

REFO®
Glossmeters for superior Gloss Quality



REFO® 3 and REFO® 60

Brilliant achievements of Dr. Lange technology

Dr. Lange sets standards in gloss measurement.

Dr. Lange's glossmeters are precision instruments built to the latest state of the art, producing certifiable results as demanded by DIN 67530, ISO 2813, ISO 7668 and [BS](#).

The glossmeters feature an **automatic calibration** system that calibrates the instrument at the touch of a button to the black glass standard A described in ISO 2813 or alternatively, for REFO® 3D and REFO® 60D, to standard according to ISO 7668.

Dr. Lange's **reference beam technology** guarantees a measurement verified twice.



REFERENCE BEAM TECHNOLOGY



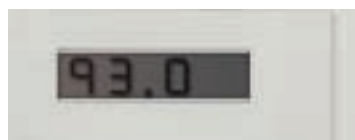
REFO® 60/60D - Fundamental gloss

For accurate routine checks.

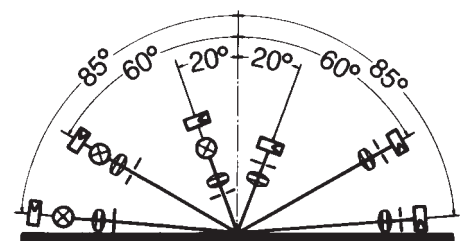
Begin objective gloss measurements with REFO® 60. REFO® 60 is conceived for accurate gloss measurement during production, i.e. measuring, deciding and correcting while production is in full swing. At the touch of a button the result appears immediately on the display and REFO® 60D stores it for later evaluations. This handy glossmeter goes with you to all places of production.

With the 60°-geometry for a wide range of application

The 60° measuring geometry is the best angle for standard gloss measurement from physical and optical points of view. The measuring accuracy in extreme high-gloss and matt ranges is satisfactory for routine purposes.



Additionally, REFO® 60D measures metallic surfaces using the metal standard.



The measurements are documented directly via interface on a Dr. Lange LD 500 printer. The documentation can be performed with REFO® 3 in online mode. Models REFO® 3D and REFO® 60D feature a memory for subsequent documentation.

The service schedule includes an optional annual maintenance service with control of inspection, measuring and test equipment which is documented with a corresponding certificate. This guarantees an optimum measuring accuracy of REFO® 3 and REFO® 60. Independent. Portable. With a 3-year guarantee.

REFO® 3



REFO® 3/3D - The gloss professionals

For best flexibility and measuring accuracy.

REFO® 3 is an easy-handling portable glossmeter with a three-angle geometry which is perfectly suited to each and every field of gloss measurement: be it in the lower range of matt surfaces (85°-angle), in the mid (60°) or high-gloss range (20°) - it always provides precise and guaranteed results. To measure metal surfaces, REFO® 3D is calibrated against the metal standard specified in ISO 7668.

Four modes of operation are at choice:

- One-angle measurement as single or multimeasurement stating also mean value, standard deviation and coefficient of variation.
- Three-angle measurement as single or multimeasurement stating also mean value, standard deviation and coefficient of variation.
- Gloss difference measurement against a reference.
- Gloss gradients can be determined from the continuous gloss measurement mode.

One-button easy operation.

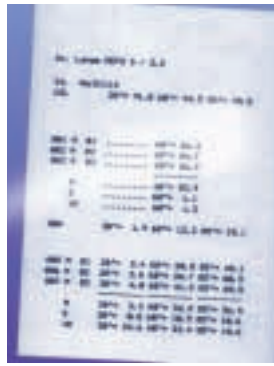
Before starting to measure, press the button to calibrate REFO® 3D on the standard. Then measure, read-off, print and evaluate the result.

Measurement memory REFO® 3D.

REFO® 3D features a data logger to keep all information available for further analysis.



Technical Specifications



LD 500

External matrix printer.

Small, handy, mobile mains operation.
For data and instrument
memory
print.



International rules and standards

DIN 67 530 TAPPI T 480
ISO 2813 ASTM D 523
ISO 7668

International Calibration Standard

REFO® 3/60: Standard A
REFO® 3D/60D: Standard A and Metal Standard

Measuring geometries

REFO® 3/3D: 20°, 60°, 85°
REFO® 60/60D: 60°

Measuring surfaces

20° approx. 9 x 9 mm
60° approx. 17 x 9 mm
85° approx. 100 x 10 mm

Interface RS 232 C

REFO® 3/3D, REFO® 60/60 D

Memory for mobile application

REFO® 3D: 450 measurements
REFO® 60D: 300 measurements

Optional features REFO® 3/3D

Printer: LD 500

Power supply

REFO® /3D: mains/rechargeable batteries
REFO® 60/60D: alkalines

Dimensions

REFO® 3/3D: 200 x 56 x 80 mm l/w/h
REFO® 60/60D: 140 x 40 x 80 mm l/w/h

Weight

REFO® 3/3D: 750g
REFO® 60/60D: 430g

Guarantee

3 years

Subject to technical modification.



DR LANGE

D Dr. Bruno Lange GmbH & Co. KG · Willstätterstraße 11 · D-40549 Düsseldorf · Tel.: +49-211-5 28 8-136 · Fax: +49-211-5 28 8-106
GB Dr. Bruno Lange (U.K.) Ltd. · Lennox Road · Basingstoke · Hants · RG22 4AP · Tel.: +44-1256-333 403 · Fax: +44-1256-330 724
NL Lange Group · Laan van Westroijen 2a · NL-4003 AZ Tiel · Tel.: +31-344-63 11 30 · Fax: +31-344-63 11 50
Further subsidiaries in: AUSTRIA · BELGIUM · DENMARK · FRANCE · ITALY · POLAND · SWITZERLAND

www.drlange.com