QUALITY EXCELLENCE SERVICES

Quality Excellence Services
18 Maple Avenue, Ste. 148
Barrington, RI 02806
United States of America
+1 (401) 246-3204 · +1 (401) 252-9653
mweeden@qesisbest.com · https://QESisBest.com

STANDARDS & GUIDANCE BRIEF · INTERNATIONAL · INTERNATIONAL STANDARD

CIE L*a*b*

CIE 1976 L*a*b* color space and color difference formulas (ISO/CIE 11664 series)

DOCUMENT	QES-WP-150, Rev B	DATE	November 7, 2026
ISSUED BY	International Commission on Illumination (CIE), jointly with ISO	PREPARED BY	Conner Davidson
EDITION	ISO/CIE 11664-4 (CIELAB) and 11664-6 (CIEDE2000)	STATUS CHECKED	October 24, 2026
INDUSTRIES	Textiles & Materials, Consumer Products & Toys	ONLINE	qesisbest.com/standard-cie-lab.html

CURRENT EDITION Color acceptance by instrument depends on agreeing the formula, illuminant, observer, and tolerance in writing.

What It Covers

How color is measured by spectrophotometer and expressed as L*, a* and b* coordinates, and how differences are calculated as ΔE.

Who It Applies To

Anyone approving color by instrument: mills, dye houses, garment and product makers, and their buyers.

Key Requirements

- A physical or digital standard agreed for each color, with its illuminant and observer.
- A color difference formula (CIEDE2000 or CMC) and a tolerance, stated in the specification.
- Instrument calibration and sample preparation controlled, so readings are comparable.
- Metamerism checked under a second illuminant.

What an Auditor Asks to See

- The color standard, the formula, and the tolerance for a product.
- Calibration records for the spectrophotometer.

Where Systems Fall Short

- Approvals made against last season's sample instead of the standard.
- ΔE tolerances quoted without the formula, which makes them meaningless.

How QES helps. Color approval procedures that end the arguments, because the numbers are agreed before the dyeing starts. See the gap assessment: qesisbest.com/services.html#gap-assessment · +1 (401) 246-3204 · mweeden@qesisbest.com

Sources, checked October 24, 2026. CIE — International Commission on Illumination, colorimetry standards — cie.co.at.

A summary for orientation, prepared by Quality Excellence Services. It does not reproduce or replace the standard or regulation: read the official text, which governs. Not legal advice.