

SAFEGUARDS

CONSUMER GOODS AND RETAIL

SOFTLINES

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UV PROTECTION FACTOR (UPF) OF TEXTILES

Over exposure to ultraviolet radiation (UVR) from the sun has raised considerable public health concerns. Consumers have an increased awareness of skin cancer, eye damage (such as cataracts) and premature skin aging and as a result they are looking for protection beyond sunscreens such as lotions and creams. Depletion of the ozone layer, which protects the earth's surface from harmful UVA, UVB and UVC rays, has forced the need for additional protection.

UVA and UVB are the two classifications for solar radiation hitting the earth's surface. UVA wavelengths are between 315 and 400 nm and are most abundant at the earth's surface. Exposure to these rays results in premature aging, wrinkling and has been implicated as a cause of skin cancer. UVB wavelengths are between 280 and 315 nm and are more dangerous than UVA rays however less of them reach the earth's surface as most are absorbed by the ozone layer. UVB rays are a major cause of sunburn, skin cancer and cataracts. The third type, UVC wavelengths are between 100 and 280 nm and are extremely dangerous but they do not reach the earth surface due to their absorption by the ozone layer. Clothing can provide a barrier against harmful rays, however, it is important to understand that not all fabrics and garments offer equal protection. There are several international UPF test standards available. The protection offered by fabrics against UVA and UVB can be determined according to these standards.

FACTORS AFFECTING UPF OF TEXTILES

- Fibre composition, some types of fibres absorb more UV light than others
- Fabric construction, especially thickness, weight and porosity
- Fabrics in dark colours are usually more effective in blocking UV
- Optical brightening agents can absorb UV and emit visible light

COMPARISON OF UPF TEST STANDARDS

TEST STANDARD	AS/NZS 4399 (UPF TESTING AND LABELING)	EN 13758-1 (UPF TESTING) EN 13758-2 (LABELING)	AATCC 183 (UPF TESTING) ASTM D6544 (SAMPLE EXPOSURE PROCEDURES) ¹ ASTM D6603 (LABELING)
Specimen condition	<ul style="list-style-type: none">• Dry state	<ul style="list-style-type: none">• Dry state	<ul style="list-style-type: none">• Dry state, and• as needed in Wet state
Sample preparation	<ul style="list-style-type: none">• Original	<ul style="list-style-type: none">• Original	<ul style="list-style-type: none">• Original (unprepared) or Laundered-once (depends on care instruction), and• After ASTM D6544 exposure procedures

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Reference sun spectrum	Melbourne in Australia	Albuquerque in USA	Albuquerque in USA
UPF rating requirement ²	UPF rating: minimum 15 (UPF rating shown on label: 15, 20, 25, 30, 35, 40, 45, 50, and 50+)	UPF 40+ (Requirements: (a) The lowest UPF value > 40, and (b) UVA transmission < 5 %)	UPF value ³ : minimum 15 (UPF value shown on label: 15, 20, 25, 30, 35, 40, 45, 50, and 50+)

Remark:

1. ASTM D6544 standardized the exposure procedures prior to UV transmission testing of the fabric or garment. The exposure conditions include 40 cycles of washing, 100 AATCC Fading Units of simulated sunlight, and chlorinated water for swimwear which relates to approximately two years of seasonal use.
2. For labeling details, please refer to details in AS/NZS 4399, EN 13758-2, and ASTM D6603.
3. According to ASTM D6603, the UPF value on the product label should be the lowest UPF value among the results of "unprepared (original)", "laundered-once" (for products with care label "Wash once before wearing") or "prepared-for-testing (as per exposure conditions in ASTM D6544)" specimens.

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