

# DIN EN ISO 24442:2012-03 (E)

## Cosmetics - Sun protection test methods - In vivo determination of sunscreen UVA protection (ISO 24442:2011)

---

<b>Contents</b>		<b>Page</b>
Foreword .....		3
Introduction .....		4
1	Scope .....	5
2	Terms and definitions .....	5
3	Principle .....	6
4	Test subjects .....	6
4.1	Selection of test subjects .....	6
4.2	Number of subjects .....	7
5	Reference sunscreen formulae .....	7
6	UVA source .....	7
6.1	Spectral characteristics .....	7
6.2	Maintenance and monitoring the UV solar simulator output .....	8
6.3	Beam size and uniformity .....	8
6.4	Total irradiance (UV, visible and near-infrared rays) .....	8
7	Product application quantity and procedure .....	9
7.1	General .....	9
7.2	Position of the subject .....	9
7.3	Defining test sites .....	9
7.4	Application procedure .....	10
8	Determination of minimal persistent pigment darkening doses (MPPDD) .....	10
8.1	UV exposure timing and subject position .....	10
8.2	Determination of the minimal pigmentation dose on the unprotected test sites (MPPDDu) using a multiple-beam solar simulator .....	10
8.3	Determination of the MPPDDu using a single-beam output solar simulator .....	11
8.4	Determination of the MPPDDp using a multiple-beam solar simulator .....	11
8.5	Determination of the MPPDDp on the protected test site with a single-beam solar simulator .....	12
9	Product removal .....	12
10	MPPDD assessment procedure .....	13
10.1	Observation time for responses of MPPDDs .....	13
10.2	Position of subjects for MPPDD observations .....	13
10.3	MPPDD evaluation .....	13
11	Calculations of the UVAPF and statistics .....	14
11.1	Calculation of the individual UVAPF (UVAPFi) for each test product for each subject .....	14
11.2	Calculation of the mean UVAPF .....	14
11.3	Statistical test .....	14
11.4	Test rejection for failure of meeting the statistical test for the reference sunscreen .....	14
12	Test report .....	14

<b>Annex A (normative) Selection criteria for the test subjects .....</b>	<b>15</b>
<b>Annex B (normative) Definition of the source of UVA radiation .....</b>	<b>17</b>
<b>Annex C (normative) UVAPF reference sunscreen S1 .....</b>	<b>19</b>
<b>Annex D (normative) Statistics and calculations .....</b>	<b>26</b>
<b>Bibliography .....</b>	<b>29</b>