

DIN EN ISO 24444:2020-05 (E)

Cosmetics - Sun protection test methods - In vivo determination of the sun protection factor (SPF) (ISO 24444:2019)

Contents	Page
European foreword	4
Foreword	5
Introduction	6
1 Scope	7
2 Normative references	7
3 Terms and definitions	7
4 General principle	9
5 Test subjects	9
5.1 Selection of the test subjects	9
5.1.1 General	9
5.1.2 Skin colour of the test subjects	10
5.1.3 Age restriction	10
5.1.4 Frequency of participation in tests	10
5.1.5 Ethics and consent	10
5.2 Number of test subjects	10
6 Apparatus and materials — Source of ultraviolet radiation	11
6.1 General	11
6.2 Quality of ultraviolet radiation	11
6.3 Total irradiance (UV, visible and near infrared rays)	11
6.4 Uniformity of beam	11
6.4.1 General	11
6.4.2 Film densitometry	12
6.4.3 UV sensor	12
6.4.4 Large beam source	12
6.4.5 Small beam source	12
7 Maintenance and monitoring the UV solar simulator output	13
7.1 Spectroradiometry	13
7.2 Radiometry	14
8 Reference sunscreen formulations	15
8.1 General	15
8.2 Reference standard to be used	15
9 Procedure	15
9.1 Main steps	15
9.2 Test conditions	16
9.3 Position of the test subjects	16
9.4 Product application	16
9.5 Procedure for MED assessment	20
9.5.1 General	20
9.5.2 Time of assessment of MED	20
9.5.3 Data rejection criteria	21
9.5.4 Test failure criteria	22
9.5.5 Expression of MEDs	22

10	Calculation of the sun protection factor and statistics	22
10.1	Calculation of the individual SPF (SPF_i)	22
10.2	Calculation of product SPF	22
10.3	Statistical criterion	22
10.4	Validation of the test	23
11	Test report	23
11.1	Overview	23
11.2	General information	23
11.3	Data in tabular form for each test subject	23
11.4	Statistics for the test products	24
Annex A (normative) Selection criteria for the test subjects		25
Annex B (normative) Definition of the UV solar simulator output		27
Annex C (normative) SPF reference sunscreen formulations		34
Annex D (normative) Calculations and statistics		47
Annex E (normative) Colourimetric determination of skin colour typing and prediction of the minimal erythema dose (MED) without UV exposure		53
Annex F (informative) Visual guidance for erythema grading		57
Annex G (normative) Sample report form		61
Bibliography		65