



## LTL3000 retroreflectometer features

LTL3000 is part of a new generation of DELTA retroreflectometer instruments for measuring retroreflection of road markings. The instrument is based on the latest technological developments and with modern design and materials. LTL3000 is, like all other DELTA instruments, very easy to calibrate and operate, we like to say "very user-friendly". And the instrument is of course robust and long lasting – like our earlier generations of road marking retroreflectometers – and on top of this small in size (420 x 300 x 150 mm / 16.5 x 11.8 x 5.9 inch) and light in weight (4.7 kg / 10.4 lbs.).

LTL3000 is primarily intended for users who need an instrument for less demanding measurement programs, who want an instrument which is easy to transport and who do not need many features to support the measurements.

The instrument complies with international standards like: EN 1436, ASTM E 1710, ASTM E 2177, ASTM E 2302, ASTM E 2367.

### General features

- Measurement time less than 1 sec for both  $R_L$  and Qd
- Measures  $R_L$  on profiled markings up to 15 mm / 0.6 inch
- Memory 8 GB
- Multi-lingual
- Easy-readable color touch LED display with 3 buttons
- Long-life illumination system
- USB memory stick interface
- Power supply, standard Bosch professional battery
- Stray light compensated
- Single handed operation, user-friendly
- Shows and stores day and time
- Facility for entering and storing road ID and user ID
- Data presentation in MS Excel format

### Optional features

- $R_L$  and Qd for dry & wet markings ( $R_L$  is standard delivery, Qd is optional)
- GNSS positioning
- Nighttime color (x,y) for  $R_L$  measurements



### Performance

LTL3000 measure all types of road markings at a simulated distance of 30 m with a high accuracy. The instrument operates with a reproducibility of +/- 5 % and a repeatability of +/- 2 %.

LTL3000 measures Qd (daytime visibility) and  $R_L$  (nighttime visibility) under dry and wet conditions. LTL3000 measures  $R_L$  from 0 to 4.000 mcd/lx/sqm and Qd from 0 to 318 mcd/lx/sqm. LTL3000 can in addition measure nighttime chromaticity coordinates (x,y) according to ASTM E 2367 and CIE 1931.

LTL3000 has automatic stray light compensation. Daylight and other outside light sources will not affect the accuracy of the measurements.

LTL3000 measurements can be exported to commonly available software like MS-Excel format.

### Calibration standards

LTL3000 instruments comes with a  $R_L$  calibration reference calibrated by DELTA in our DANAK-accredited laboratory in accordance with ISO 17025 and assuring traceability to PTB (Physikalisch-Technische Bundesanstalt, Germany) and NIST (National Institute of Standards and Technology, USA).

LTL3000 is factory calibrated for the Qd value and thus Qd should only be re-calibrated when needed. instruments with Qd comes with a Qd calibration marking which can be used for verification and, if necessary, for calibration. The Qd calibration reference is not

DANAK accredited but a laboratory transfer of a DANAK accredited calibration reference.

The recommended daily calibration of the instruments is fast and easy to carry out.

### **Color coordinates (x,y)**

LTL3000 measures night time retroreflected color – CIE chromaticity - for white and yellow markings according to EN1436, ASTM D6628 and ASTM E2367.

### **Certification**

All DELTA's instruments are meeting regulatory compliance according to European and US standards for radio and EMC emission as well as workers safety. Documentation on regulatory compliance can be requested from DELTA.

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