

NDTKALA.CO
Non-Destructive Test (NDT) Equipment



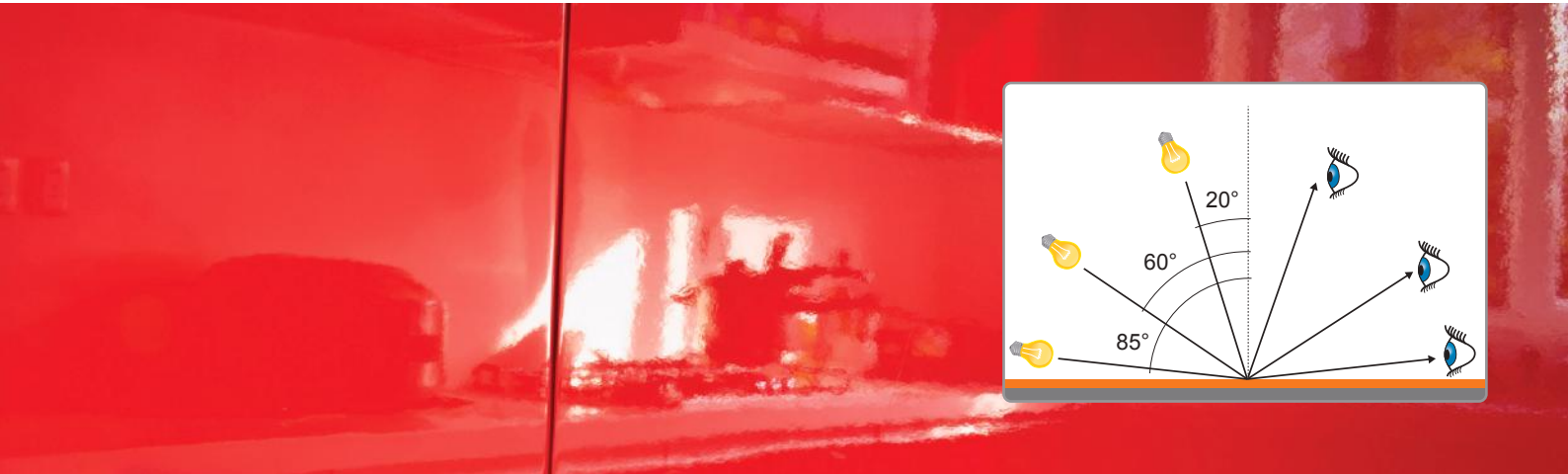
تامین تجهیزات و مواد مصرفی تست های غیر مخرب ایران
۰۲۱-۷۱۰۵۳۸۸۸ ۰۹۱۲۰۲۶۶۲۷۰

elcometer®
inspection equipment

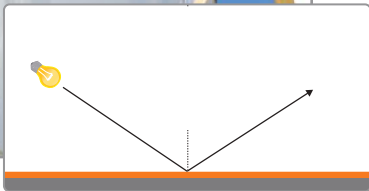


Elcometer 480
Glossmeters

Visual appearance can determine a person's perception of a product. Perception is subjective. A key measurement parameter used to define and quantify a product's overall visual quality is gloss.



High Gloss

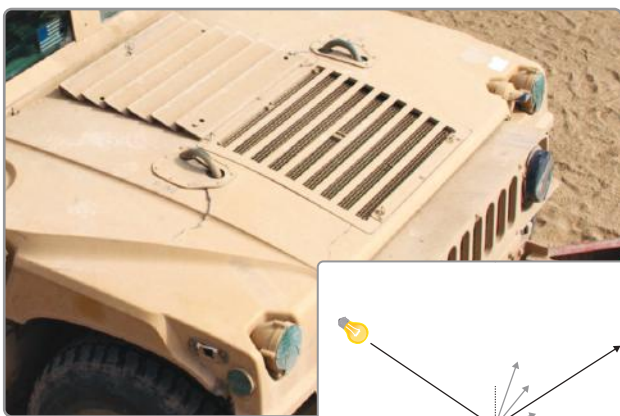


Gloss is measured by directing a constant intensity light beam, at a fixed angle, on to the test surface and then monitoring the amount of reflected light from the same angle. This specular reflectance is measured using a glossmeter.

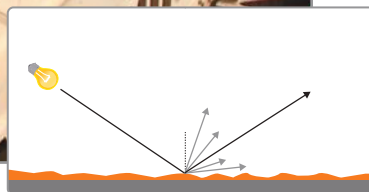
Different surfaces require different reflective angles.

High Gloss

Surfaces with a brilliant or highly polished finish reflect images clearly. This distinct reflection is caused by the incident light reflecting on the surface in a specular direction.



Semi & Matt Gloss



Semi & Matt Gloss

Semi and matt surfaces reflect images less distinctly and with reduced intensity.

On semi or matt surfaces light not only reflects in a specular direction but also is scattered causing the reflected image to appear diffused.

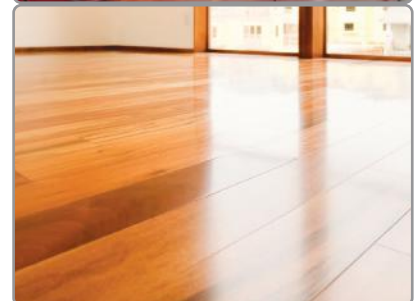
Choosing the correct angle for gloss measurement

Gloss measurement is based on the amount of light reflected on the surface relative to a polished glass reference standard, measured in Gloss Units (GU). The amount of light that is reflected on the surface is dependent on the angle of incidence and the properties of the surface.

Gloss is categorised as either matt, semi or high gloss. In order to determine the most appropriate measurement angle start with a glossmeter set at a 60° angle of incidence.

If the result is between 10 - 70GU, the coating is termed 'semi-gloss' and should be measured using the 60° angle. If the result is less than 10GU, the product is 'low gloss' and should be measured using the 85° angle and if it is greater than 70GU, the product is known as 'high gloss' and should be measured using the 20° angle.

All three angles should be recorded (20, 60 & 85°) when measuring gloss on anodised metals to ensure a complete understanding of the specular reflectance between the coating and the metal substrate.



| Gloss Range | 60° value | Measure with |
|-------------|-----------|--------------|
| High Gloss | > 70GU | 20° |
| Semi Gloss | 10 - 70GU | 60° |
| Low/ Matt | < 10GU | 85° |

% Reflectance (%)

% Reflectance compares the amount of light energy transmitted and received by a glossmeter and expresses the value as a percentage. The shinier a surface is, the closer the value will be to 100%.

Whilst the Gloss Unit (GU) scale is linear, each angle of incidence has a different measurement range; 0 – 2000GU (20°), 0 – 1000GU (60°), 0 – 160GU (85°).

% Reflectance displays the measurement value as a percentage relative to the selected angle of incidence. For example, a value of 1000GU at 20° would be expressed as 50%₂₀ and 500GU would be expressed as 25%₂₀, but at 60° this would be expressed as 50%₆₀.

Haze (HU)

Haze causes a drop in reflected contrast and causes 'halos' to appear around the reflected light sources, dramatically reducing the visual quality.

In accordance with ASTM D4039 haze is defined as the numeric difference between the specular reflectance at 60° and 20°.

This is expressed in Haze Units (HU).

Elcometer 480**Glossmeters**

The Elcometer 480 range of handheld glossmeters combine accuracy, repeatability and reproducibility with functionality allowing you to measure Gloss, % Reflectance & Haze with ease.

- Small, robust & ergonomic
- 3 - 10 readings per second
- Repeatable, reproducible & accurate
- Multiple angles; 20°, 60°, 85°
- 40,000 reading memory in up to 2,500 batches
- Date and time stamped readings
- USB & Bluetooth® data output
- PC, iPhone or Android™ compatible
- Automatic gauge & file diagnostics
- Auto calibration tile recognition via RFID†
- 40 user definable limit standards
- Standard, auto repeat and scan modes
- Differential mode with pass/fail
- Display readings, statistics, graphs & batch review

**STANDARDS:**

AS/NZS 1580.602.2, ASTM C584, ASTM D523, ASTM D1455, ASTM D2457, ASTM D4039, ASTM E430, ASTM E2387, BS 3900 D5, DIN 67530, ECCA T2, EN 12373-11, EN 13523-2, ISO 7668, ISO 2813, ISO 13803, JIS K 5600-4-7, JIS Z 8741, TAPPI T 653 (20°)

2 YEAR*
WARRANTY

* Elcometer 480 gauges are supplied with a one year warranty against manufacturing defects. The warranty can be extended to two years via www.elcometer.com

† Radio Frequency Identification; European Patent Number: 2906904

Elcometer 480



new



Using state-of-the-art design and manufacturing techniques, the Elcometer 480 Glossmeters quickly and accurately measure and record gloss measurements on a wide range of materials, including paint, plastic, ceramic or metal.

The Elcometer 480's rapid LED technology accurately measures up to 3 angles at the same time at a rate of 10 readings per second.

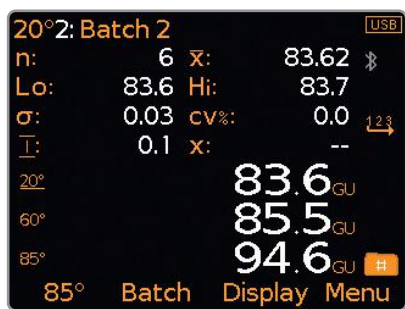
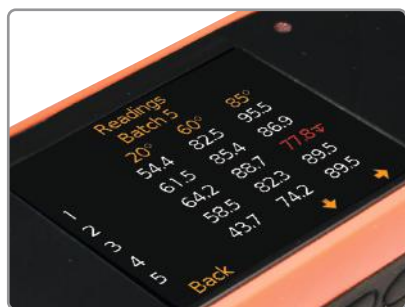
Measurements can be instantly transferred to PC, iPhone, Android™ or other mobile devices via USB or Bluetooth®.

Using the ElcoMaster® software, professional reports for gloss and other appearance measurements can be quickly generated. Alternatively gloss readings can be combined with other key measurement parameters such as coating thickness, adhesion and oven temperature profile - within the same software package.



Elcometer 480 Model T: Made for iPhone 6 Plus, iPhone 6, iPhone 5s, iPhone 5c, iPhone 5, iPhone 4s, iPhone 4, iPad Air 2, iPad mini 3, iPad Air, iPad mini 2, iPad (3rd and 4th generation), iPad mini, iPad 2, and iPod touch (4th and 5th generation). "Made for iPod," "Made for iPhone," and "Made for iPad" mean that an electronic accessory has been designed to connect specifically to iPod touch, iPhone, or iPad, respectively, and has been certified by the developer to meet Apple performance standards. Apple is not responsible for the operation of this device or its compliance with safety and regulatory standards. Please note that the use of this accessory with iPod touch, iPhone, or iPad may affect wireless performance.

Elcometer 480



Glossmeters

The Model Range

The Elcometer 480 is available as either a simple entry level 60° glossmeter or state of the art Single, Dual or Triple angle variants.

- Single: 60°
- Dual: 20° & 60°
- Triple: 20°, 60° & 85°

Memory and Batching

Store 40,000 date and timed stamped readings in up to 2,500 user definable alpha-numeric batches.

Readings can be transferred to PC, iPhone, Android™ or other mobile devices via USB or Bluetooth® for instant reporting using ElcoMaster® software.

Display Modes

Fully customisable, scratch and solvent resistant colour LCD allows the user to display:

- Gloss, % Reflectance or Haze readings
- Statistics
- Readings and Differential with pass/fail
- Trend Graph
- Analogue Scan Bar

Standard, Auto Repeat & Scan Modes

No two inspections are the same. It is for this reason that the Elcometer 480 is equipped with three measurement modes:

- Standard Mode: Press the measure button to take an individual spot measurement.
- Auto Repeat Mode: When the glossmeter is slid over the surface a measurement of all three angles is automatically taken at a user definable rate between 10 - 180 readings per minute. When enabled all the individual readings are stored into memory.
- Scan Mode: As the glossmeter slides over the entire surface area the gauge measures all three angles at a continuous rate of 10 readings per second. When stopped, the gauge displays and stores the average, highest and lowest values - ideal for checking a sample's overall uniformity.

Glossmeters

Elcometer 480

Accuracy & Repeatability

Advanced electronics and state-of-the-art optical design ensures highly accurate, repeatable and reproducible measurements.



| | | | |
|-----------------|--------|----------|------------|
| Range | 0-10GU | 10-100GU | 100-2000GU |
| Repeatability | ±0.1GU | ±0.2GU | ±0.2% |
| Reproducibility | ±0.2GU | ±0.5GU | ±0.5% |

Limit Standards and Differential Mode with Pass/Fail

When visual appearance is critical Master Standards are created. These are generated and approved by the customer and then used by manufacturers as part of their quality control inspection regime. As these Master Standards have been visually approved they often do not have numerical gloss values assigned.



In order to avoid subjectivity between inspectors, the Elcometer 480 can automatically generate and store the nominal (target), highest & lowest acceptable gloss values (Limits) from the Master Standard.

Up to 40 Limits for each customer's Master Standards can be stored within, and recalled from, the gauge's 'Limit Standard' memory.

When Limit Standards are used in combination with the gauge's Differential Mode, the Elcometer 480 displays the measurement value together with the difference from the nominal (target) value.

Readings outside the Limit Standard are displayed in red, providing quick Pass/Fail analysis.

Due to the Elcometer 480's industry leading inter-instrument agreement, once a Master Standard Limit has been created, the gauge can transfer these values to other Elcometer 480 glossmeters, via the ElcoMaster® software's Library of Limit Standards, at any time.

Information from multiple glossmeters can be combined into a single inspection report within ElcoMaster®, ideal for multiple production and assembly lines.



Elcometer 480

Create instant reports with ElcoMaster®

What you do with the collected data is just as important as taking the readings themselves.



ElcoMaster® is a fast, easy to use software solution for all your data management and quality assurance needs, preparing professional inspection reports at the click of a button.

Data transferred to ElcoMaster® includes;

- 20° 60° & 85° Gloss Units (GU)
- Haze Unit (HU)
- % Reflectance (%)
- Date & time of each reading
- Limit Standard values
- Batch information & statistics
- Calibration information including date/time, serial number & tile values

Whether you are in the field or on the factory floor, using the ElcoMaster® Mobile App users can;

- Store live readings directly on to a mobile device and save them into batches
- View graphs in real-time whilst carrying out the inspection
- Add notes to individual batch reading
- Add photographs of the test surface to each individual batch reading at the click of a button
- Plot individual readings on to a location Map photograph or diagram via the mobile device's internal GPS
- Inspection data can be transferred from mobile to PC for further analysis and reporting
- Generate instant .pdf¹ report for submission

¹ Available on iOS devices only

Elcometer 480

Using the Limit Standard Library within ElcoMaster®, Limit Standards from one gauge can be transferred to other gauges optimising the inspection process.



Connect

Connect gauge via Bluetooth® to see live readings directly on the phone and save them into batches.

Review

Review average, maximum and minimum readings instantly.

Manage & Print

Store all data; gloss, dry film thickness, surface profile, climate and manual reports in easy to manage folders.

Photos & Notes

Add photos, notes and comments.

Image Collection

Use measurement location points on images to indicate the position for the next reading.

Combine

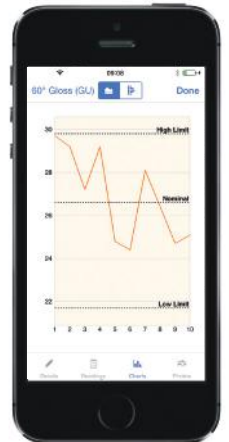
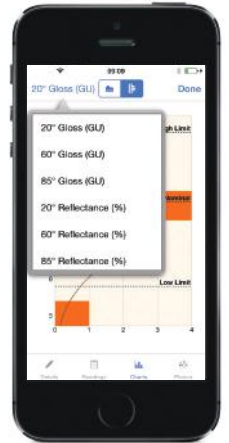
Combine different inspection parameters (such as gloss, dry film thickness, oven temperature profile and adhesion) together with images, notes and other project specific information into reports.

Collaborate

Share inspection data securely via the Cloud and collaborate on projects using the instant messaging feature in ElcoMaster®.

Send

Email inspection data from a mobile device to a PC for further analysis and reporting or transfer data via the Cloud.



PC



Elcometer 480

Glossmeters

| Product Features | ■ Standard | □ Optional |
|--------------------------------------------------------------------------------------------|------------|---------------------------|
| | Model B | Model T |
| Measurement geometries | 60° | 60°, 20/60° or 20/60/85°* |
| Measurement units | GU | GU, HU [†] & % |
| Fast, accurate reading rate | ■ | ■ |
| Repeatable & reproducible measurements | ■ | ■ |
| Easy to use menu structure; <i>in 30+ languages</i> | ■ | ■ |
| Tough, impact, waterproof & dust resistant | ■ | ■ |
| Scratch & solvent resistant colour display; <i>2.4" (6cm) TFT</i> | ■ | ■ |
| Rotating display: <i>auto, 0°, 180°</i> | ■ | ■ |
| Ambient light sensor; <i>with adjustable auto brightness</i> | ■ | ■ |
| Data output | | |
| USB live readings | ■ | ■ |
| USB batch download | | ■ |
| Bluetooth®: <i>to PC, iOS or Android™ mobile devices</i> | | ■ |
| USB & battery powered | ■ | ■ |
| Calibration Certificate | ■ | ■ |
| Manual gauge calibration | ■ | ■ |
| Auto gauge calibration; <i>via RFID tagging of integrated calibration tile[#]</i> | | ■ |
| On screen statistics - <i>user selectable</i> | | |
| Number of readings, Mean (average), Standard deviation, | ■ | ■ |
| Highest reading, Lowest reading, Range | | ■ |
| Coefficient of variation, | | ■ |
| Nominal value, High Limit value, Low Limit value | | ■ |
| Number above high limit, Number below low limit | | ■ |
| Measurement modes | | |
| Standard Mode | ■ | ■ |
| Auto Repeat Mode; <i>programmable 10-180 readings per minute</i> | | ■ |
| Scan Mode; <i>10 readings per second</i> | | ■ |
| Differential Mode with Pass/ Fail mode; | | ■ |
| Limit Standards; <i>up to 40 programmable standards</i> | | ■ |
| Gauge & batch specific standard limits | | ■ |
| Gauge memory 40,000 readings in up to 2,500 batches | | ■ |
| Alpha-numeric batch names | | ■ |
| Fixed batch size mode | | ■ |
| Date and time stamp | | ■ |
| Gauge auto diagnostics | ■ | ■ |
| Display modes; <i>user selectable</i> | | |
| Readings; <i>gloss, % reflectance[†], haze[†]</i> | ■ | ■ |
| Selected statistics | ■ | ■ |
| Live trend graph; <i>last 20 readings</i> | | ■ |
| Scan bar | | ■ |
| Readings & differential (with pass/fail) | | ■ |
| Delete last reading | ■ | ■ |
| 2 year extended warranty [^] | ■ | ■ |

[^]The Elcometer 480 is extendable within 60 days from date of purchase, free of charge, to 2 years via www.elcometer.com

* Dependant on model

[†] Haze on Dual and Triple models only




[#] Radio Frequency Identification; European Patent Number: 2906904

Glossmeters

Elcometer 480

Technical Specification

C

| Part Number | Description | Certificate |
|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|
| J480B-6 | Elcometer 480 Model B 60° Glossmeter | • |
| J480T-6 | Elcometer 480 Model T 60° Glossmeter | • |
| J480T-26 | Elcometer 480 Model T 20/60° Glossmeter | • |
| J480T-268 | Elcometer 480 Model T 20/60/85° Glossmeter | • |
| Display information | 2.4" (6cm) QVGA colour TFT display, 320 x 240 pixels | |
| Power | USB (via PC) or 2 x AA batteries (~50,000 readings) | |
| Measurement Dimensions |  20°: 10 x 10mm |  60°: 8 x 16mm |
| | |  85°: 4 x 55mm |
| Measurement Range | 0 - 2,000GU | 0 - 1,000GU |
| Repeatability | ± 0.1GU (0 - 10GU); ±0.2GU (10 - 100GU); ±0.2%: 100 - 2000GU | |
| Reproducibility | ± 0.2GU (0 - 10GU); ±0.5GU (10 - 100GU); ±0.5% 100 - 2000GU | |
| Resolution | Gloss: 0.1 GU (0 - 100GU); 1 GU (>100GU) % Reflectance: 0.01% (0 - 10%); 0.1% (10 - 100%) Haze: 0.1 HU (0 - 100HU); 1 HU (>100HU) | |
| Operating Temperature | -10°C to 50°C (14 to 122°F); Relative Humidity: 0 - 85%RH | |
| Dimensions (H x W x D) | 68 x 155 x 50mm (2.68 x 6.10 x 1.97") | |
| Weight | 534g (1lb 3oz) [including batteries] | |
| Packing List | Elcometer 480 Glossmeter, integrated calibration tile, calibration certificates for gauge & calibration tile, 2 x AA batteries, wrist strap, operating instructions, plastic carry case, ElcoMaster® software (Model T) and USB cable (Model T) | |

Accessories

| | | | |
|---------------|-------------------------------------------------------------|------------------------------|---|
| T48024798-LC | Low Gloss Calibration Tile | Nominal Value: 22GU at 60° | • |
| T48024798-MDC | Mid Gloss Calibration Tile | Nominal Value: 55GU at 60° | • |
| T48024798-HC | High Gloss Calibration Tile* | Nominal Value: 97GU at 60° | • |
| T48024798-MRC | Mirror Gloss Calibration Tile | Nominal Value: 1900GU at 20° | • |
| T48024798-SH | Soft Material Specimen Holder, complete with 3 sample trays | | |
| T48025004 | Soft Material Sample Trays (x3) | | |
| T99923535 | Gloss Tile Cleaning Cloth | | |
| T99925002 | USB Cable | | |



Each calibration tile is supplied within its own base unit to ensure measurement accuracy and repeatability



The soft material specimen holder is supplied with 3 sample trays - ideal for testing soft, powder or viscous materials



• Certificate supplied as standard.

* Supplied with gauge



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Elcometer 480 Model T: Made for iPhone 6 Plus, iPhone 6, iPhone 5s, iPhone 5c, iPhone 5, iPhone 4s, iPhone 4, iPad Air 2, iPad mini 3, iPad Air, iPad mini 2, iPad (3rd and 4th generation), iPad mini, iPad 2, and iPod touch (4th and 5th generation).
 "Made for iPod," "Made for iPhone," and "Made for iPad" mean that an electronic accessory has been designed to connect specifically to iPod, iPhone, or iPad, respectively, and has been certified by the developer to meet Apple performance standards. Apple is not responsible for the operation of this device or its compliance with safety and regulatory standards. Please note that the use of this accessory with iPod, iPhone, or iPad may affect wireless performance.

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Due to our policy of continuous improvement, Elcometer Limited reserves the right to change specifications without notice. All gauges come with a 1 year warranty as standard, the Elcometer 480 is extendable within 60 days from date of purchase, free of charge, to 2 years via www.elcometer.com

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