

# SIGMACHECK 2

Comprehensive Eddy Current Conductivity Meter



- Lightweight, ergonomic slim-line case with easy to hold probe with adjustable finger grip.
- High resolution colour display (2.8"/71mm, 320 pixels by 240pixels)
- Operating frequencies 60kHz, 120kHz, 240kHz, 480 kHz. Option of 960 kHz.
- Range of Reference Standards available for in-field use.
- High impact, splash-proof flame retardant ABS case.
- Over 12 hours battery life.
- Two year warranty, extendable to 5 years with ETHERCover.

The SIGMACHECK 2 Eddy Current Conductivity Meter is designed to give accurate conductivity measurements while offering the user the very best in reliability, usability, technology and cost-effectiveness.

The instrument is extremely user friendly and can just as easily be operated by a semi-skilled Operator as by Experts. It will be equally at home in the Aerospace, Metals Processing, Casting, Maintenance and Quality Assurance industries as well as appealing to Heat Treatment Specialists and those determining the purity of materials such as gold bullion and coins.

## APPLICATIONS

- Material verification / sorting.
- Heat treatment verification.
- Heat or fire damage investigation.
- Lightning damage investigation.
- Material ageing assessment.
- Measuring phosphor content of Cu alloys.
- Monitoring of deposition process for non-ferrous material on a non-ferrous substrate.
- Monitoring the condition of highly stressed parts
- Forged/plated material verification.
- Non-conductive coating thickness measurement.
- Determining the purity / composition of materials i.e. gold bullion and coins.
- Aircraft structures e.g. Paint thickness measurement.
- Assessment of ageing of alloys.



## Key Benefits

- User programmable display.
- 2GB of data storage. Able to store over one million data points.
- Uploaded data can be viewed using MS Excel.
- Intelligent charger via Micro USB Port.
- Excellent resistance to “edge effect”.
- Rapid Display of Conductivity Results.
- Battery life (up to 12 hours).
- Field upgradeable Firmware.
- Different probes can be mapped to the same instruments, 3 probe types available.
- Real-time clock readings can be “time stamped”.
- Real-time PC control via USB or optional RS232 link.

## Procedural Compliance

The Sigmacheck 2 may be used to comply with the requirements of the following inspection procedures.

- Boeing BAC5651
- Airbus AITM 6-6004
- ASTM E1004
- AMS2658
- BS EN 2004
- MIL-STD-1537
- Bell Helicopter BPS 4453



## Advantages

- High resolution colour display (2.8"/71mm, 320 pixels by 240 pixels).
- Lockdown mode allows advanced users to lock down features and settings for basic operator mode.
- Accurate conductivity range (0.5% IACS to 110% IACS, 0.28-64 Ms/m).
- Wide range of frequencies for testing thin materials (60kHz, 120kHz, 240kHz, 480kHz). Option of 960kHz.
- Non-conductive coating thickness. Measurement display up to 0.5mm.
- Lightweight (350 grams / 12 oz). Ergonomic slim-line case design and easy to hold probe with adjustable finger-grip.
- Two-year warranty on instrument (excludes batteries), extendable to 5 years with ETHERCover.

## High Resolution Display

The full colour 2.8" LCD display screen is 320 x 240 pixels providing excellent resolution and displaying conductivity and lift-off results with up to three decimal places precision. The display features an adjustable LED backlight allowing the Operator to set their required screen brightness. The Operator can also customise both the background colours and text colours to meet their personal preference.

## In-Field Performance and Reporting

USB PC Connectivity is built into the SIGMACHECK 2 for remote control and data logging. The USB Connection also offers real time data acquisition as well as eliminating any complicated driver installation. In addition, the USB Connection allows easy charging of the Instrument.

The SigmaCheck 2 also supports "Field Exchangeable Probes", once mapped to the instrument, meaning an operator can quickly change between them, improving on-site inspection efficiency.

## Understanding Conductivity

Electrical conductivity is the measurement of a materials ability to conduct an electric current. This is the inverse of electrical resistivity, measuring a materials ability to resist an electric current.

Conductivity in metal is established using Ohm's Law, which states that current through a conductor between two points, is directly proportional to the potential difference across the two points. The resistance of the material, which is a constant for that material, allows the usual mathematical equation for this relationship to be true. Conductivity is widely used to indicate material type and determine the state of heat treatment.

In order to give accurate readings the SIGMACHECK 2 uses a three-point reference method. The first measurement with the probe in the air and then two further measurements are required which span the range of interest.

The SIGMACHECK 2 is supplied with a detachable reference piece with two standards that span the range of commonly used metals.

ETHER NDE also manufacture individual conductivity test blocks which may be used to match the clients own testing requirements. We can also provide a handy test block holder (Part number: ASIG003) that can hold up to five of these test blocks at any one time as shown above.

### Ohms Law Equation:

$$I = \frac{V}{R}$$

I = Current (Amps)

V = Voltage (Volts)

R = Resistivity (ohms)

### Electrical Conductivity Equation:

$$\sigma = \frac{L}{RA}$$

L = length (cm)

OR

A = Area (cm<sup>2</sup>)

$$R = \frac{L}{\sigma A}$$

R = Electrical Resistance of a uniform specimen of the material (ohms)

$\sigma$  = Conductivity (ohm<sup>-1</sup> cm<sup>-1</sup>)



Conductivity Test Blocks in holder.

## SigmaCheck 2 Specification

Inspection Technology	Eddy Current
Operating Frequencies	60 kHz, 120 kHz, 240 kHz, 480 kHz. Option of 960 kHz.
Conductivity Range	0.5 % IACS to 110 % IACS, 0.28-64 MS/m
Accuracy	Probe must be in thermal equilibrium with test material, and instrument and probe stabilized prior to testing. Minimum 15-minute warm up time for stabilisation. At 20°C: 0-20% IACS: $\pm 0.05$ IACS At 20°C: >20% IACS $\pm 0.25\%$ of readout
Display Resolution	Up to 3 decimal places.
Lift Off	13mm probe compensated to 0.020" (0.5mm) 7 mm probe compensated to 0.010" (0.25 mm)
Temperature Measurement	In-probe sensor (accurate to 0.5 °C) Range 0 °C to + 50 °C
Automatic Temperature Compensation	Conductivity measurements are corrected to the 20°C value
Environmental Range	0 to 95% relative humidity, 0°C to + 50°C for reliable operation.
Display	2.8" (70mm) 320 x 240 pixels colour display. LCD with selectable backlight.
Languages	Multiple languages available. e.g. English, German, French, Spanish.
Construction & Storage	High impact, splash-proof, moulded UL94-5VA flame-retardant ABS case. Protective rubber boot to protect the unit, probes, probe cable, operator manual on USB, and removable stand.
Conductivity Standards	On top of unit. Removable for value verification, and when attached ensures thermal equilibrium
Power	1 Internal Rechargeable Battery, 3.635 V, Lithium Ion, 3.5 Ah. Over 12 hrs battery life at 60kHz, 50% screen brightness.
Size (l x w x d)	163mm (6.4") x 80mm (3.1") x 25mm (1.0").
Weight	358g (0.79lbs) including batteries and dual reference block
Data Logger Memory	Removable 32GB micro SD Card allowing over 2 million readings to be stored
PC Connectivity	Micro USB port for charger & PC Communications
Probes	13mm diameter for 60 kHz to 480 kHz (PSIG001A) 8mm probe operates at 60 kHz to 480 kHz (PSIG002A)

### Product & Accessory Part Numbers:

**KISIG001B-NIST:** Standard Kit, Instrument, SIGMACHECK 2 Conductivity Meter.

**KISIG002B-NIST:** RS232 Kit, Instrument, SIGMACHECK 2 Conductivity Meter.

**KISIG003B-NPL:** Standard Kit, Instrument, SIGMACHECK 2 Conductivity Meter.

**KISIG004B-NPL:** RS232 Kit, Instrument, SIGMACHECK 2 Conductivity Meter.



**ASIG014B-NIST:** Accessory, Dual Conductivity Reference Standards, Nominal Values 9.4% and 58.8% IACS.

**ASIG015B-NPL:** Accessory, Dual Conductivity Reference Standards, Nominal Values 9.4% and 58.8% IACS.

**ASIG002:** Accessory, Instrument Stand.

**ASIG004:** Accessory. Hard Peli 1400 Case with custom shaped foam inserts.

**PSIG001A:** Probe, Conductivity, Dia 13.00mm, Straight, Lemo 5-Way

**PSIG002A:** Probe, Conductivity, Dia 8.00mm, Straight, Lemo 5-Way

**PSIG003A:** Probe, Conductivity, Right Angled, 60, 120, 240 and 480kHz Dia 13.00mm, 90deg, Lemo 5-Way (SigmaCheck2)

**ALL05-L05-015-SIG2:** Accessory, Lead, 5-Way Lemo to 5-Way Lemo, 1.5m

**ASIG003:** Reference block holder, for up to 5 blocks.

For further information on Ether NDE's range of Reference blocks please visit [ethernde.com/probes/test-blocks](http://ethernde.com/probes/test-blocks).



t: +44 (0)1727 648050

e: [sales@ethernde.com](mailto:sales@ethernde.com)

[www.ethernde.com](http://www.ethernde.com)

Endeavour House, 18 Brick Knoll Park, St Albans,  
Hertfordshire, AL1 5UG, United Kingdom



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Distributed by:



EN DE TEK Australia Pty Ltd  
A: Unit 8 / 2 Apollo Street, Warriewood NSW 2102, AUSTRALIA  
P: PO Box 140, Mona Vale NSW 1660  
P: +612 9979 8777 | F: +612 9979 5050 |  
E: [sales@endetek.com.au](mailto:sales@endetek.com.au) | W: [www.endetek.com.au](http://www.endetek.com.au)