

Appendix

Physicochemical Constants

$0^{\circ}\text{C} = 273.16\text{ K}$

R gas constant = $1.987\text{ cal deg}^{-1}\text{ mole}^{-1}$

Standard gravity = $980.66\text{ cm sec}^{-2}$; 9.8066 N/Kg

Faraday's constant = $f = 23,062\text{ cal (volt equivalent)}^{-1}$

Avogadro's constant = $N = 6.0238 \times 10^{23}\text{ molecules mole}^{-1}$

Density of hair = 1.32 g cm^{-3}

Refractive index of hair:

Epsilon = 1.56 (light parallel to fiber axis)

Omega = 1.55 (light perpendicular to fiber axis)

Elastic moduli at 60–65% RH for Caucasian hair:

Stretching = $3.89 \times 10^{10}\text{ dyn/cm}^2 = 3,890\text{ MPa}$

Bending = $3.79 \times 10^{10}\text{ dyn/cm}^2 = 3,790\text{ MPa}$

Torsion = $0.89 \times 10^{10}\text{ dyn/cm}^2 = 890\text{ MPa}^a$

^aBogaty HJ (1967) *J Soc Cosmet Chem* 18:575

Approximate Diameter of a Few Keratin fibers

Fiber type	Diameter (μm)
Human scalp hair	
Terminal hair	30–120 (See Chap. 9)
Vellus hair	<4
Wool fiber	
Fine wool	17–33 ^a
Coarse wool	33–42 ^a
Horse hair	
Mane	50–150 ^a
Tail	75–280 ^a
Cat whisker	~450
Porcupine quill	can be >1,000

^aHarris M (ed) (1954) Harris handbook of textile fibers. Harris Research Labs., Washington, DC

Units of Linear Measure

Unit	Symbol	Quantity
Meter	m	–
Centimeter	cm	10^{-2} m
Millimeter	mm	10^{-3} m
Micrometer	μm	10^{-6} m
Nanometer	nm	10^{-9} m
Angstrom	Å	10^{-10} m
Picometer	pm	10^{-12} m

Meter is the arbitrarily chosen standard of length of the metric system. It is the distance between two marks on a platinum-iridium bar kept at constant temperature at the International Bureau of Weights and Measures near Paris. For conversion to the English system, 1 m equals 39.37 in. and 1 cm equals 0.3937 in. (2.5401 cm = 1 in.), etc.

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