major issues have emerged, notably concerning the ethics, reproducibility, accessibility, repeatability, more speed and standardization of SPF methods. These crucial issues have led to new discussions within the scientific community, aimed at improving current practices.

The "Alt-SPF" program, managed by a consortium of cosmetics companies and CROs, including Eurofins Cosmetics & Personal Care, analysed five alternative techniques.

Two of them were selected as the best characterized and officially published as ISO standards: **ISO 23675 (double plate) and ISO 23698 (HDRS).**

With a team of experts actively involved in standardization on committees (e.g., the ALT-SPF Consortium, Members of ISO etc.), Eurofins Cosmetics & Personal Care is committed to staying abreast of the current and future regulatory solar testing environment.



ISO Sun Protection

TEST METHODS

Published Standards	Study type	Publication
ISO 24444	SPF <i>in vivo</i>	Dec 2019
ISO 23675	SPF <i>in vitro</i>	Dec 2024
ISO 23698	SPF hybrid <i>in vivo</i> / <i>in vitro</i> + UVA + CW*	Dec 2024
ISO24442	UVA <i>in vivo</i>	June 2022
ISO 24443	UVA <i>in vitro</i> + CW	Dec 2021
ISO 16217	Water Resistance	May 2020
ISO 18861	% of Water Resistance	Sept 2020

*Critical Wavelength

ISO 23675

SPF *IN VITRO* DOUBLE PLATE

1



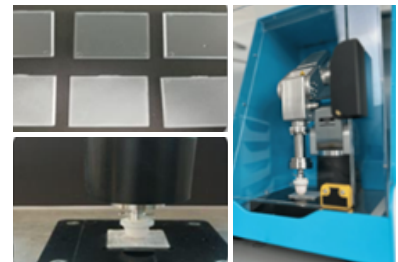
Preparation of reagents and materials

Incubation at $27 \pm 2^\circ\text{C}$ for at least 12h

Product application and robot automatic spreading

on minimum 3 sandblasted ($1,2 \text{ mg/cm}^2$) and 3 moulded ($1,3 \text{ mg/cm}^2$) PMMA plates + drying period (30-60minutes)

2



3



Absorbance measurement with a spectrophotometer 290-400nm spectrum **BEFORE UV exposure**

*--> Calculation of initial *IN VITRO* SPF*

UV exposure with a SolarLightMonoport (dose according to in vitro initial SPF)

4



5



New absorbance measurements with the spectrophotometer **AFTER UV exposure**

→ IN VITRO SPF determination

ISO 23698

HYBRID DIFFUSE REFLECTANCE SPECTROSCOPY

A method combining spectroscopic data obtained by *in vivo* and *in vitro* methods

- *In vivo* part is based on skin's ability (epidermis + dermis) to reflect part of received UV spectrum.
- Application of a sunscreen limits the amount of emitted light.
- The SPF is determined on the basis of this light transmission attenuation.

Advantage: Infra-MED of UV exposure incident light => NO ERYTHEMA

IN VIVO part : HDRS

1

Subjects selection same as ISO24444 in vivo

2

DRS polychromatic measurements
9 points per zones
SolarLight Poly602



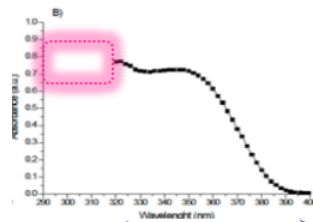
3

Product application same as ISO24444 in vivo

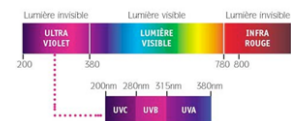


4

New DRS polychromatic measurements
9 points per zones



Obtention of DRS UVA spectrum



IN VITRO part

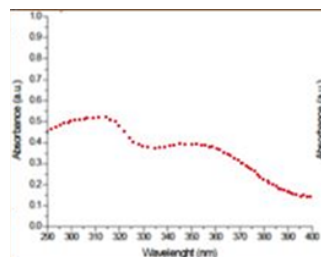


Incubation at 24±1-2°C for at least 12h

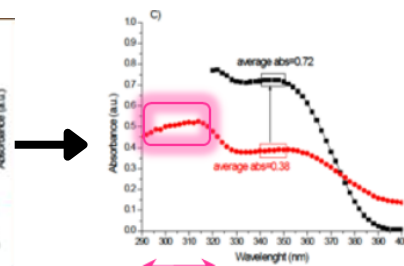


Absorbance measurement **BEFORE** and **AFTER** UV exposure

Determination of **UVB+UVA spectrum** same approach as **ISO 24443** norm

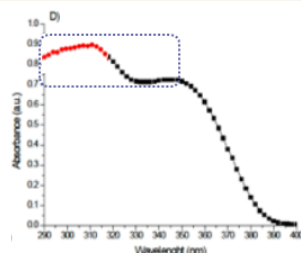


In vitro UV absorbance spectrum
(290-400nm)



Extraction of the **UVB** portion

➔ **Hybridation**



=> For 1 sunscreen: 3 results
SPF + UVA-PF + CW

3 SPF ISO METHODS

ISO 23675 AND ISO 23698 CO-EXIST WITH EXISTING ISO 24444 METHOD (*IN VIVO*)

	ISO 24444 <i>In vivo</i>	ISO 23675 <i>In vitro</i>	ISO 23698 HDRS
Ethical aspect	-	+	+
Type of products	All galenic (excepted Nail Polish)	Validated method for emulsions or single-phase hydroalcoholic formulation	Validated method for single-phase products and emulsions
Claims	SPF static +/- WR and other protocols (sweat, sand, wet-skin...)	SPF static only	SPF static only
Advantages	Product / Skin interaction (reflecting real application)	Fast ; Lower cost	Product / Skin interaction (reflecting real application) WITHOUT erythema reaction 3 results: SPF / UVA-PF / CW HDRS cost +/- similar ISO 24444
Disadvantages	Subjects constraints & risks (erythema reactions +/- strong)	Not suitable for powders and sticks	Time > ISO 23675 but < ISO 24444 (cumulative <i>vitro/vivo</i> tests)

SPF DETERMINATION



Thanks!



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