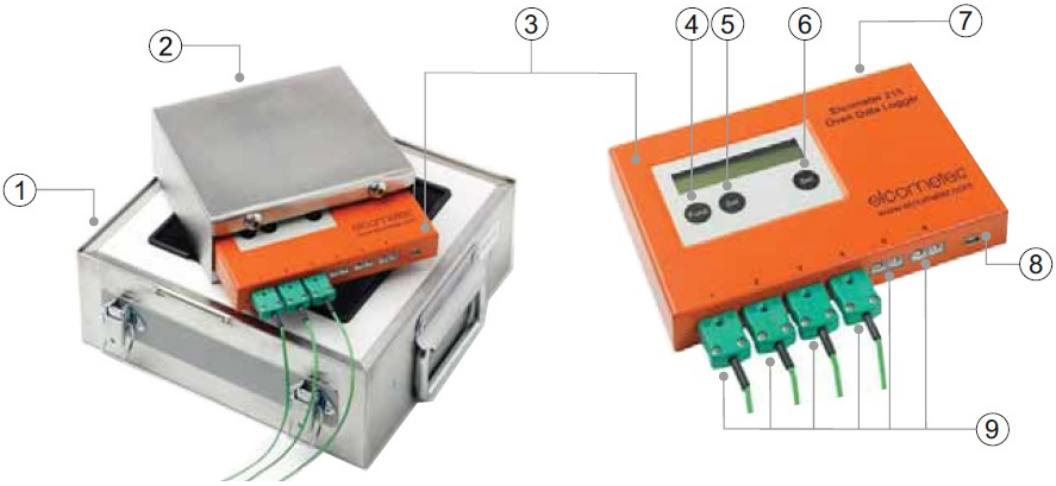
Elcometer 215 oven Data Logger Dew point and temperature User Guide

Contents

elcometer®

Elcometer 215 oven Data Logger Dew point and temperature

GAUGE OVERVIEW



1. Thermal Barrier
2. Heat Sink Block
3. Oven Data Logger
4. ‘Func’ Key; selects the function
5. Sel’ Key; selects the channel or sub-function
6. Set Key; changes any of the settings
7. Battery Compartment; on the rear of the logger
8. USB Socket
9. K-type Temperature Probe Socket; 6 off

BOX CONTENTS

- Elcometer 215 Oven Data Logger
- Thermal Barrier (Model S only)
- Thermal Barrier with Heat Sink Block (Model T only)

- AA Batteries; x2
- Transit Case
- ElcoMaster Software
- USB Cable
- Calibration Certificate (if ordered)
- User Guide

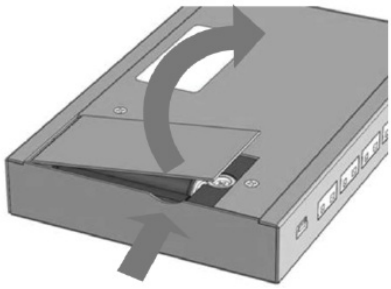
  Note: The Elcometer 215 is not supplied with k-type temperature probes must be ordered separately, see Section 5.1 Temperature Probes' on page en-9.

GETTING STARTED

FITTING THE BATTERIES

The Elcometer 215 is powered by 2 xAA alkaline batteries (supplied).
Note: The maximum operating temperature for the batteries supplied is 50°C (122°F). Prolonged use of the logger in excess of this temperature may require the use of alternative batteries.

To insert or replace the batteries:



1. Remove the battery cover located on the rear of the lodge.
    - The cover is held in place by a magnetic catch.
2. Insert 2 batteries taking care to ensure correct polarity.
3. Refit the battery cover

To view the approximate percentage of battery life remaining, press the Func key until 'BATTERY' is displayed.
Two AA batteries should give 200 hours of operation using the default settings. Excessive use of communications via ElcoMaster Software however, will dramatically reduce battery life.
When batteries are fitted, the logger is switched on but in an idle state, press the 'Func' key to wake the logger.

Note: Remove the batteries if the logger is to remain unused for a long period of time. This will prevent damage to the logger in the event of a malfunction of the batteries.
Note: Batteries must be disposed of carefully to avoid environmental contamination. Please consult your local Environmental Authority for information on disposal in your region. Do not dispose of any batteries in a fire.

SELECTING YOUR LANGUAGE

1. If idle, press the 'Func' key to wake the logger.
2. Repeatedly press the 'Func' key until 'SET is displayed.
3. Repeatedly press the 'Sel' key until 'SET language' is displayed.

4. Press and hold the Set key for approximately 5 seconds whilst ‘Hold to change’ is displayed.
5. Press the ‘Set key to select the required language.
    - English, German, French, Spanish and Italian are available for selection.
6. Press the ‘Func’ key to exit the menu.

SELECTING THE MEASUREMENT UNITS

The Elcometer 215 can display readings in °C or °F. The default setting is °C.
To change the measurement units:

1. If idle, press the Func key to wake the logger.
2. Repeatedly press the ‘Func’ key until ‘SET is displayed.
3. Repeatedly press the ‘Sel’ key until ‘SET range’ is displayed.
4. Press and hold the ‘Set key for approximately 5 seconds whilst
5. ‘Hold to change’ is displayed.
6. Press the Set key to select the required measurement units.
    - CRange: -200/1300°C; °F Range: -328/2372°F
7. Press the ‘Func’ key to exit the menu.

Note: Any runs stored in the logger must be deleted before changing the measurement units, see Section 4.5 Clearing the Memory’ on page en-8.

SETTING THE DATE FORMAT

1. If idle, press the Func’ key to wake the logger.
2. Repeatedly press the ‘Func’ key until ‘SET is displayed.
3. Repeatedly press the ‘Sel’ key until ‘SET format’ is displayed.
4. Press and hold the ‘Set key for approximately 5 seconds whilst
5. Hold to change’ is displayed.
6. Press the ‘Set key to select the required date format.
7. DD/MM/YY, MM/DDYY or YYIMM/DD
8. Press the ‘Func’ key to exit the menu.

SETTING THE TIME AND DATE

1. If idle, press the ‘Func’ key to wake the logger.
2. Repeatedly press the ‘Func key until TIME/date’ is displayed.
3. Press and hold the ‘Set key for approximately 5 seconds whilst
4. Hold to change’ is displayed.
5. Set the date and time using the Sel’ and ‘Set keys.
6. Press the’Func’ key to exit the menu.

SETTING THE LOGGING INTERVAL

The Elcometer 215 measures continuously but takes and saves readings at time intervals set the by user ranging

from 0.125 s (8 readings per second) to 2 hours. The default setting is every 2 seconds.

The maximum recording period depends on the number of probes being used and the specified recording time.

1. To change the logging interval:
2. If idle, press the ‘Func’ key to wake the logger.
3. Repeatedly press the Func’ key until ‘INTERVAL’ is displayed.
4. Press and hold the ‘Set key for approximately 5 seconds whilst
5. Hold to change’ is displayed.
6. Set the required logging period using the ‘Sel’ and ‘Set’ keys.
7. Press the ‘Func’ key to exit the menu.

The logging interval can also be set within ElcoMaster and transferred to the logger, see Appendix A Using ElcoMaster on page en-13 for further information.

CONNECTING THE PROBES

The Elcometer 215 has six input sockets (channels) for K-type temperature probes. Probes should be connected to each1 socket in turn, starting with channel 1, followed by channel 2, etc.

Each probe plug has a narrow and a wide terminal, ensure that the plug is orientated correctly before making the connection. To view details of the probe connected to each channel, press the ‘Func’ key until ‘METER’ is displayed and repeatedly press the ‘Sel’ key to display each probe in turn. If no probe is connected, ‘open’ is displayed.

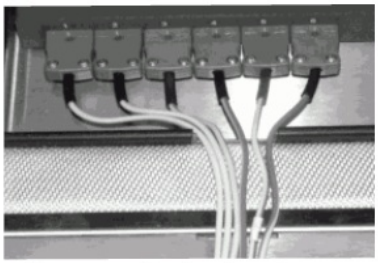
Note: The Elcometer 215 is not supplied with k-type temperature probes – probes must be ordered separately, see Section 5.1 Temperature Probes’ on page en-9.
Note: A set of probe identification tags is available to purchase as an optional accessory to help match each probe with its assigned channel, see Section 5.2 Probe Identification Tags’ on page en-10.

THE THERMAL BARRIER& HEAT SINK BLOCK

The Elcometer 215 Model S and T are supplied with a thermal barrier as standard.

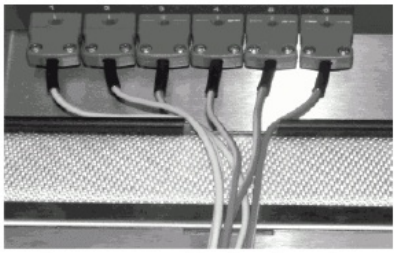
To ensure the logger does not exceed its maximum operating temperature, it should be placed inside the protective thermal barrier prior to going into the Oven.

Place the logger in the thermal barrier, ensuring that the probe leads are passed through the barrier's cable guide and they are not twisted or trapped.



Correct: Probe leads are not twisted or trapped

Always take the logger out of the thermal barrier immediately after passing through the oven.



Incorrect: Probe leads are twisted

DO NOT touch surfaces that become hot during high-temperature operation.

Thermal Barrier with Heat Sink Block

The Elcometer 215 Model T is supplied with a thermal barrier compatible with the heat sink block, also supplied. When used together, they enable the logger to be used at elevated temperatures over a longer time period, see 'Thermal Characteristics' table on page en-7.

warning: DO NOT use the heat sink block if the heat sink material is in liquid form, see Appendix B The Heat Sink Block' on page en-21 for further information.

Note: A Material Safety Data Sheet for the heat sink material in the heat sink block supplied with the Elcometer 215 Model T and available as an accessory, is available to download via our website **www.elcometer.com**/images/stories/MSDS/elcometer_215_heat _sink.pdf

THERMAL CHARACTERISTICS[b]		
Temperature	Time at Temperature	
	Standard Thermal Barrier	High Temperature Thermal Barrier with Heat Sink Block
100°C (212°F)	140 minutes	340 minutes
150°C (302°F)	80 minutes	195 minutes
200°C (392°F)	60 minutes	130 minutes
250°C (482°F)	50 minutes	100 minutes
300°C (572°F)	-	30 minutes

USING THE LOGGER

BEFORE YOU START

Set-up the logger, see Section 3.2 to 3.6 on page en-3. Connect the probes, see Section 3.7 on page en-5. Place the logger in the heat sink block (if required) and thermal barrier

START LOGGING

The Elcometer 215 can store up to 260,000 readings in up to 8 production runs.

To start logging:

1. If idle, press the ‘Func’ key to wake the logger.
2. Repeatedly press the Func’ key until LOG no runs’ is displayed.
3. Press and hold the ‘Set key for approximately 5 seconds whilst
4. Hold to start’ is displayed, logging will commence.

The logger can be pre-programmed via ElcoMaster” to start logging immediately after holding the Set key; after a set period; when a set temperature has been reached or when the rate of temperature increase rises above a set value – see Appendix A: Section A.2 Creating a Settings File’ on page en-14 for further details.

STOP LOGGING

Logging will stop when the maximum run time has been reached unless the logger is pre-programmed via ElcoMaster to stop after a set time period has elapsed or the temperature falls below a set value, see Appendix A: Section A.2 ‘Creating a Settings File’ on page en-14 for further details.

- Other time/temperature combination thermal barriers are available on request. Please contact Elcometer or vour local supplier for further details.

Logging can also be stopped manually by the user at any time, which will override any pre-programmed stop triggers.

To manually stop logging:

1. Press the Func key to wake the logger.
2. Press and hold the ‘Set’ key to stop logging.

When logging has stopped, ‘run completely’ is displayed and if cure parameters have been set via ElcoMaster”, see Appendix A: Section A.3 ‘Creating a New Paint Type’ on page en-15, an indication will also be given whether the latest run has met the cure parameters. Batch data can be downloaded to ElcoMaster for further reporting and analysis, see Section 4.4.

DOWNLOADING DATA

When one or more runs have been recorded, the data can be downloaded to PC for further analysis and reporting using ElcoMaster software and the USB cable supplied, see Appendix A Using ElcoMaster on page en-13 for further infomation.

CLEARING THE MEMORY

The Elcometer 215 can store up to 260,000 readings in up to 8 production runs. When all 8 runs are complete, start logging will automatically overwrite the oldest. It is therefore not necessary to clear the memory however, this can be done if required.

To clear the memory:

1. If idle, press the’Func’ key to wake the logger.
2. Repeatedly press the Func’ key until TOOLS’ is displayed.
3. Repeatedly press the ‘Sel’ key until ‘clear’ is displayed.
4. Press and hold the Set’ key for approximately 5 seconds whilst
5. Hold to continue’ is displayed. ‘ok’ is displayed and all runs are deleted.

Note: All stored runs will be deleted. It is not possible to select which runs are deleted.

SPARES& ACCESSORIES

TEMPERATURE PROBES
A wide range of K-type temperature probes is available with 1.5m (4’9″), 3m (9’8″) or 6m (19′ 7″) cable lengths.

All probes offer:

- Perfect contact between the probe and the surface.
- Low mass and optimised shape to avoid influence on the temperature of the sample.
- Extremely strong, highly flexible and easy to clean Teflon coated cables.

The probes listed below have a continuous maximum operating temperature of 250°C (428°F) and a short term maximum temperature of 300°C (570°F).

Note: The Elcometer 215 is not suppled with k-type temperature probes – probes must be ordered separately.

Probe Type	Cable Length[c] / Part Number		
	1.5m (4' 9")	3m (9' 8")	6m (19' 7")
Clamp Air Probe	T21521275	T21521276	T21521277
Magnetic Air Probe	T21521287	T21521288	T21521569
Clamp Surface Probe	T21521278	T21521279	T21521280
Magnetic Surface Probe	T21521281	T21521282	T21521283
Combined Magnetic Clamp Air and Surface Probe	T21521284	T21521285	T21521286

Probes with longer cable lengths and for use at higher temperatures are available on request. Please contact Elcometer or your local supplier for further information.

PROBE IDENTIFICATION TAGS

Part Number
T21521241

Available to purchase as an optional accessory, each tag is numbered 1 to 6 to help match each probe with its assigned channel.

Description

Probe Identification Tags, Pack of 6

THERMAL BARRIERS & HEAT SINK BLOCK

The Elcometer 215 Model S and T are supplied with a thermal barrier as standard.

The thermal barrier supplied with the Elcometer 215 Model T is compatible with the heat sink block. When used together, they enable the logger to be used at elevated temperatures over a longer time period, see Thermal Characteristics' table on page en-7 for further information.

- DO NOT use the heat sink block if the heat sink material is in liquid form, see Appendix B The Heat Sink Block' on page en-21 for further information.

Description

- Standard Thermal Barrier (supplied with Model S)
- High Temperature Thermal Barrier (supplied with Model T)
- Heat Sink Block (supplied with Model T)

Note: The heat sink block can only be used with the high temperature thermal barrier which has a larger cavity. It is not compatible with the Standard Thermal Barrier.

WARRANTY STATEMENT

The Elcometer 215 Oven Data Logger and temperature probes are supplied with a 12 month warranty against manufacturing defects, excluding contamination and wear.

TECHNICAL SPECIFICATION

Model	Model S[e]	Model T[f]
Measurement Range	-200°C to 1300°C (-328°F to 2372°F)	
Operating Temperature	Logger only: -30°C to 65°C (-22°F to 149°F)	
	Max[g]: 250°C (482°F) for 50 minutes	Max[g]: 300°C (572°F) for 30 minutes
Accuracy	5°C to 500°C: ±0.5°C (41°F to 932°F: ±1.0°F) > 500°C: ±1.0°C (> 932°F: ±2.0°F)	
Number of Channels	6	
Measuring Intervals	Adjustable from 8 per second to 1 per hour	
Memory	260,000 readings or 8 production runs	
Power Supply	2 x AA batteries	
Dimensions	Logger only: 153 x 101 x 23mm (6 x 4 x 0.9")	
	245 x 245 x 115mm (9.65 x 9.65 x 4.5")	
Weight	Logger only: 450g (15.8oz)	
	4kg (8.8lb)	6kg (13.2lb)

- Technical specification quoted using the supplied standard thermal barrier.
- Technical specification quoted using the supplied high temperature thermal barrier with heat sink block.
- See page en-7 for thermal characteristics using different time / temperature combinations.

LEGAL NOTICES & REGULATORY INFORMATION

The Elcometer 215 meets the Electromagnetic Compatibility Directive when used with sensor leads up to 3m long; compliance may be affected by using longer leads.
The Elcometer 215 is Class B, Group 1 ISM equipment according to CISPR 11 Group 1 1SM product: A product in which there are intentionally generated and/or used conductively coupled radio-frequency energy which is necessary for the internal functioning of the equipment itself.
Class B products are suitable for use in domestic establishments and in establishments directly connected to a low voltage power supply network which supplies buildings used for domestic purposes.

The Elcometer 215 is packed in a cardboard package. Please ensure that this packaging is disposed of in an environmentally sensitive manner. Consult your local Environmental Authority for further guidance.

APPENDIX A: USING ELCOMASTER°

Using ElcoMaster, supplied with the Elcometer 215 and available to download via www.elcometer.com, the user

can:

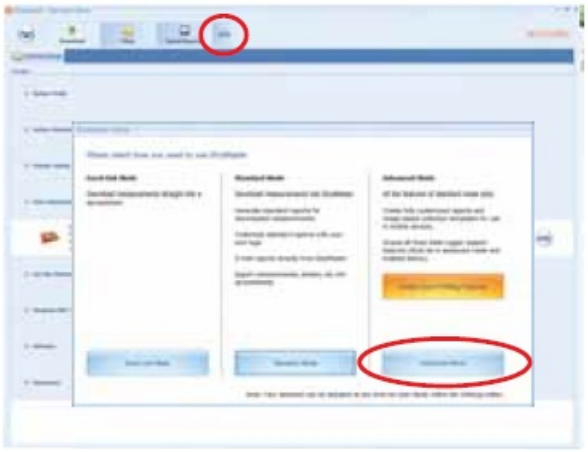
- Configure the logger for different oven applications.
- Create a ‘Paint Cure Library’ by manufacturer and / or paint type with automatic calculation of the percentage cure.
- Set up templates for different products incorporating annotated images with diagrams of measurement locations.
- Create and transmit PDF reports incorporating all data in a professional, easy to read format.

The Elcometer 215 is pre-loaded with some basic settings that allow temperature data to be collected straight out of the box however, the functionality can be greatly increased by uploading a settings file to the logger.

Logger settings are broken down into four areas:

- Oven Logger Settings; configure basic settings.
- Paint Type; add cure time and temperature information for the cure calculation.
- Product; add supplementary information regarding the product including diagrams and probe location.
- Template; combine all of the above into a template which can be uploaded to the logger.

BEFORE YOU START



1. Ensure ElcoMaster is installed on the PC.
2. Switch ElcoMaster to ‘Advanced Mode’ by clicking on the expand arrow and selecting ‘Advanced Mode’.

CREATING A SETTINGS FILE

1. Click on the ‘Oven Profiling’ tab.
2. Click ‘New>Oven Logger’. A new file is created labelled ‘New Logger Setup x’. To rename file, right-click and select ‘Rename’.

Various tabs are now available which allow different settings to be configured.

- **Description:** make general notes about the logger.
- **Channel Set-up:** label each channel for example, ‘Air Probe Top’, Surface Probe Bottom’.
- **Sample Rate Setup:**

configure how often readings should be taken and how many different batches of readings can be held on the logger at any one time. For example, if ‘4 Batch Runs’ is selected, the logger will hold 4 batches and when the fifth is created, batch 1 will be deleted.

Note: The maximum run time for each batch, calculated using the selected reading rate and number of batches, is displayed in the yellow box.

- **Sample Rate Setup:**

configure how often readings should betaken and how many different batches of readings can be held on the logger at any one time. For example, if ‘4 Batch Runs’ is selected, the logger will hold 4 batches and when the fifth is created, batch 1 will be deleted.

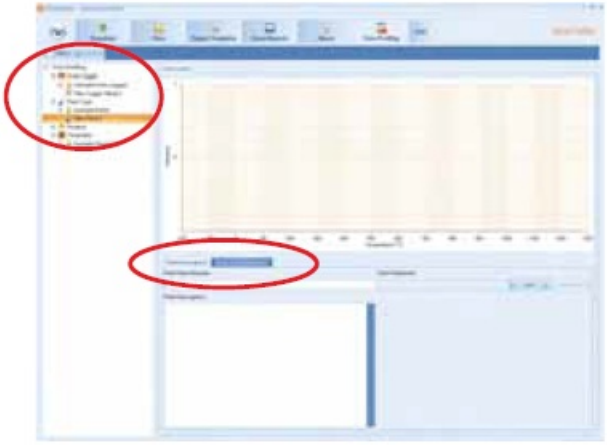
Note: The maximum run time for each batch, calculated using the selected reading rate and number of batches, is displayed in the yellow box.

- **Stop triggers are handled in a similar way:** Run Duration: will stop logging after a pre-defined set time. **Threshold Temperature:** will stop logging when the temperature of the probe connected to channel 1 falls below the set temperature. If nothing is selected, the logging will stop when either the maximum run time is reached or logging is stopped manually. Once the settings file has been created, click ‘Upload’ to upload the data directly to the logger and follow the on-screen instructions.

CREATING A NEW PAINT TYPE

Time and temperature data for the paint type can be added to allow the logger to perform a cure calculation providing the user with a numerical value for how well the coating has cured at each probe location.
A cure calculation of 100 represents a coating which has only just cured with less representing a coating which has not cured enough. A cure calculation greater than 100 is not usually an issue as long as the maximum temperature is not exceeded. If significantly greater than 100 however, there may be scope for increasing efficiency by speeding up the process or turning the oven temperature down.
The cure calculation result is shown both on the logger screen and also within ElcoMaster at the end of the run.

To create a new paint type:



1. Click on the ‘Oven Profiling’ tab.
2. Click ‘New>’Paint Type’. A new file is created labelled ‘New Paint x’. To rename file, right-click and select ‘Rename’.

Various tabs are now available for data entry.

Description: add basic data regarding the paint type and upload the manufacturers' data sheet (pdf format) if available.

- **Setup Cure Parameters:**

enter details of the cure temperature parameters, cure calculation method and temperature limits. Cure Temperature Parameters: enter the maximum, mid and / or minimum cure temperature and time values. At least two sets must be completed for the cure calculation to work.

Cure Curve Type: choose between linear and exponential based on how well the line on the cure curve fits with the time temperature points.

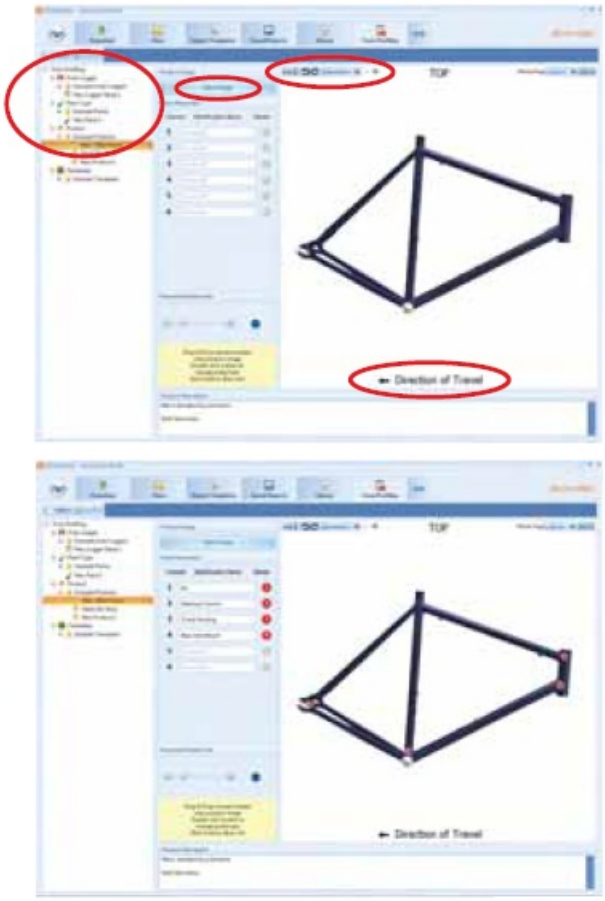
Cure Temperature Limits: if the minimum crosslink and maximum safe temperatures are known, these should be entered to increase the accuracy of the cure calculation and providea warning if the product is getting too hot.

CREATING A NEW PRODUCT

Allows the user to add additional information regarding the product under test including annotated diagrams and labels for each individual thermocouple as well as their location on the product.

To create a new product:

1. Click on the Oven Profiling' tab.
2. Click 'New'>'Product'. A new file is created labelled 'New Product x'.
3. To rename file, right-click and select 'Rename'.

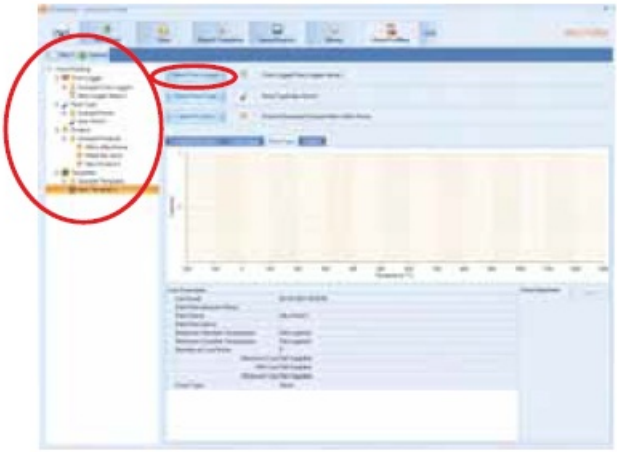


4. Click ‘Select Image’ to impot a diagram or image of the product.
5. Use the tools at the top of the image preview to rotate the image to the correct orientation.
6. Click on ‘Direction of Travel’ at the bottom of the image preview to cycle through the different direction options. Label each channel in turn and click and drag the probe indicator mark to the appropriate location on the image.

CREATING A NEW TEMPLATE

A template combines logger settings, paint type and product information for upload to the logger. Any combination of the three settings can be used to create a template.

To create a new template:



1. Click on the ‘Oven Profiling’ tab.
2. Click ‘New’Template’. A new file is created labeled ‘New Template x’. To rename the file, right-click and select

‘Rename’.

3. Click ‘Select Oven Logger’ and select the required oven logger settings file. Repeat for ‘Select Paint Type’ and ‘Select Product’ if required.
4. Add descriptive text under Template Description’ if required.

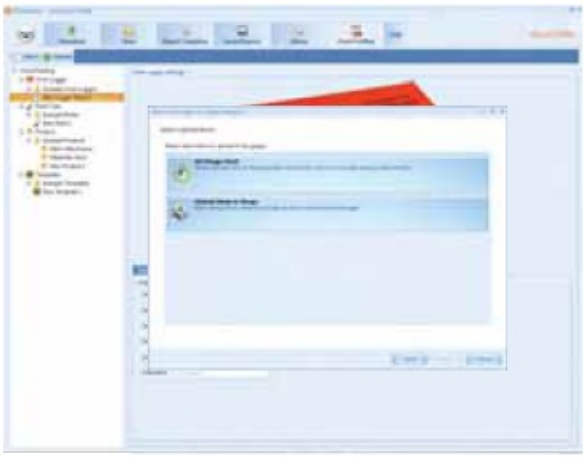
Once the template has been created, click “Upload’ to upload the data directly to the logger and follow the on-screen instructions.

UPLOADING SETTINGS AND TEMPLATES

Settings and templates created in ElcoMaster can be uploaded to the Elcometer 215 ensuring that all runs through the oven have the correct calculations performed and the correct supplementary data recorded against them. Different paint types, products and templates can be applied at a later date to each batch but logger settings cannot be changed.

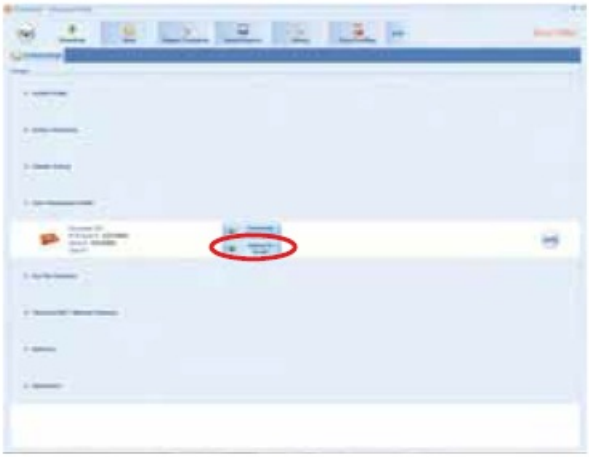
To upload via the ‘Oven Profiling’ Tab:

1. Connect the logger to the PC using the USB cable supplied and click on the ‘Download’ tab.
2. Connect the logger to ElcoMaster” using the ‘Connect Gauge’ wizard.
3. Click on the ‘Oven Profiling’ tab and select the required oven- logger settings file or template.
4. Click ‘Upload’ and follow the on-screen instructions to connect the logger.
5. A window will appear with the options to ‘Set Gauge Clock (recommended) and Upload Setup to Gauge’.



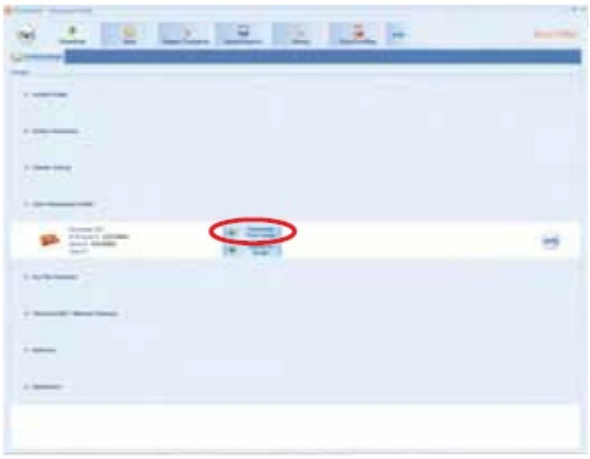
6. Click ‘Upload Setup to Gauge’ to upload the selected settings file or template.

To upload via the ‘Download’ Tab:



1. Connect the logger to the PC using the USB cable supplied and click on the ‘Download’ tab.
2. Connect the logger to ElcoMaster using the Connect Gauge’ wizard.
3. Click on ‘Upload to Gauge’ and follow the on-screen instructions.

DOWNLOADING DATA



When one or more runs’ have been recorded, the data can be downloaded to PC for further analysis and reporting.

To download data:

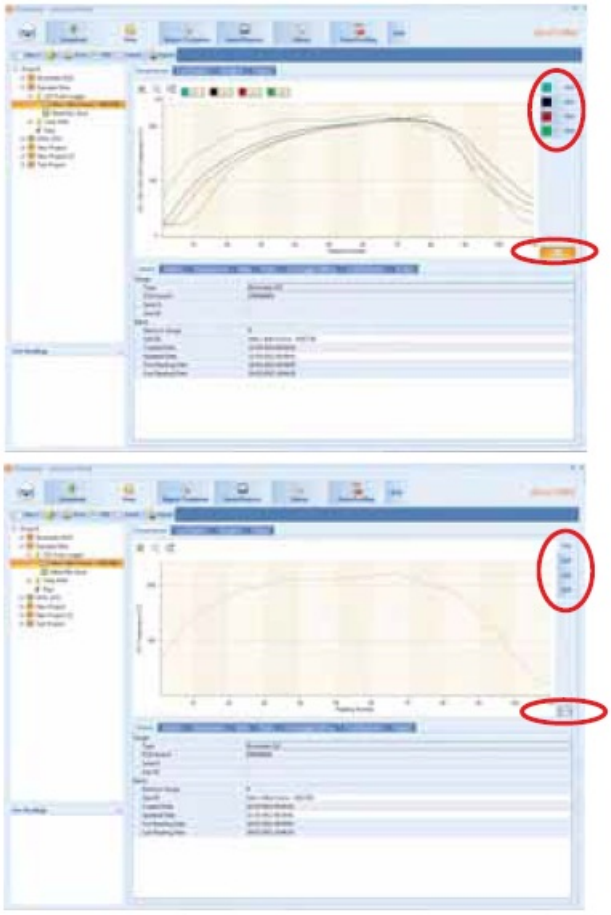
1. Connect the logger to the PC using the USB cable supplied and click on the ‘Download’ tab.
2. Connect the logger to ElcoMaster using the Connect Gauge’ wizard.
3. Click on ‘Download from Gauge’ and follow the on-screen instructions.

Data can be downloaded to an ElcoMaster batch file, Excel spreadsheet or text file.
Note: To view the data in ElcoMaster and generate reports using the report wizard, the data must be downloaded to an ElcoMaster batch file.

VIEWING DATA

Downloaded data can be viewed at any time by clicking on the View’ tab and selecting the appropriate Elcometer 215 project.

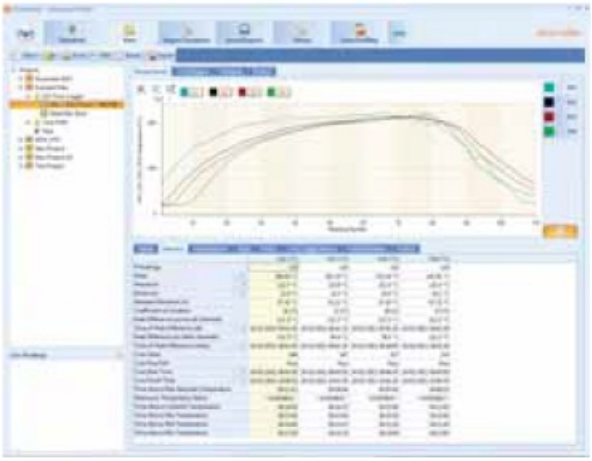
The temperature trace graph is displayed with tabs to view the Cure Progress, ‘Histogram’ and ‘Product information (if available).



Toggle the ‘Showing Multiple Lines’ button to on to view the temperature trace lines for all channels on one graph. Toggle off to view the temperature trace line for the selected channel only.

Below the graph are a series of tabs containing the following batch information:

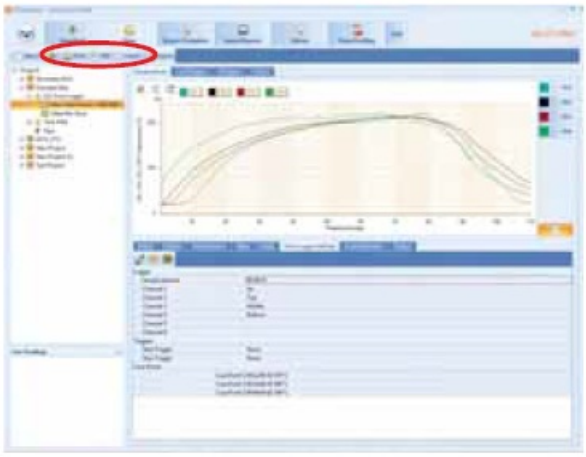
- **Details**: batch header and traceability information including serial numbers and dates/time that logging commenced.



- **Statistics**: summary statistics for each channel including cure value information and maximum temperature warnings.
- **Measurements**: a list of all the measurements taken.
- **Notes/Photos:** add supplementary information, images or drawings as required.
- **Oven Logger Settings:** summary of the logger settings used for the batch.
- **Paint Parameters**: summary of the paint parameters used for the batch.
- **Product:** summary of the product information used for the batch.

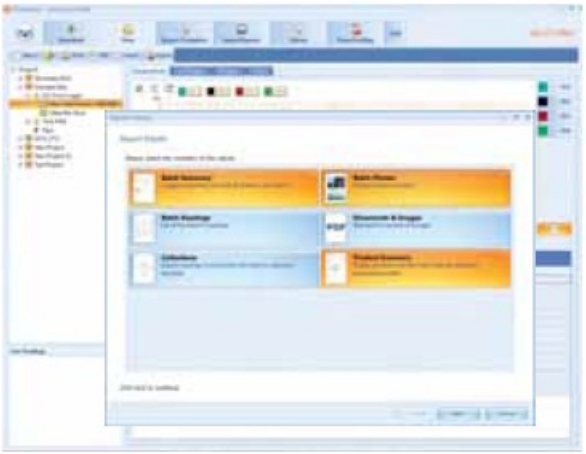
CREATING A REPORT

ElcoMaster includes a built-in report generator to create simple but effective reports on oven runs. Three quick report functions are |available via the ‘View’ tab:



- **Print**: sends the report directly to a printer.
- **PDF**: creates and saves the report on the PC as a pdf file.
- **Email**: attaches the pdf report to a blank e-mail using the default e-mail client.

Selecting any of these options will start the report wizard.



To create a full oven logger report,select Batch Summary’, Batch Photos and ‘Product Summary’.
Note: ‘Batch Readings’ can be selected to create pages of all the individual measurements however, as an oven run usually consists of hundreds of readings, this is not recommended.

APPENDIX B: THE HEAT SINK BLOCK

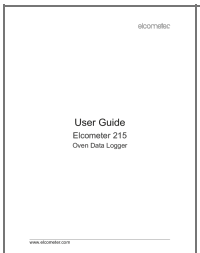
The heat sink block, when used with the high-temperature thermal barrier, is both supplied with the Elcometer 215 Model T and available to purchase as accessories see Section 3.8 The Thermal Barrier & Heat Sink Block' on page en-7 enables the logger to be used at elevated temperatures over a longer time period, see Thermal Characteristics' table on page en-7 for further information.

The heat sink material absorbs large amounts of heat energy and consequently, it has a relatively low melting point. The material changes phase from a solid to a liquid when the temperature of the heat sink is above 32°C (89.6°F). The heat sink should therefore be kept cool before use in order to maximize the protection it provides the
logger.

Ideally, the heat sink should be at 20°C to 22°C (68°F to 71.6°F) before use. In warm ambient temperatures above 25°C (75°F), it is recommended that the heat sink is cooled/ chilled before use. A possible solution is a refrigerator at 7°C (44.6°F). Re-crystallisation (change from liquid to solid) will start between 24°C and 26°C (75.2°F to 78.8°F); cooling in a freezer or ice bath / cool water bath will speed up this process.

Note: A Material Safety Data Sheet for the heat sink material in the heat sink block supplied with the Elcometer 215 Model T and available as an accessory, is available to download via our website:
www.elcometer.com/images/stories/MSDS/elcometer_215_heat_sink.pdf

Documents / Resources

	**Elcometer 215 oven Data Logger Dew point and temperature** [pdf] User Guide 215 oven Data Logger Dew point and temperature, oven Data Logger Dew point and temperature, point and temperature