

Testing of textiles  
**Cotton fibre maturity**  
 Concepts

**DIN**  
**53 943**  
 Part 1

Prüfung von Textilien; Reifezustand von Baumwollfasern; Begriffe

Supersedes July 1978 edition.

## 1 Scope

The purpose of this standard is to establish the concepts to be used when determining the fibre wall development or the degree of maturity of cotton fibres.

## 2 Concepts

As defined in DIN 60 001 Part 1, cotton fibres are the monocellular seed hairs of a variety of plants belonging to the genus *Gossypium*. Their quality as textiles, besides depending on their fineness and staple length, is also a function of the development and thickness of their fibre wall, i.e. of the quantity and arrangement of the cellulose layers.

**2.1** Classification of cotton fibres on the basis of their cell wall development shall be as specified in subclauses 2.1.1 to 2.1.3 below.

### 2.1.1 Mature fibres

Fully developed fibres which had completed their overall growth by the time the seed poll burst, and which exhibit a considerable thickening of the cell wall, along with convolutions.

### 2.1.2 Immature fibres

Fibres whose development was arrested at the beginning of the wall thickening stage (from approx. 20th day on), or which were picked before they had reached maturity, and which thus exhibit only a slight thickening of the cell wall (also referred to as "thin-walled" fibres).

Note. There are intermediate stages of development between immaturity and maturity.

### 2.1.3 "Dead" fibres

Fibres which died before the beginning of the wall thickening stage, and whose cell walls thus consist solely of an outside, translucent wall, approximately 0,5 µm thick.

**2.2** When examining cotton fibres under a microscope, the concepts given below in subclauses 2.2.1 to 2.2.5 shall be used to denote the structure and shape of the individual fibres.

### 2.2.1 Outside wall

The first thin wall of the fibre formed as it starts to grow in length. The surface layer consists of pectic substances and waxes.

### 2.2.2 Secondary wall

Wall layers of cellulose that accumulate on the inner surface of the outside wall.

### 2.2.3 Lumen

Cavity (cell canal) in the fibre cell, i.e. here in that of the cotton fibre.

### 2.2.4 Wall thickness

Any given thickness of the cell wall produced during the growth of the cotton fibre as a result of the accumulation of cellulose on the outside wall.

### 2.2.5 Convolutions

Structural peculiarity of cotton fibres which, though generally flat, exhibit occasional twists, the direction and frequency of the twists varying greatly both over the length of the fibre and over the length of the individual convolution.

**2.3** The maturity of the cotton shall be expressed as specified in subclauses 2.3.1 and 2.3.2 below.

### 2.3.1 Fibre wall development

Fibre wall development is the state of development reached by the individual cotton fibre with regard to its relative wall thickness (outside and secondary wall).

Continued on pages 2 and 3