

# DIN EN ISO 24444:2022-07 (E)

## Cosmetics - Sun protection test methods - In vivo determination of the sun protection factor (SPF) (ISO 24444:20 19 + Amd 1:2022) (includes Amendment :2022)

<b>Contents</b>		<b>Page</b>
<b>European foreword</b>		<b>4</b>
<b>▣<sup>A1</sup> European foreword to Amendment A1</b> ▣ <sup>A1</sup>		<b>5</b>
<b>Foreword</b>		<b>6</b>
<b>▣<sup>A1</sup> Foreword to Amendment 1</b> ▣ <sup>A1</sup>		<b>8</b>
<b>Introduction</b>		<b>9</b>
<b>1 Scope</b>		<b>10</b>
<b>2 Normative references</b>		<b>10</b>
<b>3 Terms and definitions</b>		<b>10</b>
<b>4 General principle</b>		<b>12</b>
<b>5 Test subjects</b>		<b>12</b>
5.1 Selection of the test subjects		12
5.1.1 General		12
5.1.2 Skin colour of the test subjects		13
5.1.3 Age restriction		13
5.1.4 Frequency of participation in tests		13
5.1.5 Ethics and consent		13
5.2 Number of test subjects		13
<b>6 Apparatus and materials — Source of ultraviolet radiation</b>		<b>14</b>
6.1 General		14
6.2 Quality of ultraviolet radiation		14
6.3 Total irradiance (UV, visible and near infrared rays)		14
6.4 Uniformity of beam		14
6.4.1 General		14
6.4.2 Film densitometry		15
6.4.3 UV sensor		15
6.4.4 Large beam source		15
6.4.5 Small beam source		15
<b>7 Maintenance and monitoring the UV solar simulator output</b>		<b>16</b>
7.1 Spectroradiometry		16
7.2 Radiometry		17
<b>8 Reference sunscreen formulations</b>		<b>18</b>
8.1 General		18
8.2 Reference standard to be used		18
<b>9 Procedure</b>		<b>18</b>
9.1 Main steps		18
9.2 Test conditions		19
9.3 Position of the test subjects		19
9.4 Product application		19

9.5	Procedure for MED assessment.....	23
9.5.1	General.....	23
9.5.2	Time of assessment of MED .....	23
9.5.3	Data rejection criteria.....	24
9.5.4	Test failure criteria.....	25
9.5.5	Expression of MEDs.....	25
<b>10</b>	<b>Calculation of the sun protection factor and statistics.....</b>	<b>25</b>
10.1	Calculation of the individual SPF (SPF <sub>i</sub> ).....	25
10.2	Calculation of product SPF.....	25
10.3	Statistical criterion.....	25
10.4	Validation of the test.....	26
<b>11</b>	<b>Test report.....</b>	<b>26</b>
11.1	Overview.....	26
11.2	General information.....	26
11.3	Data in tabular form for each test subject.....	26
11.4	Statistics for the test products.....	27
<b>Annex A (normative) Selection criteria for the test subjects.....</b>		<b>28</b>
<b>Annex B (normative) Definition of the UV solar simulator output.....</b>		<b>30</b>
<b>Annex C (normative) SPF reference sunscreen formulations.....</b>		<b>37</b>
<b>Annex D (normative) Calculations and statistics.....</b>		<b>50</b>
<b>Annex E (normative) Colourimetric determination of skin colour typing and prediction of the minimal erythemal dose (MED) without UV exposure.....</b>		<b>56</b>
<b>Annex F (informative) Visual guidance for erythema grading.....</b>		<b>60</b>
<b>Annex G (Normative) Sample report form.....</b>		<b>64</b>
<b>Bibliography.....</b>		<b>68</b>