The PHI (V2.0) Toolbox

User Guide

June 2022

IMPORTANT

This document provides instructions on how to use the Toolbox software.

Please refer to Red Meat Code of Practice, Chapter 9: Post Slaughter Activity for guidelines on the appropriate implementation of the Process Hygiene Index (PHI).

https://www.mpi.govt.nz/dmsdocument/27957-Post-slaughter-activity-Red-Meat-Code-of-Practice-chapter-9

Contents

Introduction

The PHI Toolbox web interface calculates the PHI values for meat cooling processes.

Please refer to Red Meat Code of Practice, Chapter 9: Post Slaughter Activity[1] for guidelines on the appropriate implementation of the Process Hygiene Index (PHI).

The process for using the web interface is as follows:

PREPARE

Collect the required number of time-temperature logger data from the cooling process.

Prepare and format the files for use by the PHI Toolbox

ANALYSE

STEP 1: Enter your data into the Toolbox

STEP 2: Visually check your time temperature profiles

STEP 3: Calculate PHI value and check against performance criteria

If required download PHI report (Word document)

If process fails PHI Performance Criteria consider using PHI Plus

1: https://www.mpi.govt.nz/dmsdocument/27957-Post-slaughter-activity-Red-Meat-Code-of-Practice-chapter-9

Prepare

Folders

A. Create a folder to collect your files which will be prepared for input into the PHI Toolbox app. All files to be used for evaluating a specific cooling process should be stored in the same folder. The files need to be able to be uploaded in a single operation.

Input Files

B. Each time-temperature logger recording should be stored in a separate file, with a unique name that will allow the recording to be easily identified. The file names will be used to identify the cooling process recordings, resultant PHI results in the web interface and in downloaded reports.

For processes where a separate set of logger data files are used pre and post boning, the data should be kept in their separate files with unique names. Do not manually combine files.

The information required from the logger recordings, will be the date/time and the temperature at these time points. The logger data file will need to be edited to be readable by the Toolbox. Prepared files will have three columns of data headed:

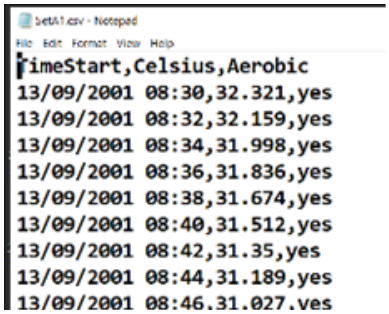
TimeStart, The date/time details at the time of temperature recording.

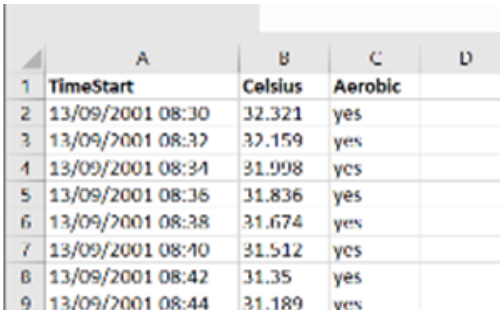
Celsius, The temperature in °C.

Aerobic, **yes** = aerobic conditions, **no** = anaerobic conditions

More details about the format of these columns is given in the following pages.

Examples of the first few rows of an input file opened as a text file (left) or in excel (right) are shown below





	A	B	C	D
1	TimeStart	Celsius	Aerobic	
2	13/09/2001 08:30	32.321	yes	
3	13/09/2001 08:32	32.159	yes	
4	13/09/2001 08:34	31.998	yes	
5	13/09/2001 08:36	31.836	yes	
6	13/09/2001 08:38	31.674	yes	
7	13/09/2001 08:40	31.512	yes	
8	13/09/2001 08:42	31.35	yes	
9	13/09/2001 08:44	31.189	yes	

Converting the logger files to input files

Starting with the temperature logger file:

C. Remove any logger lines of data which include information other than the time, temperature and aerobic status such as header lines or summary information from data logger.

D. Remove any lines of data when the temperature probe was not attached to the carcass/meat, such as at the beginning and end of recording, and also for temporary removal during boning.

E. Remove any empty lines or columns.

F. If required, manually add the aerobic status at each time point

Each file should be saved in a CSV (Comma Separated Value) format before uploading to the app.

Prepare

Aerobic or Anaerobic?

The third column of the input data is to indicate if the surface of the meat is exposed to oxygen. Different PHI models are used depending if aerobic or anaerobic conditions exist.

> Put **yes** if bacteria have access to oxygen. This includes pre-packaging, cuts packaged in non-barrier vacuum bags and loose plastic over-wraps.
>
> Put **no** if bacteria has limited access to oxygen. This includes vacuum-packed, gas-packed and bulk –packed product.

If in doubt consult MPI, or default to the aerobic model as it gives higher growth rates than the anaerobic model.

Prepare

Date / Time format

The “Timestart” column of your temperature log data must follow one of these formats:

DD/MM/YYYY HH:MM:SS PM
MM/DD/YYYY HH:MM:SS PM
DD/MM/YYYY HH:MM
MM/DD/YYYY HH:MM

The dates/times need to be a single format across all of the files you intend to load into the PHI Toolbox at a time. If not, you will need to change the format of date/time information to standardise the format.

When the files are in one set before boning and one after, the date-time formats of the two sets may be different, as long as the format within each set are the same.

If needed the Date/time formats can be changed in Excel:

a. Open your file in Excel

b. Select the column of dates/times to change format (1)

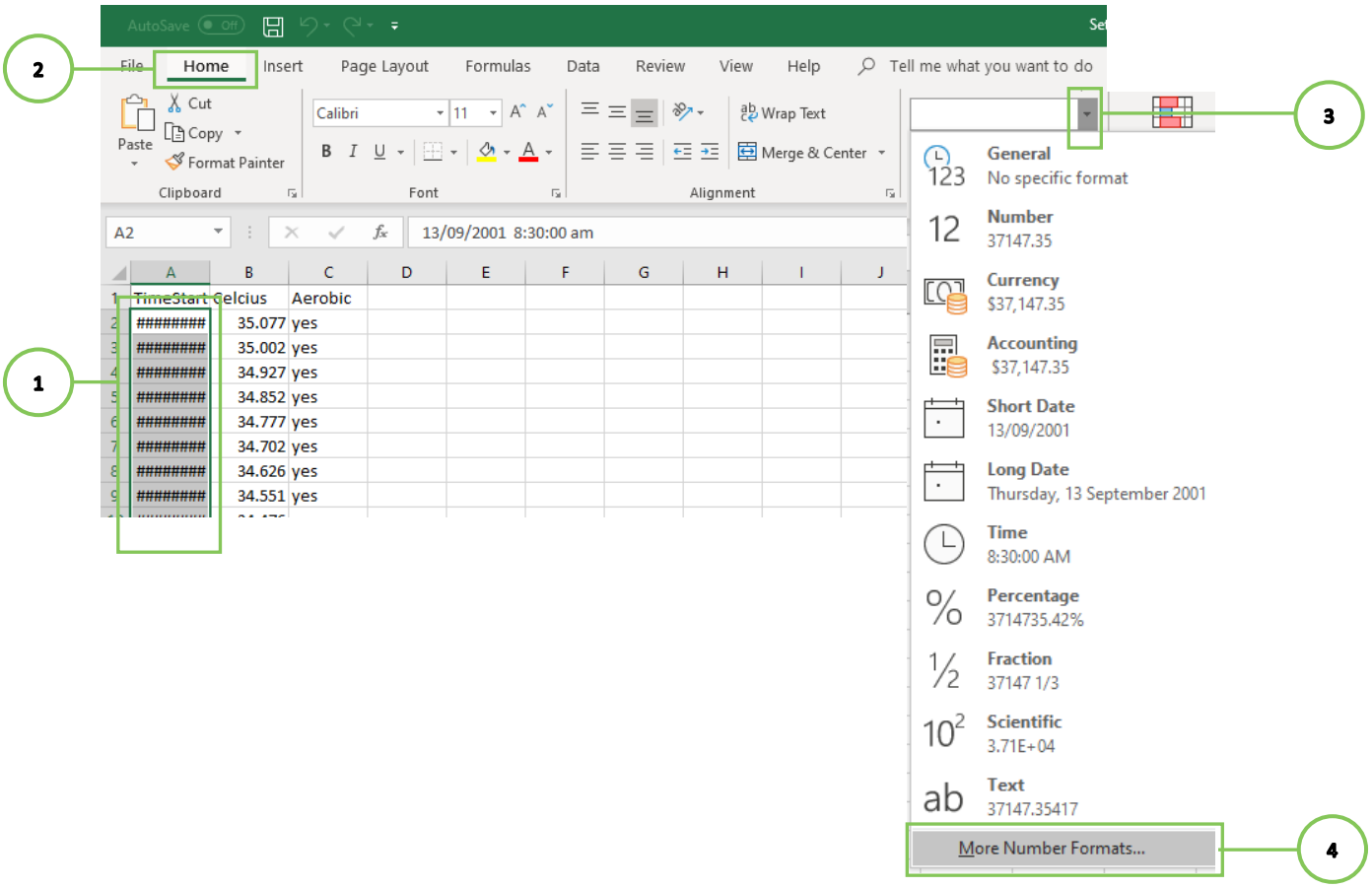
c. On the “Home” ribbon (2) open the cell format menu (3)

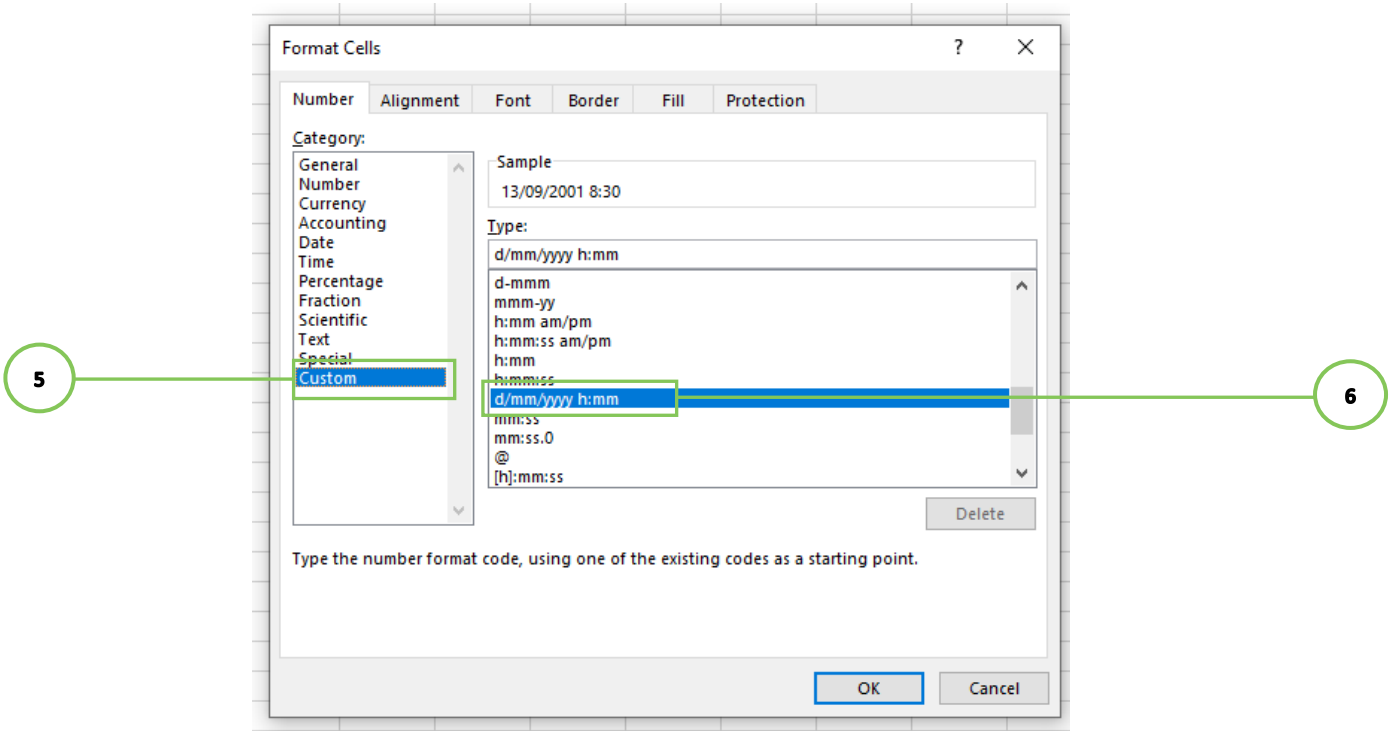
d. Choose “More Number Formats” (4)

e. Find the “Custom” (5) formats and select the “”d/mm/yyyy h:mm” (6) format and click “OK”

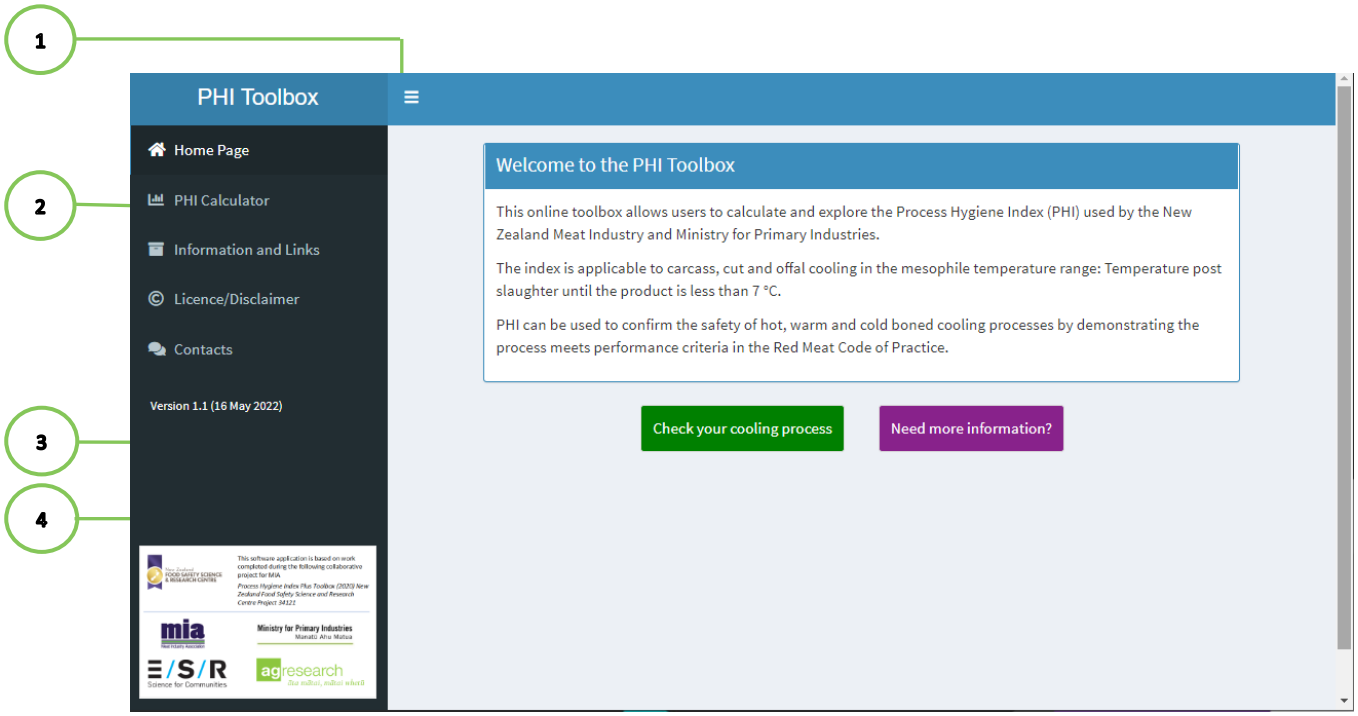
f. Save and close your document

PHI Toolbox will give a warning if there are any incorrect or inconsistent formats loaded, and will not continue with the PHI calculation.


1
2
3
4
File
Home
Insert
Page Layout
Formulas
Data
Review
View
Help
Tell me what you want to do
Cut
Copy
Format Painter
Paste
Clipboard
Calibri
11
Font
Wrap Text
Merge & Center
Alignment
A2
13/09/2001 8:30:00 am
TimeStart
Celcius
Aerobic
35.077 yes
35.002 yes
34.927 yes
34.852 yes
34.777 yes
34.702 yes
34.626 yes
34.551 yes
General
No specific format
Number
37147.35
Currency
$37,147.35
Accounting
$37,147.35
Short Date
13/09/2001
Long Date
Thursday, 13 September 2001
Time
8:30:00 AM
Percentage
3714735.42%
Fraction
37147 1/3
Scientific
3.71E+04
Text
37147.35417
More Number Formats...


5
6
Format Cells
Number
Alignment
Font
Border
Fill
Protection
Category:
General
Number
Currency
Accounting
Date
Time
Percentage
Fraction
Scientific
Text
Special
Custom
Sample
13/09/2001 8:30
Type:
d/mm/yyyy h:mm
d-mmm
mmm-yy
h:mm am/pm
h:mm:ss am/pm
h:mm
h:mm:ss
d/mm/yyyy h:mm
mm:ss
mm:ss.0
@
[h]:mm:ss
Delete
Type the number format code, using one of the existing codes as a starting point.
OK
Cancel

Home Page



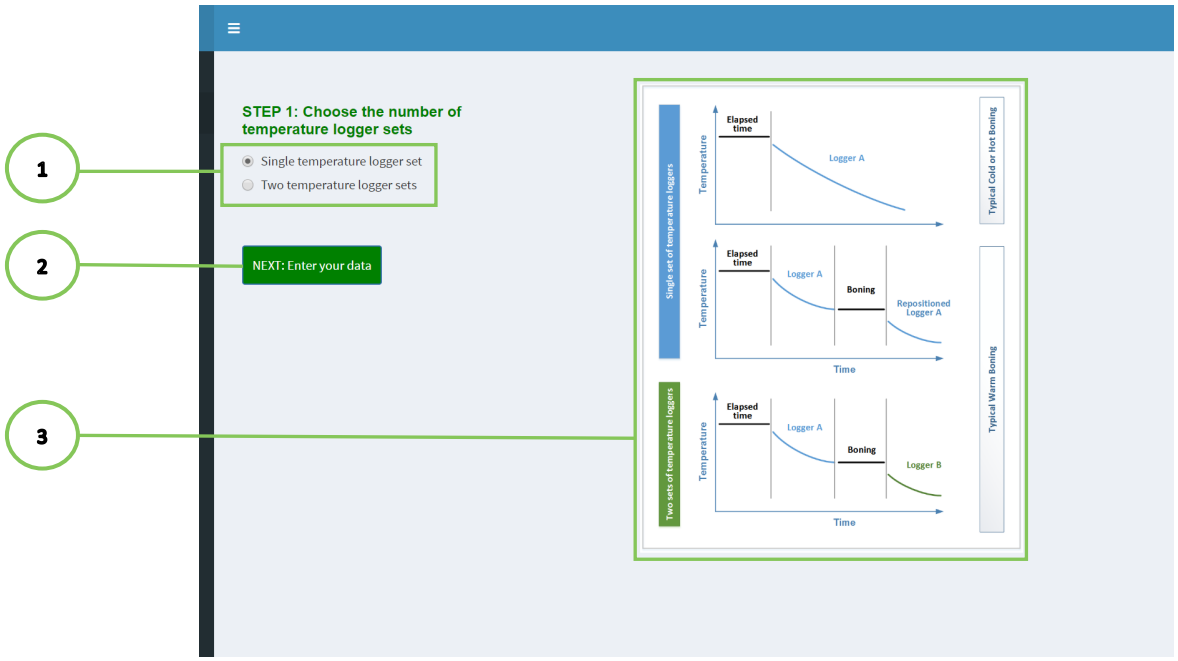
1 Toggle the Navigation Bar (see or remove the grey bar on left hand side of page

2 The Navigation Bar: Provides quick links to the PHI calculator and Information

3 To begin using the PHI Calculator, click the “Check your cooling process” text

4 For access to the user manual, supporting information and links click the “Need more information” button or the “Information and Links” text in the Navigation Bar

PHI Calculator — STEP 1



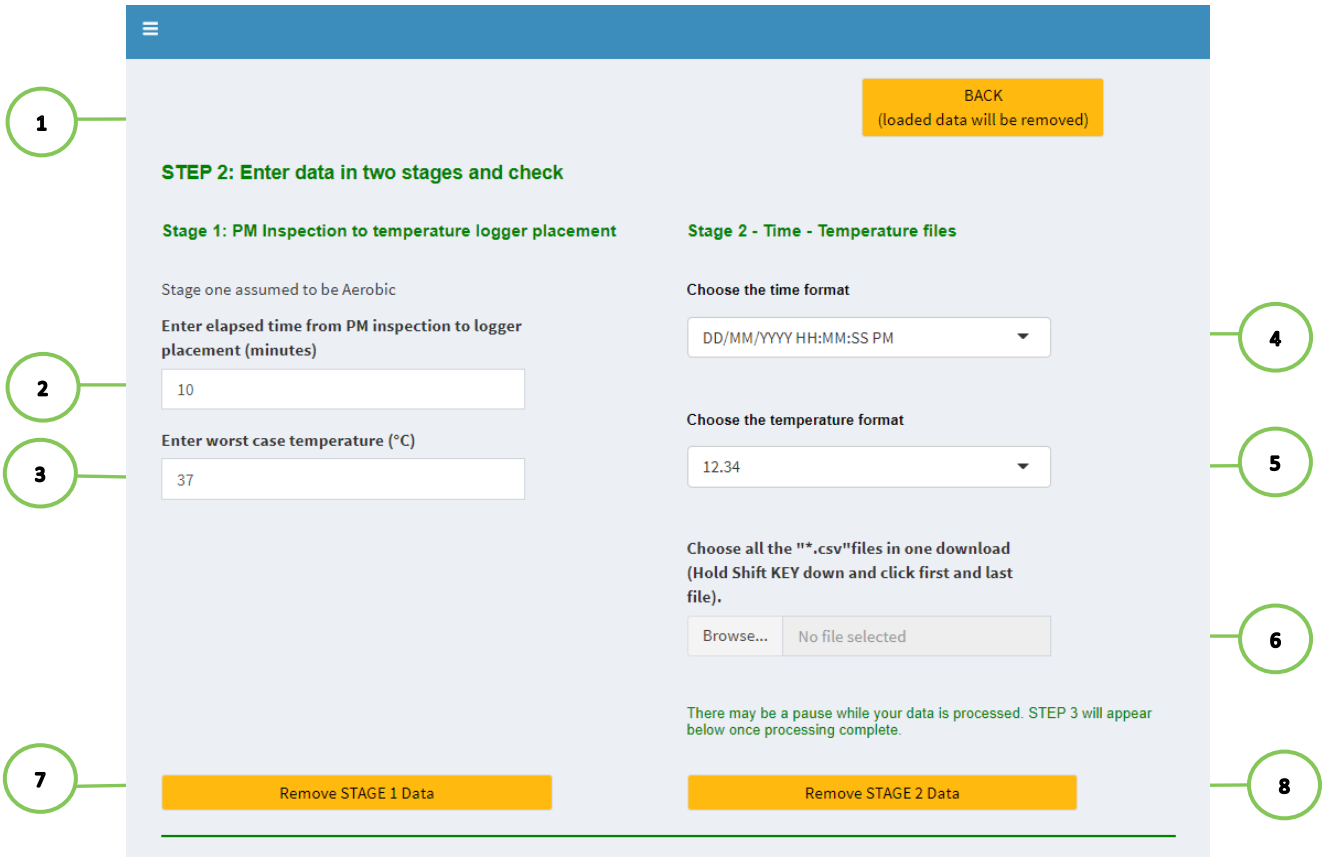
STEP ONE , How many sets of data loggers were used?

A. Select how many sets of temperature loggers were used (1)

B. Click the “NEXT: Enter your data” button (2)

The graph shows example temperature profiles using one or two temperature loggers, with hot, cold, and warm boning. (3)

Data Upload Page — Step 2



STEP 2 of the PHI Calculator,

Stage 1:

A. Enter the elapsed time from post-mortem inspection to the placement of the temperature logger (2)

B. Enter the temperature in degrees Celsius for this elapsed time (°C) (3)

Stage 2:

C. Select the appropriate time format of your temperature logger data (4)
If the format of your data is not here, see pages 5-6 of this guide on how to reformat the date in Excel

D. Select the format of your temperature readings (5)

E. Click the “Browse…” button to load your temperature logger files into PHI Calculator (6)
See page 11 of this guide for more instructions

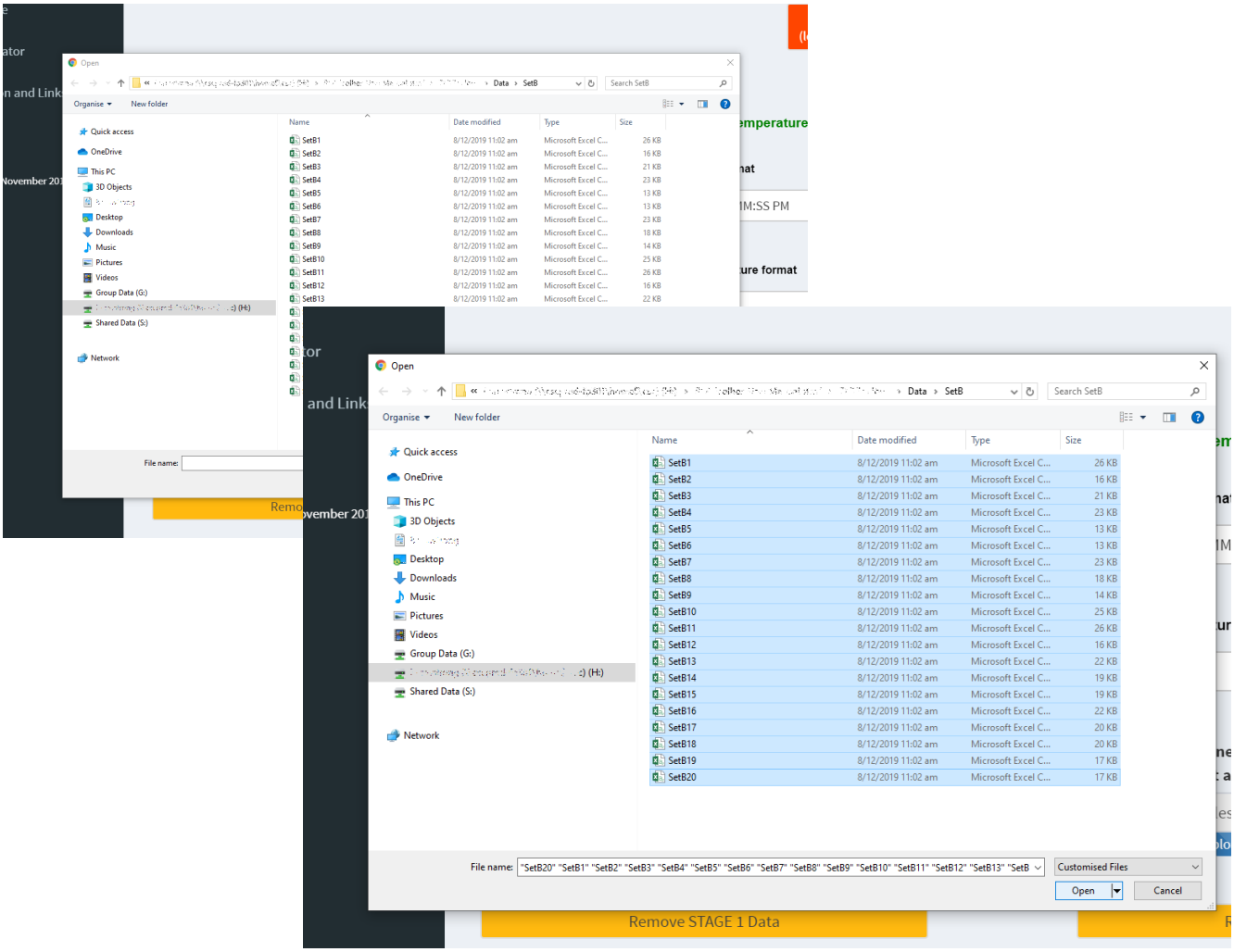
If you make a mistake:

Click the “BACK” button to reset everything (1) **clicking the “BACK” button will erase all data**

Click the “Remove STAGE 1 Data” button (7) to reset “Lag time” and “Worst Temperature”

Click the “Remove STAGE 2 Data” button (8) to reset formats and remove your data

How to upload multiple files



To upload all of your data logger files in one go:

A. Click the “Browse…” button. (circle 6 on page 10)

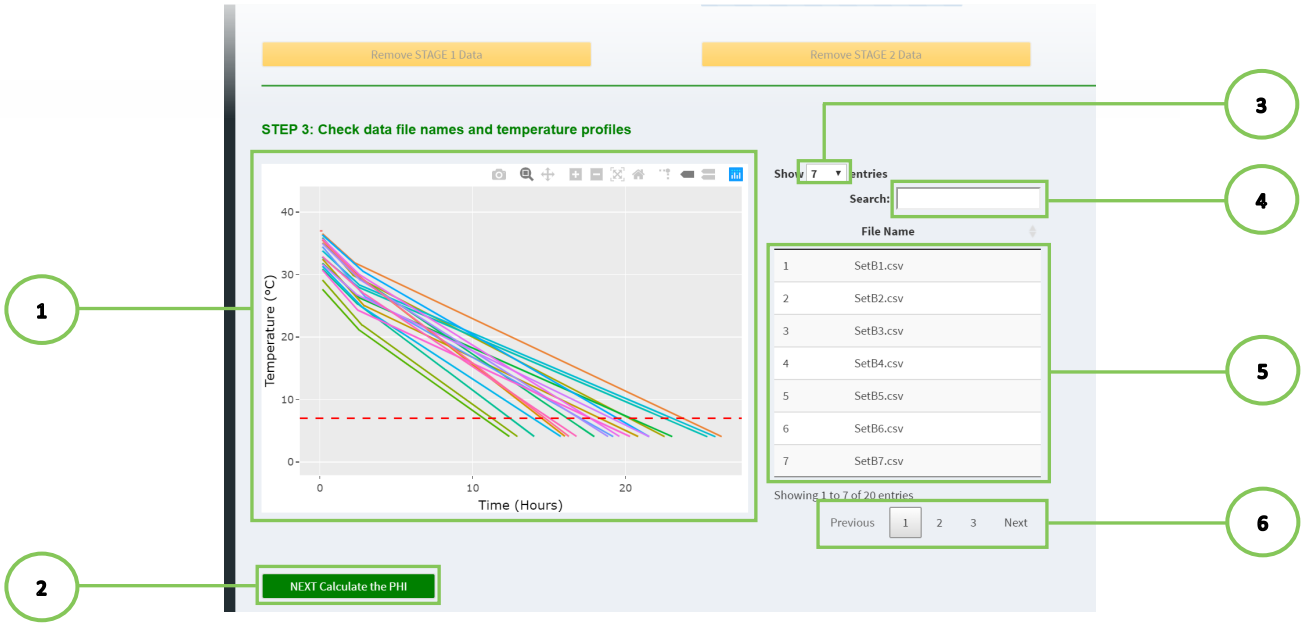
B. Within this Window, navigate to the folder that contains all of your data logger files. All of the files you want to upload must be in one folder.

C. Click on the first file you want to load then scroll down to the last file you want to load. Hold down the shift key and click on the last file you want to load.

D. When you have all of the files selected/highlighted, click the “Open” button

If you need to select specific files in a directory individually, hold down control button and click on the required files.

Check uploaded data — Step 3



STEP 3: Checking your time — temperature data.

A. Check the graph for anomalies in the profiles (See page 15 for graph viewing options) 1

B. Check all the time—temperature profiles end below 7°C in the graph.

C. Check all the files have been uploaded 5

   i. Show more/fewer file names in the list change the number using “Show Entries” button 3

   ii. Search for files by name using the “Search” box 4

   iii. Page through files using the buttons below the list 6

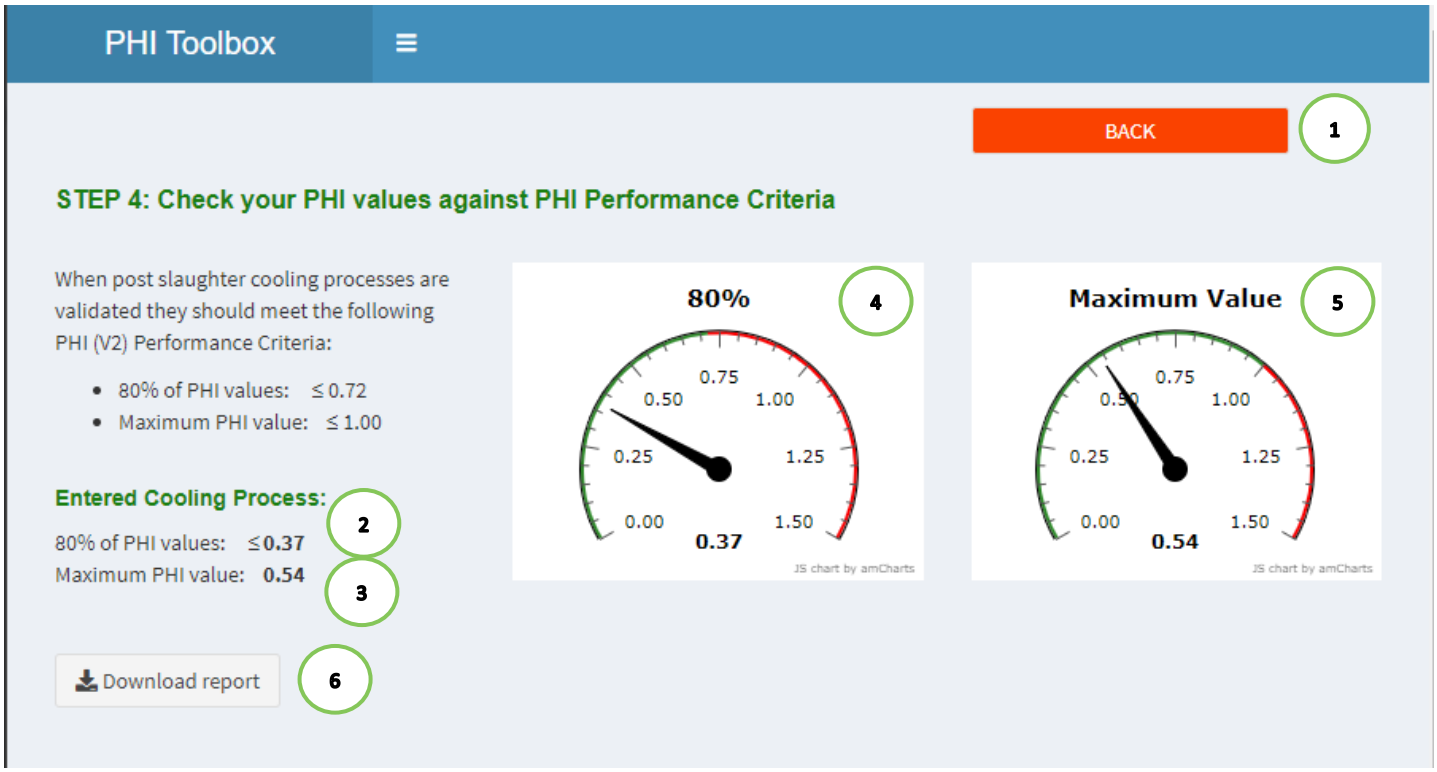
D. If time-temperature profiles are acceptable correct Click the “Calculate PHI” button 2

Notes

1. To remove or enter additional files you will need to re-enter all your data files. Previously entered data will be removed when more files are downloaded.

2. Data files that do not finish below 7°C will not be used to calculate performance criteria values and a warning message will be displayed on the web page and in the downloadable report.

PHI Performance Criteria — Step 4



STEP FOUR, Reading your PHI performance criteria results:

A. The PHI value 80% of recordings are less than or equal to is found at (2) and (4)

B. The maximum calculated PHI value is found at (3) and (5)

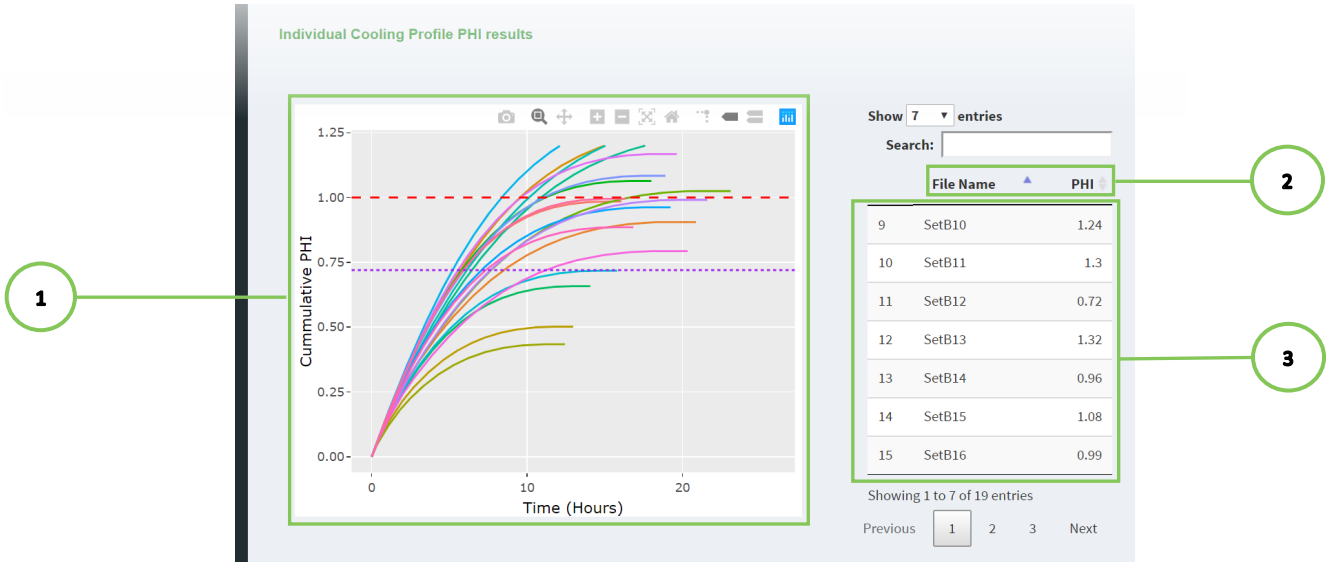
C. Click the "Download report" button (6) to save a Word document containing these results, warnings and plots of the time-temperature profiles to your computer.

D. To return to the data entry page, click the "BACK" button. (1) This will not delete your data.

NOTE:

Any warning messages displayed on the Toolbox interface, will also be listed in the downloadable Word document. Record in the document, comments recognising these warnings, reasons for them, and any justification for excluding the associated data from the PHI calculations.

PHI Individual Results



Exploring individual PHI profiles

The individual PHI results for each cooling profile are presented in the table 3

The table can be sorted by file name or PHI value, by using the arrows in the table headers 2

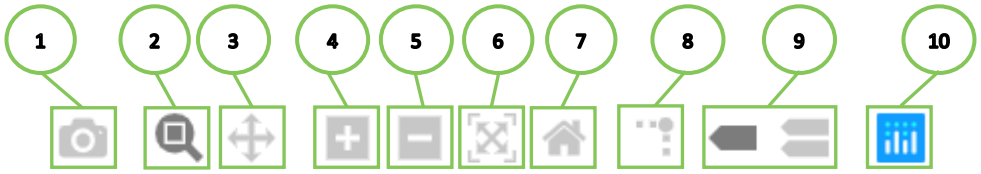
The graph 1 shows the cumulative PHI value calculated over the time for each of the cooling processes. This allows the user to see which parts of the cooling process are contributing most to the final PHI value.

The red dashed horizontal line (1.0) corresponds to the maximum permitted PHI value

The purple dotted horizontal line (0.72) corresponds to the 80% of PHI values performance criteria

More information about the tools available for graph exploration and saving is on page 15 of this guide

Graph Exploration Menu



1 Download plot as png file

2 Zoom in on section—click and drag over the area you want to zoom in on

3 Click and drag to move the area shown in the plot window

4 Zoom in from centre

5 Zoom out from centre

6 Auto scale—show the whole graph

7 Reset axes—show default graph

8 Toggle seeing lines extending from the data points to the axes when hover over

9 Choose which data details to see when you hover the mouse cursor over the graph: Nearest data or all data with similar time

10 Link to the Plotly who provide the software for the graphs

If you cannot see the above menu in the plot window, place mouse cursor over the plot window to reveal

To reset the graph view at any time click on icon 7

Notes

Concurrent Users

To ensure the application will run in a timely fashion, the application has a restricted number of concurrent users. If you log into the application and there are no free slots, you will get the following message on your www browser. If you try again later using the same browser window, don't forget to refresh your window.

Too Many Users

Sorry, but this application has exceeded it's quota of concurrent users.

Please try again later.

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