# elcometer

# Elcometer 224 Digital Surface Profile Gauges

## Roughness Measurement & Blast Profiles to
## ASTM D 4417-B, SANS 5772, SSPC PA 17, US Navy NSI 009-32, US Navy PPI 63101-000

The Elcometer 224 provides the very latest in surface profile measuring technology for measuring profile on either flat or curved surfaces. Fast, accurate and very user friendly, the Elcometer 224 Surface Profile Gauge is available with or without memory and Bluetooth®.

The Elcometer 224 surface profile meter is available in two different models: Model B and Model T. Each surface profile gauge provides the user with increasing functionality from the entry level Elcometer 224 Model B, to the top of the range Elcometer 224 Model T, with memory, alpha-numeric batching and Bluetooth® communication.

Standard and armoured probes are available for the separate models, providing even greater measurement flexibility. Elcometer surface profile probes are supplied with a glass zero plate, calibration test foils (nominal values 125µm & 508µm and an Elcometer Test Certificate).

## Features

- Accurate, immediate and repeatable results
- Integral & separate probe variants for flat and convex* surfaces
- The separate probes can now measure on pipes and tanks
- Tough tungsten carbide user replaceable tip, can be used for up to 20,000 readings
- Stores up to 150,000 readings in alpha numeric batches (Model T only)
- Auto rotating display with tap awake feature
- Cost per test is significantly lower than other test methods
- Large backlit screen makes viewing readings easy
- Digital display prevents reading interpretation errors
- Intuitive menus in multiple languages enables use straight from the box
- Dust and water resistant rugged design equivalent to IP64
- Ergonomic design for comfort during continuous use
- 2.4" Colour screen provides enhanced reading visibility at all angles
- Fast reading rate at 60+ readings per minute
- Review batch data or last 20 readings in a graph format
- Counted average mode stores the average value of a preset number of readings (Model T only)
- USB and Bluetooth® data output to ElcoMaster® (Model T only)

Integral or separate probes measure profiles up to 500 microns on flat or curved surfaces*



Ergonomic design for comfort during continuous use



2.4" Colour screen provides enhanced reading visibility at all angles

# Designed with you in mind

### User Friendly

- Large buttons ideal for gloved hands
- Easy to use menus in multiple languages
- High contrast colour LCD with auto rotate
- High and low reading limit indicators
- Factory calibrated for immediate use

### Accurate

- Measurement capability to ±5%
- Conforms to National & International Standards
- Temperature stable measurements
- Statistics are calculated & displayed in real time.
- Live and batch readings graph format for instant analysis

### Reliability

- Repeatable and reproducible
- 2 year gauge warranty
- Supplied with fully traceable Test Certificates
- Batch & individual reading date and time stamp facility

### Tough

- Sealed, heavy duty and impact resistant
- Dust and waterproof equivalent to IP64
- Scratch and solvent resistant display
- Durable gauge and probe construction
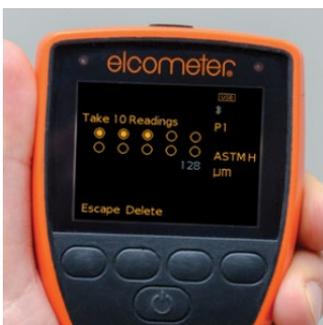- Suitable for use in harsh environments

### Efficient

- Fast reading rate of 60+ per minute
- Integral and separate probe options to suit your application on flat or curved surfaces*
- Alpha numeric batch identification
- Compatible with ElcoMaster / ElcoMaster Mobile
- Powersave mode with tap awake

### Powerful

- Tough tungsten carbide user replaceable tip can be used for up to 20,000 readings
- USB and Bluetooth® data output
- Stores up to 150,000 readings in 2,500 batches
- Measures profiles up to 500µm

## 3 Measurement Modes

Whichever test method or Standard you are working to the Elcometer 224 Digital Surface Profile Gauge has a range of easy to use Measurement Modes.



**Custom Mode**

In Custom mode, simply select to take either 5 or 10 readings per measurement then specify either the average, highest or lowest measurement of each set of readings to be displayed and saved into the batch memory (T only).



**Standards Mode**

Select the International Standard you are working to and the Elcometer 224 will automatically set the data collection method accordingly. When selecting ASTM D 4417, you can even choose if the gauge stores the average or highest reading as the measurement.



**Immediate Mode**

Take individual peak-to-valley measurements and save into the batch memory (T only). The Elcometer 224 automatically calculates and displays key statistics whilst you're inspecting, and you can set limits so the gauge will alarm whenever the reading is outside a predefined acceptable range.

# Product Features

| | ■ Standard Model B | □ Optional Model T |
|---|:---:|:---:|
| Fast, accurate reading rate; *50+ readings per minute^* | ■ | ■ |
| Repeatable & reproducible measurements | ■ | ■ |
| Easy to use menu structure; *in 30+ languages* | ■ | ■ |
| Tough, impact, water & dust resistant; *equivalent to IP64* | ■ | ■ |
| Bright colour screen; *with permanent back light* | ■ | ■ |
| Scratch & solvent resistant display; *2.4" (6cm) TFT* | ■ | ■ |
| Large positive feedback buttons | ■ | ■ |
| Flat & convex surfaces* | ■ | ■ |
| USB power supply; *via PC* | ■ | ■ |
| Test certificate | ■ | ■ |
| 2 year gauge warranty† | ■ | ■ |
| Automatic rotating display; *0°, 90°, 180° & 270°* | ■ | ■ |
| Ambient light sensor; *with adjustable auto brightness* | ■ | ■ |
| Emergency light mode | ■ | ■ |
| Gauge software updates¹ *via ElcoMaster® Software* | ■ | ■ |
| Data output | ■ | ■ |
|    USB; *to computer* | ■ | ■ |
|    Bluetooth®: *to computer, Android™ & iOS‡ devices* | | ■ |
| Measurement modes; *Immediate, Custom, Standards* | ■ | ■ |
| On screen statistics | ■ | ■ |
|    Number of readings; η, Mean (average); x, Standard deviation; σ, Highest reading; Hi, Lowest reading; Lo, Coefficient of variation; CV% | ■ | ■ |
|    High & low limits; *definable audible & visual alarms* | | ■ |
|    Number above high limit | | ■ |
|    Number below low limit | | ■ |
| ElcoMaster® Software & USB cable | | ■ |
| Date and time stamp for each reading | | ■ |
| Replaceable screen protectors | ■ | ■ |
| Protective case | ■ | ■ |
| Plastic transit case | □ | ■ |
| Measurement range | 0-500μm | 0-500μm |
| On-screen calibration instructions; *in 30+ languages* | ■ | ■ |
| Number of batches | | 2.5 |
| Gauge memory; *number of readings* | Last 5 | 150 |
| Delete last reading | ■² | ■ |
| Limits; *user definable audible & visual pass/fail warnings* | | ■ |
|    Gauge (g) or gauge & batch specific (gb) limits | | gb |
| Batch types; *normal, counted average* | | ■ |
| Batch statistics; *Average peak-to-valley, Average Max peak-to-valley, Standard deviation, σ; Highest reading, Hi; Lowest reading, Lo; Coefficient of variation, CV%* | | ■ |
| Review, clear & delete batches | | ■ |
| Copy batches and calibration settings | | ■ |
| Alpha-numeric batch names; *user definable on the gauge* | | ■ |
| Fixed batch size mode; *with batch linking* | | ■ |
| Trend Graph; *last 20 readings* | | ■ |
| Review batch graph | | ■ |

^ Up to 25 readings per minute for the convex probe
* USA Patent Number: 9,261,345
† The Elcometer 224 is extendable within 60 days from date of purchase, free of charge, to 2 years
¹ Internet connection required
‡ Visit www.elcometer.com/sdk to find out how to integrate Elcometer's MFi certified products to your App
² Up to the last 5 readings can be deleted

# Technical Specification

| | |
|---|---|
| Display information | 2.4" (6cm) QVGA colour TFT display, 320 x 240 pixels |
| Battery type | 2 x AA dry cell batteries, rechargeable batteries can also be used |
| Battery life | Approximately 24 hours of continuous use at 1 reading per second# |
| Minimum Headroom | Integral: 185mm |
| | Separate: See Accessories |
| Gauge dimensions (h x w x d) | Integral: 168 x 73 x 37mm |
| | Separate: 141 x 73 x 37mm |
| Gauge weight (including batteries) | Integral: 218g |
| | Separate: 161g |
| Measurement range | 0-500µm |
| Probe tip | Tungsten carbide tip 60° angle; Tip Radius: 50µm |
| Operating temperature | -10 to 50°C |
| Storage temperature | -10 to 60°C |
| Accuracy | ±5% or ±5µm* |
| Resolution | 1µm |

\* Whichever is the greater
\# Using default settings & lithium batteries, alkaline or rechargeable batteries may differ

## Part Numbers

**Model Options**

| Part Number | | Description | Certificate |
|---|---|---|---|
| **Integral Gauge** | **Separate Gauge^** | | |
| E224C-BI | E224C-BS | Elcometer 224 Model B Digital Surface Profile Gauge | ● |
| E224C-TI | E224C-TS | Elcometer 224 Model T Digital Surface Profile Gauge | ● |

^ Probes are supplied separately
● Test Certificate supplied as standard.

# Separate Probes

## Flat Surface Profile Probes

Supplied with either standard cables or armoured metal reinforced heavy duty cables, Elcometer surface profile probes are supplied with a glass zero plate, calibration test foils; nominal values 125 & 508µm and an Elcometer test certificate.

**Technical Specification**

| |
|---|
| Range: 0-500µm |
| Resolution: 1µm |
| Accuracy: ±5% or ±5µm |

| Probe Design | Part Number | Minimum Headroom | Minimum Sample Diameter | Certificate |
|---|---|---|---|---|
| Flat Surface: Standard | T224C500US | 125mm | 25mm | ● |
| Flat Surface: Armoured | T224C500UARM | 165mm | 25mm | ● |

## Convex Surface Profile Probes

Supplied with either standard cables or armoured metal reinforced heavy duty cables, Elcometer convex surface profile probes are supplied with a glass zero tile, calibration test foils nominal values 125 & 508µm and an Elcometer test certificate.
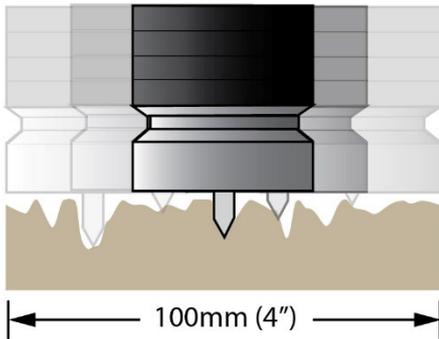
## Technical Specification

| | |
|---|---|
| Range: 0-500µm | |
| Resolution: 1µm | |
| Accuracy: ±5% or ±5µm | |

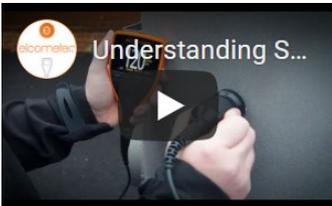| Probe Design | Part Number | Minimum Headroom | Minimum Sample Diameter | Certificate |
|---|---|---|---|---|
| Convex Surface: Standard* | T224C500UX | 135mm | 75mm | ● |
| Convex Surface: Armoured* | T224C500UXARM | 175mm | 75mm | ● |

* USA Patent Number: 9,261,345, Elcometer 224 probes are covered by a 1-year warranty

## How to measure surface profile



1. Ensure probe is 90° to substrate to ensure accurate readings and calibrate the gauge on a glass zero tile.

2. To take one spot measurement, take either 5 or 10 readings within a 100mm diameter area.

3. The measurement displayed is either the average peak-to-valley height or the maximum reading of the 5 or 10 readings, depending on which measurement mode you have selected.

4. To establish the average surface profile of an area, record 5 spot measurements for each 1m x 1m area.
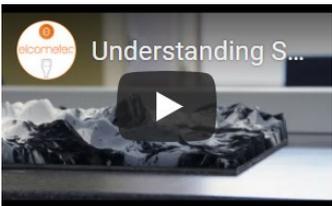
## Videos



**YouTube Video - Understanding Surface Profile with the Elcometer 224 Digital Surface Profile Gauge**
*(Click on the image to the left to view the video)*

In the industrial and protective coatings industry, metal surfaces are blasted not only to remove corrosion or old coatings, but to generate a surface profile prior to re-painting.



**YouTube Video - Understanding Surface Profile**
*(Click on the image to the left to view the video)*

In some industries a surface profile is achieved through chemical etching or mechanical abrasion. But, regardless of the method, the surface profile increases the surface area of the metal - and it is this increased surface area which provides a key for the coating to adhere or stick to.



**YouTube Video - How to Measure Surface Profile using the Elcometer 224 Digital Surface Profile Gauge**
*(Click on the image to the left to view the video)*

If the surface profile is not within specification, and is either too large or too small, this can lead to costly premature coating failures and corrosion. So that's why it is important to measure surface profile.

# Packing List

| |
|---|
| Elcometer 224 Digital Surface Profile Gauges |
| Glass Zero Tile |
| 2 x Calibration Foils† |
| Wrist harness |
| Plastic Transit Case(T) |
| Protective Case |
| Screen Protector |
| Probe Protection Cap† |
| 2 x AA Batteries |
| Test Certificate |
| Operating Instructions |
| USB Cable(T) |
| ElcoMaster® Software(T) |

† For separate gauges, the test foils, glass zero tile and protection cap are supplied with the separate probe
(T) Top Models only

# Accessories

| Part Number | Description |
|---|---|
| T22420053 | Replacement Probe Tips; Pack of 2 with Fixing Tool |
| T22420095 | Replacement Probe Tips; Pack of 5 |
| T22419793 | Probe Tip Protection Cap |
| T22421882C | Certified Calibration Test Kit: 125 & 500μ, Calibration Foils, Glass Zero Tile & Cal Certificate |
| T22420072 | Glass Zero Tile |
| T99921325 | USB Cable |
| T99924797 | USB Bluetooth Adaptor (V2.0+) - for PC's without Bluetooth |
| T99922341 | Self Adhesive Screen Protectors (x10) |
| T22423371 | Plastic Transit Case |
| T99931812 | Plastic Protective Case |

# Total Quality Assurance *(See separate Datasheet for more info)*

Professional inspection reports provide a competitive advantage in today's industrial environment.

ElcoMaster® Data Management Software is a fast, easy to use software solution for all your reporting requirements.

Instantly transfer readings, statistics, and limits; via USB or Bluetooth®; to your PC or mobile device, using ElcoMaster® or your own software application, creating professional inspection reports in minutes.

Fast, accurate and very user friendly, the Elcometer 224 Surface Profile Gauge is available with or without memory and Bluetooth®.

# Elcometer ElcoMaster® Data Management Software:

- **Easy to connect -** Using the ElcoMaster® gauge wizard, connecting a gauge & downloading data (via Bluetooth or USB) is fast and easy
- **Import existing reports -** Scan your existing report into ElcoMaster® and drag & drop all your data where you want it, then simply save and print
- **Export, print or send -** Export, print, .pdf or email
- directly from ElcoMaster® at the click of a button
- **Cloud -** Multi-site access through secure cloud

**Android™** 

Made for
**iPhone | iPad | iPod**