



CALSoft 5 Help

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Table of Contents

Foreword	0
Part I CALSoft Basics	7
Part II Main CALSoft Dashboard	9
Part III Background	11
Part IV Collect Data- Heat Penetration	13
1 What is heat penetration?	13
2 Overview- Main HP Dashboard	13
Running a new heat penetration test with CALPlex datalogger	14
HP Test Documentation tab	15
HP Data Collection Equipment tab	16
CALPlex Connection	17
RTemp Connection	18
HP Formulation tab	22
HP CritiCAL tab	22
HP Calibration Tab	23
HP Start Data Collection	24
HP Data Collection - Main screen	25
HP Data Collection - Time Temperature grid	26
HP Data Collection- Bar Graph	27
HP Data Collection- Zoom plotting during data collection	28
Entering event readings during HP test	29
Entering Log Data	29
Alert To Enter Log Entries	30
Ending a test	31
Losing Communication with CALPlex during a test	32
Losing Power during data collection	33
Opening/editing existing CALSoft files	34
Test Documentation tab	34
Data Collection Equipment tab	35
Formulation tab	36
CritiCAL tab	37
Calibration Tab	38
Time/Temperature Tab	39
Reset Start End Time	40
Log Data tab	43
Summary Tab	44
Importing Files into CALSoft 5	45
Importing DataTrace and Elab files	45
Importing Excel Files	46
Importing Comma Separated Files	50
Manual File Creation	53
Calibration	56
Backup File	57
3 HP File Command Options (Ribbon Menu Commands)	58

Save/Save As	58
Export Data to Comma Separated Value	59
Reports and Report Formats (PDF, Excel, Word, CSV)	59
Email CALSoft File	60
Zoom plotting	61

Part V Collect Data- Temperature Distribution 64

1 What is Temperature Distribution	64
2 Overview- - Main TD Dashboard	64
Running a new Temperature Distribution test with CALPlex datalogger_2	65
TD Test Documentation tab	66
TD Data Collection Equipment tab	67
TD Lead Location tab	68
TD Calibration tab	69
TD Start Data Collection	70
TD Data Collection- Main Screen	70
TD Data Collection Time Temperature grid	71
TD Data Collection- Bar Graph	72
TD Data Collection- Zoom plotting during data collection	73
Entering event readings during TD test	73
Entering Log Data	75
Ending a test	75
Losing Communication with CALPlex during a test	76
Losing Power during data collection	76
Opening/editing existing CALSoft TD files	76
Test Documentation tab	76
Data Collection Equipment tab	77
Lead Location tab	78
Calibration Tab	78
Time/Temperature Tab	79
Log Data tab	79
Summary Tab	80
Importing Files into CALSoft 5	81
Importing DataTrace and Elab files	81
Importing Excel Files	82
Importing Comma Separated Files	82
Manual File Creation TD	82
Calibration	85
Zoom plotting	85
Backup File	85
3 TD File Command Options (Ribbon Menu Commands)	86
Save/Save As	86
Export Data to Comma Separated Value	87
Reports and Report Formats (PDF, Excel, Word, CSV)	87
Email CALSoft File	88
Zoom plotting	89

Part VI Evaluate Data- Set a Process 91

1 What is Setting A Process?	91
2 Calculation Methods	92

Ball Formula Method	92
General Method	93
3 Overview- Main Set A Process Dashboard	94
The Process Calculation (ProCal) Data-Base	94
Set a New Process	95
Loading Heat Penetration files to evaluate	96
Set up Basic Process Information	97
View ing/printing/Editing Time/Temperature data	97
Check for Zero Scans	98
View ing/Printing/Editing the formulation information	99
View ing/Printing/Editing CritiCAL	99
Establishing Ball Formula plotting defaults	99
Plotting data	101
Plotting Heating data to get Ball Formula heating factors	102
Plotting Tips	104
Plotting Cooling data to get Ball Formula cooling factors	105
Lethal Rate plots	107
Using CALSoft to compare factors from multiple HP files for Ball Formula calculation	109
Calculating a Process using Ball Formula	109
Process calculation	110
Assignment of Critical Factors	111
Lethality Calculation	112
Generating Final Process report	114
Open Existing Process Calculation	115
Delete a ProCal Record	117
Quick Ball Formula Calculation	117
Reports availalbe to help Set A Process	118
Print Lethal Rate report	118
Print Accumulated F report	120
Print Time/Temperature report	122
Print Formulations	123
Print Plots	125

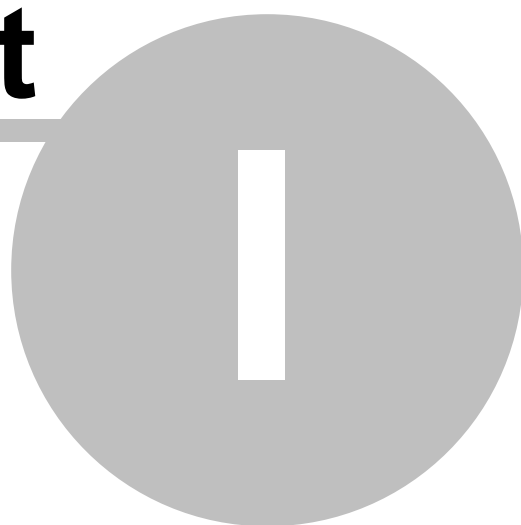
Part VII Evaluate Data- Set a CUT/Vent

127

1 What is Setting a CUT / Vent?	127
2 Overview- Main Set A CUT/Vent Dashboard	128
The CUT/Vent (TDCal) Data-Base	128
New CUT/Vent	129
Loading TD files to evaluate	129
Set up Basic TD Information	130
View ing/printing/Editing Time/Temperature data	131
View ing/Printing/Editing Lead location diagrams	132
View ing Plotted data	132
Min/Max Plotted data	133
Add Log Entries to Min/Max printout	134
Pre-CUT Plotted data	135
Zoom Plot	136
Using CALSoft to conduct a Min/Max analysis of all TD data	136
Establishing a Vent/CUT scheudle	137
Venting Schedule	138
Come-Up schedule	139
Adding Temperature Distribution Conditions	140

Generating Final Vent/CUT schedule report	141
Open Existing CUT/Vent	143
Delete a CUT/Vent Record	144
3 Reports available to help Establish a Vent or CUT	145
Print Lethal Rate report	145
Print Accumulated F report	147
Print Time/Temperature report	148
Print Lead Locations	149
Print Plots	150
Print MinMax	151
Part VIII Evaluate a Deviation	154
1 What is Evaluating a Deviation?	154
2 The Deviation (DevCal) Data-Base	155
3 Evaluating a Deviation using CALSoft	155
Main Deviation Evaluation page	156
Use Existing ProCal record to evaluate Deviation	156
Enter information about deviation	158
Using Ball Formula calculation to evaluate deviation	158
Deviation Evaluation Results	159
Generating Final Deviation Evaluation report	160
Part IX Other Tools/Features	163
1 Software Security/Activation Code	163
Automatic updates	164
2 File management	164
Heat Penetration and Temperature Distribution Data Files:	164
Calibration Files	165
Process Database	165
3 Fh Conversion	166
4 Temperature Conversion	167
5 Lethal Rate table	169
6 CALPlex diagnostic	170
7 Quick Viewer	171
8 CritiCAL Template	172
9 Beep When Scanning During Data Collection	173
10 Delay Start of Data Collection	174
11 Collect HP Set Default Free Leads	175
Index	177

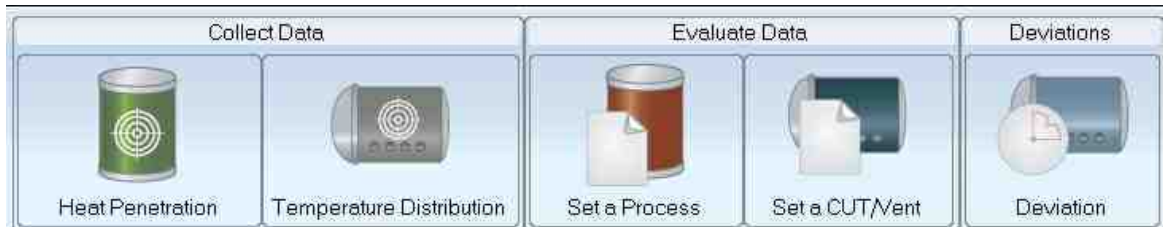
Part



1 CALSoft Basics



Select the icon below to view Help topics available for each CALSoft section

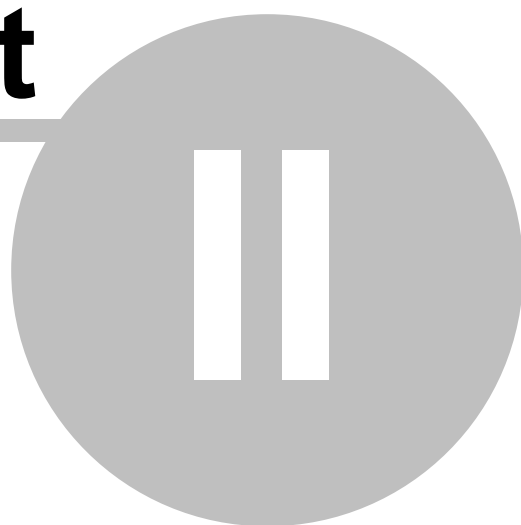


OTHER HELP ITEMS:

- [CALSoft Background](#)
- [Main CALSoft Dashboard](#)
- [Other Tools/Features](#)

www.tcal.com

Part



2 Main CALSoft Dashboard

The CALSoft5 home page is the main “dashboard” for the application. This screen gives the user the ability to navigate to any part of the program and access any of the “other features”.



MAIN SECTION: The CALSoft5 dashboard MAIN SECTION is divided into five sections, which represent the five major tasks conducted by a Process Authority:

1. Collect Heat Penetration Data
2. Collect Temperature Distribution Data
3. Evaluate HP data and establish a Thermal Process
4. Evaluate TD data and establish a Come Up time or Vent Schedule
5. Evaluate a Processing Deviation

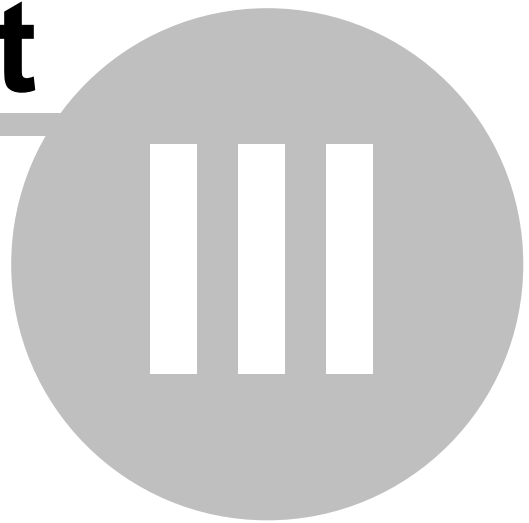
Click on any one of the section icons to begin that task.

MIDDLE PANEL: The MIDDLE PANEL will then display task-specific commands and recently used files.

OTHER FEATURES include:

- Customize Preferences, CritiCAL Template, or Create a Calibration File
- TechniCAL Support including contact information for TechniCAL Support and a CALPlex Diagnostic tool
- Utilities that include the ability to email CALSoft files, check for CALSoft updates, and the ability to uninstall CALSoft.

Part



3 Background

The objective of thermal processing is to deliver temperature into a package of product (referred to as “Canned Foods”) in a quantity sufficient to cause the death or destruction of all microorganisms of public significance as well as those of economic spoilage concern. To accomplish this objective, the packaged, hermetically sealed product (in metal cans, glass jars, flexible pouches, semi-rigid plastic) is loaded into large sterilizer machines (also called retorts or autoclaves). These retorts utilize steam or water as the heating medium under pressure to achieve a high temperature environment in which the product is ultimately sterilized. Simply put, canned food products must be properly sterilized in order to ensure the safety of that product to the consumer.

Processing Authorities undertake the task of determining what a “safe process” is and ensure that the retort can actually deliver that process time/temperature in a safe and effective manner. These two tasks are further explained as follows:

- (1) Thermal Processes for specific canned food products are developed by conducting heat penetration testing, evaluating the collected data, and using calculation methods to determine time, temperature, and lethality values.
- (2) Our ability to accurately determine the time/temperature history of the entire retort is vitally important to ensuring the thermal process is delivered to each and every container. The temperature distribution test is used for documenting this time/temperature history under a set of controlled retort processing conditions.

Regulatory agencies require that Process Authorities “have facilities, instrumentation, and equipment adequate to determine the heat processing requirements of the food product”, “use acceptable scientific methods of establishing heat sterilization processes”, and “maintain records which cover all aspects of the process establishment”.

The CALSoft™ software was designed by TechniCAL (the leading independent Process Authority) as a tool to be used specifically for assisting experienced, knowledgeable Process Authorities with the task of conducting this testing and evaluation of canned foods and retort sterilizers.

Part



IV

4 Collect Data- Heat Penetration



CALSoft allows you to conduct a Heat Penetration test and collect the time/temperature data-file on your computer.

- [What is Heat Penetration](#)
- [Overview- Main HP Dashboard](#)
- [HP File Command Operations \(Ribbon Menu\)](#)

4.1 What is heat penetration?

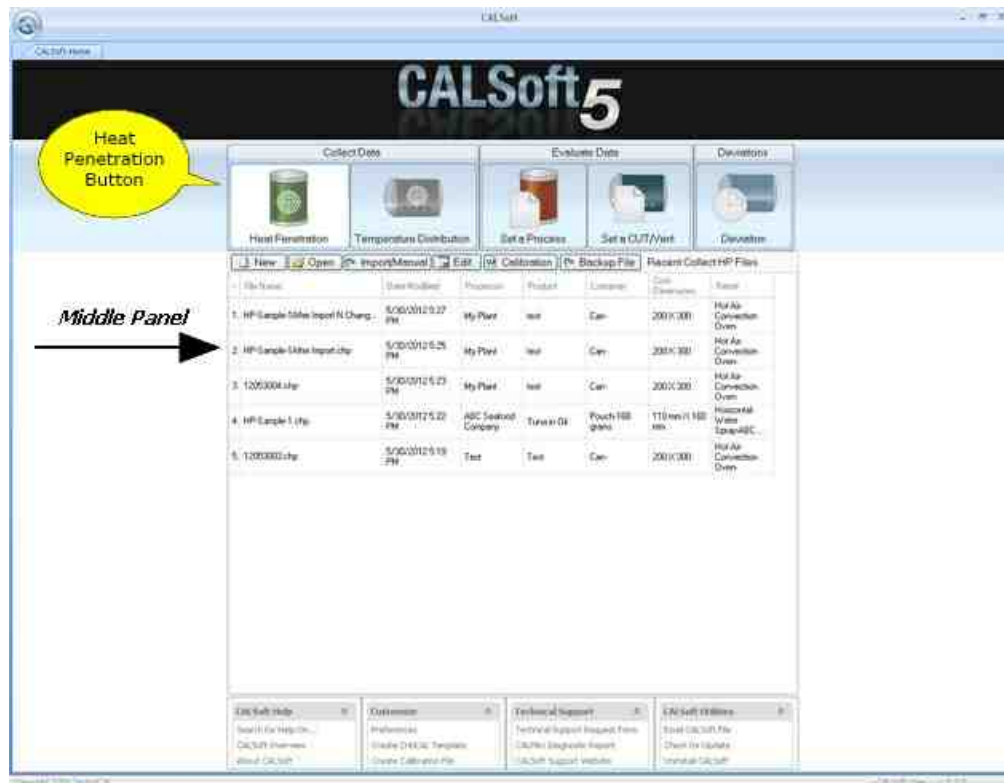
"The purpose of a heat penetration study is to determine the heating and cooling behavior of a product/package combination in a specific retort system for the establishment of safe thermal processes and evaluating process deviations. The study must be designed to adequately and accurately examine all critical factors associated with the product, package and process which affect heating rates. Numbers of containers per test run, and number of test runs to account for statistical variability are important considerations. Before commencing a heat penetration study, an evaluation of retort temperature and heat transfer uniformity, at times referred to as a heat or temperature distribution study, should have been completed. A goal in conducting these studies is to identify the worst case temperature response expected to occur in commercial production as influenced by the product, package and process."

*Institute for Thermal Processing Specialists
Protocol For Carrying Out Heat Penetration Studies (November 10, 1995)*

CALSoft is a tool used to conduct these heat penetration tests. The resulting CALSoft "Heat Penetration Data File" contains the recorded time/temperature data from the test, in addition to pertinent information such as product formulation, critical factor measurements, temperature and lethality setpoints, etc.

4.2 Overview- Main HP Dashboard

Click on "Heat Penetration" button in the Main Section and the **MIDDLE PANEL** will populate with information relevant to conducting a heat penetration test. The middle panel will display the last 5 "recently used" Heat Penetration Data Files that were opened in CALSoft.



- [Running a New Heat Penetration Test](#)
- [Opening/Editing existing CALSoft data file](#)
- [Importing DataTrace and Ellab Files](#)
- [Importing Excel Files](#)
- [Manual File Creation](#)
- [Calibration](#)
- [Backup File](#)
-

4.2.1 Running a new heat penetration test with CALPlex datalogger



Click on the **"NEW"** button to begin a new Heat Penetration (HP) test. CALSoft will then ask you to name and save to HP data file. The file name defaults to the date and sequential number indicating the number of tests you have run that day. The format is YYMMDD##. For example:

The first test run on December 15, 2009 will be named... 09121501.chp

All Heat Penetration files are saved with the extension **"CHP"**. Upon first use of CALSoft, these HP data files are stored by default in the CALSoft subdirectory titled "Data". However, you may chose another location to store your HP data files.

CALSoft allows you five sections to enter information about the HP test design, equipment and product that will be tested:

[Test Documentation tab](#)
[Data Collection Equipment tab](#)
[Formulation tab](#)
[CriticCAL tab](#)
[Calibration tab](#)
[Start Data Collection](#)

Once Data Collection begins, CALSoft provides different views to display the time/temperature data.

[Main HP Data Collection Screen](#)
[Time Temperature Grid](#)
[Bar Graph](#)
[Zoom Plotting during Data Collection](#)

Also, other information can be logged into the CALSoft file during the test..

[Entering Event readings during HP test](#)
[Entering Log Data during HP test](#)

[Ending a test](#)

[Losing Communication with CALPlex](#)
[Losing Power during data collection](#)

4.2.1.1 HP Test Documentation tab

The test documentation tab allows you to document information related to the test you are conducting. The screen is divided into 5 sections (required fields are marked with an *)

1. PRODUCT- Product name and "type" that you are testing. Chose Low Acid Canned Food (LACF), Acidified, or Other. Choosing LACF or Acidified will automatically set the z and Tref values for the sterility "F" value. Choosing "other" will allow you to enter your own z and Tref values.

2. CONTAINER- Container type and dimensions are required. Description and additional information are optional.

3. RETORT- Choosing Batch or Continuous retort will give you different choices in the "type" drop-down menu. It is important to note that the m+g factor is determined based on our selection of retort. The m+g is the factor used in the Ball Formula that represents the difference between the retort temperature and cooling water. Traditionally, for Steam retorts, the m+g = 180°F (100°C) and for Water retorts, the m+g = 130°F (72.2°C).

4. PROCESSOR - This is the name and location of the factory where the HP testing was conducted.

5. TEST INFORMATION- Enter information about this specific test such as:

- Test Type: you can designate this test as a Confirmation HP test, or a "cold spot study"

- **Targets:** enter the target F and RT for data-collection and CALSoft will use that during the test to alert you when the targets have been reached. The target RT entered will help to determine when the Free Leads reach the designated target RT, or when "Come Up Time" (CUT) has been achieved.
- **Temperature Type:** you can chose Fahrenheit or Celsius.
- **Scan intervals:** This is the time that CALSoft waits between scanning the CALPlex datalogger for Temperature readings.
- The Technician's name, reason for test, and Notes fields are optional and simply provide further documentation of the HP test

CALSoft will retain the information on this page for the next test to eliminate the need to enter it again. To clear the fields, click "CLEAR ALL" button.

4.2.1.2 HP Data Collection Equipment tab

The Data Collection Tab is divided into two main parts:

1. **EQUIPMENT:** (OPTIONAL) You may record information about the data-collection equipment such as CALPlex or RTemp, serial number, type of thermocouples used, and information about the wires used in the testing.

2. Data Logger Type

- Data can be collected with the CALPlex Data Logger or the RTemp Data Logger. Make sure to select the correct type in the Data Logger Type pull down box.

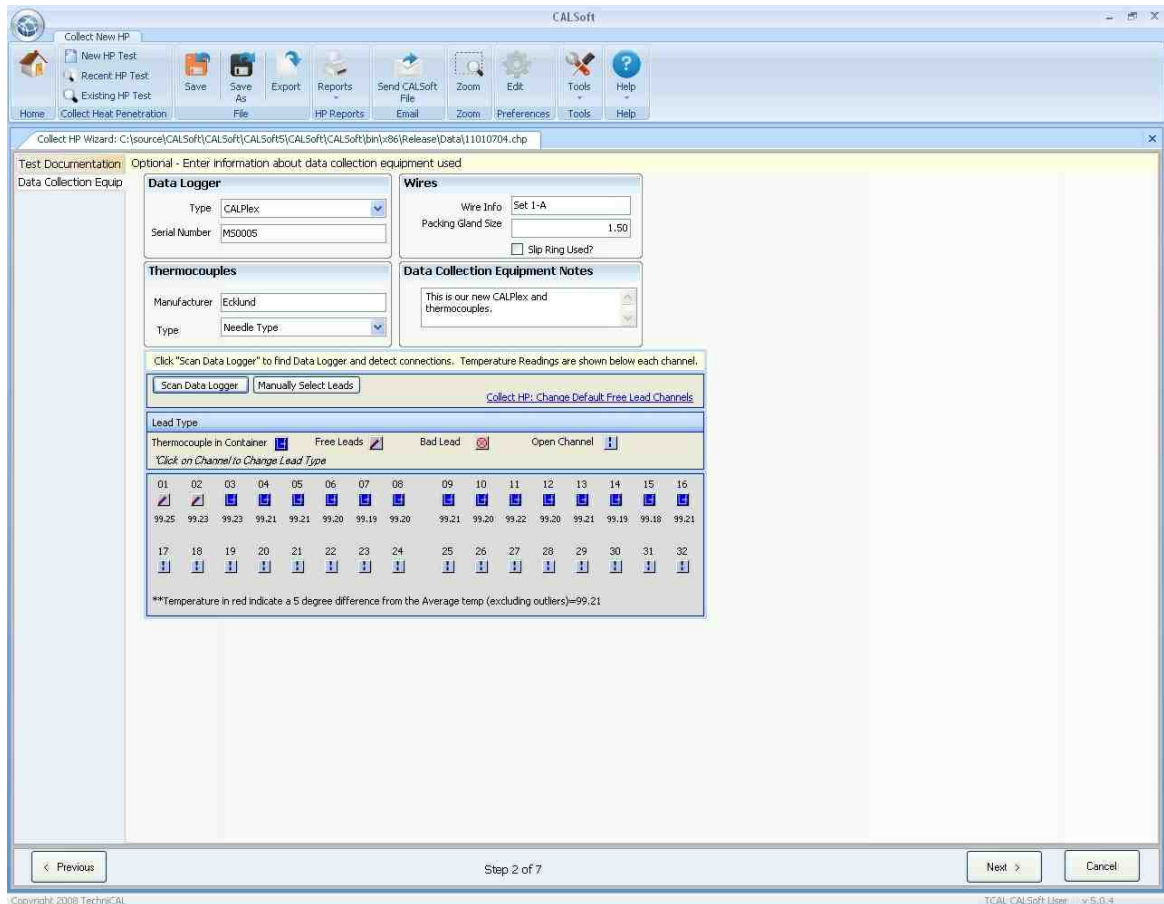
a) [CALPLEX Connections](#)

b) [RTemp Connections](#)

4.2.1.2.1 CALPlex Connection

Click the "**SCAN Data Logger**" button and CALSoft will automatically detect the connection to the CALPlex datalogger, scan all 32 channels, and display the results:

- Lead Type:** A channel can be designated as either a Thermocoupled container, Free Lead, Open Channel, or Bad Lead. Different icons represent each type. CALSoft scans CALPlex and determines which of the 32 channels have something connected. CALSoft will determine which leads are by default "Free Leads" from the [Collect HP Set Default Free Leads Utility](#), all other connections are "Thermocoupled Containers". If nothing is detected in a channel, it is displayed as an "Open Channel". If you have something connected to a channel designated as "Open", it could be an indication that the thermocouple, lead, or datalogger is not working properly. You should either fix the equipment before beginning the test or set the channel to a "Bad Lead". Any channel designation can be changed by clicking on that channel until the correct type is displayed.
NOTE: CALSoft will actually scan and record temperatures on all 32 channels during data-collection. However, you will only see the channels during data collection that are designated as Free Leads or Thermocoupled Containers.
- Temperature Reading:** CALSoft will also display the current temperature readings for each Free Lead and Thermocoupled container. CALSoft averages all of the temperature readings and will display any readings that are within +/- 5 degrees from the average in RED. This will help you to determine if you have any issues with the data-collection equipment prior to starting the HP test.



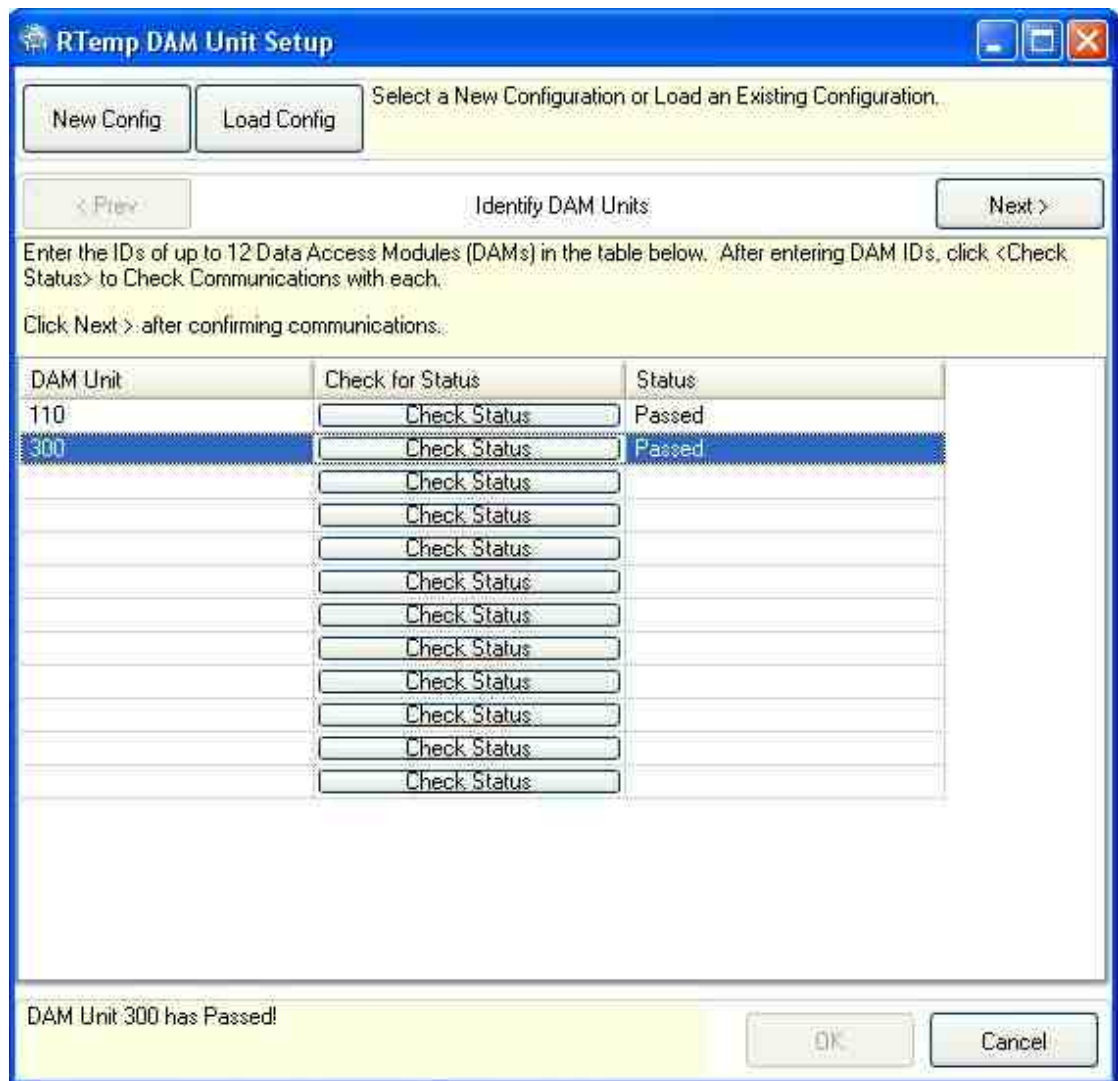
4.2.1.2.2 RTemp Connection

Collecting data with the RTemp system requires an additional setup that is accomplished by following these easy steps.

- 1) Ready the RTemp System by turning on the DAM Unit(s):
 - (a) For DAM units with a toggle On-Off Switch, move the switch to On. For those units without an On-Off toggle switch (silver canister models) simply plug one end of the external charger into a properly wired 110-240 volt circuit, and plug the other end, which is the end installed with the white miniature style female connector into the white spade style connector on top of the unit. This will turn on the DAM. Now unplug the charger connector from the DAM, and the unit will stay on for up to 4 hours. If no communication is established between the DAM and the Poller after 4 hours, the DAM powers down. You can now connect the antenna supplied with the DAM, and you are ready to start testing.
- 2) Connect the poller to the computer.
- 3) Select RTemp for the Data Logger Type on the HP (Or TD) Data Collection Equipment Tab.
- 4) Click on the Scan Data Logger button. You will be shown a form with two choices New Config or Load Config
 - (a) **New Config**

Enter the DAM Unit ID number in the first field in the data grid. Click on the Check Status button in the center column. If the Poller and DAM units are communicating, you should receive the "Passed" Reply in the Status column. If the units are not communicating, the reply will be failed. For each DAM unit to be used in the test, repeat this process. This picture shows two

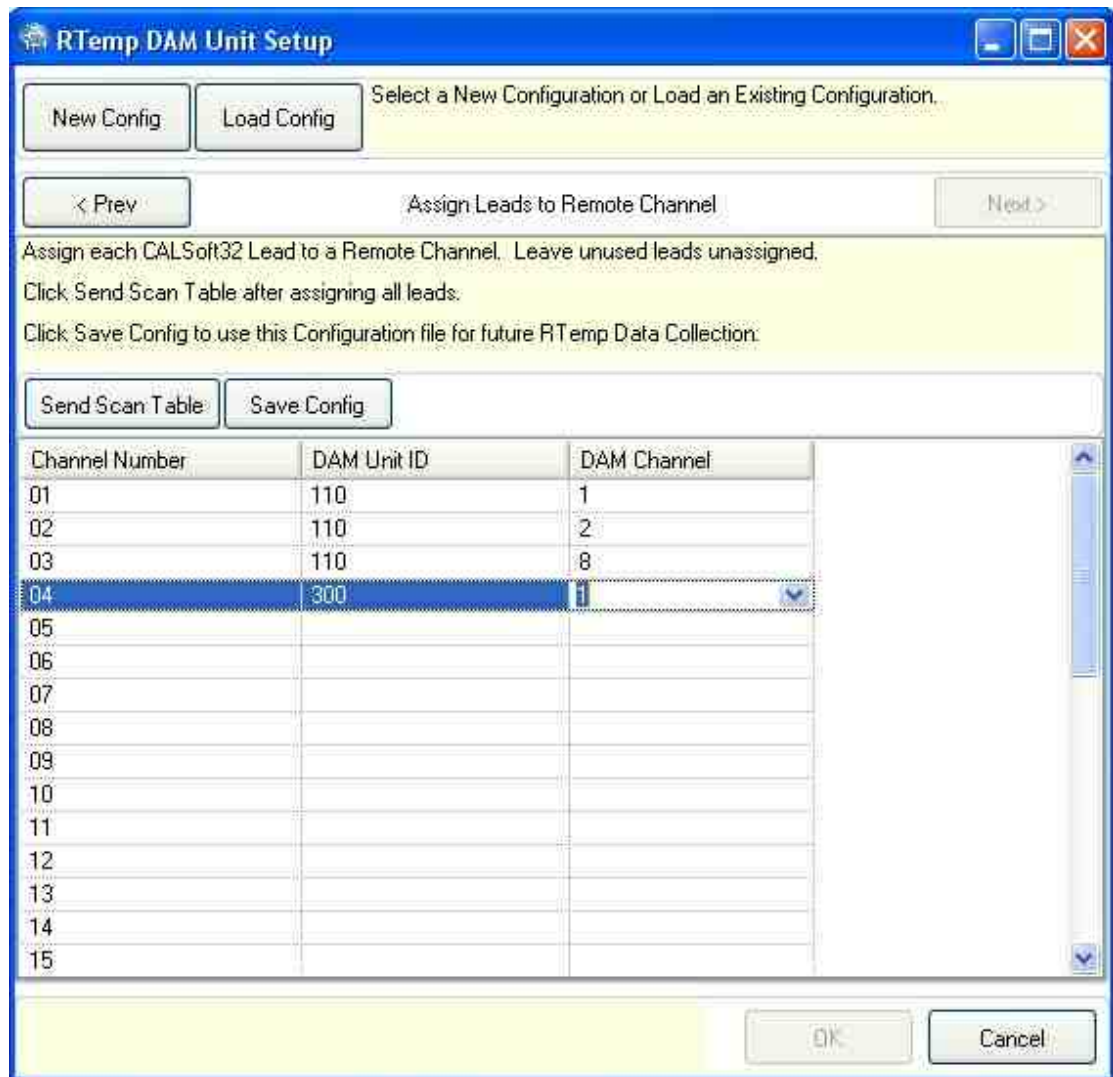
units in this test.



The image shows a software window titled "RTemp DAM Unit Setup". At the top, there are two buttons: "New Config" and "Load Config", followed by the text "Select a New Configuration or Load an Existing Configuration." Below this is a navigation bar with "< Prev" and "Next >" buttons, and the title "Identify DAM Units". The main area contains instructions: "Enter the IDs of up to 12 Data Access Modules (DAMs) in the table below. After entering DAM IDs, click <Check Status> to Check Communications with each." and "Click Next > after confirming communications:". A table with three columns is shown: "DAM Unit", "Check for Status", and "Status". The first row shows "110" in the first column, a "Check Status" button in the second, and "Passed" in the third. The second row shows "300" in the first column, a "Check Status" button in the second, and "Passed" in the third. The remaining rows are empty. At the bottom, a status bar says "DAM Unit 300 has Passed!" and there are "OK" and "Cancel" buttons.

DAM Unit	Check for Status	Status
110	Check Status	Passed
300	Check Status	Passed
	Check Status	
	Check Status	
	Check Status	
	Check Status	
	Check Status	
	Check Status	
	Check Status	
	Check Status	
	Check Status	
	Check Status	

Click the *Next* button to configure the DAM Channels to the desired CALSoft Channels. The picture below shows the form for two DAM units being configured to be mapped to different CALSoft Channels. You can associate up to 32 CALSoft Channels.



The dialog box is titled "RTemp DAM Unit Setup". It contains a yellow instruction area at the top with the text: "Select a New Configuration or Load an Existing Configuration." Below this are two buttons: "New Config" and "Load Config".

Below the buttons is a navigation bar with "< Prev", "Assign Leads to Remote Channel", and "Next >".

The main instruction area contains the following text:

Assign each CALSoft32 Lead to a Remote Channel. Leave unused leads unassigned.

Click Send Scan Table after assigning all leads.

Click Save Config to use this Configuration file for future RTemp Data Collection.

Below the instructions are two buttons: "Send Scan Table" and "Save Config".

The central part of the dialog is a table with three columns: "Channel Number", "DAM Unit ID", and "DAM Channel".

Channel Number	DAM Unit ID	DAM Channel
01	110	1
02	110	2
03	110	8
04	300	1
05		
06		
07		
08		
09		
10		
11		
12		
13		
14		
15		

At the bottom right are "OK" and "Cancel" buttons.

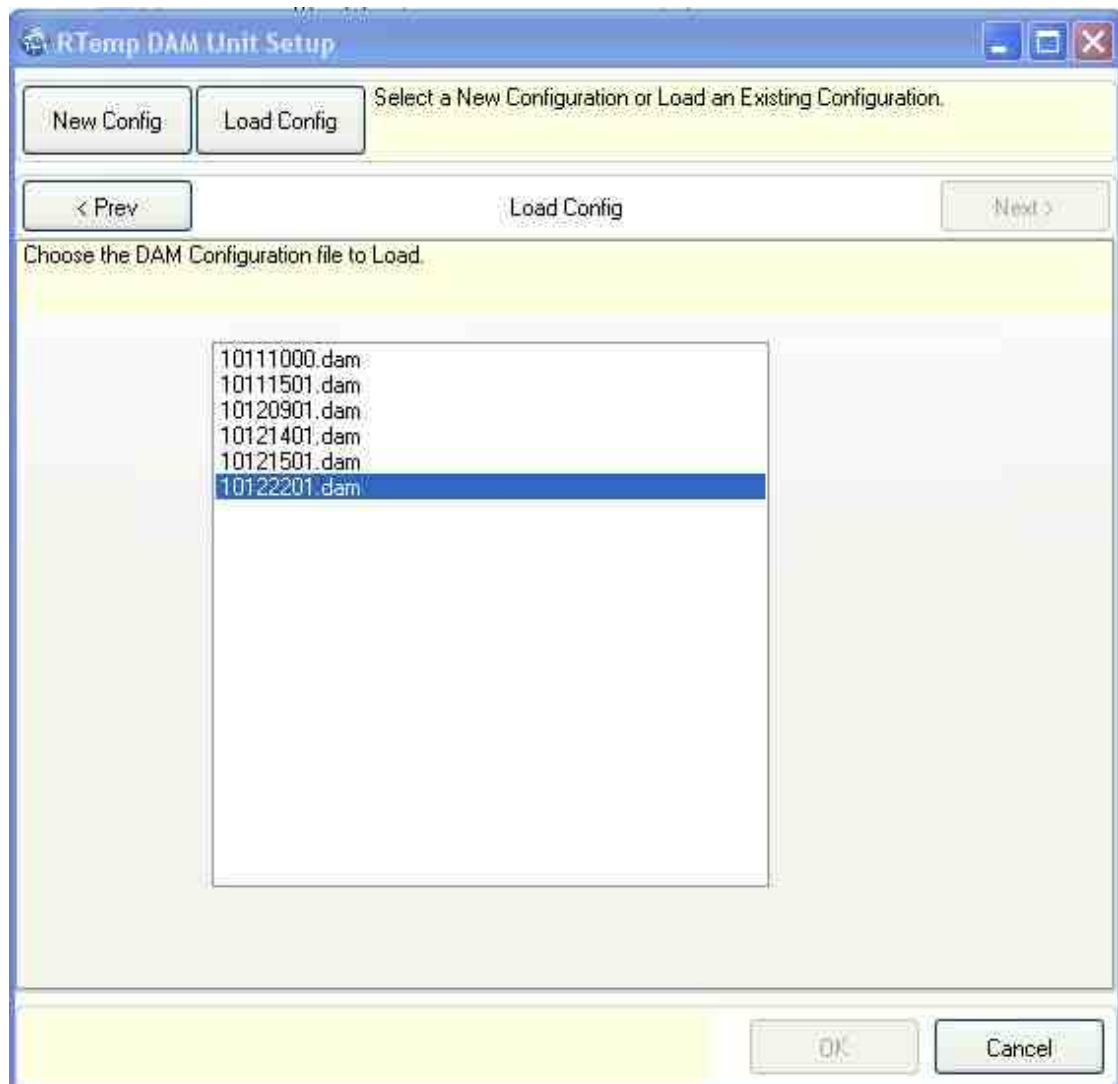
After configuring the system, click the *Send Scan Table* button. This sends the desired configuration to the Poller.

If you want to save the configuration for future reference (suggested), click the *Save Config* button. CALSoft 5 will automatically name the file and save it to the data directory for the CALSoft file that is currently being created.

Click the *OK* button and the program proceeds to detect the temperature readings for this current configuration.

(b)Load Config

If you have already saved a DAM configuration and desire to use it, Click the *Load Config* button and a form will be shown that lists all of the configuration files created in the sub-directory of this current files location.



Click on the *Next* button (Or double-click on the file name in the grid) The program will move to the next step and display the previously saved Configuration. Review the configuration.

Select the *Send Scan Table* button. The configuration will be sent to the Poller. The configuration has already been saved so it is not needed to re-save the configuration file.

Click the *OK* button and the program proceeds to detect the temperature readings for this current configuration.

4.2.1.3 HP Formulation tab

OPTIONAL. The formulation tab allows you the option of entering information about the formula of the product that you are testing in the heat penetration test. This information is permanently saved into the CALSoft data-file for future reference. Enter the CODE and/or FORMULATION NUMBER for the product. Then enter the ingredients, recording the amount used in NORMAL PRODUCTION and also the amount used in the HEAT PENETRATION TEST.

This information can be entered before, during, or after the actual test is conducted.

HP File View: C:\Documents and Settings\scabes\SCOTTLAPTOP\My Documents\CALSoft\TESTS\SamplesForMark\SampleHP-01.chp

Test Documentation
Data Collection Equip
Formulation Info
CritiCAL Factors
Calibration Files
Time/Temperature
Log Data
Summary Info

Optional - Record the formulation of the Product tested. (Click "Next" to skip)

Product: Tuna Chunks in Oil
Code: TCO-A
Formulation #: A-1966
Quantity Unit of Measure: Grams

Clear All Formulation Info Print Formulation

New Ingredient Delete Ingredient

Ingredient	Normal Production		Heat Penetration Test
	%	Qty	Qty
Chunk Tuna meat	68	89	96
Oil	10	9	12
Water	22	18	23
Σ	100	116	131

Notes: Chunk tuna is filled into cans. Oil and water are added. Cans go through exhaust chamber prior to seaming.

Copyright 2008 TechniCAL TCAL CALSoft User v 4.25.0

4.2.1.4 HP CritiCAL tab

The CritiCAL Tab allows you the option of entering **CRITICAL FACTORS** associated with each thermocoupled container in the heat penetration test. The default CritiCAL template grid includes many common critical factors. You may remove/add Critical Factors by clicking "**Customize CritiCAL Factors**" and then turning on/off any factors you wish to display. The "**Cell Copy**" feature allows you to enter a value and then click "Cell Copy" to copy that information into each cell in that column.

Using this CritiCAL feature allows you to (a) permanently record the critical factors for each

thermocoupled container tested, and (b) use that data when using CALSoft to evaluate the HP test data and establish a thermal process.

This information can be entered before, during, or after the actual test is conducted.

The screenshot shows the CALSoft HP File View window. The main area displays a table titled "Critical Factors for Test" with columns for TC Position, Orientation, and various weight measurements. The table contains 14 rows of data. Below the table, there is a checkbox for "Include Viscosity?".

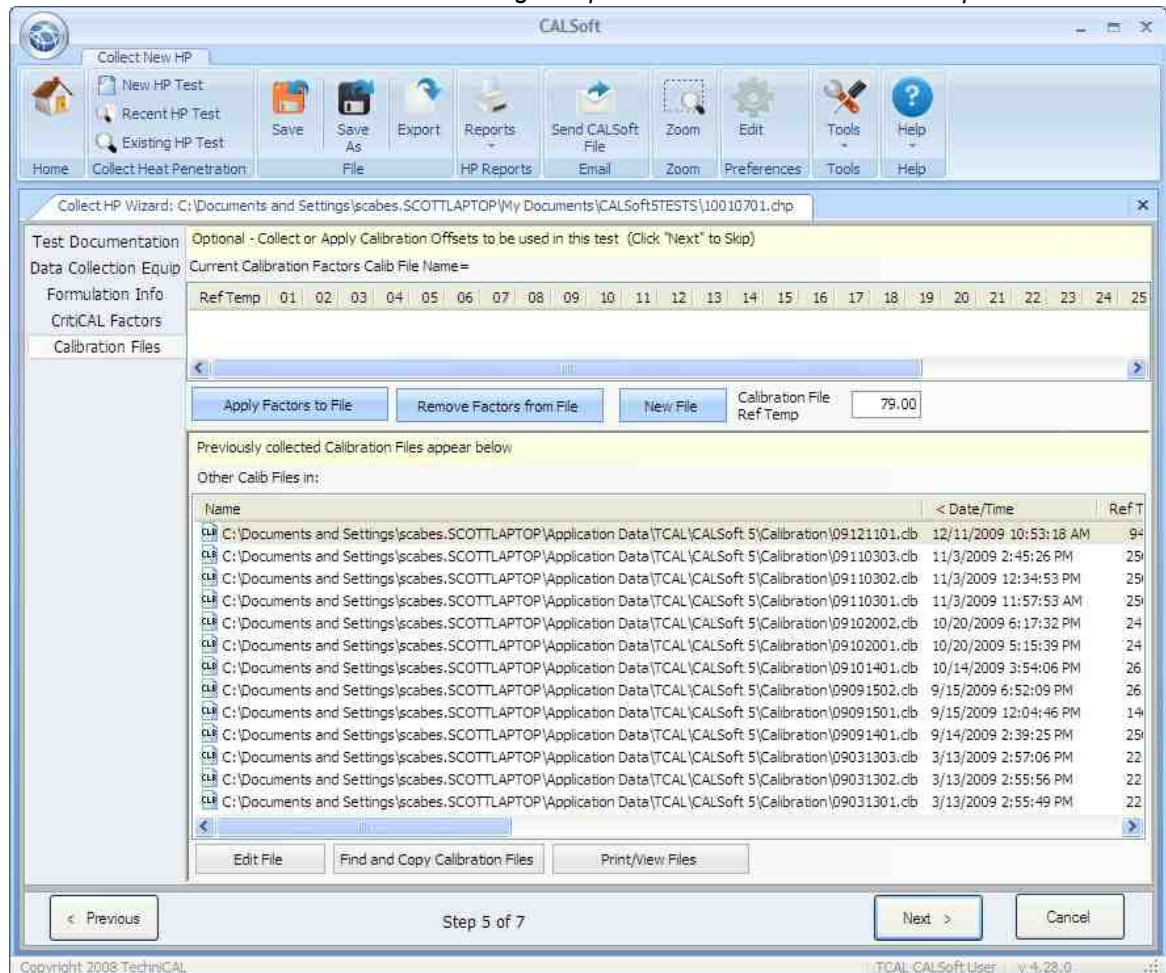
	TC Position Inches AB	Orientation	Tuna grams	Oil grams	Water grams	Tare Weight grams	Gross Weight grams	Net Weight grams	Drain Weight grams
03	1.015	Vertical	154.00	10.00	13.00	45.90	257.70	211.80	95.80
04	1.015	Vertical	156.10	10.00	13.00	45.90	260.10	214.20	102.70
05	1.015	Vertical	155.40	10.00	13.00	45.90	258.60	212.70	103.20
06	1.015	Vertical	154.80	10.00	13.00	46.20	260.70	214.50	101.20
07	1.015	Vertical	154.90	10.00	13.00	46.10	259.20	213.10	100.70
08	1.015	Vertical	155.60	10.00	13.00	45.90	258.00	212.10	100.60
09	1.015	Vertical	154.20	10.00	13.00	45.90	259.00	213.10	102.30
10	1.015	Vertical	154.00	10.00	13.00	45.90	258.30	212.40	107.30
11	1.015	Vertical	157.10	10.00	13.00	45.90	256.00	210.10	101.40
12	1.015	Vertical	158.00	10.00	13.00	45.70	254.90	209.20	99.80
13	1.015	Vertical	155.00	10.00	13.00	45.70	257.00	211.30	100.10
14	1.015	Vertical	156.30	10.00	13.00	45.90	260.30	214.40	104.90

4.2.1.5 HP Calibration Tab

CALSoft allows you the option to **calibrate** your entire data-collection system of thermocouples, wires, and CALPlex datalogger against a known standard in order to zero-out any possible errors. This is typically accomplished by bundling the thermocouples/wires inside the retort near the temperature sensor of the calibrated Temperature Indicating Device (MIG or Digital Temperature Gauge), brining the retort up to a temperature normally used during production (i.e. 250 degrees F), and holding the temperature steady. Once the retort has "equilibrated" at the setpoint temperature, you can use CALSoft to capture OFFSETS for each of the 32 channels. This is referred to as "calibration" within CALSoft.

To Calibrate your data-collection system, enter a **REFERENCE TEMPERATURE** and chose **NEW FILE**. CALSoft will scan the CALPlex datalogger and capture an offset (difference) against the reference temperature for each of the 32 channels. The collection of these offsets are referred to as a calibration file. Calibration files can be saved on your computer (by default, Calibration files are saved in the CALSoft/CALIBRATION directory) and APPLIED to your test by clicking on "**APPLY FACTORS TO FILE**". To apply an already created calibration file, click on the file from the list or click "Find and Copy...". Once the file is located, click "**APPLY FACTORS TO FILE**". When a Calibration File is set to be APPLIED, the offsets will be applied to all data collected during the test. To remove the offsets (calibration factors), click on **REMOVE FACTORS FROM FILE**.

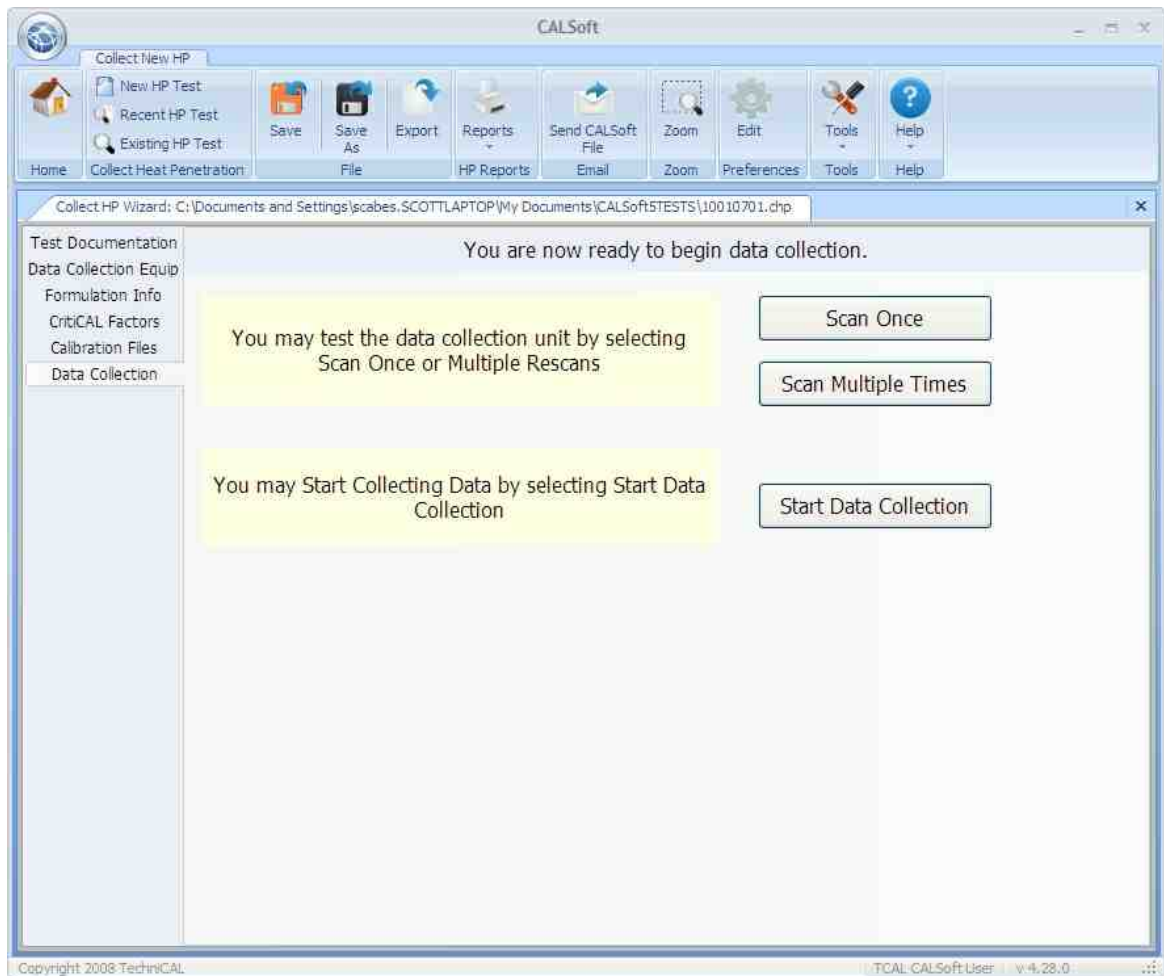
NOTE TO CALSoft 32 users- if you used a calibration file during a test, CALSoft 5 saves the calibration offsets in the data-file and no longer requires that the calibration file be present.



4.2.1.6 HP Start Data Collection

The final screen in the setup process is the "Data Collection" tab. This allows you three options:

1. **SCAN ONCE:** Test the data-collection setup by Scanning the CALPlex datalogger once to see what the reading are
2. **SCAN MULTIPLE TIMES:** This option will begin scanning (but not recording) the CALPlex box continuously. This can help you test your data collection equipment setup prior to formally starting the test.
3. **START DATA COLLECTION:** This option will begin the Heat Penetration test. The timer for the test will start and data logging will begin.



4.2.1.7 HP Data Collection - Main screen

The default view during Data Collection is called the "Main Data Collection Screen". This screen displays only all "active" channels (Free Leads and Thermocoupled leads). CALSoft will actually scan and record temperatures on all 32 channels during data-collection. However, you will only see the channels during data collection that are designated as Free Leads or Thermocoupled Containers. *To change the status of channel or to turn a channel on or off, go to the Data Collection Equipment tab and click on a channel to change it's type. It will then be displayed during data collection.*

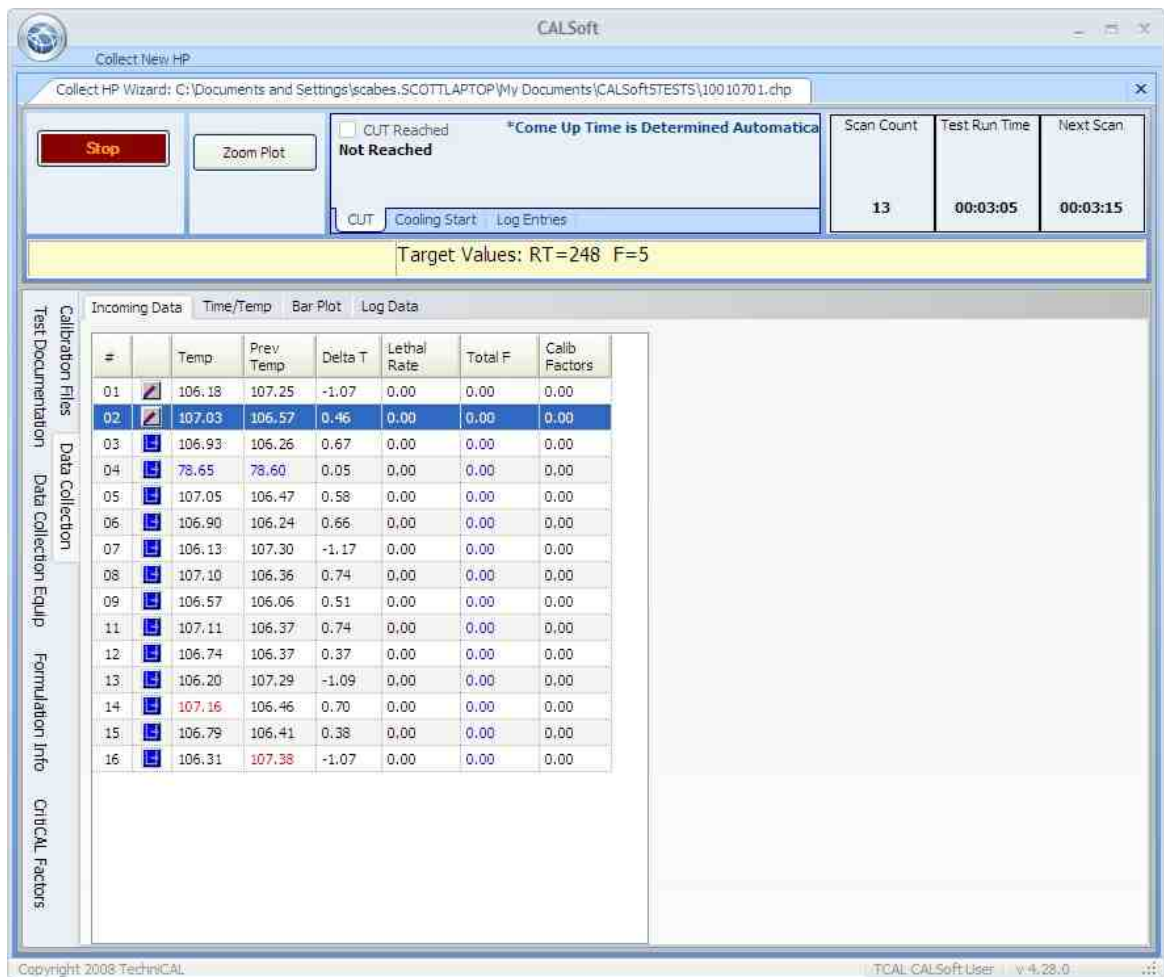
This screen displays the channel number, type (graphically shows Thermocouple or Free Lead), current reading, previous reading, the difference between the two ("Delta T"), the lethal rate, and the accumulated F (Total F). Any calibration factors that are applied are shown in the last column.

CALSoft will help you visually know which channel is the highest and lowest. The Thermocoupled container with the highest reading is displayed in **RED** and the lowest reading in **BLUE**. Since this is a Heat Penetration test, Free Leads are not considered in the high-low feature.

You can sort on any column by clicking the column heading.

You can navigate to other data views by using the tabs across the top for [Time/Temperature](#), [Bar Plot](#), and [Log Data](#)... or view the data on a time/temperature graph by clicking the "[Zoom Plot](#)"

button

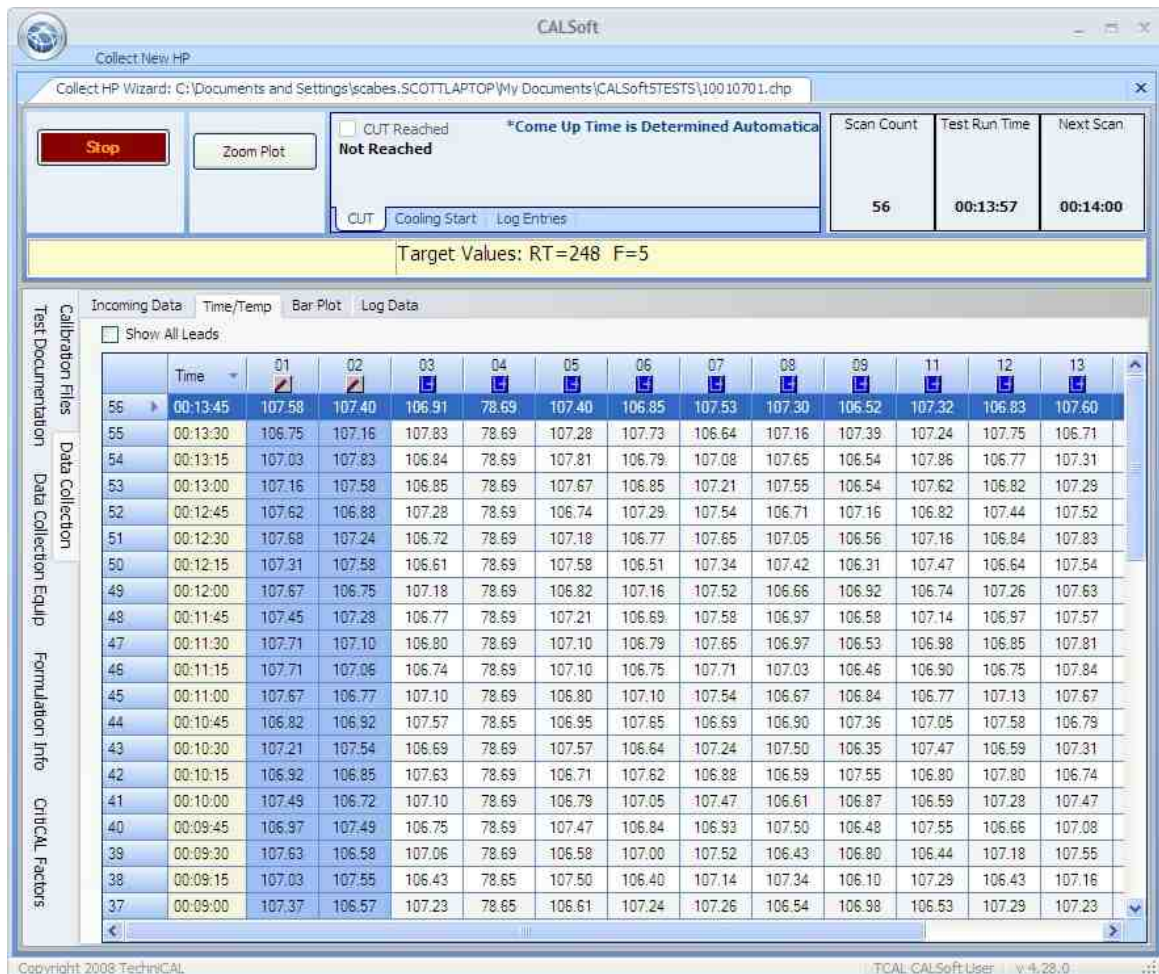


4.2.1.8 HP Data Collection - Time Temperature grid

During Data Collection, the **"Time Temperature Grid"** displays your data in a spreadsheet format. This screen displays only all "active" channels (Free Leads and Thermocoupled leads). CALSoft will actually scan and record temperatures on all 32 channels during data-collection. However, you will only see the channels during data collection that are designated as Free Leads or Thermocoupled Containers. *To change the status of channel or to turn a channel on or off, go to the Data Collection Equipment tab and click on a channel to change it's type. It will then be displayed during data collection.*

By default, the most recent scan is displayed at the top of the grid. To reverse this order, simply click on the "Time" column heading.

Channels with "Free Leads" are marked graphically under the Channel number and are displayed as **BLUE** columns to visually assist you in determining which channels are Free Leads and which are Thermocoupled Containers.



4.2.1.9 HP Data Collection- Bar Graph

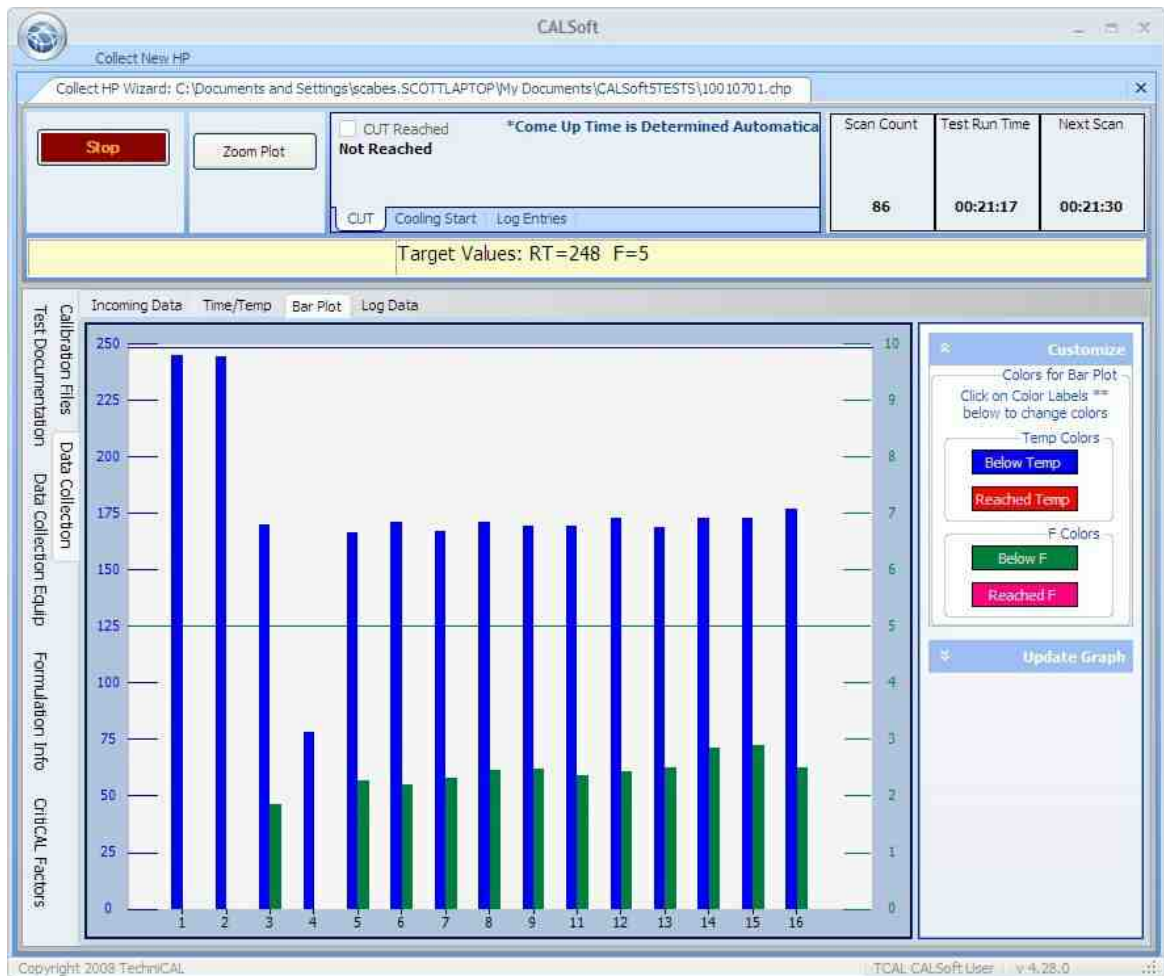
During Data Collection, the "Bar Graph" displays your data in a graphical format. This screen displays only all "active" channels (Free Leads and Thermocoupled leads). CALSoft will actually scan and record temperatures on all 32 channels during data-collection. However, you will only see the channels during data collection that are designated as Free Leads or Thermocoupled Containers. *To change the status of channel or to turn a channel on or off, go to the Data Collection Equipment tab and click on a channel to change it's type. It will then be displayed during data collection.*

The "TARGETS" entered in the Test Documentation tab (first tab) when you set up the HP test will be used on this bar graph to let you know when the targets are reached. Once the readings reach the desired targets, the bar will turn colors to alert you that the target has been reached.

- The **Temperature** is displayed on the left-hand vertical axis, with the "TARGET RT" displayed as a horizontal line on the grid.
- The **Accumulated Lethality** is displayed on the right-hand vertical axis, with the "TARGET F" displayed as a horizontal line on the grid.

To update the Target RT or F, click "Update Graph" button.

To change the colors of the bars, click on "Customize" button



4.2.1.10 HP Data Collection- Zoom plotting during data collection

During Data Collection, CALSoft enables you to graph your data in real-time on a time/temperature grid. Once the data is plotted, you can "zoom in" by clicking and dragging the mouse over the range you wish to enlarge. This feature is referred to within CALSoft as **"Zoom Plotting"**. To graph your data during the test, click on the **"Zoom Plot"** button at the top Ribbon. The Zoom Graph will be displayed in a separate window and the graph will be updated in real-time.

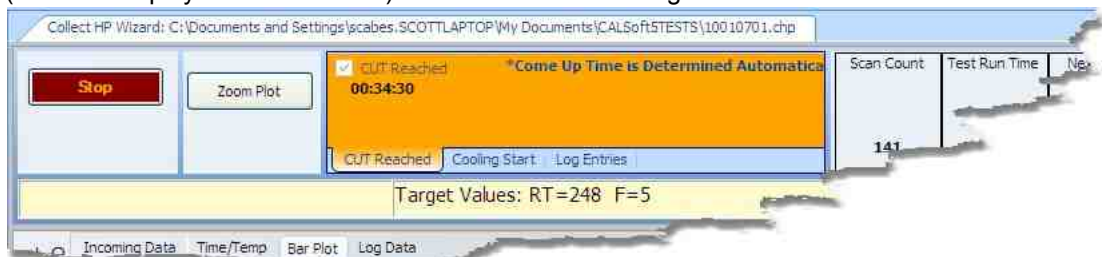


Click here for more information on [using the CALSoft Zoom Plotting Feature](#)

4.2.1.11 Entering event readings during HP test

During Data Collection, CALSoft enables you to enter "**Event**" readings during the Heat Penetration test. To enter these events, use the tabs at the top of the screen during data-collection. .

CUT: The Come Up Time (CUT) is logged automatically as the time that each Free Lead reached the Target RT. CALSoft will alert you automatically by displaying a message and changing the color of the "CUT Reached" tab to GOLD when all Free Leads have reached the target Retort Temperature (which is displayed under the tab). The CUT can be changed later when the data file is evaluated.



Cooling Reached:

Once the Cook Phase is completed and the retort goes into the Cooling Cycle, chose the "Cooling Reached" tab and then click on Entered Cooling. The current time will be displayed, but you can edit that accordingly. Enter the Cooling Water temperature (optional) which will be used if you plot cooling data in the Ball Formula.



4.2.1.12 Entering Log Data

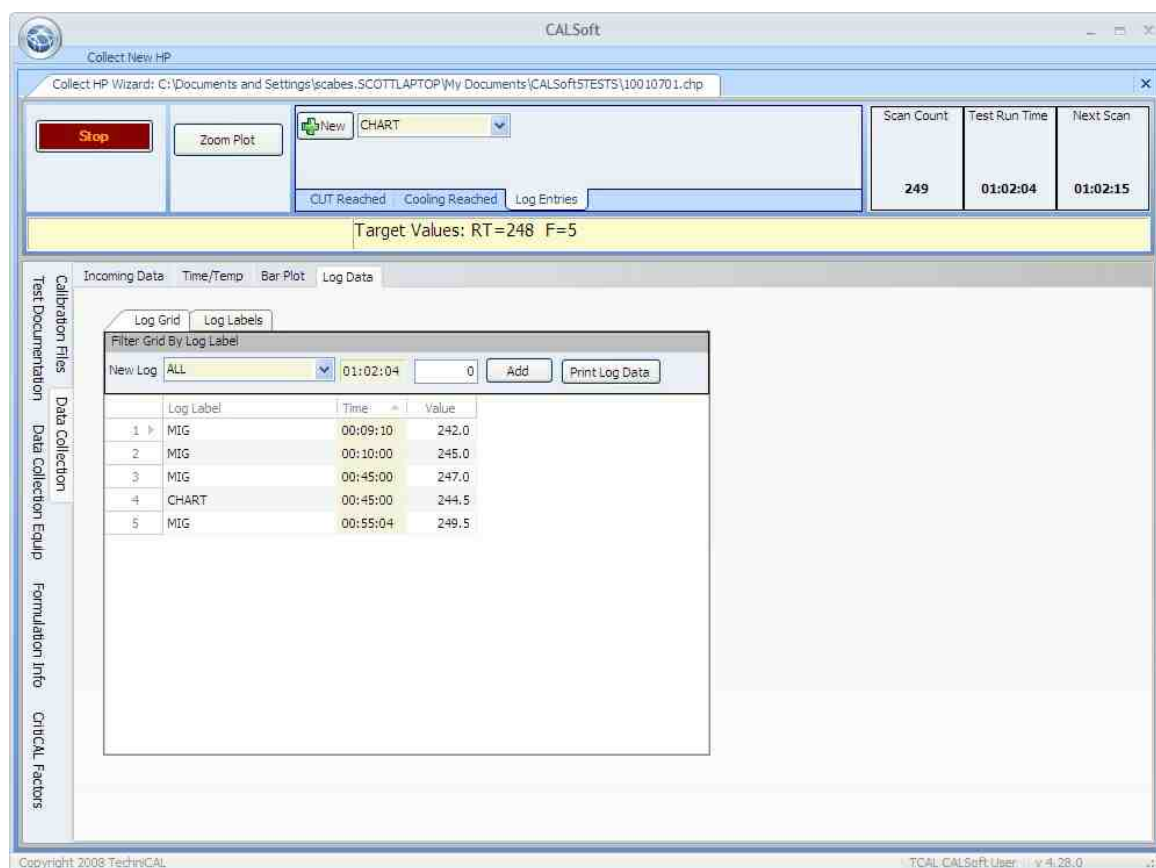
During Data Collection, CALSoft enables you to manually enter other readings during the Heat Penetration test such as temperature readings from the MIG or Digital thermometer, pressure gauge readings, RPM readings, etc. These readings are referred to as "LOG-DATA" in CALSoft. Use the "LOG-DATA" tab across the top of the screen to quickly enter LOG readings during the test. Chose the type of reading you want to log from the drop-down menu, Click "NEW" and CALSoft will time-stamp your entry (you can change the time as necessary). Enter the reading and click "ADD". The reading will be logged into the CALSoft datafile.

NOTE: Log Data can be entered after the test is complete.

[Click here to learn how to set CALSoft to Alert you when to enter Log Entries during an HP or TD test.](#)

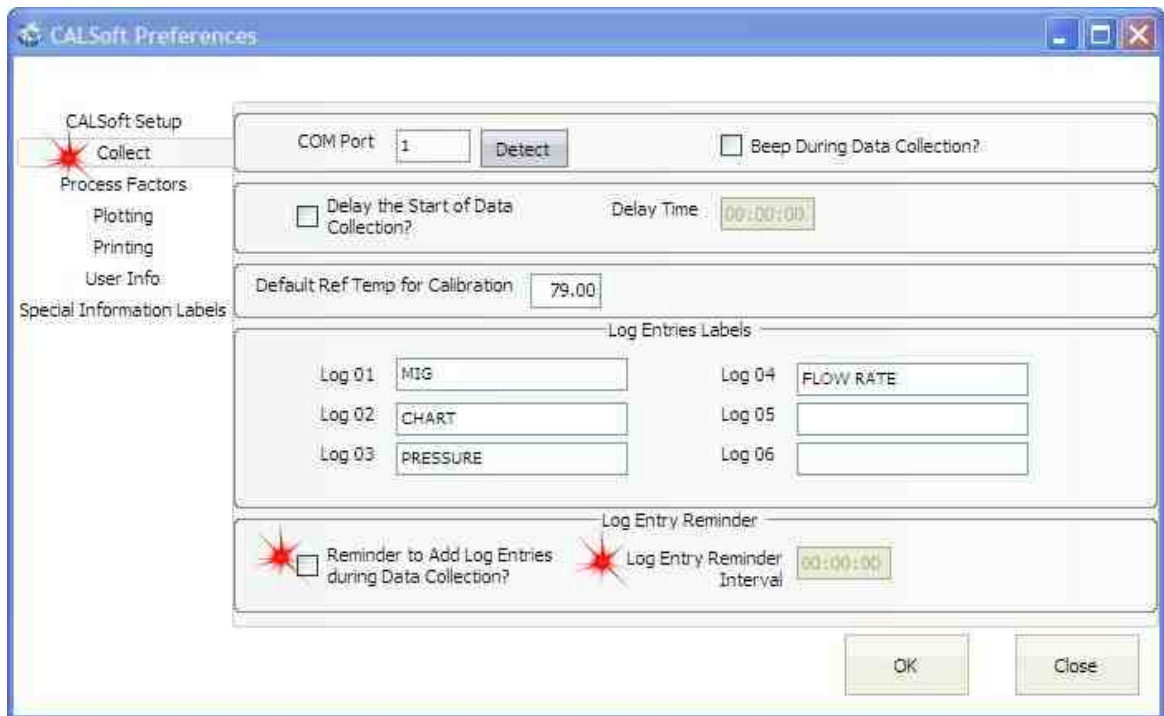


You can view your log entries by clicking on the **Log Data** tab. This will display a grid showing you all the log-data that has been entered. You may also enter log readings here by choosing the type (created in the "LOG LABELS" sub-tab), entering the time, entering the reading, and clicking "ADD". The Log Entry will show up on the list.



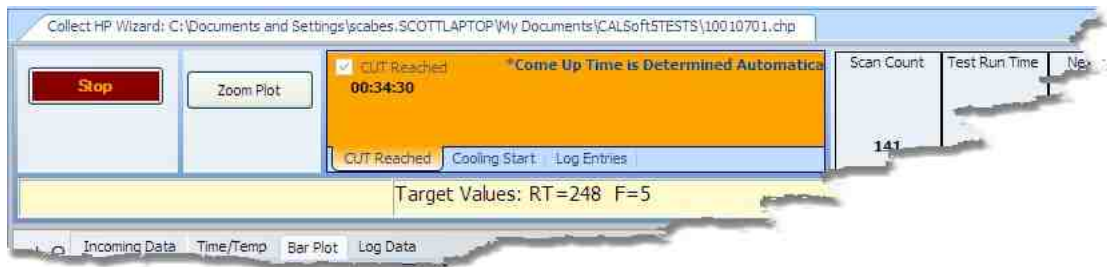
4.2.1.12.1 Alert To Enter Log Entries

CALSoft can alert you during the HP or TD test when it is time to record a "Log Entry". ([click here for more on Log Entries](#)). To set this, go to PREFERENCES (in the Ribbon menu of any section, or on the main Dashboard) and chose the COLLECT tab on the right. Then check "Reminder to Add Log Entries During Data Collection" and enter a time interval (hours, minutes, seconds) that you want to be reminded (i.e.. every 2 minutes would be 00:02:00). To turn off this feature, un-check "Reminder to Add Log Entries During Data Collection"



4.2.1.13 Ending a test

To End a test, click the "STOP" button at the top. CALSoft will display a message asking you to confirm that you want to stop data collection. If you chose YES, CALSoft will stop scanning and receiving data from CALPlex. The file will be "closed" and the [Summary Page will be displayed](#). Once data-collection is stopped, it cannot be re-started without beginning a new test.

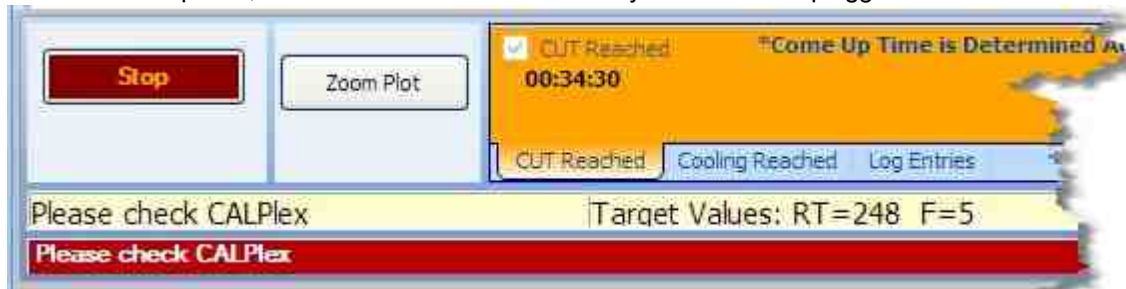


Note For Data Collection where the Data Logger Type is the RTemp system:

At the end of Data Collection CALSoft 5 checks to see if there are any missing scans that can be recovered from the RTemp DAM Units. RTemp stores data collection on each individual DAM unit. It is possible that the RTemp poller might not be able to communicate with the DAM units during data collection. At the end of test CALSoft and the RTemp poller will re-poll for these missed scans; if the DAM unit is back in range the Poller will be able to recapture the missing scan information. After about 30 seconds of polling for the missing DAM units the user can select to ignore the missing scans and complete this test.

4.2.1.14 Losing Communication with CALPlex during a test

If your computer loses connection to the CALPlex datalogger during a test, CALSoft will display a **RED** message notifying you to "Please Check CALPlex". The CALPlex may be off, the battery may have run out of power, or the communication cable may have come unplugged.



Once the connection is re-established, data-collection is resumed at the current time and the RED message will disappear. All data collected during the communication failure will be logged as ZEROS.

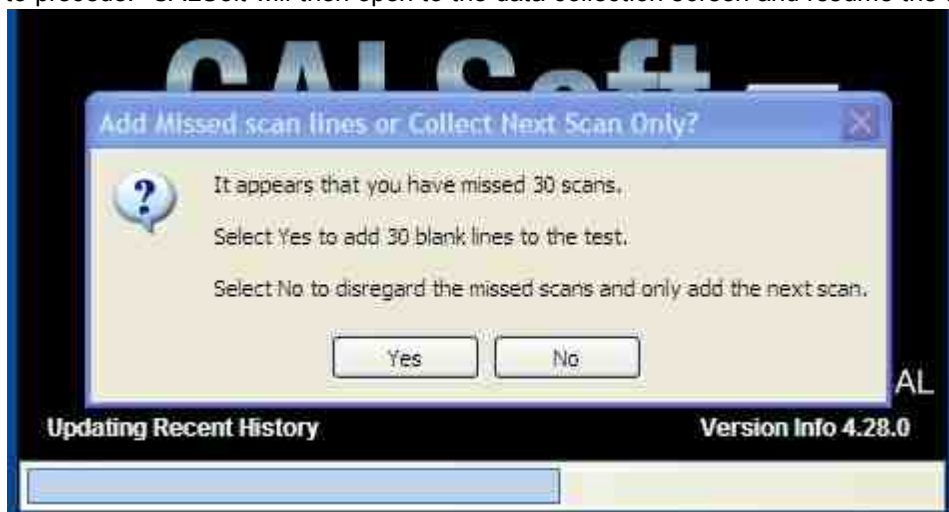
	Time	01	02	03	04	05	06	08	09	11	12	13	14	15
311	01:17:30	247.22	247.78	247.22	78.21	247.80	247.14	247.72	246.99	247.73	247.17	247.32	247.75	247.19
310	01:17:15	247.15	247.76	247.21	78.14	247.86	247.14	247.86	246.88	247.87	247.08	247.33	247.82	247.11
309	01:17:00	247.11	247.79	246.89	78.01	247.79	246.79	247.75	246.65	247.72	246.84	247.29	247.69	246.82
308	01:16:45	246.75	247.54	246.99	77.84	247.63	247.06	247.60	246.79	247.63	246.88	246.93	247.69	246.86
307	01:16:30	246.89	246.65	247.36	77.65	246.69	247.33	246.62	247.23	246.67	247.43	246.80	246.75	247.47
306	01:16:15	247.04	246.29	246.46	77.29	246.43	246.44	246.37	246.13	246.33	246.37	247.11	246.24	246.51
305	01:16:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
304	01:15:45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
303	01:15:30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
302	01:15:15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
301	01:15:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
300	01:14:45	248.05	247.88	247.35	78.48	247.78	247.35	247.82	247.10	247.75	247.27	248.13	247.75	247.42
299	01:14:31	247.93	247.25	248.07	78.48	247.29	247.96	247.32	247.69	247.22	247.08	247.89	247.28	248.16
298	01:14:26	248.25	247.38	247.67	78.48	247.31	247.64	247.12	247.60	247.60	247.30	247.80	247.30	247.80
297	01:14:24	247.61	248.26	247.35	78.48									
296	01:14:22	247.50	247.54	248.11										

4.2.1.15 Losing Power during data collection

If your computer loses power during a test and the CALSoft program is closed, your data is not lost. CALSoft saves the data-file after each scan. Once CALSoft is re-opened, you will be notified that a HP test was in progress and asked you if you would like to recover the data....



If you chose Yes, CALSoft will determine how many scans were missed and ask you how you want to precede. CALSoft will then open to the data-collection screen and resume the test.



4.2.2 Opening/editing existing CALSoft files



To open and view/edit an existing CALSoft HP data file, there are two options:

- (1) double click on the file in the "recently used" list in the MIDDLE PANEL, or
- (2) Click the **"OPEN"** button and find the file you want to open.

The file will then load into CALSoft Collect HP mode and display all of the data in that specific file.

The Heat Penetration Data File is divided into "Tabs" (on the left-hand side of the page).

- [Test Documentation tab](#)
- [Data Collection Equipment tab](#) ☐
- [Formulation tab](#)
- [CriticCAL tab](#)
- [Calibration Tab](#)
- [Time/Temperature Tab](#)
- [Log Data tab](#)
- [Summary Tab](#)

4.2.2.1 Test Documentation tab

The test documentation tab displays information related to the Heat Penetration test that was conducted. You can edit any of the information that is in a "text box". Note that *required fields are marked with an **. This tab is divided into 5 sections:

1. **PRODUCT**- Product name and "type" that was testing. You can edit this section. For the type, you can choose Low Acid Canned Food (LACF), Acidified, or Other. Choosing LACF or Acidified will automatically set the z and Tref values for the sterility "F" value. Choosing "other" will allow you to enter your own z and Tref values.
2. **CONTAINER**- Container type and dimensions are required. Description and additional information are optional.
3. **RETORT**- Choosing Batch or Continuous retort will give you different choices in the "type" drop-down menu.
4. **PROCESSOR**- This is the name and location of the factory where the HP testing was conducted.
5. **TEST INFORMATION**- You may enter additional information in this section. The TARGET F and RT are the values used during data-collection as CALSoft will indicate graphically when these targets are achieved. If this is an older CALSoft file converted to CALSoft 5, these values may be blank.

HP File View: C:\Documents and Settings\scabes.SCOTTLAPTOP\My Documents\CALSoftTESTS\SamplesForMark\SampleHP-01.chp

Test Documentation / Enter Information about this test. Required fields = *

Product

Name * Tuna Chunks in Oil

Product Type ☒ LACF ☐ Acidified ☐ Other F: 10.00 / 121.11

Container

Type * Can

Description CAN-3 PC STEEL

Dimension * 300 x 203

Addl. Info

Retort

☒ Batch ☐ Continuous

Type * Horizontal- Steam

Manfr./Model

Control System Log-Tec

Controller SetPoint 121.10 Steam Header Pressure 21 RPM 0

Processor

Plant Name * ABC Seafood Company

Location New Orleans, Louisiana

Test Information

Date/Time of Test 11-25-08 07:50:55

Type of Test ☒ Confirmation ☐ Cold Spot

Target F for Data Collection 6.00 Target RT for Data Collection 118.00

Temperature Type Celsius

Scan Interval 30 Seconds

Total Time of Test 01:59:00

Total Scans 239 Heating 189 Cooling 50

Time Entered Cool 01:34:00 Cooling Water Temp (Optional) .85

Technician Name John Smith

Reason For Test New product

Notes

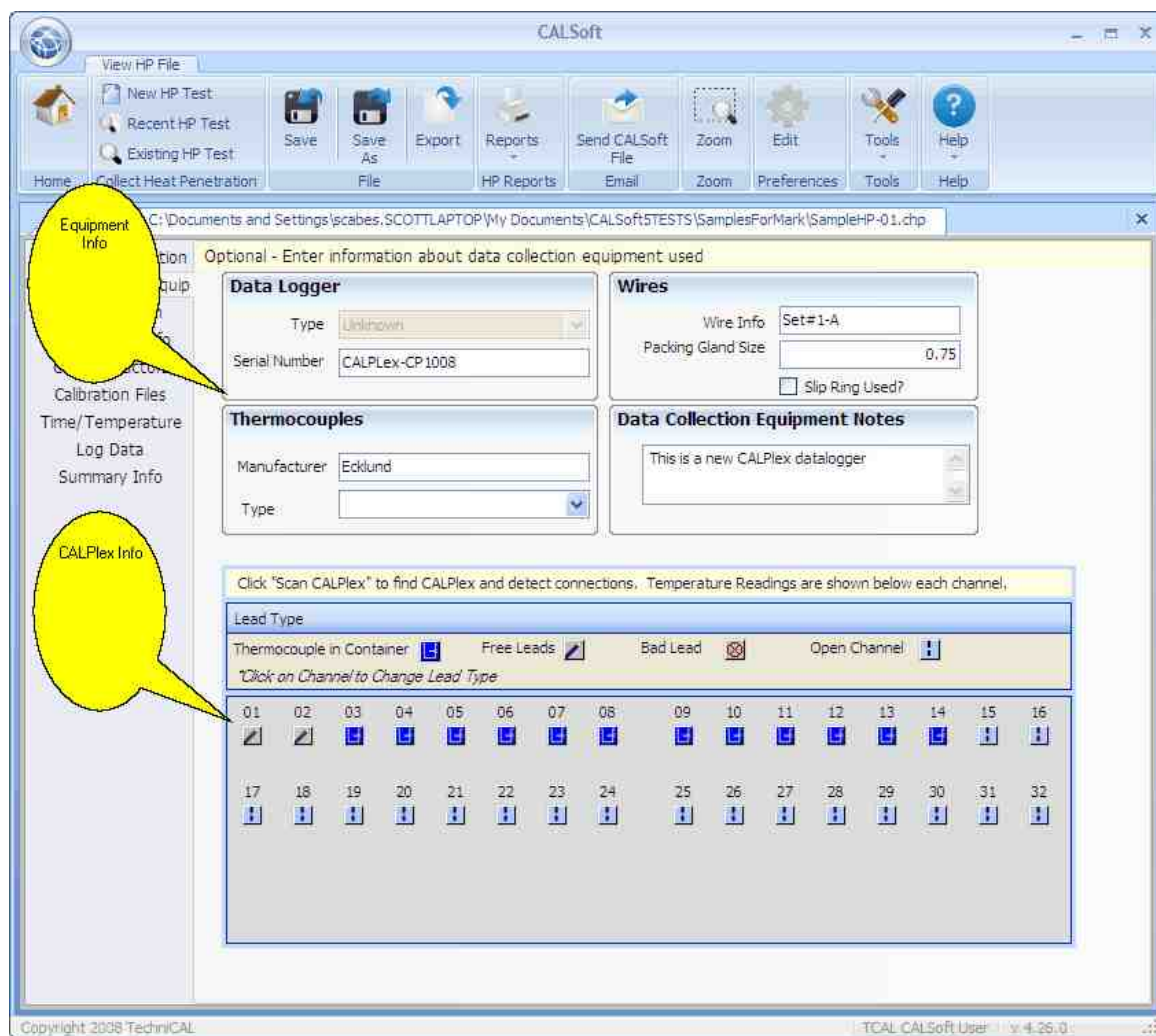
heat pen 1

Copyright 2008 TechniCAL TCAL CALSoft User v 4.26.0

4.2.2.2 Data Collection Equipment tab

The Data Collection Tab is divided into two main parts:

1. **EQUIPMENT:** (OPTIONAL) You may record information about the data-collection equipment such as CALPlex serial number, type of thermocouples used, and information about the wires used in the testing.
2. **CALPLEX CONNECTIONS:** This section shows you the 32 channels of the CALPlex datalogger and what type of lead (Thermocoupled container, Free Lead, Open Channel, or Bad Lead) was plugged into each during the test. You can change the type of lead by clicking on the channel to rotate through the options.



C

4.2.2.3 Formulation tab

The formulation tab allows you the option of entering information about the formula of the product that you are testing in the heat penetration test. This information is permanently saved into the CALSoft data-file for future reference. Enter the **CODE** and/or **FORMULATION NUMBER** for the product. Then enter the ingredients, recording the amount used in **NORMAL PRODUCTION** and also the amount used in the **HEAT PENETRATION TEST**.

HP File View: C:\Documents and Settings\scabes,SCOTTLAPTOP\My Documents\CALSoftTESTS\SamplesForMark\SampleHP-01.chp

Test Documentation
Data Collection Equip
Formulation Info
CritiCAL Factors
Calibration Files
Time/Temperature
Log Data
Summary Info

Optional - Record the formulation of the Product tested. (Click "Next" to skip)

Product: Tuna Chunks in Oil
Code: TCO-A
Formulation #: A-1966
Quantity Unit of Measure: Grams

Clear All Formulation Info Print Formulation

New Ingredient Delete Ingredient

Ingredient	Normal Production		Heat Penetration Test
	%	Qty	Qty
Chunk Tuna meat	68	89	96
Oil	10	9	12
Water	22	18	23
Σ	100	116	131

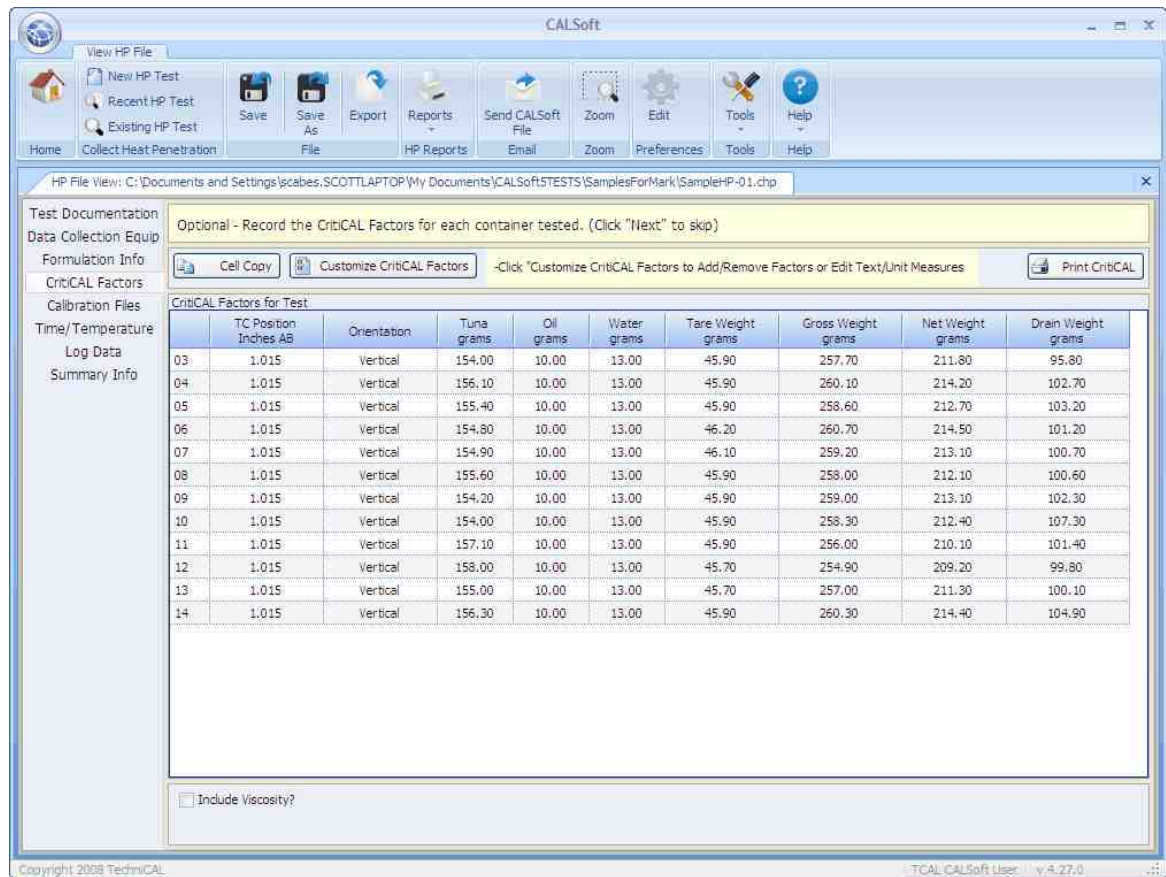
Notes: Chunk tuna is filled into cans. Oil and water are added. Cans go through exhaust chamber prior to seaming.

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4.2.2.4 CritiCAL tab

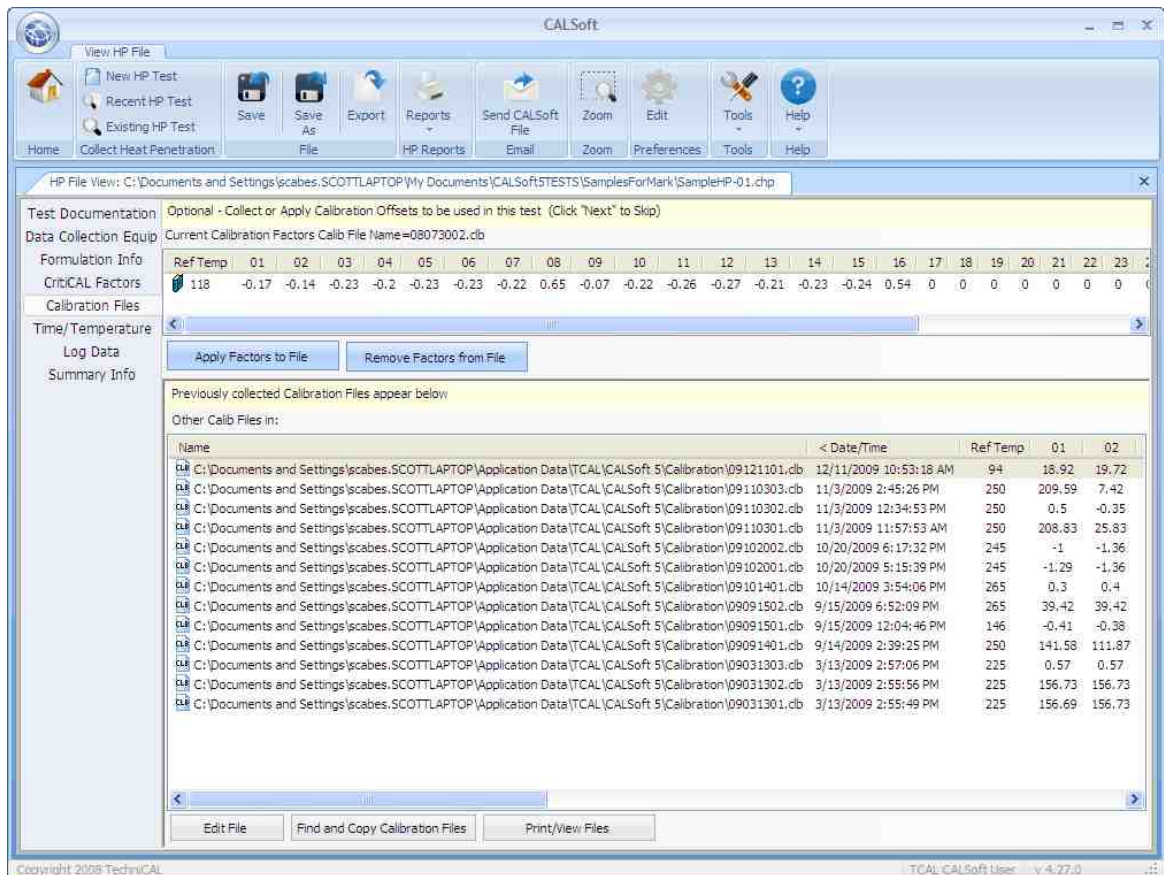
The CritiCAL Tab allows you the option of entering **CRITICAL FACTORS** associated with each thermocoupled container in the heat penetration test. The default CritiCAL template grid includes many common critical factors. You may remove/add Critical Factors by clicking "**Customize CritiCAL Factors**" and then turning on/off any factors you wish to display. The "**Cell Copy**" feature allows you to enter a value and then click "Cell Copy" to copy that information into each cell in that column.

Using this CritiCAL feature allows you to (a) permanently record the critical factors for each thermocoupled container tested, and (b) use that data when using CALSoft to evaluate the HP test data and establish a thermal process.



4.2.2.5 Calibration Tab

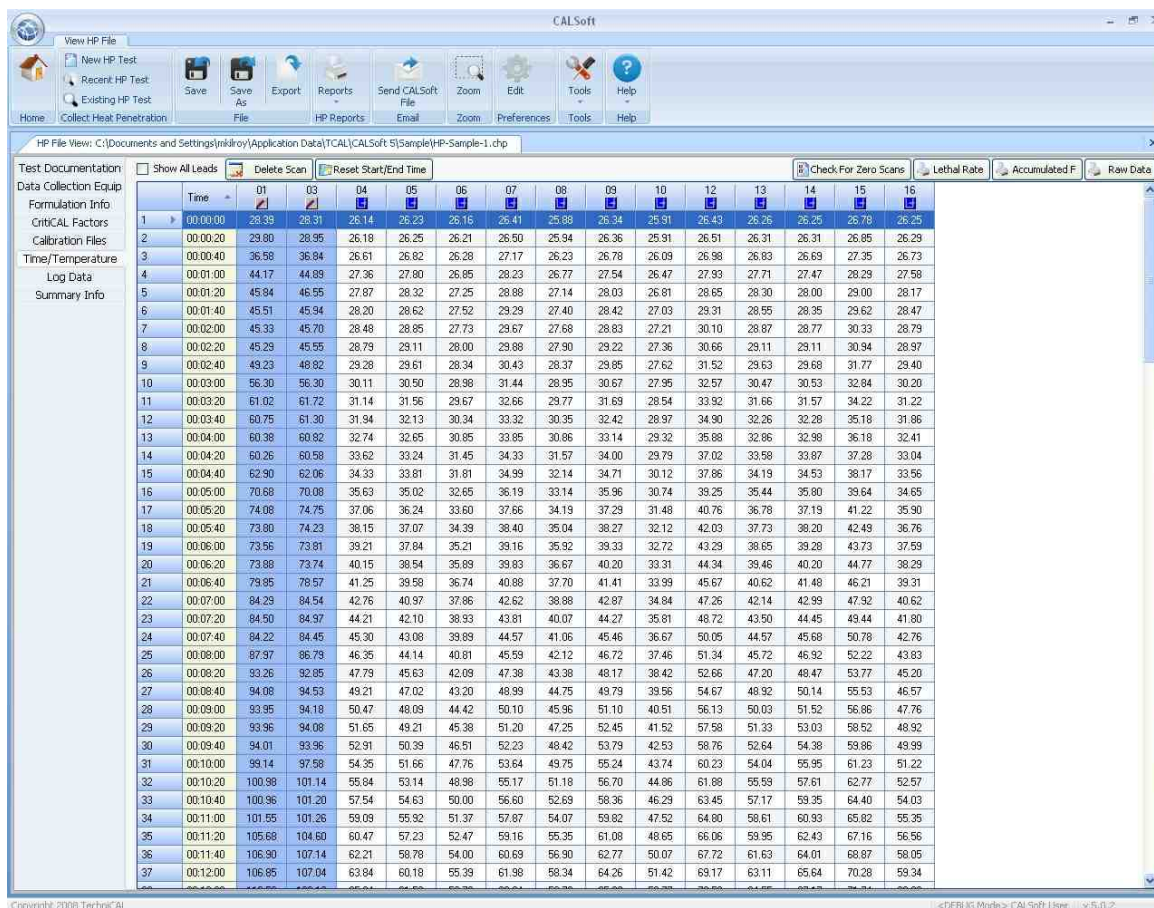
CALSoft allows you the option to **"calibrate"** your entire data-collection system of thermocouples, wires, and CALPlex datalogger against a known standard. See [HP Calibration](#) for more information on using CALSoft to collect calibration files.



4.2.2.6 Time/Temperature Tab

The Time/Temperature Tab allows you the ability to view and print the temperature data that was collected during the Heat Penetration test.

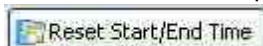
- By default, only Thermocoupled Containers and Free Leads are displayed in the grid ("BAD" leads and "OPEN" channels are not displayed by default).
- Click the checkbox "**Show All Leads**" to display all 32 channels.
- Click on the "**Time**" column heading to sort the time from ascending to descending.
- Under each channel number is a graphical indication of the TYPE of lead (Free Lead or Thermocoupled lead).
- Free Leads are also shown as **BLUE** columns to help differentiate them from Thermocoupled leads.
- Use the Delete Scan button to Delete a scan (row) of data in the file. (Note: Use Reset Start/End Time to Delete scans from the start of the file.)
- Use the Reset Start/End Time button to delete one or multiple rows from the Start or End of the Data File
- Check for Zero Scans utility to check the file for any zero readings in the file. This utility allows the user to replace the zero value with another value.
- Lethal Rate Report returns the cumulated lethality for a selected Lead.
- Accumulated F Report calculates the General Method F for all of the leads in the file.
- Raw Data Report prints the Time/Temperature data for the file.



4.2.2.6.1 Reset Start End Time

The Reset Start/End Time utility allows the CALSoft user to remove data scans (rows) of data from the Start or End of a File.

- From the Time Temperature control select the Reset Start/End Time Button



- CALSoft 5 will ask you if you want to Reset the Start/End Time for the file.



- CALSoft 5 will make a backup of the current file and tell you the file name and location.



- The Reset Start/End Time form will be shown. This form displays the Time/Temperature information for the given file in the right panel. The new Start and End Time will be established in the left panel.

Reset Start/End Time

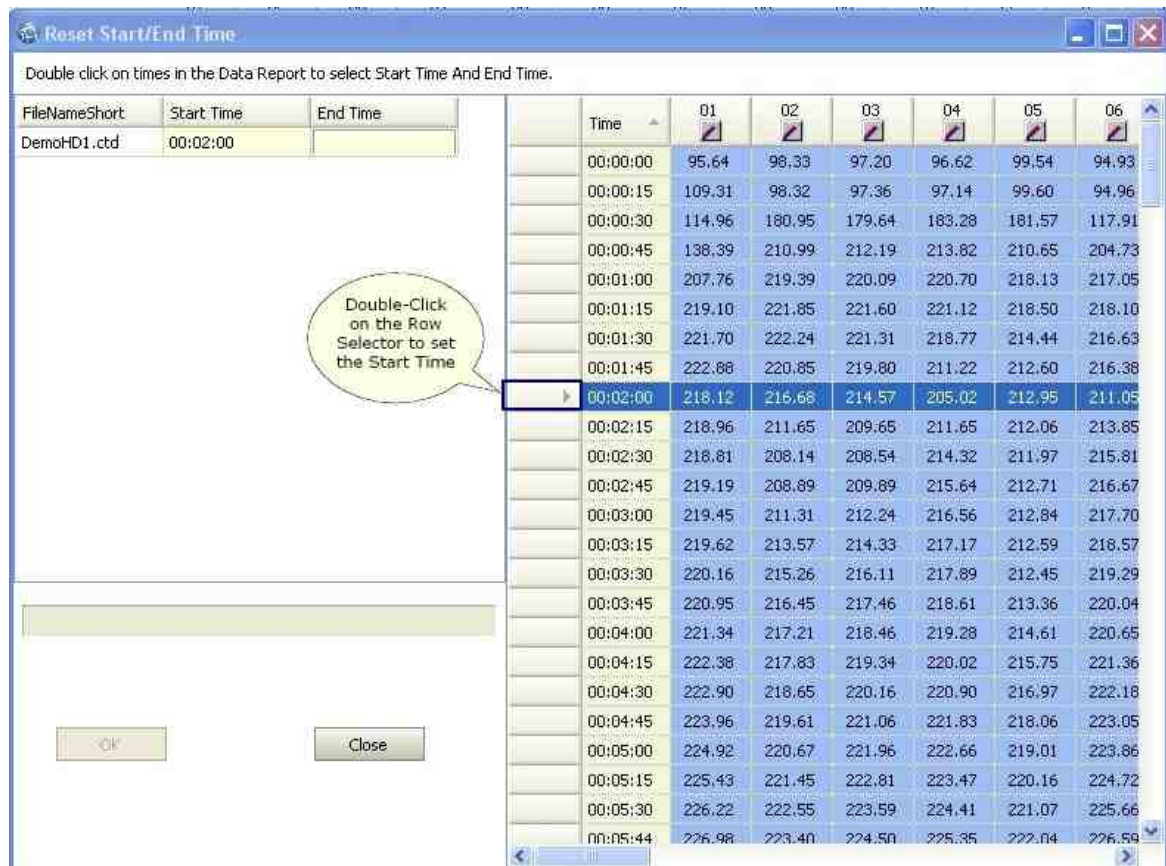
Double click on times in the Data Report to select Start Time And End Time.

FileNameShort	Start Time	End Time
DemoHD1.ctd		

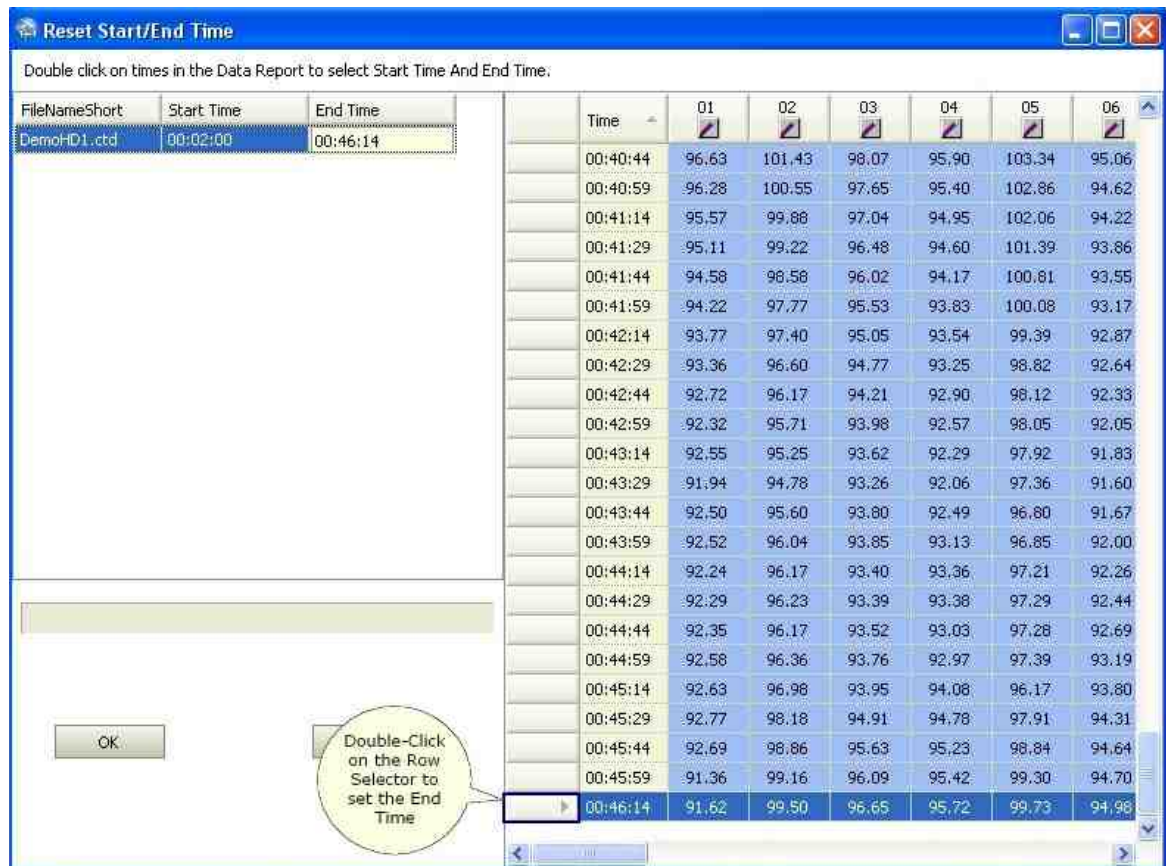
Time	01	02	03	04	05	06
00:00:00	95.64	98.33	97.20	96.62	99.54	94.93
00:00:15	109.31	98.32	97.36	97.14	99.60	94.96
00:00:30	114.96	180.95	179.64	183.28	181.57	117.91
00:00:45	138.39	210.99	212.19	213.82	210.65	204.73
00:01:00	207.76	219.39	220.09	220.70	218.13	217.05
00:01:15	219.10	221.85	221.60	221.12	218.50	218.10
00:01:30	221.70	222.24	221.31	218.77	214.44	216.63
00:01:45	222.88	220.85	219.80	211.22	212.60	216.38
00:02:00	218.12	216.68	214.57	205.02	212.95	211.05
00:02:15	218.96	211.65	209.65	211.65	212.06	213.85
00:02:30	218.81	208.14	208.54	214.32	211.97	215.81
00:02:45	219.19	208.89	209.89	215.64	212.71	216.67
00:03:00	219.45	211.31	212.24	216.56	212.84	217.70
00:03:15	219.62	213.57	214.33	217.17	212.59	218.57
00:03:30	220.16	215.26	216.11	217.89	212.45	219.29
00:03:45	220.95	216.45	217.46	218.61	213.36	220.04
00:04:00	221.34	217.21	218.46	219.28	214.61	220.65
00:04:15	222.38	217.83	219.34	220.02	215.75	221.36
00:04:30	222.90	218.65	220.16	220.90	216.97	222.18
00:04:45	223.96	219.61	221.06	221.83	218.06	223.05
00:05:00	224.92	220.67	221.96	222.66	219.01	223.86
00:05:15	225.43	221.45	222.81	223.47	220.16	224.72
00:05:30	226.22	222.55	223.59	224.41	221.07	225.66
00:05:44	226.98	223.40	224.50	225.35	222.04	226.59

OK Close

- In the Right Panel double click on the row selector to select the new Start Time.



- Next in the Right Panel double-click on the row selector to select the new End Time.

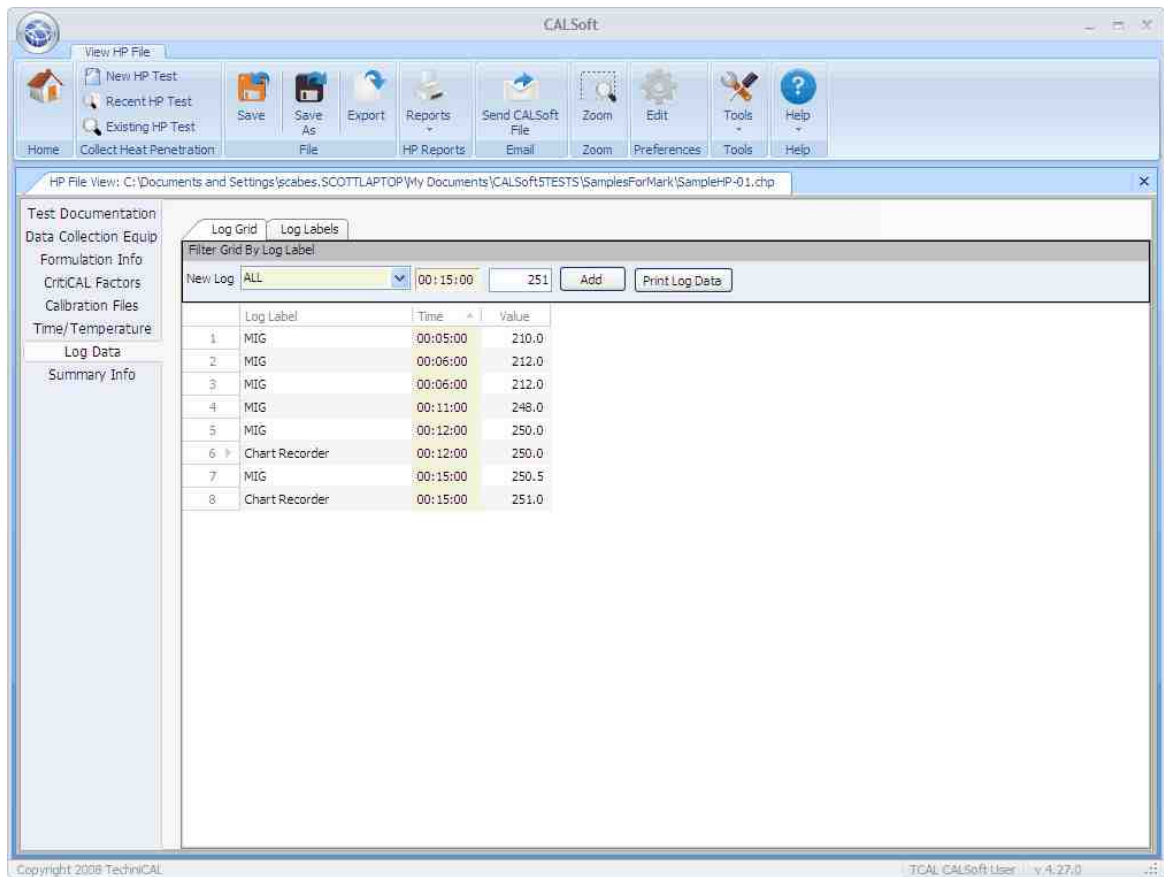


- After the new Start and End Time have been established Select OK and CALSoft 5 will save the file with these new Start and End Time values and modify the file accordingly.

4.2.2.7 Log Data tab

"LOG-DATA" is the other information recorded during a test. This includes readings that are periodically recorded from the MIG, Chart Recorder, Pressure, etc. CALSoft allows you the option to record this information into the data-file. LOG-DATA can be entered during the test, or after the test is completed using this tab. There are two sub-tabs in this section:

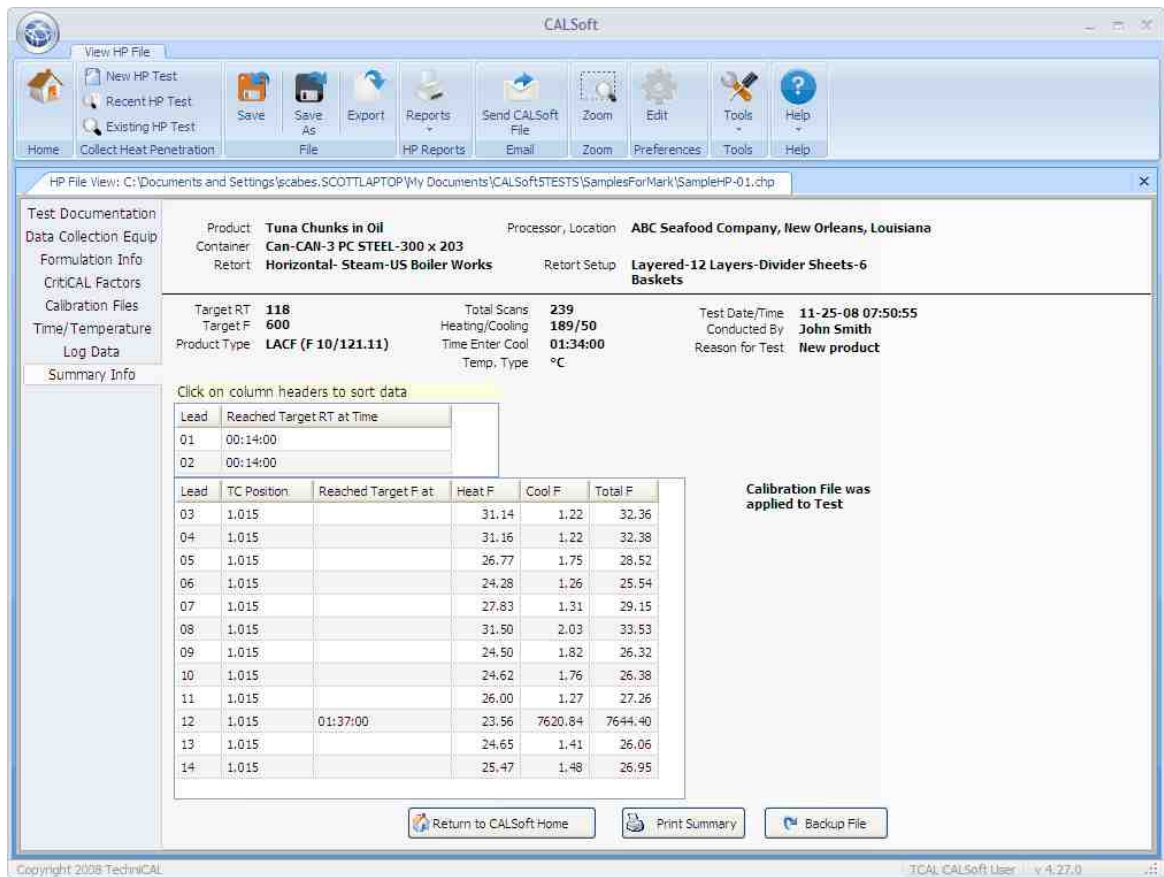
- **LOG-GRID** - this shows you all the log-data that has been entered. You may also enter log readings here by choosing the type (created in the "LOG LABELS" sub-tab), entering the time, entering the reading, and clicking "ADD". The Log Entry will show up on the list.
- **LOG LABELS** - this sub-tab allows you to create WHAT you want to monitor/record (MIG, Chart Recorder, Pressure, Rotation, etc.) during the test.



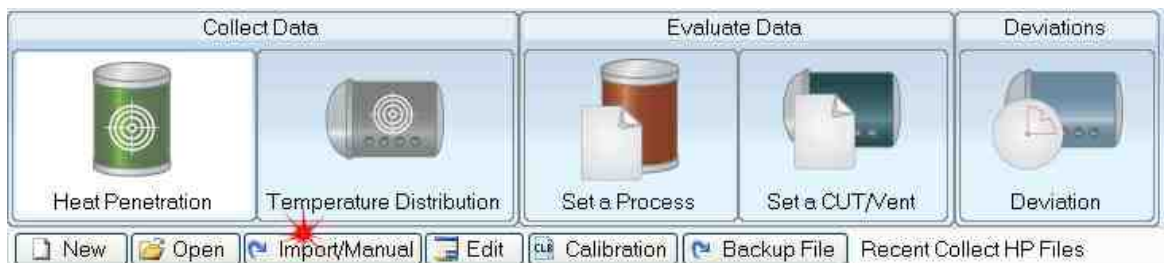
4.2.2.8 Summary Tab

The **SUMMARY TAB** is a summary of the information collected into the data-file during the test. Free Leads and Thermocoupled Containers are displayed in separate tables. You may click on any column heading to sort the data on that table. The column for "**TC Position**" comes from the CritiCAL factor "TC Position". This Summary tab may be useful in conducting a quick analysis of the data, especially in helping to determine the "cold spot" in the container for future thermocouple placement for subsequent Heat Penetration tests.

The "**Backup File**" feature allows you to back up a copy of your data to another location or device (USB "jump drive", external hard drive, etc.). For more information on the Backup File feature, [click here](#)



4.2.3 Importing Files into CALSoft 5



CALSoft 5 allows a number of data files to be imported into the Collect Heat Penetration Utility.

[Importing DataTrace and Ellab Files](#)

[Importing Excel Files](#)

[Importing Comma Separated Values \(CSV\)](#)

4.2.3.1 Importing DataTrace and Ellab files

CALSoft5 allows for a direct import of HP data files collected with DataTrace or Ellab systems. Simply click on the **Import** button and follow these steps: chose the file type you want to import

- (1) click the **Browse** button to find the file you would like to import

- (2) The time-temperature data should show up in the section on the right
- (3) Find the row of data that represents the **Start** of the test and double click on it.
- (4) Then find the row of data that represents the **End** of the test and double click on it
- (5) Then click OK to import the data
- (6) CALSoft will create a new HP data file that you can name/save as you wish

CALSoft will import the time/temperature data from the Data Trace or Ellab file. After creating a file with the Import utility the user is taken into the Collect HP or TD file viewer. CALSoft 5 now populates the file with Test Documentation information from the last collected or Imported/Manually Created file information. If the values that were input by default are not correct the user can select the Clear All button at the top right of the form. The final result will be a new CALSoft Heat Penetration Data File containing the time/temperature data.

4.2.3.2 Importing Excel Files

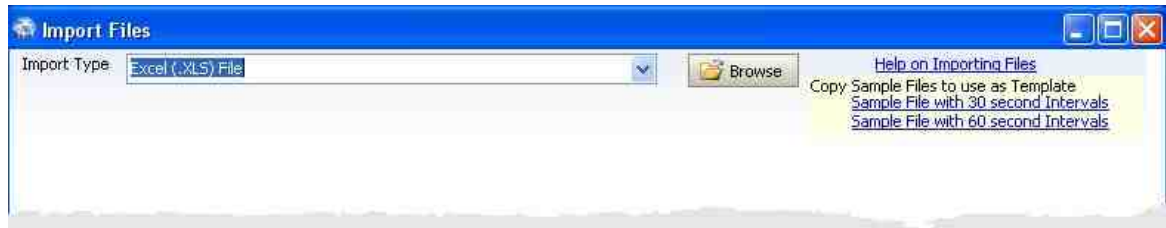
Excel data files are imported using the same procedures as importing DataTrace and Ellab files. However, the format of the Excel file must be set up correctly for the import to work. The format is as follows:

- You must put your Time/Temperature data in the first Sheet of the Excel Spreadsheet.
- The first column of the spreadsheet must include the TIME in the format of HH:MM:SS. Excel will try to convert your entry into an actual date/time format (you do not want this format). To fix this, you will need to add an apostrophe (') before the time you enter into each cell in Excel. Excel will then interpret this as plain text and will not try to convert the entry to a date/time. For example... Excel will translate 00:10:10 as 12:10 am and 10 seconds. But if you put a (') before the numbers, Excel will read it directly as 00:10:10
- The first row should include the term "ScanTime" in the first column, and then the number of each channel in the next columns.
- It is necessary to have the ScanTime in this format: "00:00:30"
- The lead names should be represented with CH before the lead number : CH01, CH22 etc. Do not skip any leads.

For example:

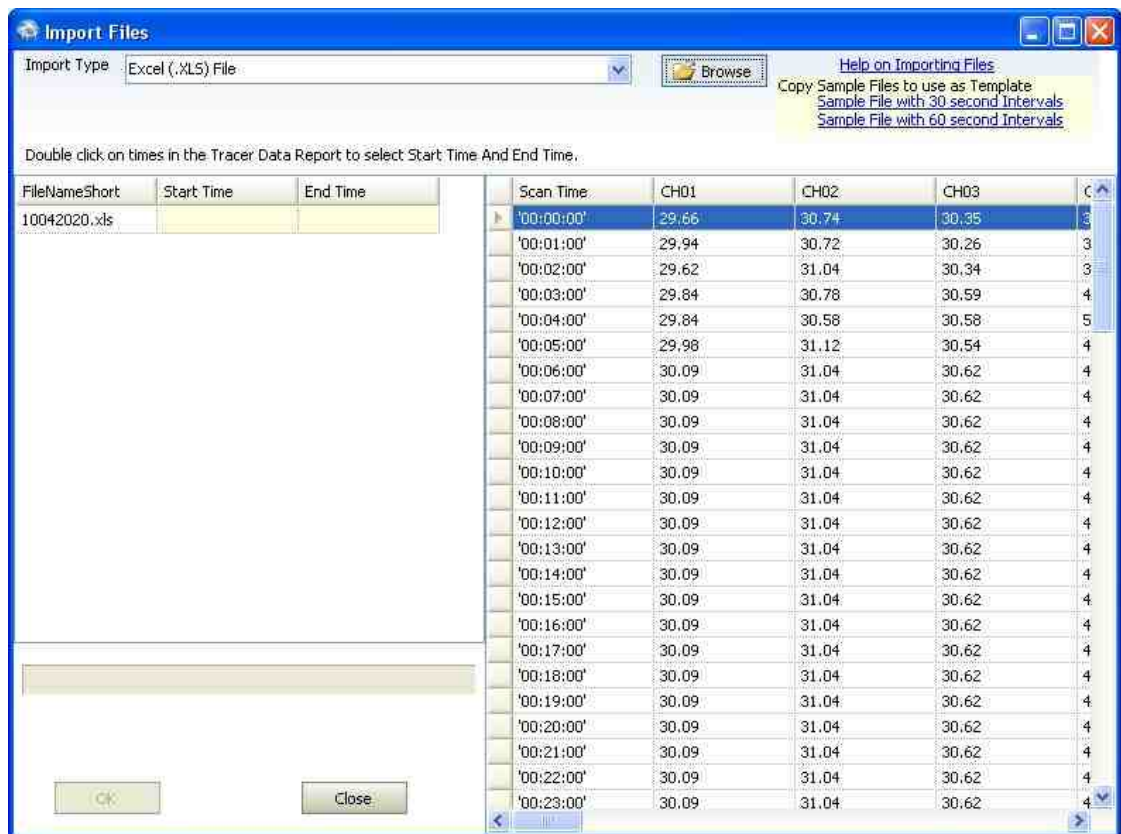
ScanTime	CH1	CH2	CH3	CH4
'00:00:00'	114.7	114.71	114.74	114.76
'00:00:15'	114.72	114.71	114.73	114.76
'00:00:30'	114.71	114.67	114.71	114.75
'00:00:45'	114.73	114.71	114.72	114.77

- If you are having problems importing Excel files you can copy a sample/template file from within CALSoft 5.
- On the Import form there are two link labels.
- If you select either of these links: Sample File with 30 second intervals or Sample File with 60 second intervals, CALSoft 5 will copy these files to a location that you specify which will allow you to use these files as a template for an Excel file that CALSoft 5 will read.

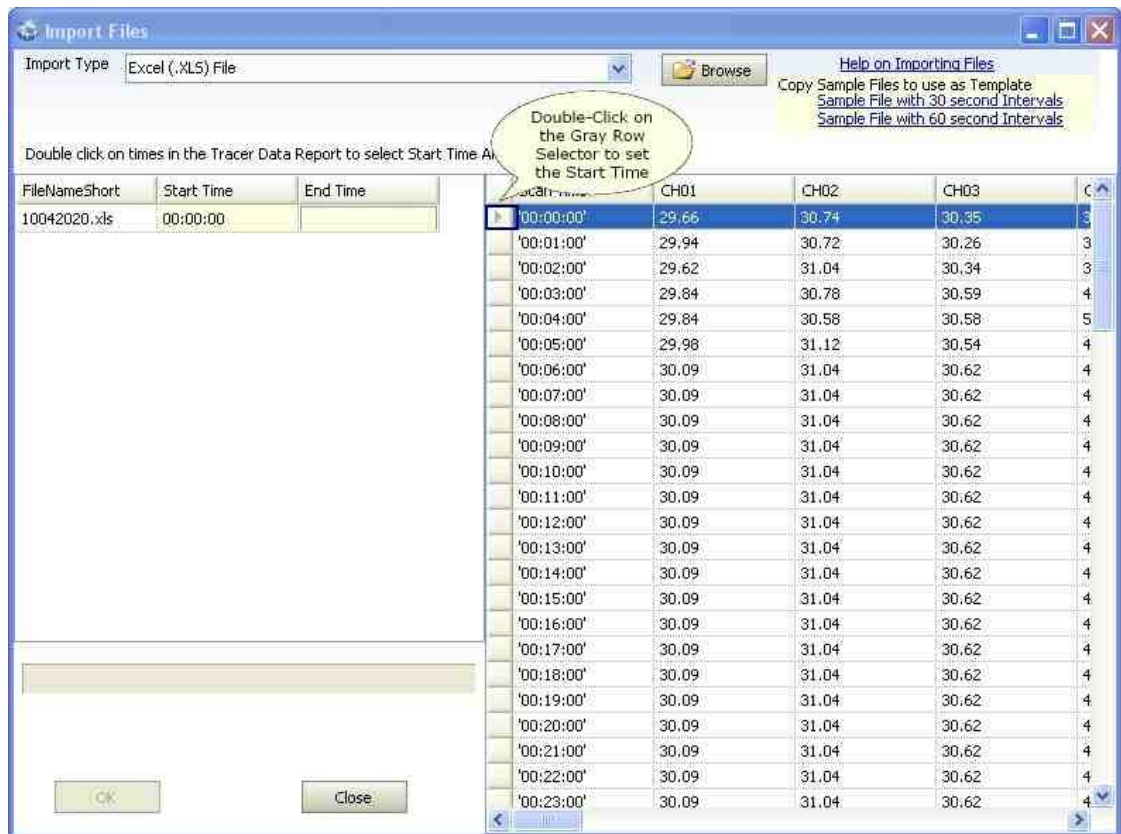


Now you are ready for importing the Excel file.

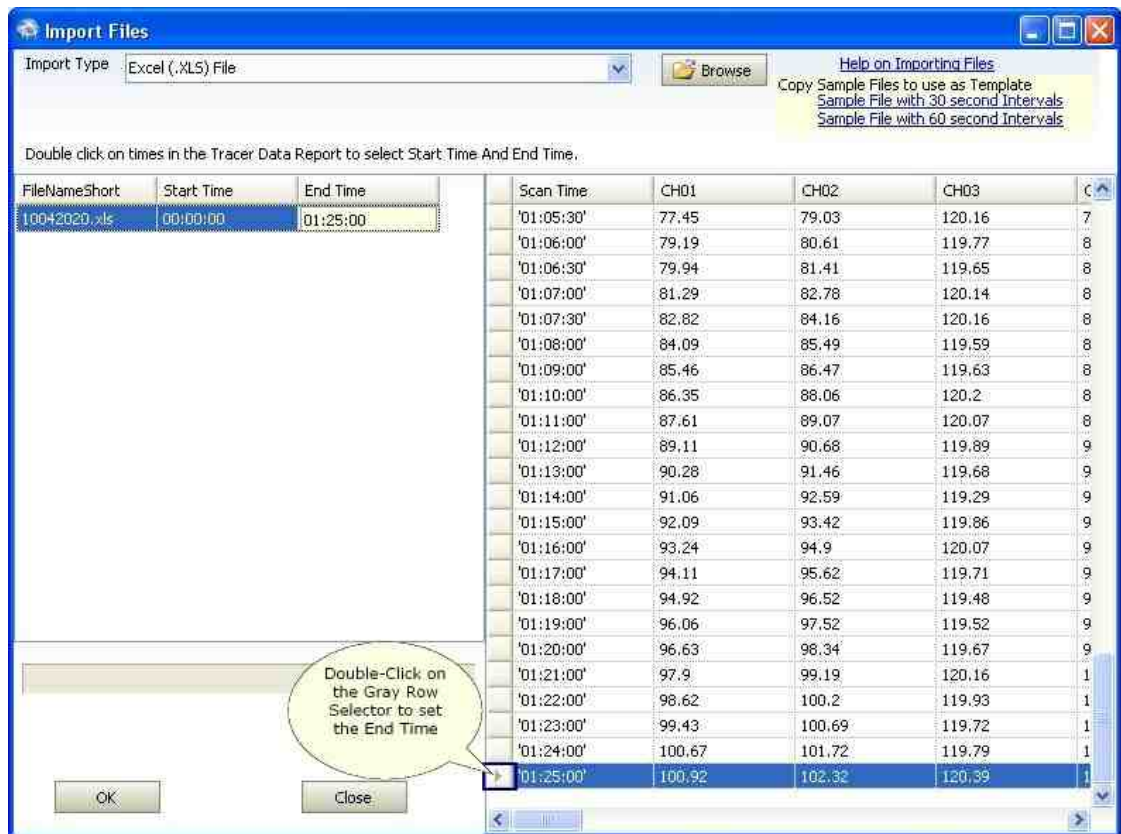
- 1) Click the **Browse** button to find the file you would like to import
- 2) The time-temperature data should show up in the section on the right



- 3) Find the row of data that represents the **Start** of the test and double click on the row selector to set the Start Time.



- 4) Then find the row of data that represents the **End** of the test and double click on the Row Selector to set the End Time.



- 5) Then click **Ok** to import the data
- 6) CALSoft will create a new HP data file and ask you to save that file.
- 7) You will be asked to provide the Temperature and Product Type for the file. (For Temperature Distribution files you will only be asked for the Temperature Type.)



- 8) CALSoft will take you into Collect HP (or Collect TD) next. CALSoft will import the time/temperature data from the Data Trace or Ellab file. After creating a file with the Import utility the user is taken into the Collect HP or TD file viewer. CALSoft 5 now populates the file with

Test Documentation information from the last collected or Imported/Manually Created file information. If the values that were input by default are not correct the user can select the Clear All button at the top right of the form. The final result will be a new CALSoft Heat Penetration Data File containing the time/temperature data.

4.2.3.3 Importing Comma Separated Files

Comma Separated Files (CSV) data files are imported using the same procedures as importing DataTrace and Ellab files. However, the format of the CSV file must be set up correctly for the import to work. The format is as follows:

- The first column of the spreadsheet must include the TIME in the format of HH:MM:SS. If you create your CSV file in Excel then Excel will try to convert your entry into an actual date/time format (you do not want this format). To fix this, you will need to add an apostrophe (') before the time you enter into each cell in Excel. Excel will then interpret this as plain text and will not try to convert the entry to a date/time. For example... Excel will translate 00:10:10 as 12:10 am and 10 seconds. But if you put a (') before the numbers, Excel will read it directly as 00:10:10
- The first row should include the term "ScanTime" in the first column, and then the number of each channel in the next columns.
- It is necessary to have the ScanTime in this format: "00:00:30"
- The lead names should be represented with CH before the lead number : CH01, CH22 etc. Do not skip any leads.

For example:

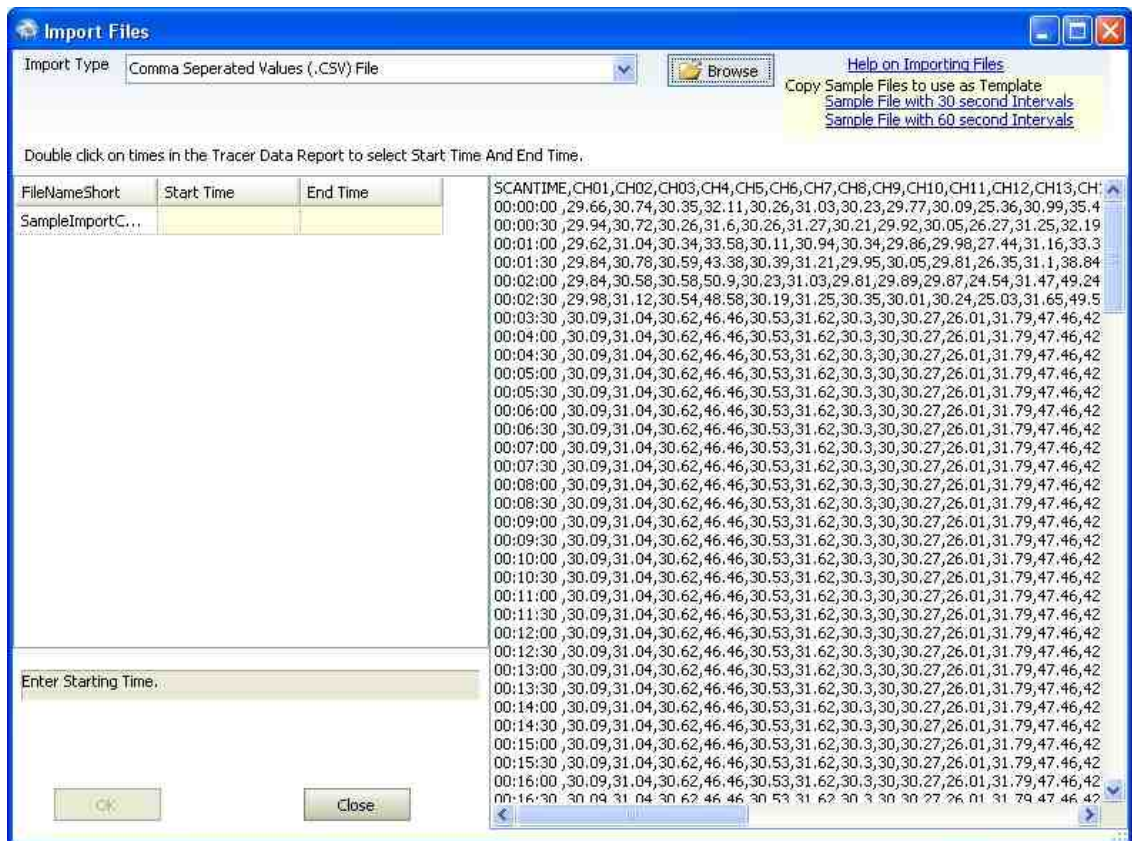
ScanTime	CH1	CH2	CH3	CH4
'00:00:00'	114.7	114.71	114.74	114.76
'00:00:15'	114.72	114.71	114.73	114.76
'00:00:30'	114.71	114.67	114.71	114.75
'00:00:45'	114.73	114.71	114.72	114.77

- If you are having problems importing CSV files you can copy a sample/template file from within CALSoft 5.
- On the Import form there are two link labels.
- If you select either of these links: Sample File with 30 second intervals or Sample File with 60 second intervals, CALSoft 5 will copy these files to a location that you specify which will allow you to use these files as a template for a CSV file that CALSoft 5 will read.

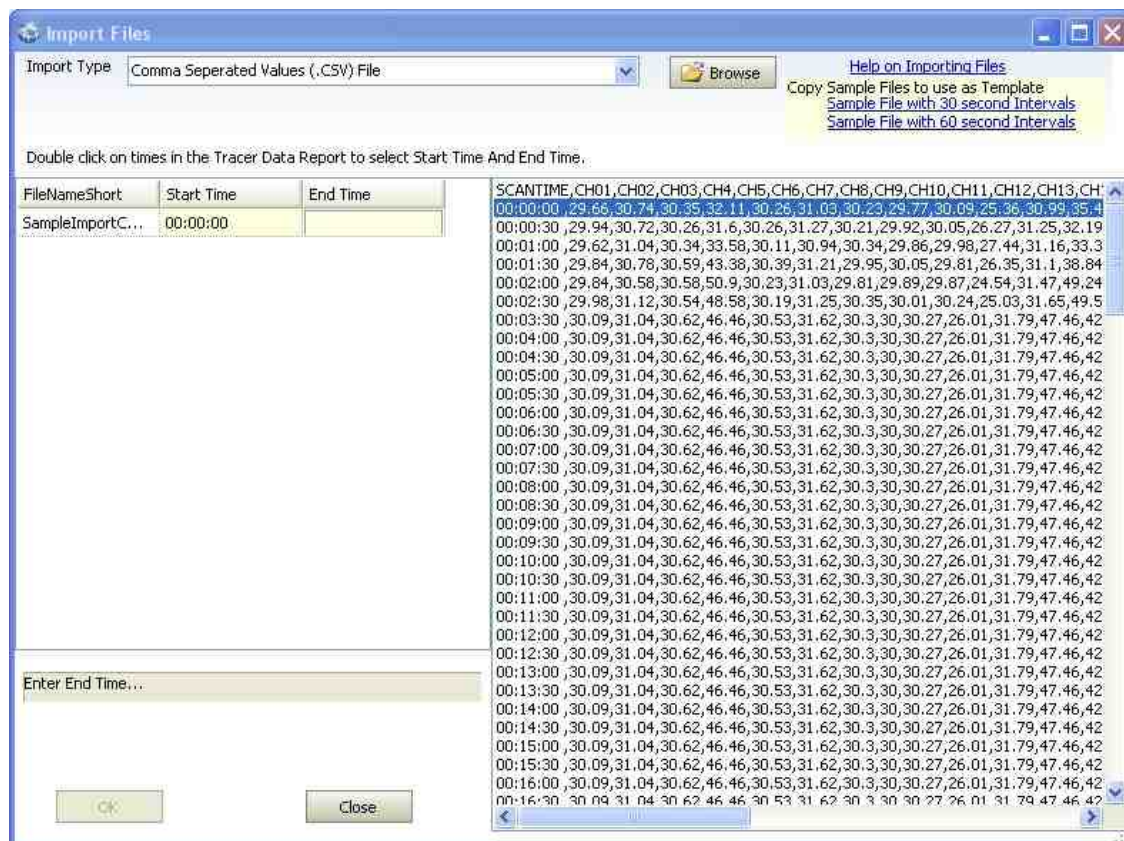


Now you are ready for importing the Comma Separated file.

- 1) Click the **Browse** button to find the file you would like to import
- 2) The time-temperature data should show up in the section on the right



- 3) Find the row of data that represents the **Start** of the test and double click on it.



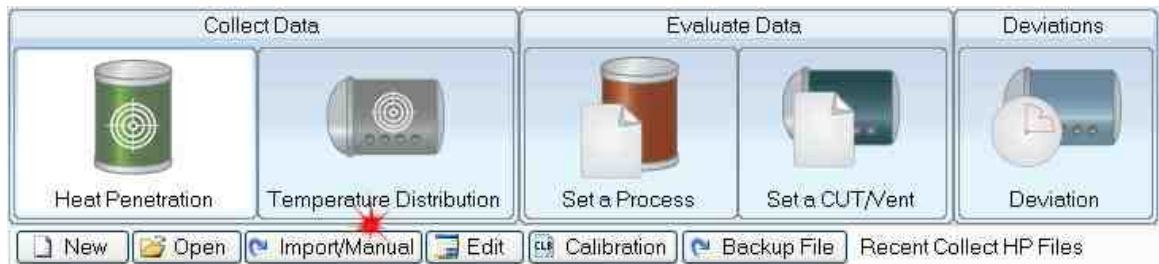
- 4) Then find the row of data that represents the **End** of the test and double click on it
- 5) Then click **Ok** to import the data
- 6) CALSoft will create a new TD data file that you can name/save as you wish
- 7) You will be asked to provide the Temperature and Product Type for the file.



- 8) CALSoft will take you into Collect HP (or Collect TD) next. CALSoft will import the time/

temperature data from the Data Trace or Ellab file. After creating a file with the Import utility the user is taken into the Collect HP or TD file viewer. CALSoft 5 now populates the file with Test Documentation information from the last collected or Imported/Manually Created file information. If the values that were input by default are not correct the user can select the Clear All button at the top right of the form. The final result will be a new CALSoft Heat Penetration Data File containing the time/temperature data.

4.2.4 Manual File Creation



CALSoft users starting with Version 5.05 can Manually create files. Simply click on the **Import/Manual** button and then select the Manually Create a HP File button and follow these steps:

- (1) Choose the file name and save that file that you will manually create.
- (2) The Manual File Creation form will be shown. This form has two steps. The first step is to set the Number of Rows (Scans).
- (3) Please input the Heating Scans, Cooling Scans and Scan Interval. The Scan interval can be as low as 1 second. The Total Scans is automatically calculated from the Heating plus Cooling Scans. In Addition please select the number of Columns (Channels) for the test. By double-clicking on the Lead Type key image you can set all leads to that lead type. For example if you want to set all leads to Open Channel double click on the Open Channel image in the Lead Type panel. When you have set the Number of Rows and Number of Columns please select the Next button to go to the Next step.

Manual File Entry

Number of Rows (Scans)

Heating Scans: 0
Cooling Scans: 0
Scan Interval: 15
Total Scans: 0

Number of Columns (Channels)

Lead Type

Thermocouple in Container ☒ Free Leads ☒ Bad Lead ☒ Open Channel ☒

Click on Channel to Change Lead Type

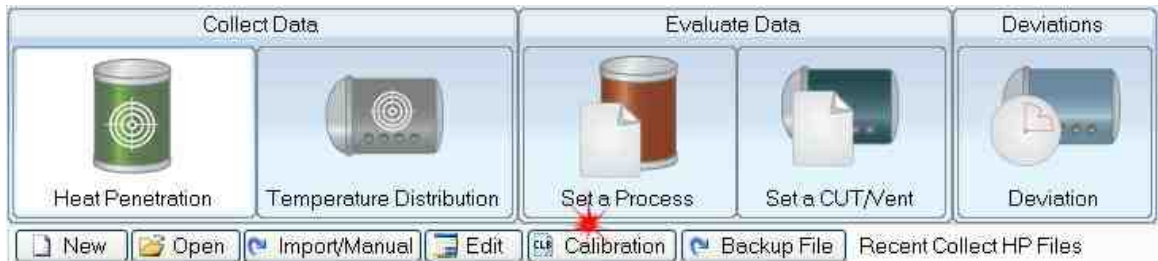
01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16
☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒
17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒	☒

< Previous Clear Cancel Next > Save and Finish

- (4) The second step of Manual File Creation will show a time temperature grid. You can input the new values by hand or you can copy a spreadsheet of temperature data from Excel and right click in the datagrid to Paste the contents into the Grid. Note: only the temperature columns can be pasted into; the time column is set from the previous step. After you have set the data for this grid please select Save and Finish and the file that you have created will be saved.

- (6) Next the Collect HP form will be shown. After creating a file with the Manual File Creation utility the user is taken into the Collect TD file viewer. CALSoft 5 now populates the file with Test Documentation information from the last collected or Imported/Manually Created file information. If the values that were input by default are not correct the user can select the Clear All button at the top right of the form.

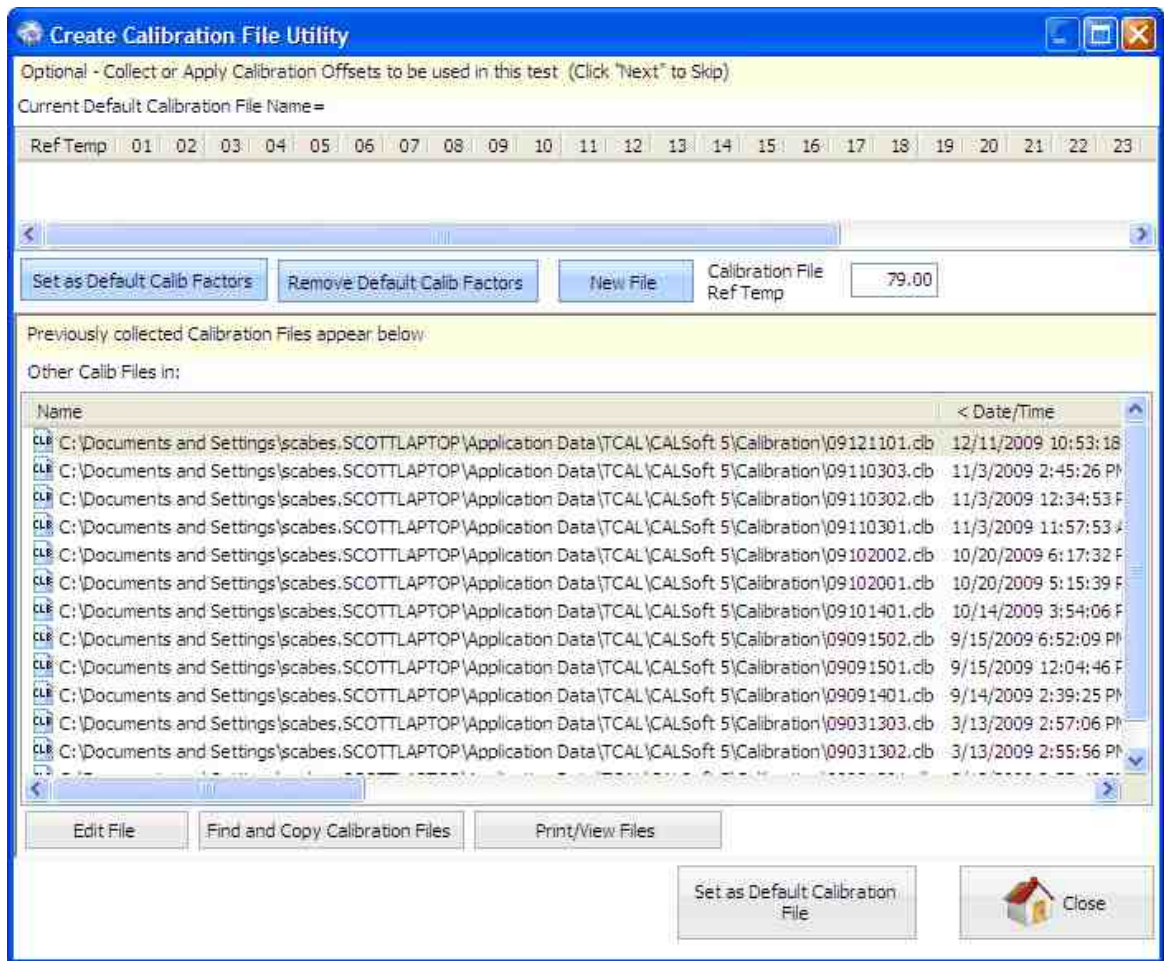
4.2.5 Calibration



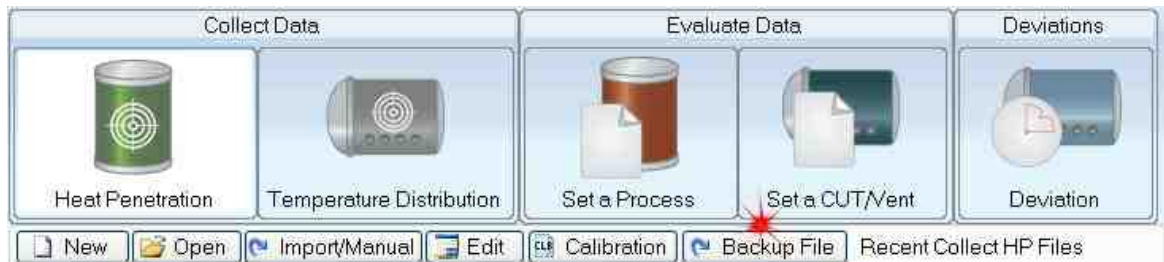
CALSoft allows you the option to "**calibrate**" your entire data-collection system of thermocouples, wires, and CALPlex datalogger against a known standard in order to zero-out any possible errors. This is typically accomplished by bundling the thermocouples/wires inside the retort near the temperature sensor of the calibrated Temperature Indicating Device (MIG or Digital Temperature Gauge), bringing the retort up to a temperature normally used during production (i.e. 250 degrees F), and holding the temperature steady. Once the retort has "equilibrated" at the setpoint temperature, you can use CALSoft to capture OFFSETS for each of the 32 channels. This is referred to as "calibration" within CALSoft.

Click the "**Calibration**" button to apply calibration factors to your data-collection. You can either (a) collect new calibration file, or (b) use an existing calibration file from your computer. To collect a new calibration file, enter a **REFERENCE TEMPERATURE** and chose "**NEW FILE**". CALSoft will scan the CALPlex datalogger and capture an offset (difference) against the reference temperature for each of the 32 channels. The collection of these offsets are referred to as a "calibration file". Calibration files can be saved on your computer (by default, Calibration files are saved in the CALSoft/CALIBRATION directory) and APPLIED to your test by clicking on "**Set As Default Calib Factors**". To apply an already created calibration file, click on the file from the list or click "Find and Copy...". Once the file is located, click "**Set As Default Calib Factors**". These calibration factors will be applied to all future data-collection. To remove the offsets (calibration factors), click on **REMOVE DEFAULT CALIB FACTORS**.

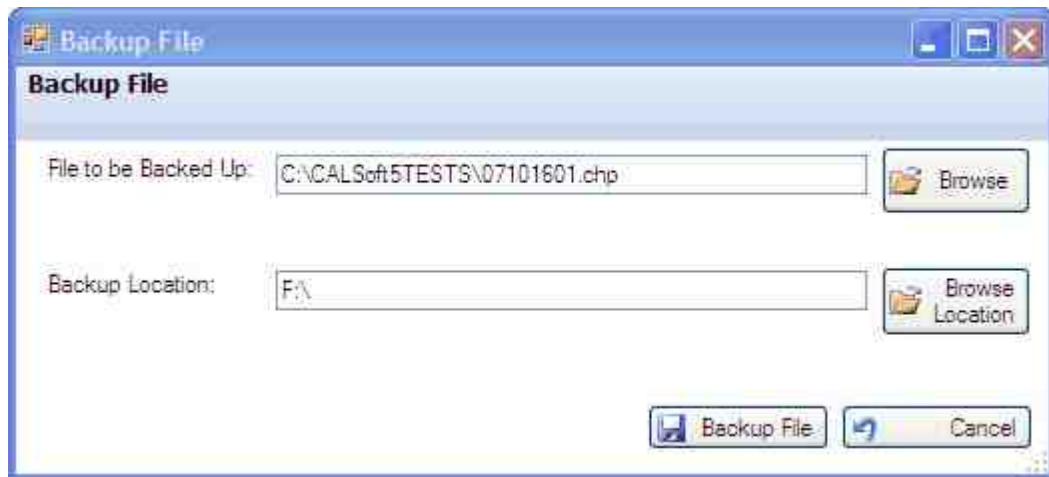
NOTE TO CALSoft 32 users- if you used a calibration file during a test, CALSoft 5 saves the calibration offsets in the data-file and no longer requires that the calibration file be present.



4.2.6 Backup File



The **"Backup File"** feature allows you to back up a copy of your data to another location or device (USB "jump drive", external hard drive, etc.). Click the Backup File button and chose a location where you would like to backup the file. This will not MOVE your, but instead, it will save a COPY to another location.



4.3 HP File Command Options (Ribbon Menu Commands)



CALSoft includes a “Ribbon Menu” in all sections of the program. The menu for Collect Heat Penetration includes commands related to the heat penetration data file.

- [Save/Save As](#)
- [Export Data to Excel](#)
- [Reports & Report Formats](#)
- [Email CALSoft File](#)
- [Zoom Plotting](#)

4.3.1 Save/Save As



The SAVE command will save the file. It is suggested that you click SAVE whenever changes are made to the data file. SAVE AS enables you to save the file as a different name and/or to a different location on your computer.

4.3.2 Export Data to Comma Separated Value

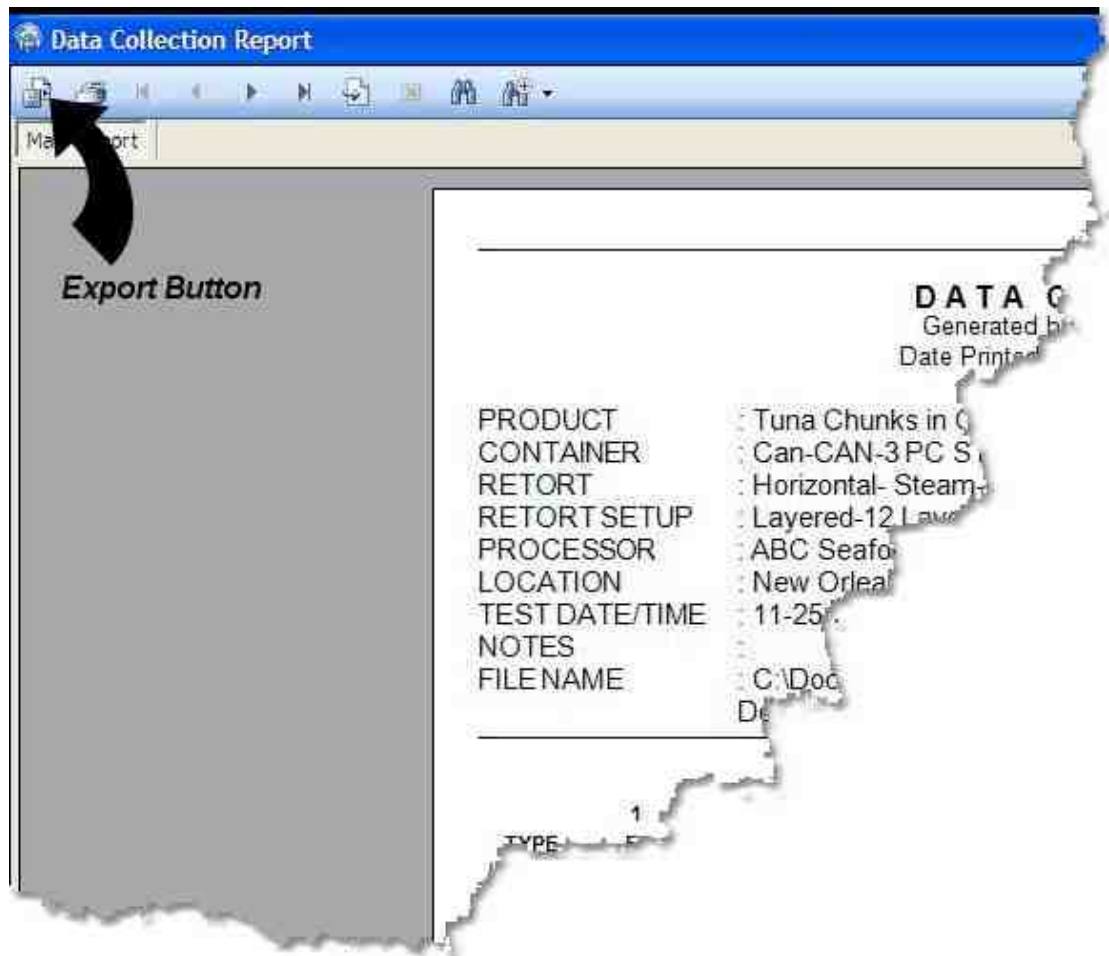


The EXPORT button allows you to export the time temperature data, along with the basic test documentation information text, to a Comma Separated Value format.

4.3.3 Reports and Report Formats (PDF, Excel, Word, CSV)



All available reports are listed under the “REPORTS” button. When you chose to run a report in CALSoft, the report is generated and displayed on the screen. You can then print the report to your printer, or you can click the button in the upper left-hand side of the page and export the report to different formats (PDF, Excel, Word, RTF, etc.).



4.3.4 Email CALSoft File



To email a Data File from CALSoft, simply click on the **SEND CALSOFT FILE** button in the ribbon menu. This will launch your default email client software on your computer and attach the data file. You can then send the file to anyone via email.

4.3.5 Zoom plotting



Click on the **"Zoom"** button in the ribbon to access CALSoft's unique graphing feature. CALSoft's "Zoom" utility plots the time/temperature data on a graph and then allows you to "ZOOM IN" on the data by using your cursor to select the part of the graph you want to zoom into. Features of Zoom Include:



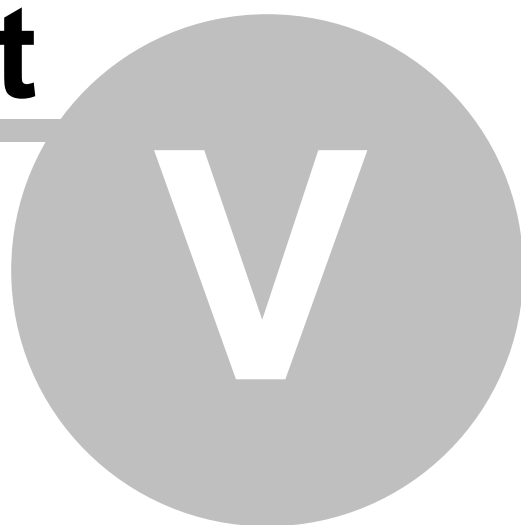
Click to expand.

- Zoom To:** This feature allows you to create your own grid by entering specific times and temperatures. Zoom will use this to generate the graph and replot the data accordingly.
- Lead Info:** This feature allows you to toggle on and off the lead type and selector at the bottom of the page, and also the grid lines on the graph.
- Plot Additional Data:** This feature allows you to add a line to your graphs for additional times that were recorded into the data file during the test, such as time vent closed, drain closed, steam on, etc. When selected these will show as vertical lines on the graph. If no data has been entered into the data file for these specific events, nothing will show on the graph.
- Custom Lines:** This feature allows you to display a custom time or temperature line on the graph.
- Type of Leads:** This indicates whether the lead being plotted is designated as a "free lead" or a "thermocoupled container" in the data file.
- Lead Plot Selector:** This allows you to display or hide one or more leads on the plot.

TO "ZOOM" into a specific part of the graph, click and drag your mouse to highlight the area that you

wisht Zoom into. When you let go of the mouse button, the graph will redraw the graph and zoom into the plotted data, using the coordinates you selected.

Part



5 Collect Data- Temperature Distribution



CALSoft allows you to conduct a Temperature Distribution test and collect the time/temperature data-file on your computer.

- [What is Temperature Distribution](#)
- [Overview- Main TD Dashboard](#)
- [TD File Command Operations \(Ribbon Menu\)](#)

5.1 What is Temperature Distribution

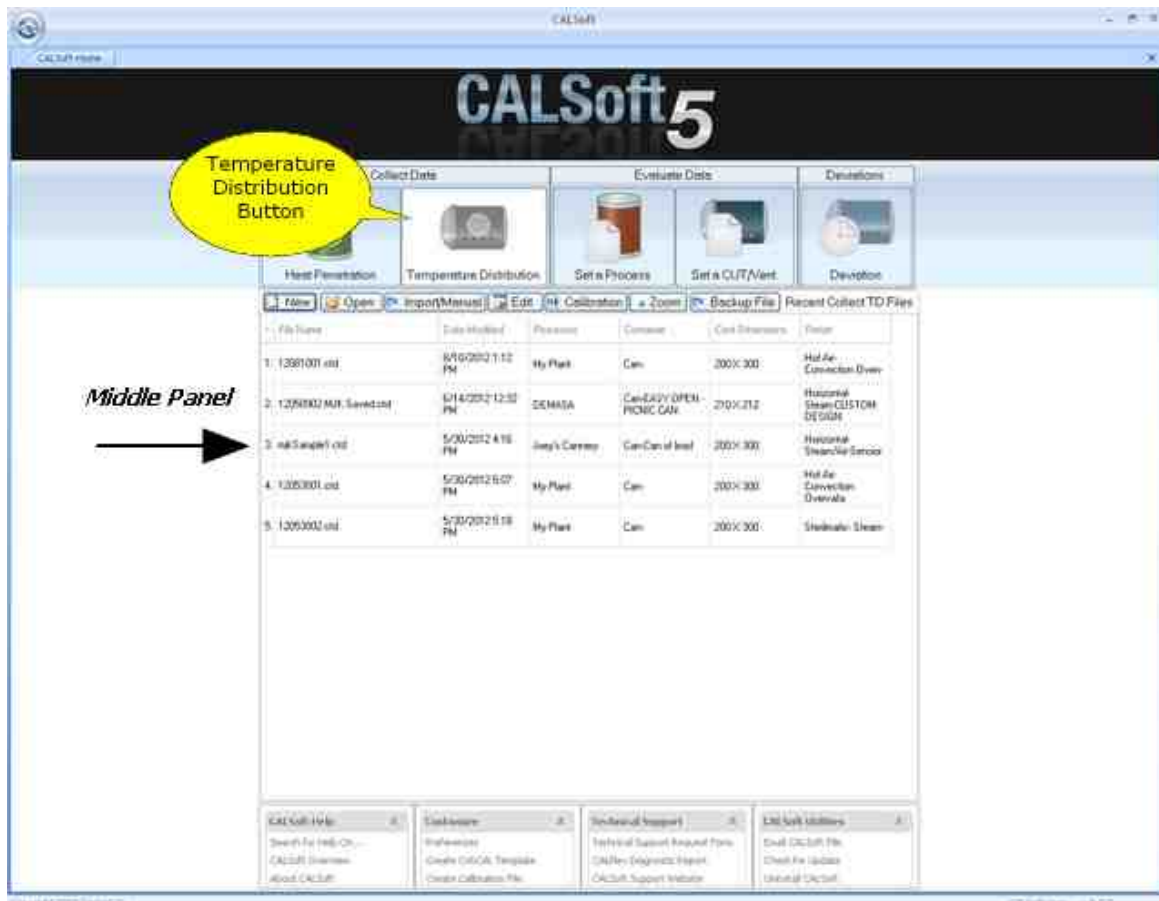
Temperature distribution is the thorough documentation of the process delivery system as it is installed and operated in any given facility. This documentation includes, but is not limited to, surveys of the utility piping to the retort(s), boiler type and capacity, air compressor type and capacity, water pressure and quality, type of control system, temperature profile, and temperature uniformity/stability within the vessel as well as operational and performance repeatability.

The measurement of the temperature exposure is generally accomplished by installing thermocouples throughout the retort load, and testing the sterilizer under the most adverse conditions anticipated during normal production. Once the vessel's temperature distribution has been determined to be acceptable, any alterations to the process delivery system as documented at the time of testing should be reviewed by a competent process authority before the alterations are made. Additionally, any changes to the operation of the retort (i.e., change in the vent schedule or required come-up time) must be reviewed prior to adoption.

CALSoft is a tool used to conduct these Temperature Distribution tests. The resulting CALSoft Temperature Distribution Data File" contains the recorded time/temperature data from the test, in addition to pertinent information such as retort information, lead location diagram, temperature setpoints, etc.

5.2 Overview- - Main TD Dashboard

Click on "Temperature Distribution button in the Main Section and the **MIDDLE PANEL** will populate with information relevant to conducting a temperature distribution test. The middle panel will display the last 5 "recently used" Temperature Distribution Data Files that were opened in CALSoft.



- [Running a New Temperature Distribution Test](#)
- [Opening/Editing existing CALSoft data file](#)
- [Importing DataTrace and Ellab Files](#)
- [Importing Excel Files](#)
- [Calibration](#)
- [Zoom plotting](#)
- [Backup Files](#)

5.2.1 Running a new Temperature Distribution test with CALPlex datalogger_2



Click on the **“NEW”** button to begin a new Temperature Distribution (TD) test. CALSoft will then ask you to name and save to TD data file. The file name defaults to the date and sequential number indicating the number of tests you have run that day. The format is YYMMDD##. For example:

The first test run on December 15, 2009 will be named... 09121501.ctd

All Temperature Distribution files are saved with the extension **“.CTD”**.

CALSoft allows you five sections to enter information about the TD test design, equipment and product that will be tested:

[TD Test Documentation tab](#)
[TD Data Collection Equipment tab](#)
[TD Lead Location tab](#)
[TD Calibration tab](#)
[TD Start Data Collection](#)

Once Data Collection begins, CALSoft provides different views to display the time/temperature data.

[Main TD Data Collection Screen](#)
[Time Temperature Grid](#)
[Bar Graph](#)
[Zoom Plotting during Data Collection](#)

Also, other information can be logged into the CALSoft file during the test..

[Entering Event readings during TD test](#)
[Entering Log Data during TD test](#)

[Ending a test](#)

[Losing Communication with CALPlex](#)
[Losing Power during data collection](#)

5.2.1.1 TD Test Documentation tab

The test documentation tab allows you to document information related to the test you are conducting. The screen is divided into 4 sections (required fields are marked with an *)

1. RETORT- Choosing Batch or Continuous retort will give you different choices in the "type" drop-down menu. Add information on the # of baskets, loading pattern, # container per layers, and other important information about the retort/loading configuration.

2. CONTAINER- Container type and dimensions are required. Description and additional information are optional. You may also document what was filled into the containers used in the TD test (water, product, or other).

3. PROCESSOR - This is the name and location of the factory where the TD testing was conducted.

4. TEST INFORMATION- Enter information about this specific test such as:

- **Target Vent Temp:** enter the target Vent Temperature and CALSoft will alert you during the TD test when all Free Leads have reach the designated target.
- **Target Process Temp:** enter the target Process Temperature and CALSoft will alert you during the TD test when all Free Leads have reach the designated target.
- **Temperature Type:** you can chose Fahrenheit or Celsius.
- **Scan intervals:** This is the time that CALSoft waits between scanning the CALPlex datalogger for Temperature readings.

- The Technician's name, reason for test, and Notes fields are optional and simply provide further documentation of the TD test

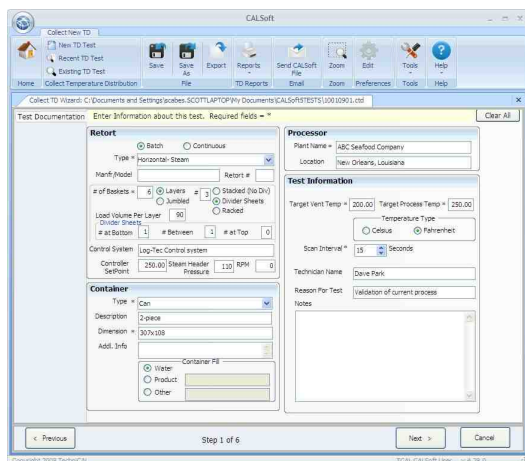
CALSoft will retain the information on this page for the next test to eliminate the need to enter it again. To clear the fields, click "CLEAR ALL" button.

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TCAL CALSoft User v 4.28.0

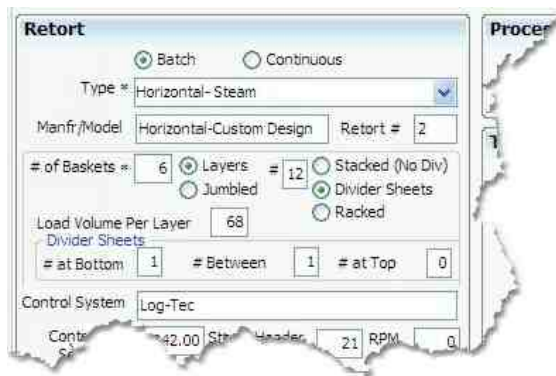
5.2.1.2 TD Data Collection Equipment tab

The Data Collection Equipment tab in Temperature Distribution is the same as in Heat Penetration. To learn more, [click here to see the help file for the "Data-Collection Equipment" tab in Heat Penetration](#)



5.2.1.3 TD Lead Location tab

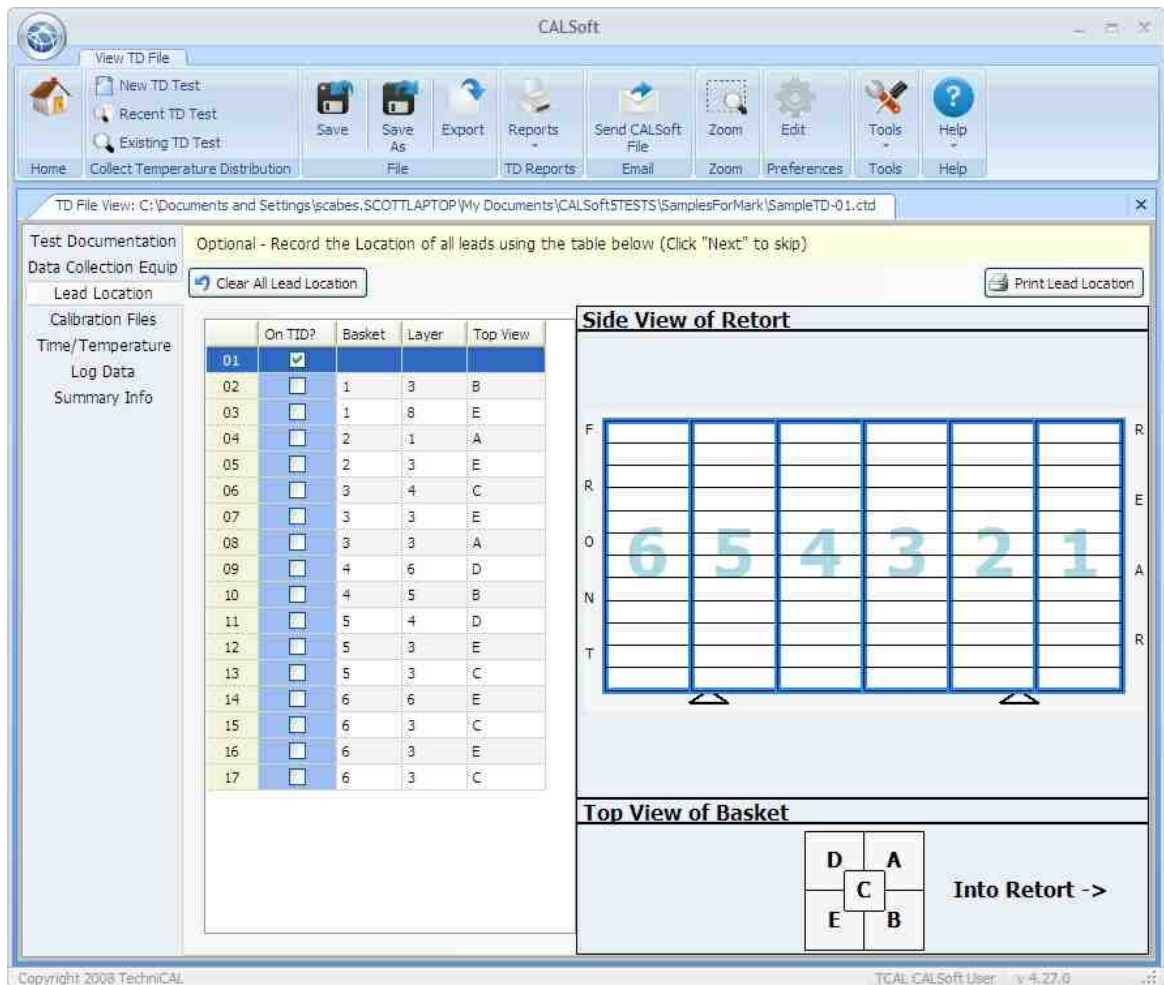
CALSoft allows you the option to record or "map" the location of your Temperature Distribution leads in the retort.



Before you can use this feature, you must have set up the retort design on the test documentation tab. If this is a CALSoft file from an earlier version, you will need to enter the Basket, loading, and layer information. Once that is setup, a schematic representation of the retort will be displayed on the right. You will see a SIDE VIEW and also a TOP VIEW of the basket.

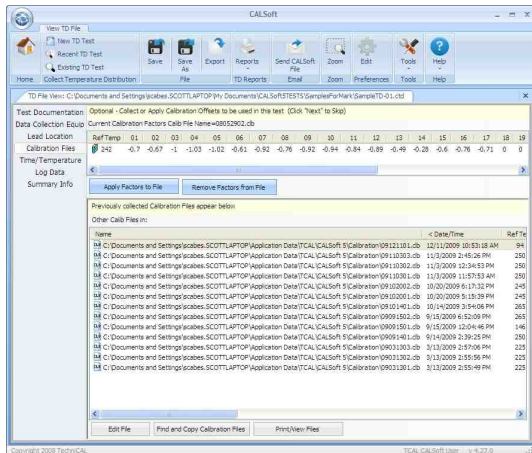
The table will show all ACTIVE leads (bad leads and open channels will not be displayed). There are 4 columns for you to use when recording the location of each lead:

1. **On TID?** -- use this if a lead is located by the sensor of the Temperature Indicating Device (TID) such as an MIG thermometer, Chart recorder, or RTD sensor.
2. **Basket** -- indicate which basket the lead is located in. NOTE: crateless retorts are shown as ONE basket
3. **Layer** -- indicate which layer the lead is located in. NOTE: crateless retorts are shown with 3 layers- upper, middle, and lower
4. **Top View** -- using the top-view graphic, determine which section the lead is located. This is provided simply to give you the ability to record the general location of the lead on the layer.



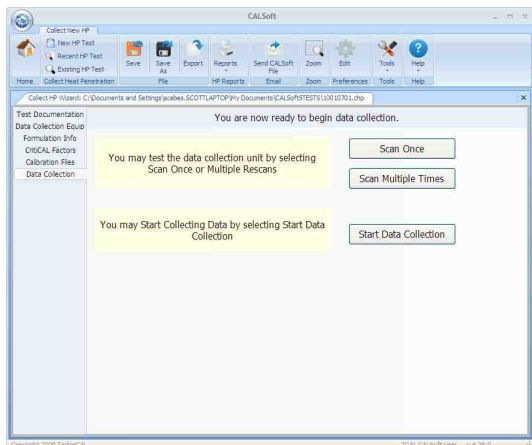
5.2.1.4 TD Calibration tab

CALSoft allows you the option to "**calibrate**" your entire data-collection system of thermocouples, wires, and CALPlex datalogger against a known standard. Using the Calibration feature duringn Temperature Distribution is the same as in Heat Penetration. To learn more, [click here to see the help file for the "Calibration Tab" feature in Heat Penetration](#)



5.2.1.5 TD Start Data Collection

The Start Data Collection tab in Temperature Distribution is the same as in Heat Penetration. To learn more, [click here to see the help file for the "Start Data-Collection" feature in Heat Penetration](#)



5.2.1.6 TD Data Collection- Main Screen

The default view during Data Collection is called the Main Data Collection Screen. This screen displays only all "active" channels (Free Leads and Thermocoupled leads). CALSoft will actually scan and record temperatures on all 32 channels during data-collection. However, you will only see the channels during data collection that are designated as Free Leads or Thermocoupled Containers. *To change the status of a channel or to turn a channel on or off, go to the [Data Collection Equipment tab](#) and click on a channel to change its type. It will then be displayed during data collection.*

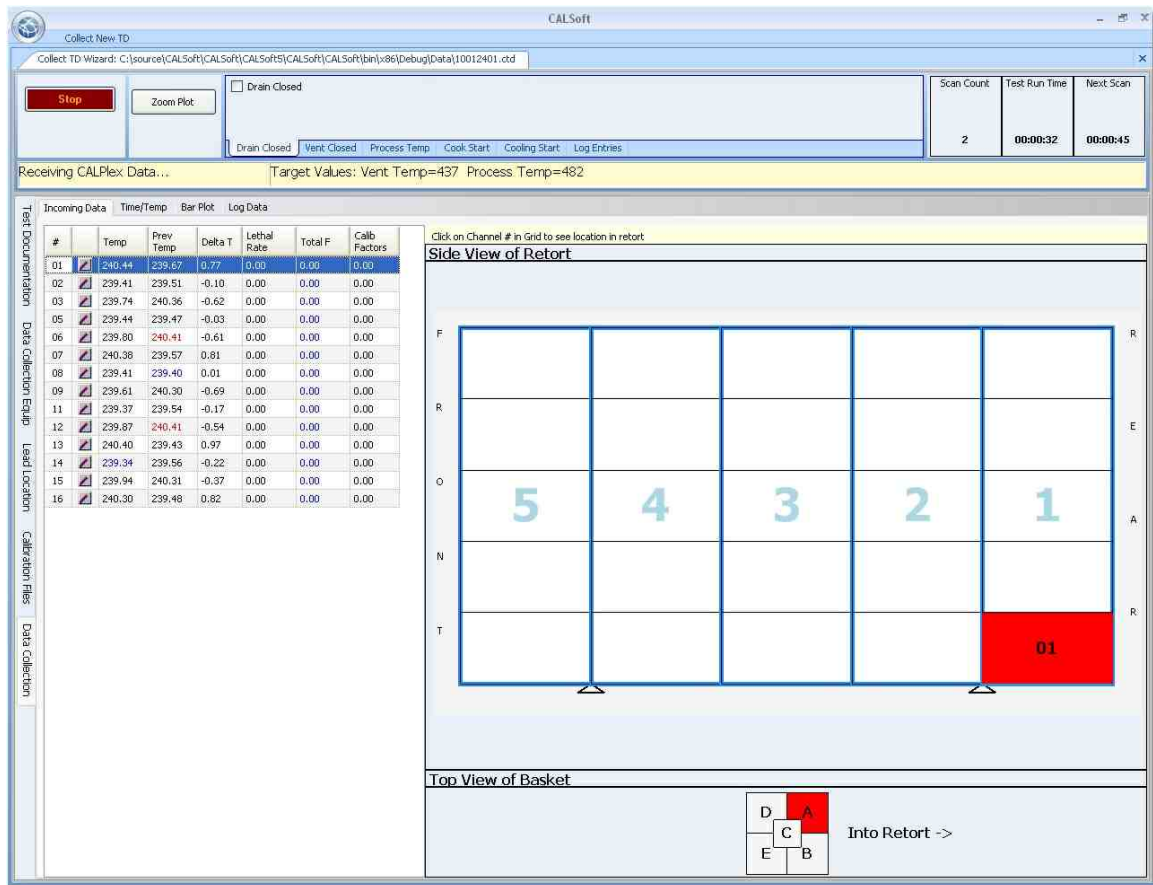
This screen displays the channel number, type (graphically shows Thermocouple or Free Lead), current reading, previous reading, the difference between the two ("Delta T"), the lethal rate, and the accumulated F (Total F). Any calibration factors that are applied are shown in the last column.

CALSoft will help you visually know which channel is the highest and lowest. The Thermocoupled container with the highest reading is displayed in **RED** and the lowest reading in **BLUE**. Since this is a Temperature Distribution test, Thermocoupled Container Leads are not considered in the high-

low feature.

You can sort on any column by clicking the column heading.

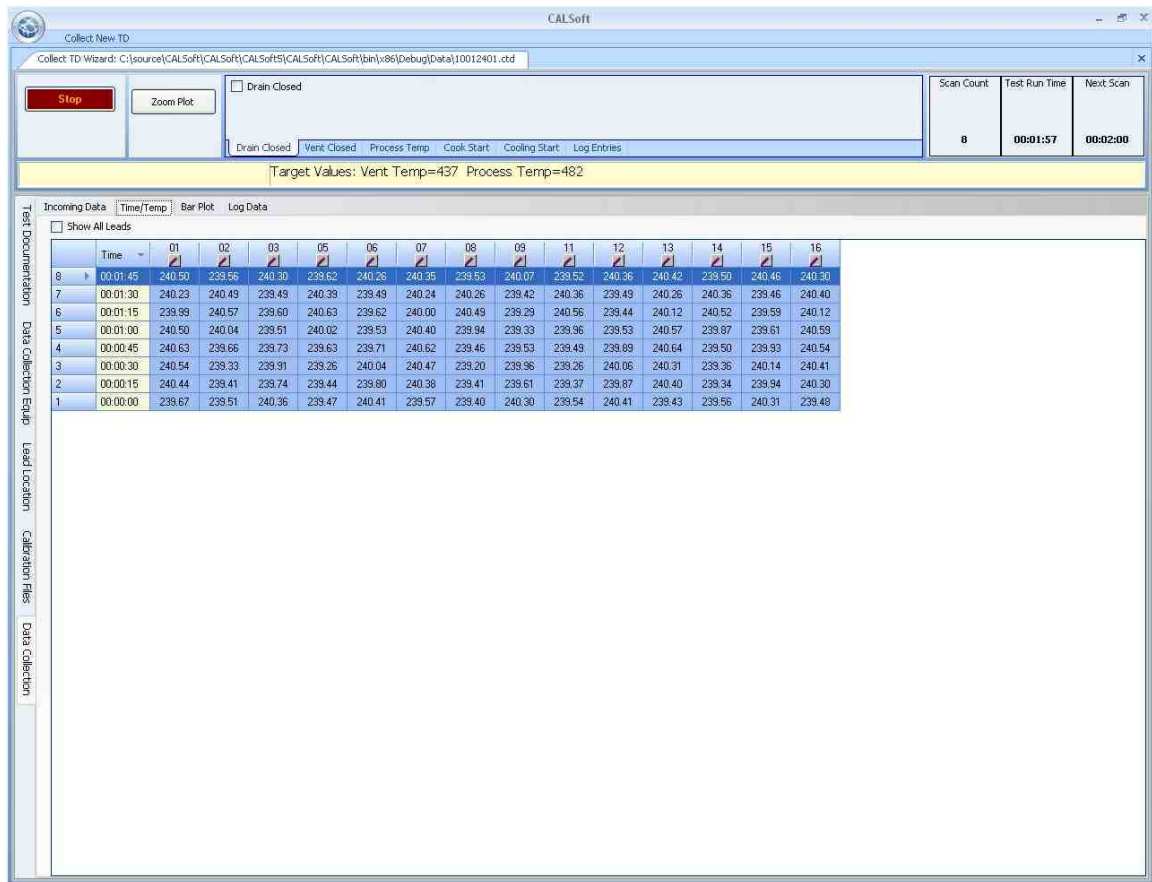
You can navigate to other data views by using the tabs across the top for [Time/Temperature](#), [Bar Plot](#), and [Log Data](#)... or view the data on a time/temperature graph by clicking the [Zoom Plot](#) button



5.2.1.7 TD Data Collection Time Temperature grid

During Data Collection, the **Time Temperature Grid** displays your data in a spreadsheet format. The Time Temperature view in Temperature Distribution is the same as in Heat Penetration.

To learn more, [click here to see the help file for the Time Temperature view during Heat Penetration](#)

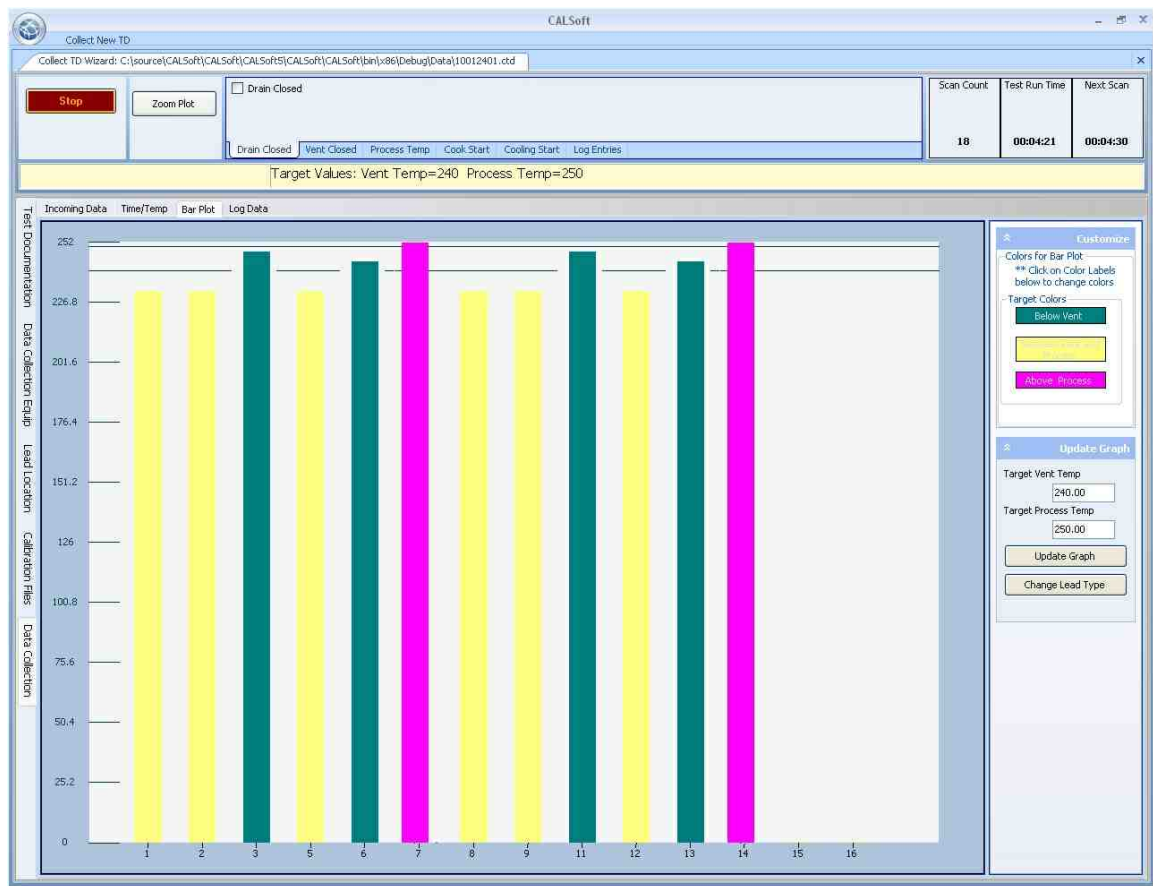


5.2.1.8 TD Data Collection- Bar Graph

During Data Collection, the "**Bar Graph**" displays your data in a graphical format. This screen displays only all "active" channels (Free Leads and Thermocoupled leads). CALSoft will actually scan and record temperatures on all 32 channels during data-collection. However, you will only see the channels during data collection that are designated as Free Leads or Thermocoupled Containers. *To change the status of channel or to turn a channel on or off, go to the Data Collection Equipment tab and click on a channel to change its type. It will then be displayed during data collection.*

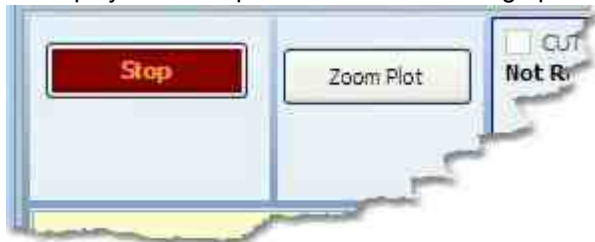
The "TARGETS" (Target Vent and Target Process Temperatures) entered in the Test Documentation tab (first tab) when you set up the TD test will be used on this bar graph to let you know when the targets are reached. Once the readings reach the desired targets, the bar will turn colors to alert you that the target has been reached. In the example below some of the leads are below the Target Vent temperature and are drawn in yellow. Other leads have reached the Target Vent but not the Target Process temperature and are drawn in green. One lead has reached the Target Process temperature and is drawn in pink.

To update the Target Values, click "Update Graph" button.
To change the colors of the bars, click on "Customize" button



5.2.1.9 TD Data Collection- Zoom plotting during data collection

During Data Collection, CALSoft enables you to graph your data in real-time on a time/temperature grid. Once the data is plotted, you can "zoom in" by clicking and dragging the mouse over the range you wish to enlarge. This feature is referred to within CALSoft as **"Zoom Plotting"**. To graph your data during the test, click on the **"Zoom Plot"** button at the top Ribbon. The Zoom Graph will be displayed in a separate window and the graph will be updated in real-time.



Click here for more information on [using the CALSoft Zoom Plotting Feature](#)

5.2.1.10 Entering event readings during TD test

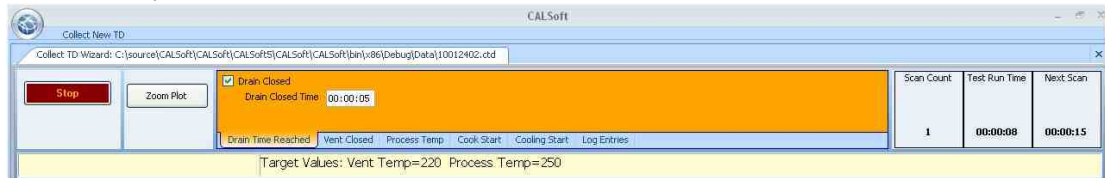
During Data Collection, CALSoft enables you to enter **"Event"** readings during the Temperature Distribution test. To enter these events, use the tabs at the top of the screen during data-collection.

When the following events are reached, you may chose the appropriate tab, click the check-box,

and CALSoft will stamp the current time. However, you may edit the time accordingly. You can also record the temperature reading on the MIG, Chart, and controller/RTD at time of the event. You can record this information for the following events:

Drain Closed

You can specify the time that the Drain was closed by selecting the Drain Time Reached tab and checking the Drain Closed Checkbox. The Drain Closed Time time control box can be modified to update this value.



Vent Valve Closed

You can specify the time that the Vent was closed by selecting the Vent Time Reached tab and checking the Vent Closed Checkbox. The Vent Closed Time time-control box can be modified to update this value. You can also input the MIG, Chart and RTD values at the time of the Vent Closed. To the right you will see that CALSoft 5 determines the Slowest Lead at the time the Vent was closed and shows both the slowest lead and the temperature of the lead at the nearest reading after the Vent was closed.



Process Temperature Reached (Come Up Time)

You can specify the time that the Process Temperature was reached by selecting the Process Temp tab and checking the Process Temp Reached Checkbox. The Process Temp Reached Time time-control box can be modified to update this value. You can also input the MIG, Chart and RTD values at the time of the Process Temp Reached. To the right you will see that CALSoft 5 determines the Slowest Lead at the time the Process Temp was reached and shows both the slowest lead and the temperature of the lead at the nearest reading after the Process Temp was reached.



Cook Started (Begin Cook Phase)

You can specify the time that the Cook was started by selecting the Cook Started tab and checking the Cook Started Checkbox. The Cook Started Time time-control box can be modified to update this value. You can also input the MIG, Chart and RTD values at the time of the Cook Started. To the right you will see that CALSoft 5 determines the Slowest Lead at the time the Cook was started and shows both the slowest lead and the temperature of the lead at the nearest reading after the Cook was started.



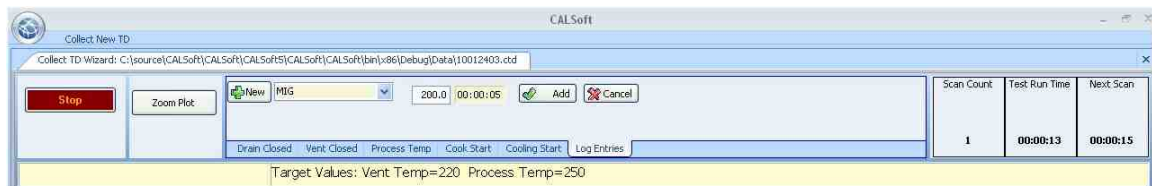
Time Entered Cooling (Cooling Reached)

You can specify the time that the Cooling was started by selecting the Cooling Reached tab and checking the Entered Cooling Checkbox. The Entered Cooling Time time-control box can be modified to update this value. You can also input the Cooling Water Temperature at this time as well; that however is Optional.



5.2.1.11 Entering Log Data

During Data Collection, CALSoft enables you to manually enter other readings during the Temperature Distribution test such as temperature readings from the MIG or Digital thermometer, pressure gauge readings, RPM readings, etc. These readings are referred to as "LOG-DATA" in CALSoft. Entering Log Data during a Temperature Distribution test is the same as in Heat Penetration. To learn more, [click here to see the help file for the Entering Log Data during Data-Collection feature in Heat Penetration](#)



5.2.1.12 Ending a test

Ending a Temperature Distribution test is the same as in Heat Penetration. To learn more, [click here to see the help file for the "Ending a Test" in Heat Penetration](#)



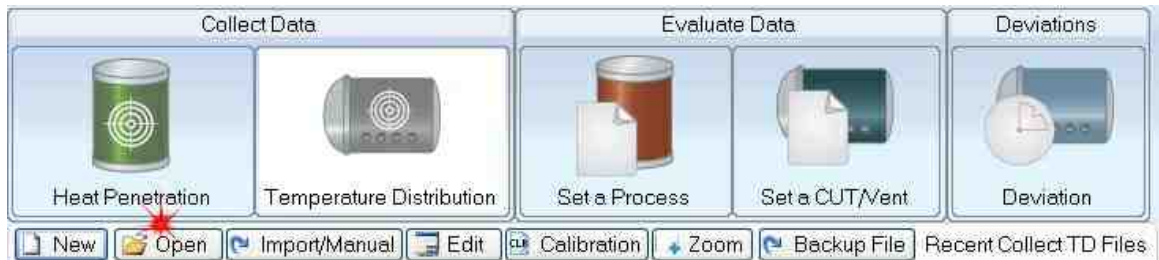
5.2.1.13 Losing Communication with CALPlex during a test

Losing Communication during a TD test is handled the same as in Heat Penetration. To learn more, [click here to see the help file for the "Losing Communication during data collection" in Heat Penetration](#)

5.2.1.14 Losing Power during data collection

Losing Power during a TD test is handled the same as in Heat Penetration. To learn more, [click here to see the help file for the "Losing Power During Data Collection" in Heat Penetration](#)

5.2.2 Opening/editing existing CALSoft TD files



To open and view/edit an existing CALSoft TD data file, there are two options:

1. Double click on the file in the "recently used" list in the **MIDDLE PANEL**, or
2. Click the "**OPEN**" button and find the file you want to open. The file will then load into CALSoft Collect HP mode and display all of the data in that specific file.

The Temperature Distribution Data File is divided into "Tabs" (on the left-hand side of the page).

- [Test Documentation tab](#)
- [Data Collection Equipment tab](#)
- [Lead Location tab](#)
- [Calibration Tab](#)
- [Time/Temperature Tab](#)
- [Log Data tab](#)
- [Summary Tab](#)

5.2.2.1 Test Documentation tab

The test documentation tab displays information related to the Temperature Distribution test that was conducted. You can edit any of the information that is in a "text box". Note that *required fields are marked with an **. This tab is divided into 4 sections:

1. RETORT - Choosing Batch or Continuous retort will give you different choices in the "type" drop-down menu. The retort schematic under [Lead Location tab](#) is created using the information entered here for the # of baskets and # layers. Other important information from the TD test is documented here, such as loading pattern, # container per layers, use of divider sheets, and control parameters.

2. CONTAINER - Container type and dimensions are required. Description and additional information are optional. You may also document what was filled into the containers used in the TD test (water, product, or other).

3. PROCESSOR - This is the name and location of the factory where the TD testing was conducted.

4. TEST INFORMATION - This section contains other information that was documented during the TD test. The TARGET Vent Close and Process Temperature were used during data-collection to indicate graphically when these targets are achieved. The Grid showing the Drain Closed, Vent Closed, Process temp, and Cook start contains times and temperature readings that were entered during the TD test. You may also enter this information after the test. The "Slow Lead" and "Slow Temp" will show the actual lead that was the slowest to reach that target temperature and the temperature reading of that lead. The Technician's name, reason for test, and Notes fields are optional and simply provide further documentation of the TD test

TD File View: C:\Documents and Settings\scabes.SCOTTLAPTOP\My Documents\CALSoftTESTS\SamplesForMark\SampleTD-01.ctd

Test Documentation Enter Information about this test. Required fields = *

Data Collection Equip
Lead Location
Calibration Files
Time/Temperature
Log Data
Summary Info

Retort

☒ Batch ☐ Continuous

Type: Horizontal - Steam

Manfr/Model: Horizontal-Custom Design Retort #: 2

of Baskets: 6 ☒ Layers ☐ Stacked (No Div)
☐ Jumbled ☒ Divider Sheets ☐ Racked

Load Volume Per Layer: 68
 Divider Sheets

at Bottom: 1 # Between: 1 # at Top: 0

Control System: Log-Tec

Controller SetPoint: 242.00 Steam Header Pressure: 21 RPM: 0

Container

Type: Can

Description: CAN-2 PC ALUM

Dimension: 307 X 111

Addl. Info

Container Fill
☒ Water ☐ Product ☐ Other

Processor

Plant Name: ABC Seafood Company

Location: New Orleans

Test Information

Date/Time of Test: 08-31-09 11:13:45

Target Vent Temp: 220.00 Target Process Temp: 241.00

Temperature Type: Fahrenheit Scan Interval: 30 Seconds

Total Time of Test: 00:55:00

Total Scans: 111 Heating: 89 Cooling: 22

Time Entered Cool: 00:44:29 Cooling Water Temp (Optional): 0

	Time	MIG	Chart	RTD	Slow Lead	Slow Temp
Drain Closed	00:07:30	NA	NA	NA	01	178.13
Vent Closed	00:11:00	220	220.5	221.0	17	218.08
Process Temp	00:17:00	242	242	242.5	08	241.97
Cook Start	00:19:00	242	242	242.0	16	239.85

Technician Name: Jane Smith

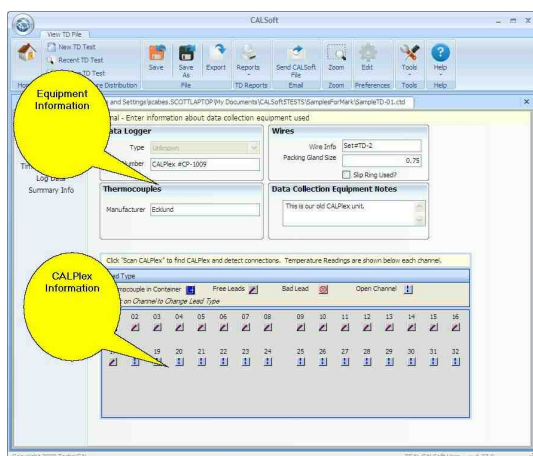
Reason For Test: New Retort installed in factory

Notes:
 FL 16&17 = near MIG
 FL 1-5 = basket 1

Copyright 2008 TechniCAL TCAL CALSoft User v 4.27.0

5.2.2.2 Data Collection Equipment tab

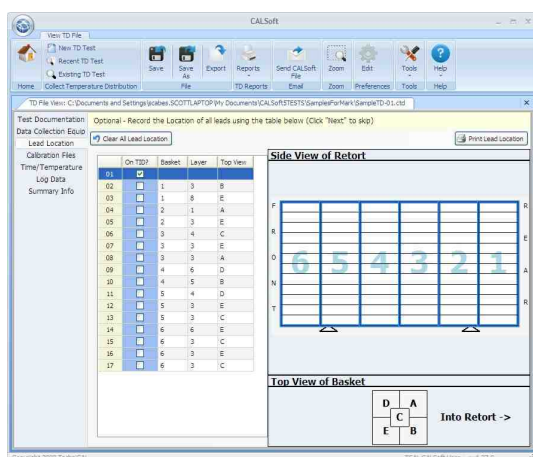
The Data Collection Equipment tab in Temperature Distribution is the same as in Heat Penetration. To learn more, [click here to see the help file for the "Data-Collection Equipment" tab in Heat Penetration](#)



C

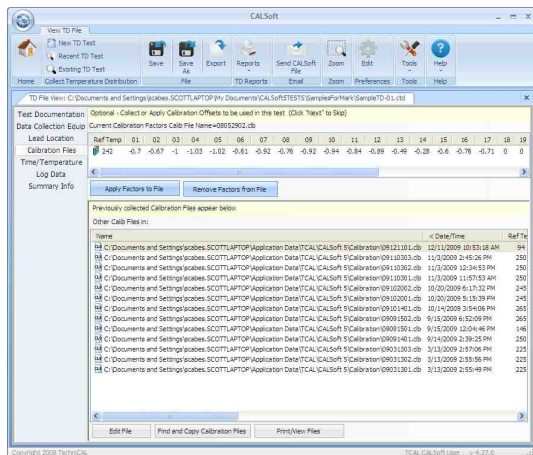
5.2.2.3 Lead Location tab

CALSoft allows you the option to record or "map" the location of your Temperature Distribution leads in the retort. Click here to see the ["Lead Location" tab in TD Data Collection](#).



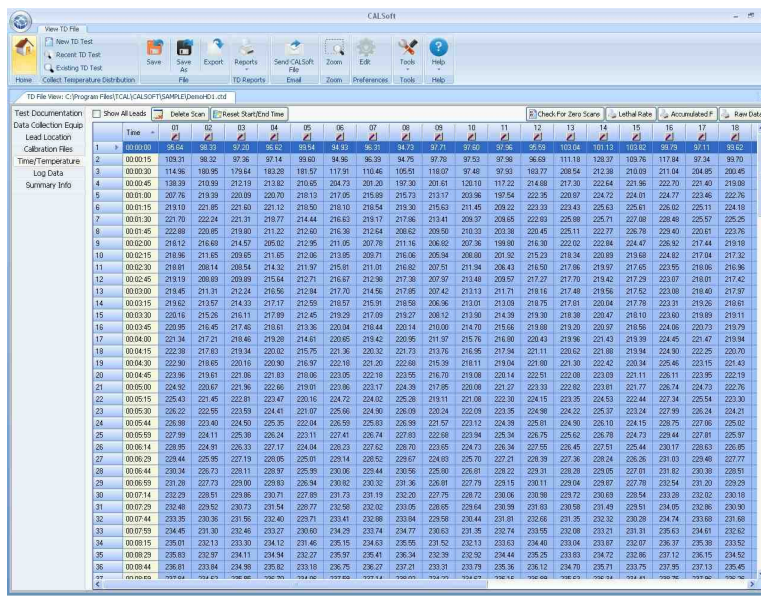
5.2.2.4 Calibration Tab

CALSoft allows you the option to "calibrate" your entire data-collection system of thermocouples, wires, and CALPlex datalogger against a known standard. Using the Calibration feature during Temperature Distribution is the same as in Heat Penetration. To learn more, [click here to see the help file for the "Calibration Tab" feature in Heat Penetration](#)



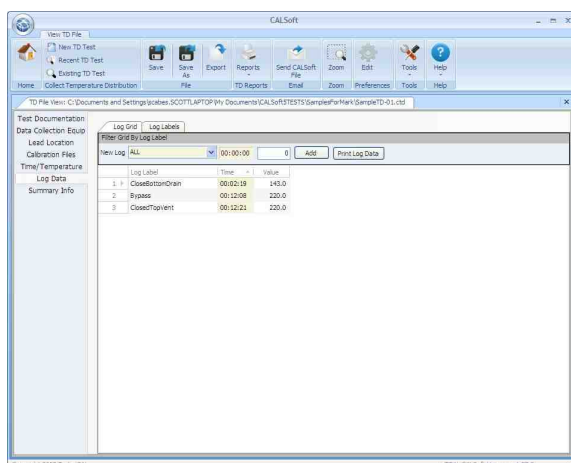
5.2.2.5 Time/Temperature Tab

The Time/Temperature Tab allows you the ability to view and print the temperature data that was collected during the Temperature Distribution test. The Time/Temperature tab in Temperature Distribution is the same as in Heat Penetration. To learn more, [click here to see the help file for the "Time Temperature" tab in Heat Penetration](#)



5.2.2.6 Log Data tab

"LOG DATA" is the other information recorded during a Temperature Distribution test, including recording the readings of the MIG, Chart Recorder, Pressure, etc. The Log Data tab in Temperature Distribution is the same as in Heat Penetration. To learn more, [click here to see the help file for the "Log Data" tab in Heat Penetration](#)



5.2.2.7 Summary Tab

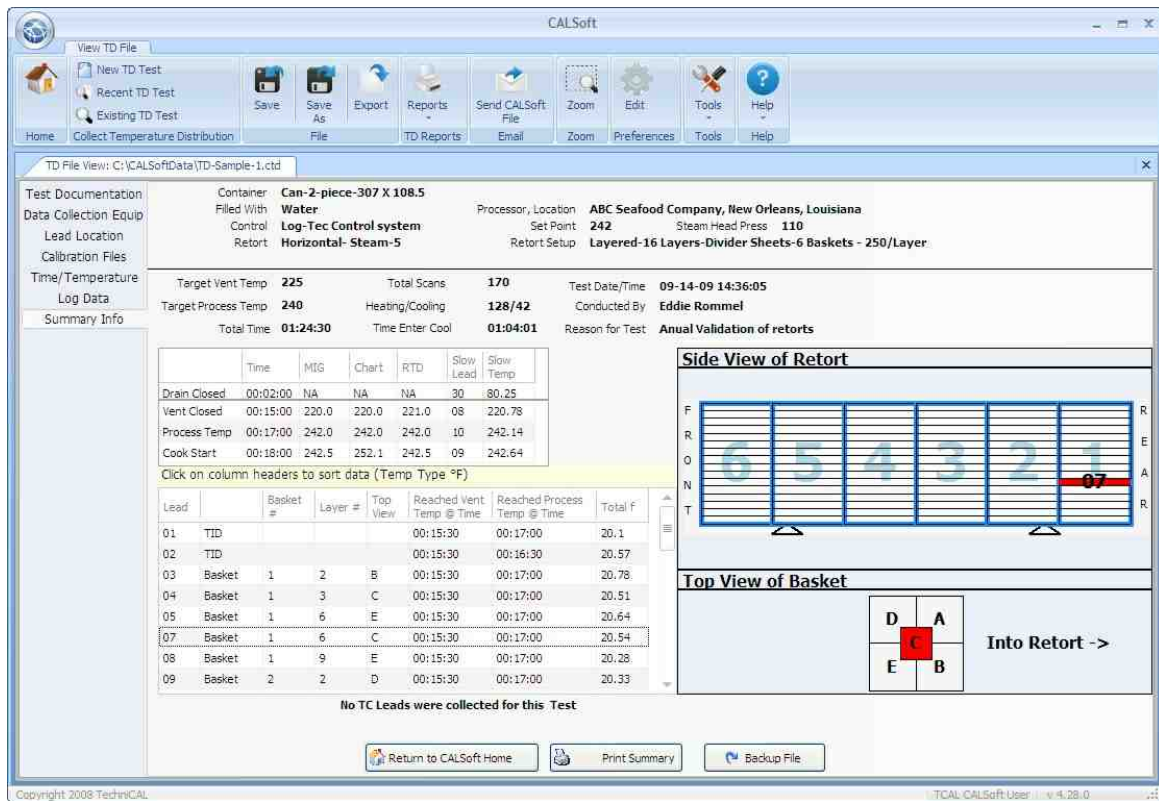
The **SUMMARY TAB** is a summary of the information collected into the data-file during the test. This Summary tab may be useful in conducting a quick analysis of the data.

The TARGET Vent Close and Process Temperature were used during data-collection to indicate graphically when these targets are achieved.

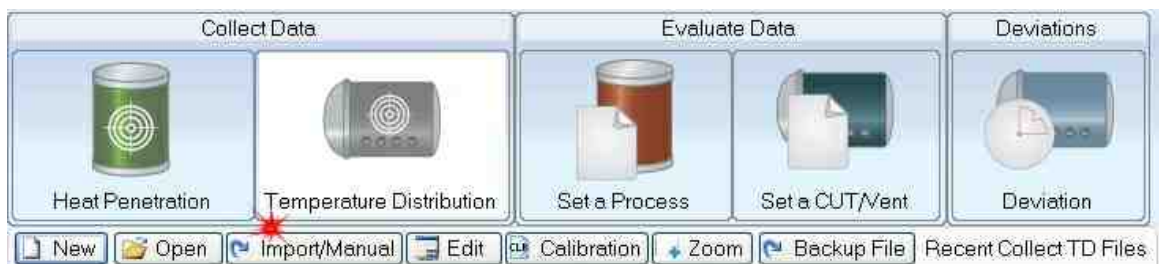
The Grid showing the Drain Closed, Vent Closed, Process temp, and Cook Start contains times and temperature readings that were entered during the TD test. The "Slow Lead" and "Slow Temp" will show the actual lead that was the slowest to reach that target temperature and the temperature reading of that lead.

All TD "Free Leads" displayed in the lower grid. You may click on any column heading to sort the data on that table. The columns for Basket, Layer, and Top View come from the [Lead Location tab](#). You may click on any lead to see it's location on the **Retort Schematic** on the right side of the page.

The **"Backup File"** feature allows you to back up a copy of your data to another location or device (USB "jump drive", external hard drive, etc.). For more information on the Backup File feature, [click here](#)



5.2.3 Importing Files into CALSoft 5



CALSoft 5 allows a number of data files to be imported into the Collect Temperature Distribution Utility. Importing files in Temperature Distribution is the same as in Heat Penetration. To learn more, [click here to see the help file for the Importing Files into CALSoft 5 feature in Heat Penetration](#)

5.2.3.1 Importing DataTrace and Ellab files

Importing DataTrace and Ellab files in Temperature Distribution is the same as in Heat Penetration. To learn more, [click here to see the help file for the "Import DataTrace and Ellab" feature in Heat Penetration](#)

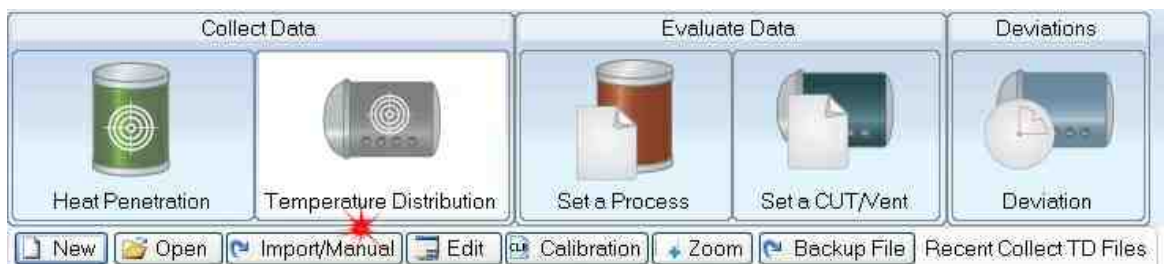
5.2.3.2 Importing Excel Files

Importing Excel files in Temperature Distribution is the same as in Heat Penetration. To learn more, [click here to see the help file for the Import Excel Files feature in Heat Penetration](#)

5.2.3.3 Importing Comma Separated Files

Importing Comma Separated files (CSV) in Temperature Distribution is the same as in Heat Penetration. To learn more, [click here to see the help file for the Import Comma Separated Files feature in Heat Penetration](#)

5.2.4 Manual File Creation TD



CALSoft users starting with Version 5.05 can Manually create files. Simply click on the **Import/Manual** button and then select the Manually Create a TD File button and follow these steps:

- (1) Choose the file name and save that file that you will manually create.
- (2) The Manual File Creation form will be shown. This form has two steps. The first step is to set the Number of Rows (Scans).
- (3) Please input the Heating Scans, Cooling Scans and Scan Interval. The Scan interval can be as low as 1 second. The Total Scans is automatically calculated from the Heating plus Cooling Scans. In Addition please select the number of Columns (Channels) for the test. By double-clicking on the Lead Type key image you can set all leads to that lead type. For example if you want to set all leads to Open Channel double click on the Open Channel image in the Lead Type panel. When you have set the Number of Rows and Number of Columns please select the Next button to go to the Next step.

Manual File Entry

Number of Rows (Scans)

Heating Scans

Cooling Scans

Scan Interval

Total Scans

Number of Columns (Channels)

**** Double Click on Icon in header to change all, or click on channel to change Lead Type**

Lead Type															
Thermocouple in Container	Free Leads	Bad Lead	Open Channel												
<i>Click on Channel to Change Lead Type</i>															
01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16
17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32

< Previous

Clear

Cancel

Next >

Save and Finish

- (4) The second step of Manual File Creation will show a time temperature grid. You can input the new values by hand or you can copy a spreadsheet of temperature data from Excel and right click in the datagrid to Paste the contents into the Grid. Note: only the temperature columns can be pasted into; the time column is set from the previous step. After you have set the data for this grid please select Save and Finish and the file that you have created will be saved.

Manual File Entry

*Place cursor on grid and right-click to paste **To change Lead type please select the Previous Button below to return to the Lead Collection

ScanTime	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21
00:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
00:00:15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
00:00:30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
00:00:45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
00:01:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
00:01:15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
00:01:30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
00:01:45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
00:02:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
00:02:15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
00:02:30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
00:02:45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
00:03:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
00:03:15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
00:03:30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
00:03:45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
00:04:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
00:04:15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
00:04:30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
00:04:45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
00:05:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
00:05:15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
00:05:30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
00:05:45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
00:06:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
00:06:15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
00:06:30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
00:06:45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
00:07:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
00:07:15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
00:07:30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
00:07:45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
00:08:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
00:08:15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
00:08:30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
00:08:45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
00:09:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
00:09:15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

< Previous Clear Cancel Next > Save and Finish

- (5) The Import File Temperature Type Form will be shown. Please select the temperature type for this test.

Import File Temperature Type and Product Type

Please provide us the following necessary information to allow us to import your file.

Temperature Type

☐ Celsius

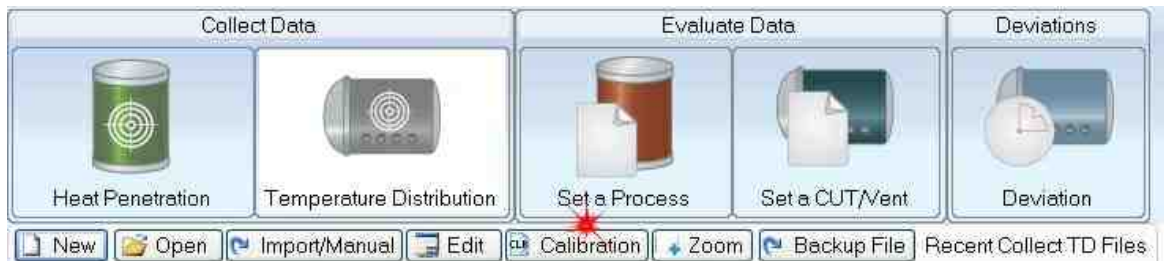
☒ Fahrenheit

OK

- (6) Next the Collect TD form will be shown. After creating a file with the Manual File Creation utility the user is taken into the Collect TD file viewer. CALSoft 5 now populates the file with

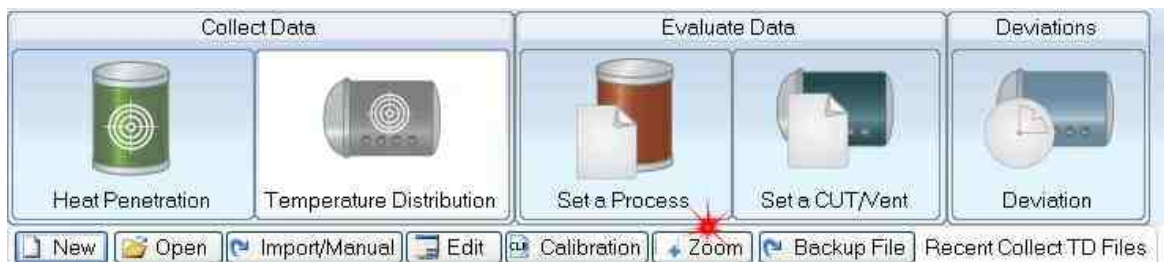
Test Documentation information from the last collected or Imported/Manually Created file information. If the values that were input by default are not correct the user can select the Clear All button at the top right of the form.

5.2.5 Calibration



CALSoft allows you the option to "calibrate" your entire data-collection system of thermocouples, wires, and CALPlex datalogger against a known standard in order to zero-out any possible errors. Calibration in Temperature Distribution is the same as in Heat Penetration. To learn more, [click here to see the help file for the "Calibration" button in Heat Penetration](#),

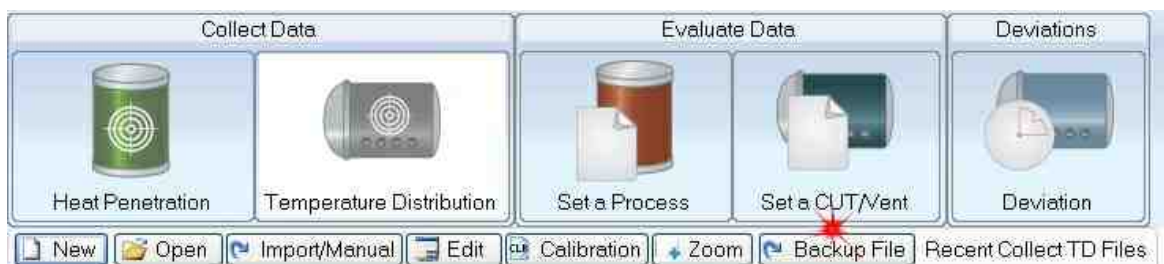
5.2.6 Zoom plotting



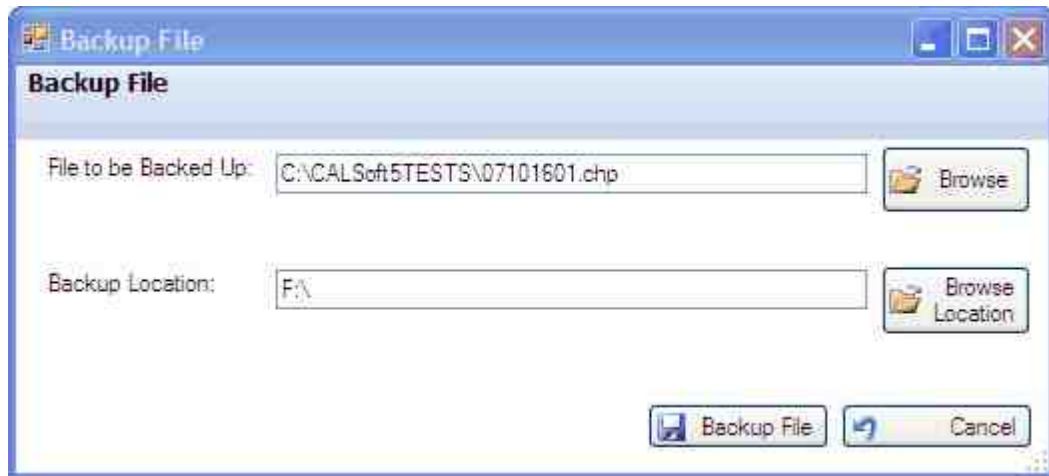
Click on the "Zoom" button in the ribbon to access CALSoft's unique graphing feature. CALSoft's "Zoom" utility plots the time/temperature data on a graph and then allows you to "ZOOM IN" on the data by using your cursor to select the part of the graph you want to zoom into.

Click here for more information on [using the CALSoft Zoom Plotting Feature](#)

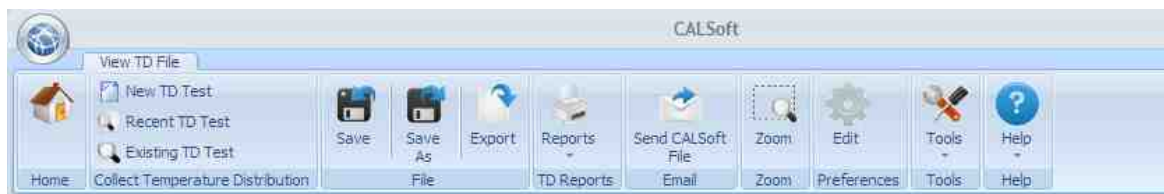
5.2.7 Backup File



The **"Backup File"** feature allows you to back up a copy of your data to another location or device (USB "jump drive", external hard drive, etc.). Click the Backup File button and chose a location where you would like to backup the file. This will not MOVE your, but instead, it will save a COPY to another location.



5.3 TD File Command Options (Ribbon Menu Commands)



CALSoft includes a Ribbon Menu in all sections of the program. The menu for Collect Temperature Distribution includes commands related to the heat penetration data file.

- [Save/Save As](#)
- [Export Data to Excel](#)
- [Reports & Report Formats](#)
- [Email CALSoft File](#)
- [Zoom Plotting](#)

5.3.1 Save/Save As



The SAVE command will save the file. It is suggested that you click SAVE whenever changes are made to the data file. SAVE AS enables you to save the file as a different name and/or to a different location on your computer.

5.3.2 Export Data to Comma Separated Value

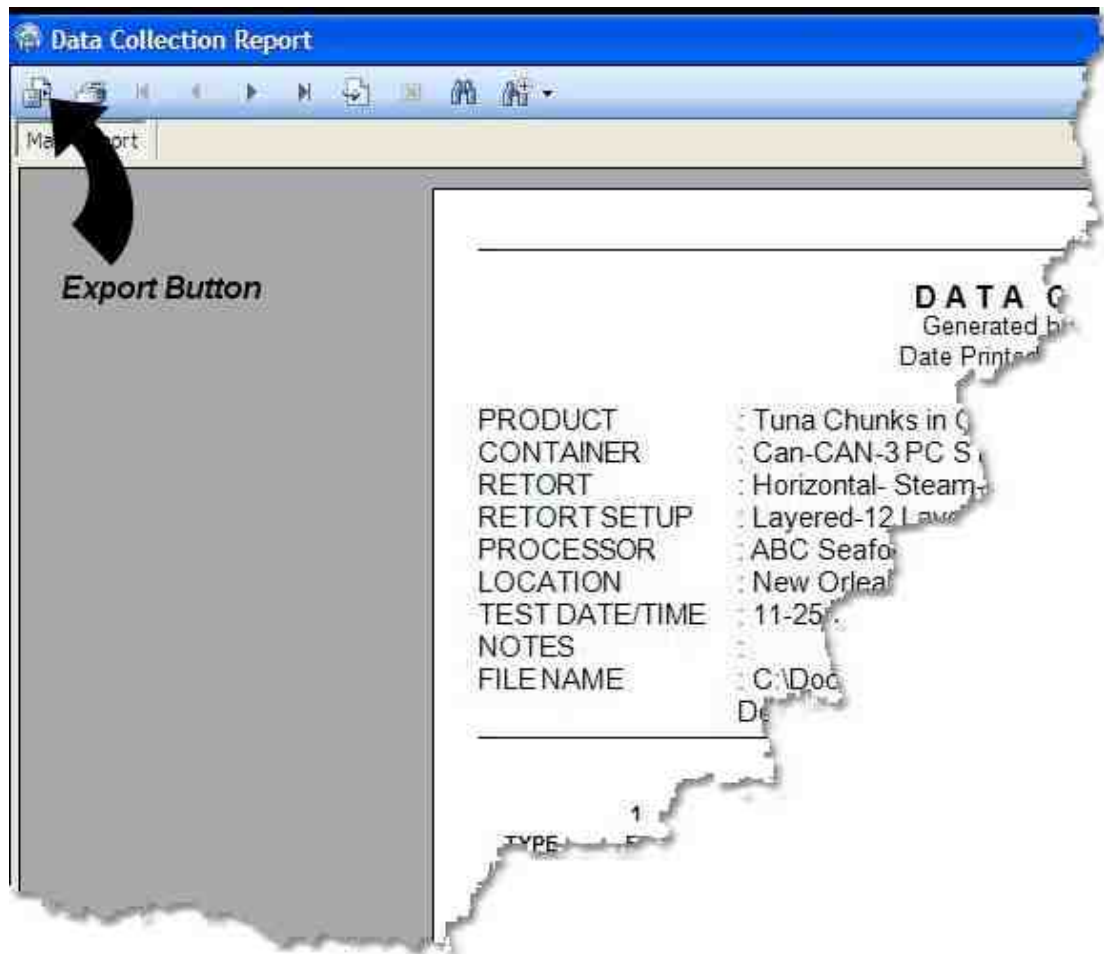


The **EXPORT** button allows you to export the time temperature data, along with the basic test documentation information text, to a Comma Separated format.

5.3.3 Reports and Report Formats (PDF, Excel, Word, CSV)



All available reports are listed under the “**REPORTS**” button. When you chose to run a report in CALSoft, the report is generated and displayed on the screen. You can then print the report to your printer, or you can click the button in the upper left-hand side of the page and export the report to different formats (PDF, Excel, Word, RTF, etc.).



5.3.4 Email CALSoft File



To email a Data File from CALSoft, simply click on the **SEND CALSOFT FILE** button in the ribbon menu. This will launch your default email client software on your computer and attach the data file. You can then send the file to anyone via email.

5.3.5 Zoom plotting



Click on the **"Zoom"** button in the ribbon to access CALSoft's unique graphing feature. CALSoft's "Zoom" utility plots the time/temperature data on a graph and then allows you to "ZOOM IN" on the data by using your cursor to select the part of the graph you want to zoom into.

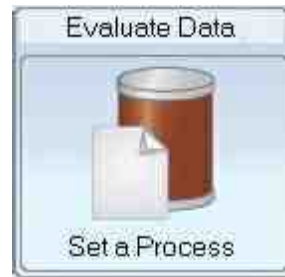
Click here for more information on [using the CALSoft Zoom Plotting Feature](#)

Part



VI

6 Evaluate Data- Set a Process



CALSoft enables you to evaluate heat penetration data and "Set A Process" using the Ball Formula Method or the General Method.

- [What is Setting A Process?](#)
- [Calculation Methods](#)
- [Overview- Main Set A Process Dashboard](#)

6.1 What is Setting A Process?

The objective of thermal processing is to deliver temperature into a package of product (referred to as "Canned Foods") in a quantity sufficient to cause the death or destruction of all microorganisms of public significance as well as those of economic spoilage concern. Processing Authorities undertake the task of determining what a "safe process" is and ensure that the retort can actually deliver that process time/temperature in a safe and effective manner.

"Setting a Process" refers to the task of establishing a safe Thermal Processes for specific canned food products. This is accomplished by by conducting heat penetration testing, evaluating the collected data, and using calculation methods to determine time, temperature, and lethality values. The objective of a thermal process must be designed to destroy all pathogenic microbial spores capable of outgrowth in the food under non-refrigerated storage and deviation conditions, which is required by federal law.

CALSoft enables you to Set A Process using heat penetration data and the Ball Formula Method. General Method evaluation reports are also available in CALSoft. The procedures to accomplish this using the Ball Formula are designed into CALSoft as follows:

1. Establish a ProCal record
2. Load Heat Penetration (HP) Files to be evaluated
3. For each HP file, review time/temperature data, product formulations, critical factor information
4. Set plotting defaults and plot data for each HP data file
5. Compare the results of evaluated heat penetration data and chose the heating factors to use in the process calculation
6. Assign critical factors to the final process
7. Calculate & print a thermal process schedule

6.2 Calculation Methods

CALSoft was designed to primarily use the [Ball Formula](#) method to calculate a thermal process using your heat penetration data. However, Reports are also available within CALSoft to determine accumulated lethality values using the [General Method](#). Click on either of these to learn more about the methods.

6.2.1 Ball Formula Method

In 1923, C. Olin Ball proposed a formula method which would allow for the extrapolation of process time independent of a required direct thermocouple measurement once time and temperature data were collected by direct measurement (heat penetration test). This mathematical calculation method is known today as the "Ball Formula Method" and is the most often used method in the United States for both process evaluation and process design for retorted canned foods.

The Ball Formula method uses heating factors to calculate process times. These Heating Factors are generated from the evaluation of heat penetration test data. The time/temperature data for each thermocoupled container is plotted on an inverted, semi-logarithmic graph which is developed based on the Retort Temperature and the Come Up Time experienced by the test containers during the heat penetration test. Heating Factors are derived from the graphed data for each thermocoupled container. The factors from a single container are chosen by the process authority for use in the Ball Formula, along with the desired Retort Temperature, Product Initial Temperature, and F_0 value. The resulting calculated thermal process time applies to the product and processing conditions in the heat penetration test.

CALSoft offers users the ability to easily evaluate/plot the heat penetration data to generate heating factors and to [calculate a thermal process using the Ball Formula method](#).

It is important to understand that basic assumptions are made in the Ball Method result from empirically defined terms in the method which allow for an "estimation" of both process time or sterilizing value. Unfortunately, these assumptions often overestimate process lethality and, although conservative, do not accurately define the actual lethality delivered in the process. The Ball Method utilizes heating and cooling factors to predict the internal product slowest heating zone temperature. The following assumptions are fixed within the method for your products:

BASIC ASSUMPTIONS:

- $j_c = 1.41$ (hyperbolic cooling lag)
- $f_c = f_h$ (slope of linear logarithmic heating = slope of linear logarithmic cooling)
- $RT - T_w$ or $m + g = 180^\circ\text{F}$ (steam) or 130°F (water)
- 42% correction of come up time in calculation of j_h value.
- No further product heating after cooling starts.
- A constant retort temperature method only.

These assumptions make Ball Method flexible but also very conservative, over-estimating the actual lethality delivered to the product (mostly occurring in cooling). In the case of conduction heating products, there is often as much as a 100% increase in resulting lethality than that targeted in the scheduled process. Sometimes this is unacceptable to product quality and the Ball Formula is not the most appropriate process calculation method.

6.2.2 General Method

The General Method is used to determine lethality equivalents at known internal container temperatures measured directly by the use of thermocouples positioned within the test container. The General Method is a procedure used to integrate the lethal effects of a time/temperature history resulting from a thermal process at a position located in the slowest heating zone in the container. The General Method is the basic direct method for calculating the F_0 value. Since the General Method uses the physically measured product temperature directly, it is the most accurate method available.

First, the time-temperature data at the slowest heating zone of a canned food must be obtained through a heat penetration test. If General Method calculation is to be used, it is very important to be aware of the following:

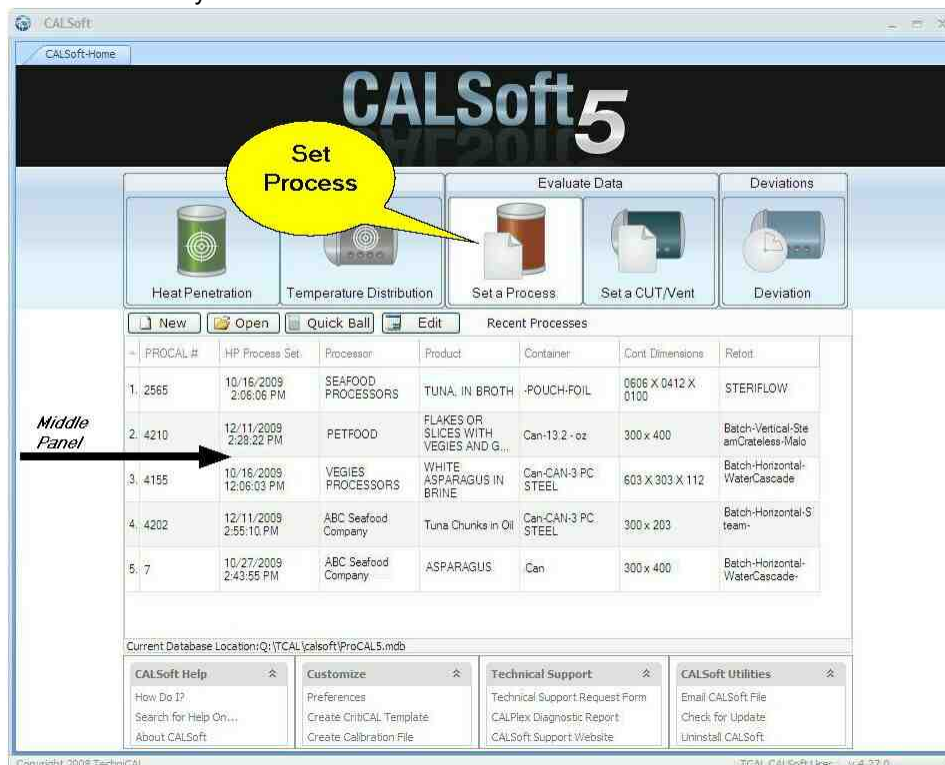
1. The heat penetration test must be designed properly. For example, the condition of the thermocoupled containers must meet or exceed the "worst case" of fill, formulation, thermocouple placement, etc.
2. Test containers must be located in the slowest heating zone of the retort (which is determined through Temperature Distribution Testing).
3. The accuracy of the data-collection equipment is also very important since direct temperature measurement is critical if the General Method is used.

Then for each measured product temperature (thermocoupled container) in the heat penetration test, a corresponding lethal rate value is calculated using the General Method and the appropriate z -value and T_{ref} . During the entire cycle of the retort process, the calculated lethal rate is accumulated for each thermocoupled container. The F_0 value delivered to the product at the slowest heating zone is the equivalent sterilization value of that specific process condition.

CALSoft provides reports that use the General Method to determine accumulated lethality during a heat penetration test. CALSoft uses the "trapezoidal method" of the General Method. However, you must use the appropriate z value and T_{ref} in the calculation according to the product that is tested.

6.3 Overview- Main Set A Process Dashboard

Click on "Set A Process" button in the Main Section and the **MIDDLE PANEL** will populate and display the last 5 "recently used" ProCal Records that were established in CALSoft.

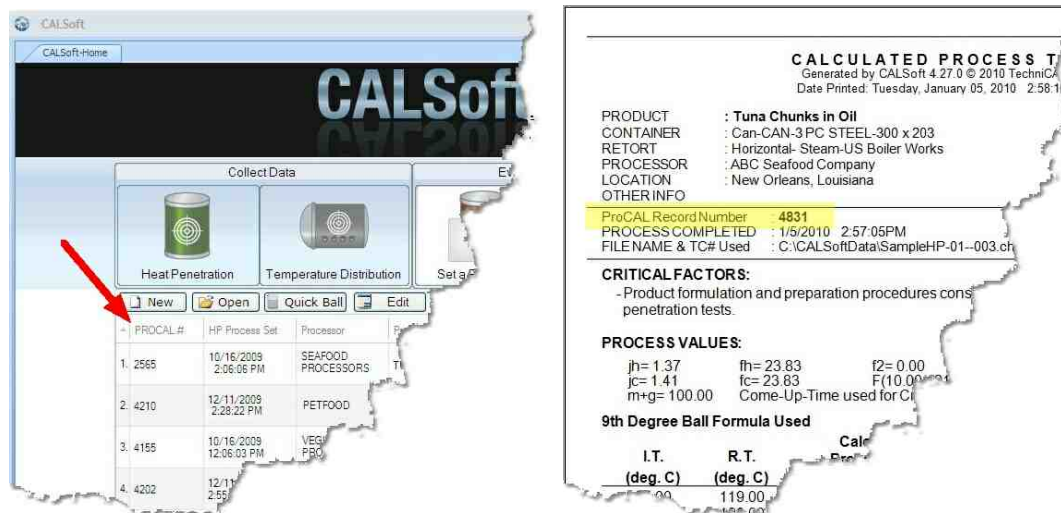


- [The Process Calculation \("ProCal"\) Data-Base](#)
- [New Process](#)
- [Open Existing Process Calculation](#)
- [Delete a ProCal Record](#)
- [Quick Ball Formula Calculation](#)

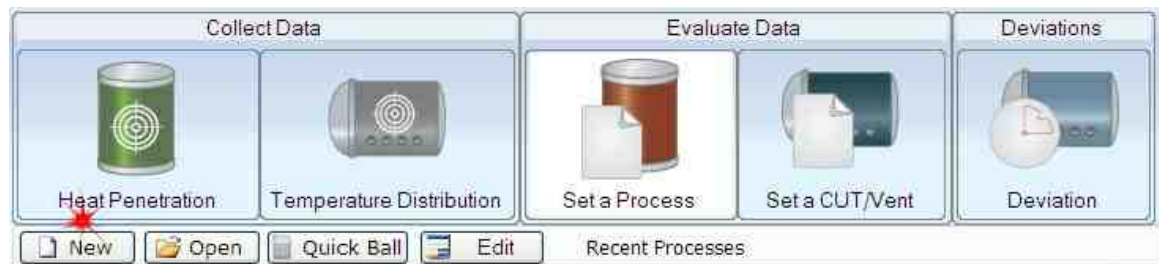
6.3.1 The Process Calculation (ProCal) Data-Base

When you "Set a Process" using CALSoft, the information related to the process is stored in a database referred to as the "ProCal Database". For more information related to the database file and it's location, see [Process Database](#).

When you begin to Set A Process with CALSoft, a new record is created in the ProCal Database. This is referred to as the ProCal Record Number and is the main reference to that Process Calculation. The ProCal Record Number is displayed on the final printed Process Schedule report and also on the main dashboard of the Set A Process page.



6.3.2 Set a New Process

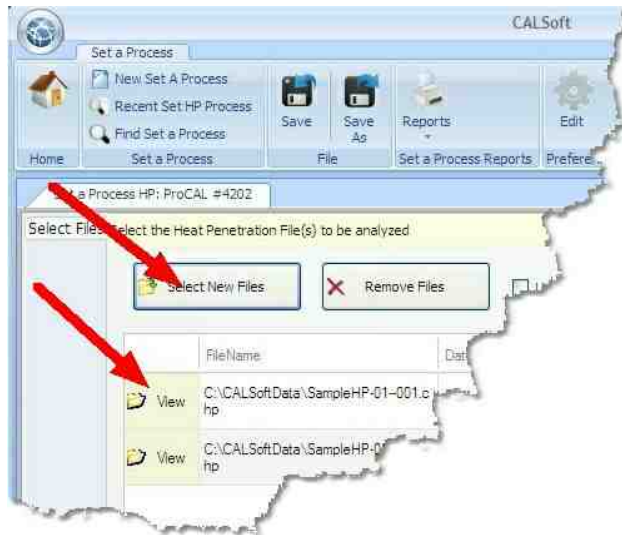


CALSoft offers users the ability to easily evaluate/plot the heat penetration data to generate heating factors and to calculate a process using the Ball Formula Method. Chose the "**Set A Process**" section and click on the "**NEW**" button to begin a NEW Process Calculation. CALSoft will then create a NEW Pro-Cal record in the database. Once the ProCal record is set up, you can begin the process of evaluating the data and then finally calculating a thermal process using the Ball Formula. The steps are as follows:

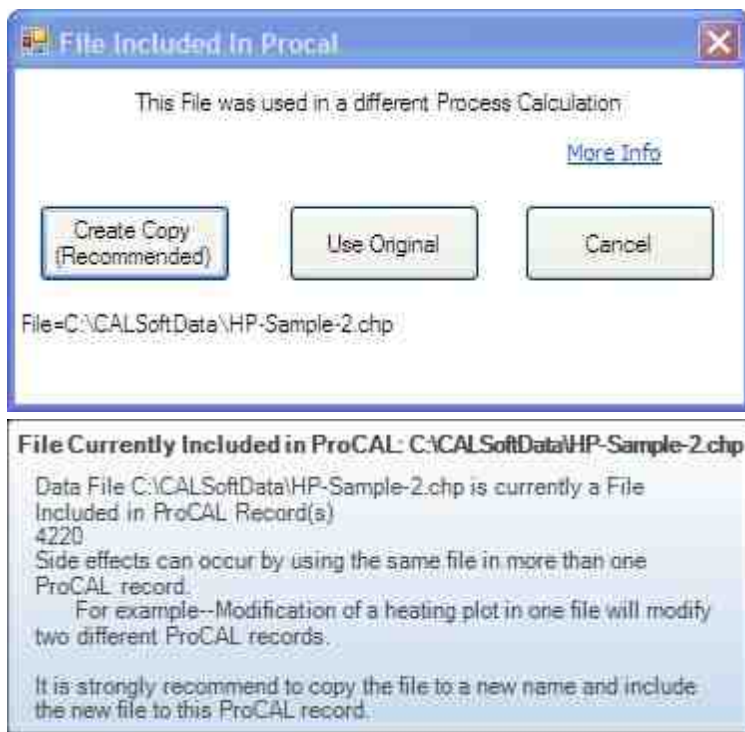
- [Loading Heat Penetration files to evaluate](#)
- [Set up Basic Process Information](#)
- [Viewing/printing/Editing Time/Temperature data](#)
- [Viewing/Printing/Editing the formulation information](#)
- [Viewing/Printing/Editing CritiCAL](#)
- [Establishing Ball Formula plotting defaults](#)
- [Plotting data to get Ball Formula heating/cooling factors](#)
- [Plotting Tips](#)
- [Using CALSoft to compare factors from multiple HP files for Ball Formula calculation](#)

6.3.2.1 Loading Heat Penetration files to evaluate

The first step is to load the heat penetration file(s) you wish to evaluate in order to calculate a thermal process. CALSoft allows you to load multiple heat penetration files into one Process Calculation exercise (ProCal record). Click on "**SELECT FILE**" and find the HP data files you wish to evaluation for this process. Once an HP data file is loaded, you can Double Click on "VIEW" to see the contents of that file.



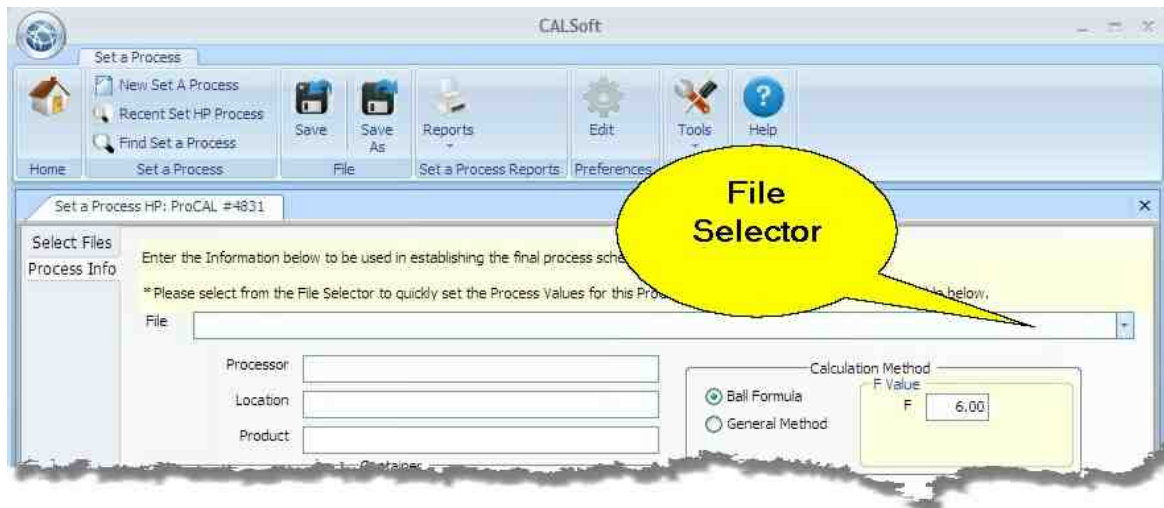
If the data file you selected has already been used in another Process Calculation (ProCal record), CALSoft will notify you and suggest that you create a copy of the file. If you chose "Create Copy", a copy of the file will be placed in the same location as the original.



T

6.3.2.2 Set up Basic Process Information

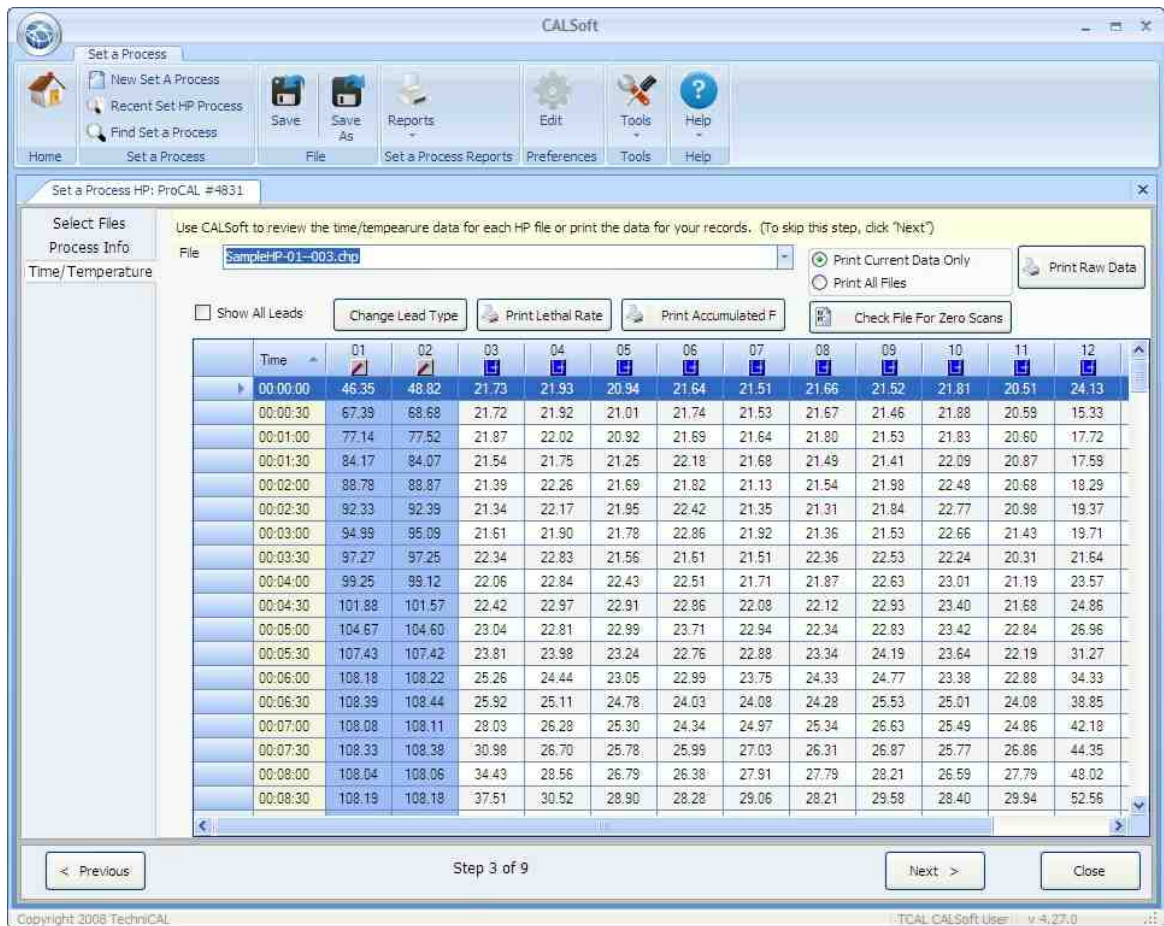
Once the data files are chosen for evaluation, you will be asked to enter the basic information related to this product. You can either (a) manually enter the Processor, Product, Container, and Retort information, or you can (b) choose to use the information that is already in one of the HP data files that was previously loaded by selecting that file from the File Selector drop-down menu. Once a file is loaded, you can edit any of the information that populates the form. This information will be used on the final [Process Schedule report](#).



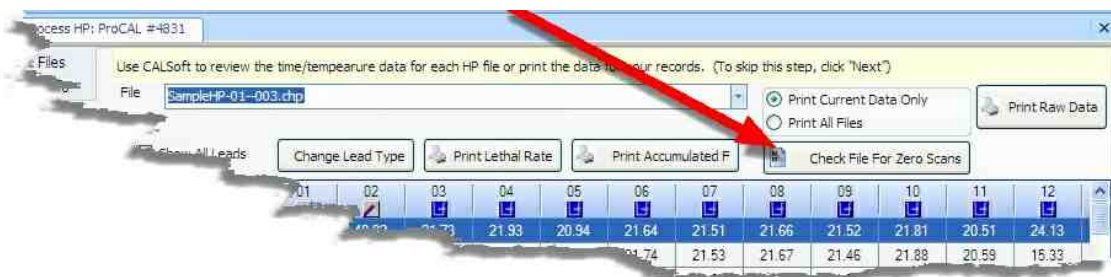
6.3.2.3 Viewing/printing/Editing Time/Temperature data

You may choose to view, print or edit the Time/Temperature data for the HP data file(s) you loaded into the Process Calculation exercise. This is optional and allows you to:

- Change the lead types (free lead, thermocoupled container, open or bad channel)
- Print the General Method "Lethal Rate" for a specific thermocoupled container in the test
- Print the General Method "Accumulated F" for all thermocoupled containers in the test
- Check the file for zero scans



6.3.2.3.1 Check for Zero Scans



CALSoft includes a very useful feature called **"Check for Zero Scans"**. This feature enables you to scan an HP or TD data file and determine if there were any missed scans or channels that show zero readings.

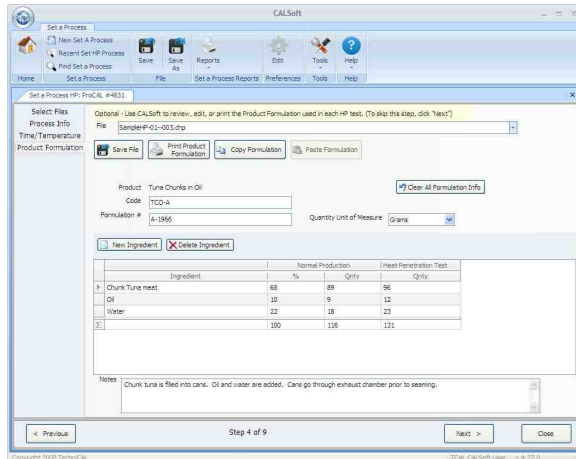
- If an entire scan (or more) was missed, this is an indication that communication was temporarily lost between CALSoft and the Datalogger.
- If a particular channel includes zero-scans, this is usually an indication that the thermocouple, lead wire, or channel in the datalogger is not working properly.

After you run the "Check for Zero Scans" feature, CALSoft will alert you if any Zero Scans are discovered and list the channel and scan time. CALSoft will then give you the opportunity to fix them or simply leave the file as-is with the zero scans unchanged. If you chose to "FIX" the zero scans, CALSoft will average the 3 scans prior and the 3 scans after the zero scan and suggest an

average to replace the zero scan. You can accept this or enter your own fix.

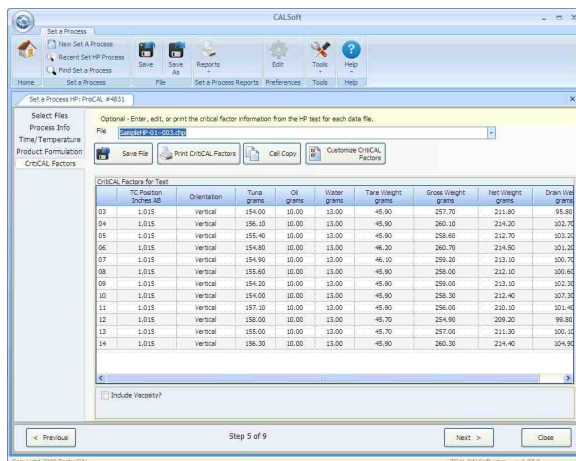
6.3.2.4 Viewing/Printing/Editing the formulation information

You may chose to view, print or edit the Formulation information for the HP data file(s) you loaded into the Process Calculation exercise. This is optional. Click here for more information on the [Formulation tab](#).



6.3.2.5 Viewing/Printing/Editing CritiCAL

You may chose to view, print or edit the Critical factor information (CritiCAL) for the HP data file(s) you loaded into the Process Calculation exercise. This is optional. Click here for more information on the [CritiCAL tab](#).



6.3.2.6 Establishing Ball Formula plotting defaults

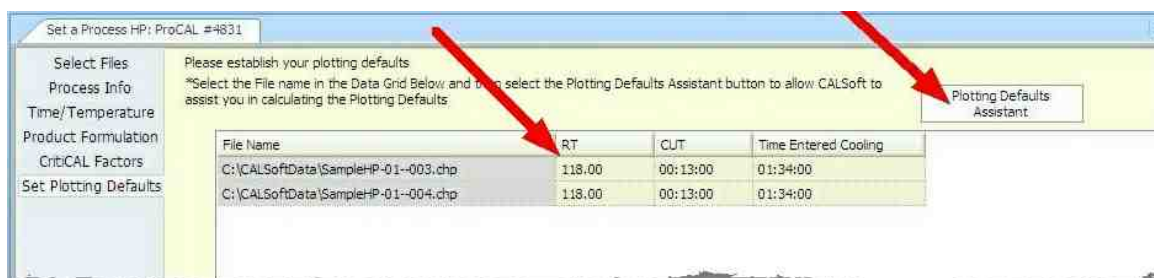
The Ball Formula method uses heating factors to calculate process times. These Heating Factors are generated from the evaluation of heat penetration test data. The time/temperature data for each thermocoupled container is plotted on an inverted, semi-logarithmic graph. This graph is developed based on the Retort Temperature and the Come Up Time experienced by the test containers during the heat penetration test. "Free Leads" are used during the HP test to record the Retort

Temperature around the test containers.

CALSoft helps you determine the Retort Temperature (RT) and Come-Up Time (CUT) that should be used for plotting the heat penetration data. By default, CALSoft will chose the RT and CUT based on the temperatures recorded by the Free Leads in the HP test. You can either:

- (a) choose to accept these values for each HP data file selected
- (b) edit the RT and/or CUT by simply typing over the default values
- (c) or you can use CALSoft's "**PLOTTING DEFAULTS ASSISTANT**" to drill-down and look at each Free Lead separately.

Once you set your CUT and RT, simply chose "NEXT" and begin plotting your data



If you would like CALSoft to help you determine the RT and CUT to use for plotting, click on a certain file to select it and then click "Plotting Defaults Assistant" button. This will launch the assistant and you must:

1. Enter the Retort Temperature that the HP data was collected
2. Enter the Time the retort Entered Cooling during the HP test
3. Then chose EVALUATE FREE LEADS

CALSoft will then calculate

- (1) the time that each FREE LEAD reached the RT (Come Up Time), which will be listed for each Free Lead as the "CUT Calculated", and
- (2) the Retort Temperature that the test containers experienced during the HP test for each FREE LEAD. CALSoft accomplishes this by calculating the average temperature from the time CUT was achieved at that Free Lead until the time that the retort went into Cooling during the HP test. CALSoft will display the "RT Calculated" for each Free Lead.

You can evaluate the information even further by using the Zoom Plotting feature to look at a graph of this time/temperature data for each free lead. This may help you to more accurately decide which CUT and RT to use for Plotting to obtain Ball Formula Heating factors.

Once you have decided on a CUT and RT to use for the plotting, you can either (a) check the Free Lead you would like to use, or (b) enter the information yourself at the bottom. Click "SAVE" when you are done. Complete this exercise for each HP data file that you plan to plot.

Plotting Defaults Assistant
 E:\development\TechniCAL\CALSoft Revision\Sample Files\HP-Sample-1.chp

1 RT Data was Collected 122.70 Time Entered Cool 00:42:20 Evaluate Free Leads

2 Determine CUT and RT

FL #	CUT Calculated	Entered Cooling	RT Calculated	Zoom
☒ 01	00:15:00	00:42:20	122.75	Zoom
☐ 03	00:15:00	00:42:20	122.76	Zoom

Enter the Information below (or Double-Click on the Grid above) to set the Plotting Defaults for this file.

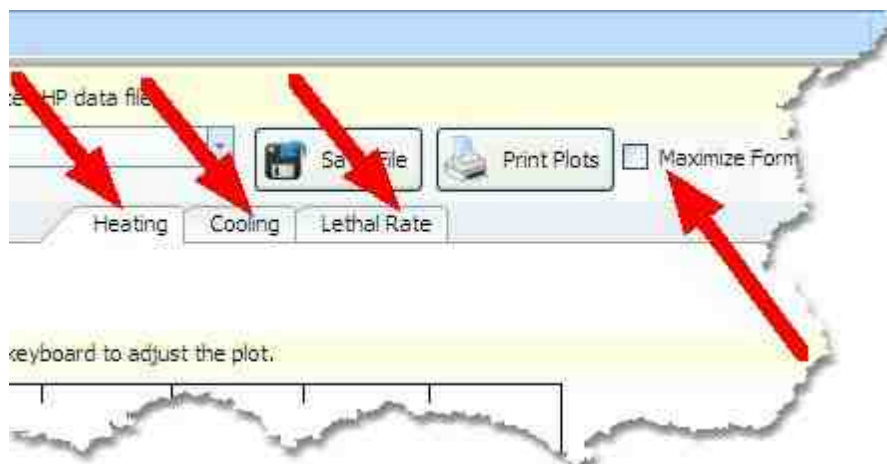
Plotting Default Selected	CUT	Entered Cooling	RT
	00:15:00	00:42:20	122.75

Save Cancel

6.3.2.7 Plotting data

CALSoft allows you the ability to view plotted data for each Heat Penetration data file:

- [Plotting Heating data to get Ball Formula heating factors](#)
- [Plotting Cooling data to get Ball Formula cooling factors](#)
- [Lethal Rate plots](#)



To get the most efficient use of your monitor to display your plot, chose "**Maximize Form Area**" in the top-right corner of the page. This will collapse the tabs on the right side and provide a larger area

to display your plot. Uncheck to disable this option and return to the regular view.

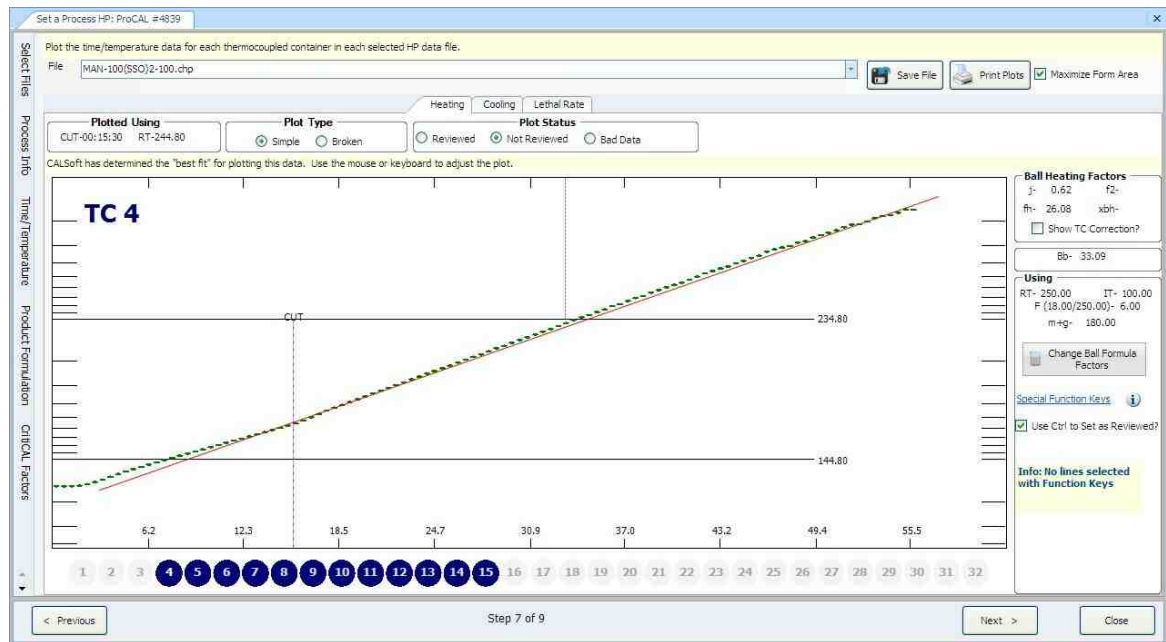
6.3.2.7.1 Plotting Heating data to get Ball Formula heating factors

The Ball Formula method uses heating factors to calculate process times. These Heating Factors are generated from the evaluation of heat penetration test data. The time/temperature data for each thermocoupled container is plotted on an inverted, semi-logarithmic graph. This graph is developed based on the Retort Temperature and the Come Up Time experienced by the test containers during the heat penetration test. The temperatures are plotted on the graph as one or two straight lines on semi-logarithmic paper.

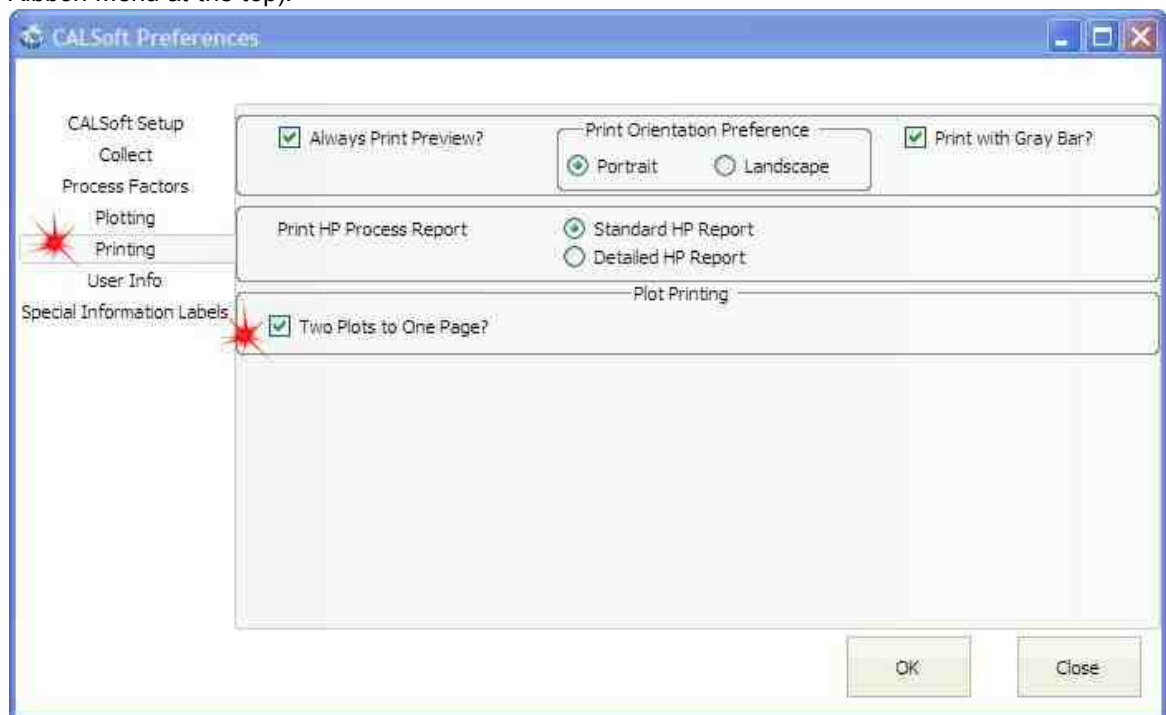
CALSoft generates the graph based on the [PLOTting DEFAULTS](#) established in the previous tab, and then automatically plots the heat penetration data and generates the Heating Factors for each thermocoupled container. To review all of the plotted data, follow these steps:

1. Click on the lead number at the bottom of the Plot screen. The lead numbers are originally identified in Blue circles, but will change to Green once that lead is "reviewed".
2. CALSoft will automatically attempt to plot your data using an algorithm that TechniCAL has developed. In most cases CALSoft will accurately and conservatively plot your data. If CALSoft is unable to plot your data an Autoplot Difficulty dialog box will be displayed.
3. If you need to adjust the line(s) that CALSoft has drawn, move your mouse pointer over the end-point of the line that you would like to move. Click-drag-drop to move the line. When you click and hold the left mouse pointer, the pointer will change to a four-headed arrow signifying that the line can be moved in any direction. Remember, you must click and hold to drag and drop the line end-point.
4. When the lines are in the correct position, click the REVIEWED button under PLOT STATUS at the top. The circle containing the lead number will change to Green signifying that it is reviewed. When REVIEWED status is selected, CALSoft will automatically advance to plotting the next lead.
5. If the data for a particular thermocouple is Bad, click the Bad Data option on the right side of the screen. When Bad data is clicked, CALSoft will not automatically advance to plotting the next lead. You have to select the next lead to plot by clicking on that lead number at the bottom.

For more help with plotting, see the [PLOTting TIPS](#) help section.



To Print TWO PLOTS PER PAGE, set the option in PREFERENCES (click Edit Preferences in the Ribbon Menu at the top).

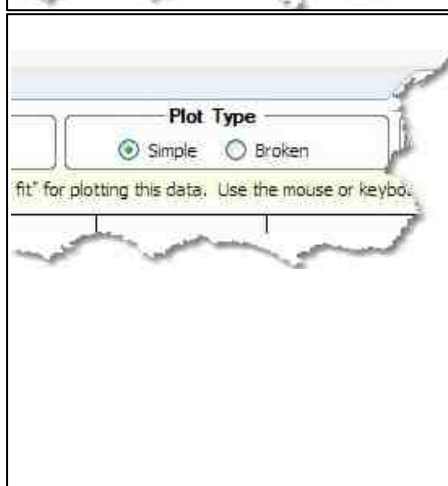


6.3.2.7.1.1 Plotting Tips

CALSoft automatically plots your heat penetration data on inverted, semi-logarithmic graph using the RT and CUT as determined by the user. The following tips will help you better understand how you can use this function in CALSoft:



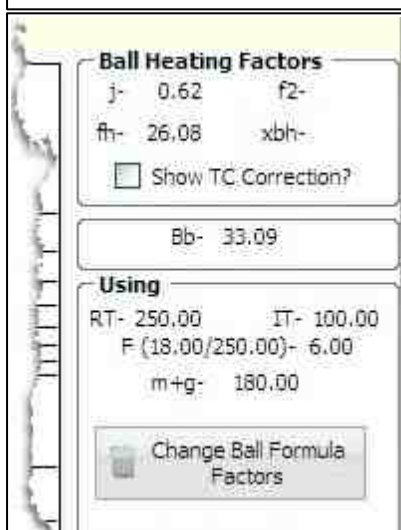
The graph is generated using the Retort Temperature (RT) and Come Up time (CUT) experienced by the test containers. The RT and CUT used to generate the graph is shown under the "Plotted Using" section.



Toggle between "Simple" or "Broken" under PLOT TYPE. to change the plot. CALSoft will automatically choose the best-fit of the line for the plotted data.

Simple Curves represent "straight line heating" and have a single red line to represent the heat penetration data. This line determines the j_h and f_h .

Broken Curves represent heating inside a container that may start very fast, but then slow down over time. This curve uses two lines to represent the heat penetration data. The first line (red) determines the j_h and f_h and the second line (blue) determines the f_2 . The point where the two lines intersect is the x_{bh} .



The Ball Formula method uses heating factors to calculate process times and lethalties. Heating factors (j , f_h , f_x , and x_{bh}) are automatically calculated by CALSoft based on the Simple or Broken line that is fit to the plotted heat penetration data. Heating factors will change as you move the line on the plotted data.

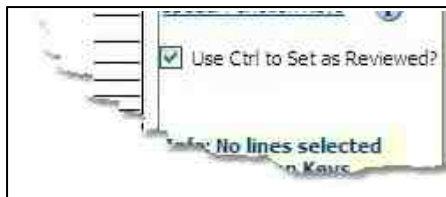
The "Bb" is the Ball Formula calculated cook time using the heating factors derived from the plot, and other factors:

- RT (Retort Temperature for process calculation)
- IT (product Initial Temperature for process calculation)
- $m+g$ (difference between retort temperature and cooling water temperature)
- F value (chosen by Process Authority based on product)

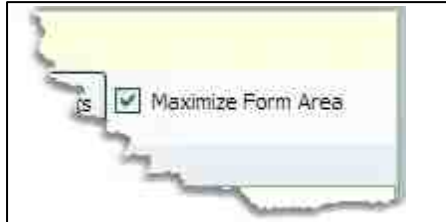
To change these factors, click "Change Ball Formula Factors" button.

NOTE: The Process Factors and RT/IT ranges can be set in PREFERENCES (choose "edit Preferences at top Ribbon Menu) and choose "Process Factors" tab.

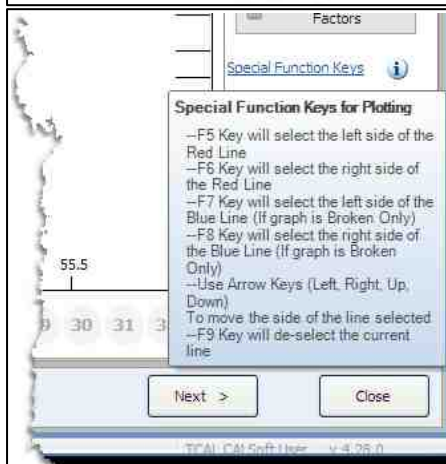
To quickly review plots, you can choose the option to use the **CONTROL** key on your keyboard. When this option is



selected, the plot/lead will be marked as REVIEWED if you pressing the Control key. This makes data evaluation quicker as you do not have to point and click "Reviewed" after you are finished reviewing each plot, you can simply hit the Control key on your keyboard. Uncheck to disable this option.



To get the most efficient use of your monitor to display your plot, chose "Maximize Form Area" in the top-right corner of the page. This will collapse the tabs on the right side and provide a larger area to display your plot. Uncheck to disable this option and return to the regular view.



CALSoft enables you to use your mouse to adjust the lines on the plotted heat penetration data... or you can use the Arrow Keys on your keyboard for a more precise movement of the lines. Hover your mouse over the "Special Function Keys" link and you will see instructions on how to chose the line to move with your Arrow Keys.

6.3.2.7.2 Plotting Cooling data to get Ball Formula cooling factors

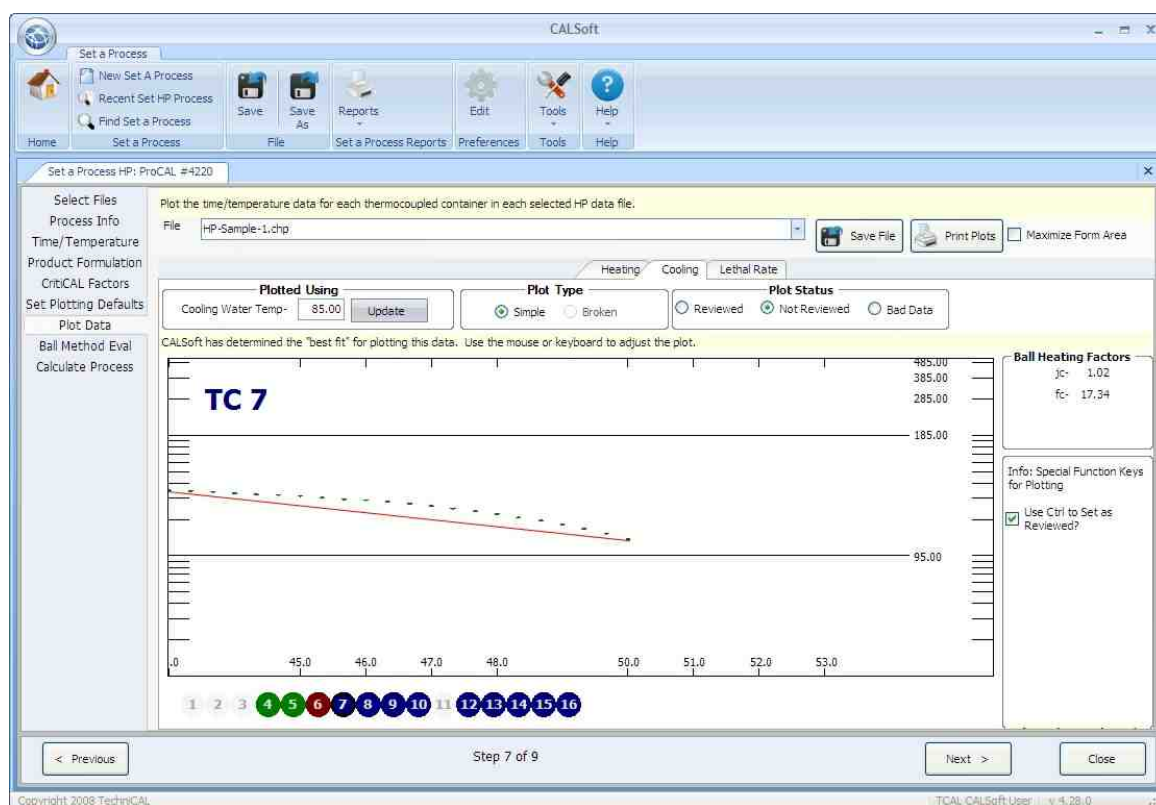
The Ball Formula Method utilizes heating and cooling factors to predict the internal product slowest heating zone temperature. The Ball method makes the assumption that a hyperbolic cooling lag exists during the cooling phase. Therefore, Ball assumes the j_c (cooling lag factor) = 1.41 which represents a hyperbolic cooling lag. Ball also makes the assumption in the calculation that $f_c = f_h$ (slope of linear logarithmic heating = slope of linear logarithmic cooling).

CALSoft gives you the option to plot the cooling data from each heat penetration test and mathematically determine a more specific cooling lag (j_c) and slope of linear logarithmic cooling (f_c). The cooling curve is obtained by plotting the difference between the product temperature and the cooling water temperature. However, unlike plotting heat data, the graph is not inverted and the bottom line of the log scale is labeled one degree above the cooling water temperature, thus the product temperature against time may be plotted directly.

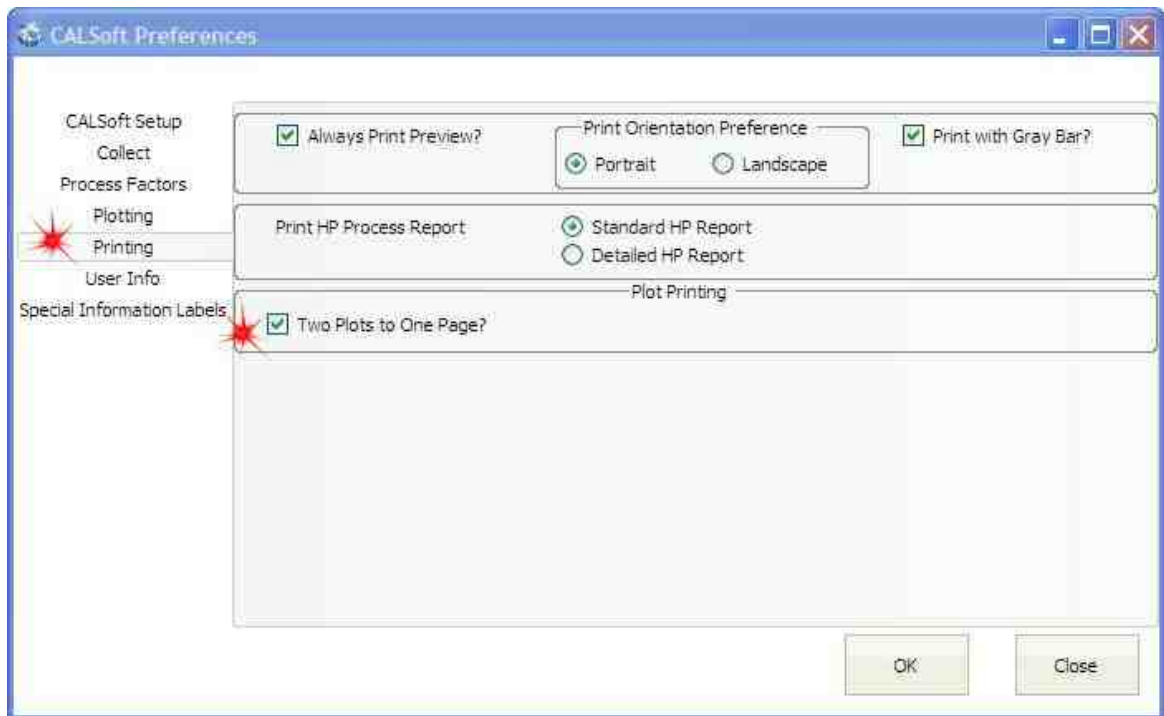
CALSoft generates the graph based on the cooling water temperature that is entered and the "Time Entered Cooling" from the HP test, and then automatically plots the heat penetration data and generates Cooling Factors for each thermocoupled container (assuming cooling data has been

collected during the HP test). To review all of the plotted data, follow these steps:

1. Click on the lead number at the bottom of the Plot screen. The lead numbers are originally identified in Blue circles, but will change to Green once that lead is "reviewed".
2. CALSoft will automatically attempt to plot your data using an algorithm that TechniCAL has developed. In most cases CALSoft will accurately and conservatively plot your data. If CALSoft is unable to plot your data an Autoplot Difficulty dialog box will be displayed.
3. If you need to adjust the line(s) that CALSoft has drawn, move your mouse pointer over the end-point of the line that you would like to move. Click-drag-drop to move the line. When you click and hold the left mouse pointer, the pointer will change to a four-headed arrow signifying that the line can be moved in any direction. Remember, you must click and hold to drag and drop the line end-point.
4. When the lines are in the correct position, click the REVIEWED button under PLOT STATUS at the top. The circle containing the lead number will change to Green signifying that it is reviewed. When REVIEWED status is selected, CALSoft will automatically advance to plotting the next lead.
5. If the data for a particular thermocouple is Bad, click the Bad Data option on the right side of the screen. When Bad data is clicked, CALSoft will not automatically advance to plotting the next lead. You have to select the next lead to plot by clicking on that lead number at the bottom.



To Print TWO PLOTS PER PAGE, set the option in PREFERENCES (click Edit Preferences in the Ribbon Menu at the top).



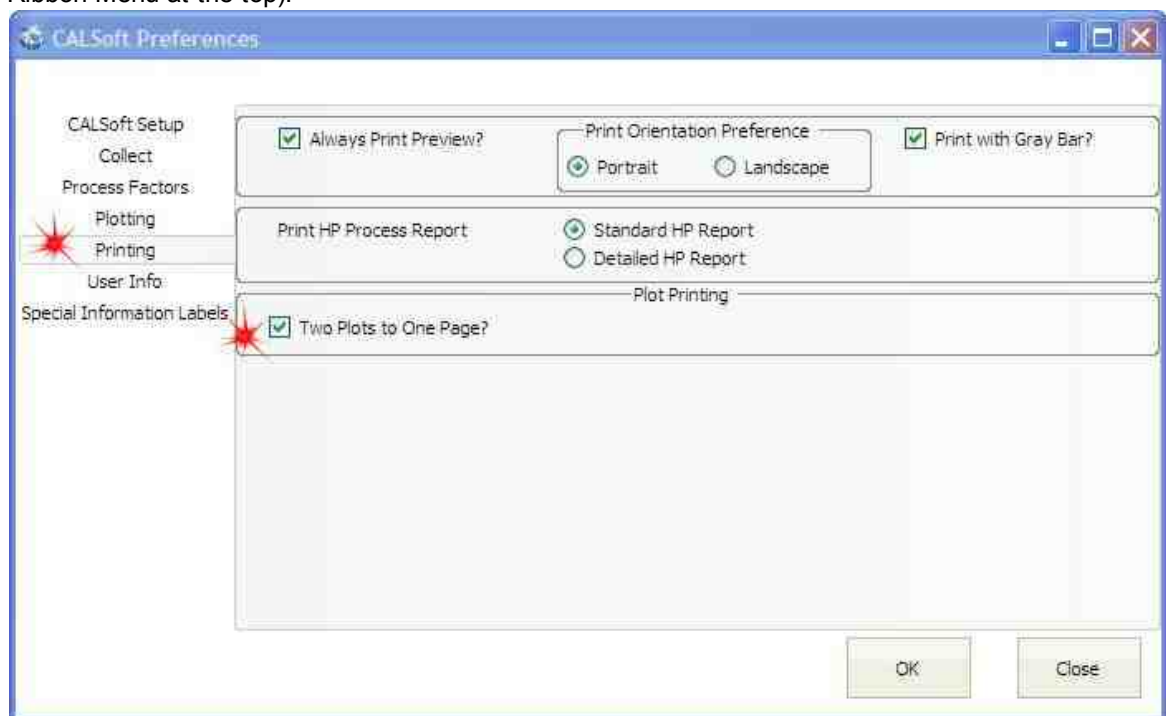
6.3.2.7.3 Lethal Rate plots

CALSoft automatically plots the temperature and lethal rate of each thermocoupled container in each heat penetration test using x, y, and z axes. The x-axis is time (total test duration (heating and cooling)), the y-axis is the temperature reading from that thermocoupled container, and the z-axis is the accumulated lethality (F_0). The plot contains the plotted thermocouple selected over time, and the cumulative F_0 over time. This plot is linear, not logarithmic. The General Method z and T_{ref} used in the accumulated F calculation are listed on the right of the plot, along with the total accumulated F during heating, cooling, and the entire test.

You may also print a "**Lethal Rate Report**" for a specific thermocouple. This report is for a single lead within an HP data file and shows Time/Temperature/Lethal Rate/Cumulative Lethality for each data scan for that particular lead.



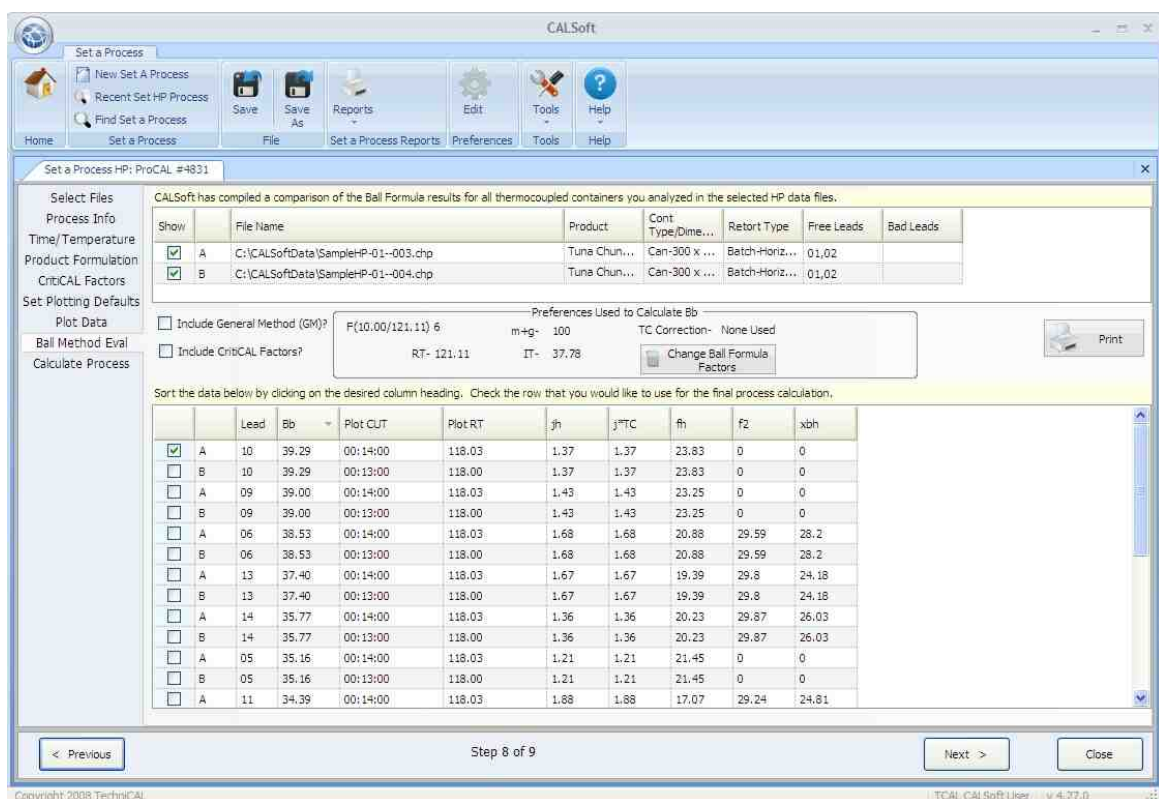
To Print TWO PLOTS PER PAGE, set the option in PREFERENCES (click Edit Preferences in the Ribbon Menu at the top).



6.3.2.8 Using CALSoft to compare factors from multiple HP files for Ball Formula calculation

After all heat penetration data has been plotted and reviewed, CALSoft will display the results of each thermocoupled container on the **"Ball Method Eval"** tab. All heat penetration data files loaded into the current ProCal record are displayed. You have the option to hide/show any of the data files. The Main Grid shows all thermocouples and the heating factors derived from the plotted. Cook times (Bb) are calculated for each using those heating factors and the process factors listed in the "Preferences Used to Calculate Bb" section. Click on "Change Ball Formula Factors" button to change these factors. Once changed, the Bb values will be updated. To help you further compare the results of your evaluated data, CALSoft gives you the ability to add General Method Accumulated lethality values and CritiCAL factors for each thermocouple. Sort the results by clicking on any column heading.

Chose the heating factors from one of the available thermocouples to use in the final process schedule calculation by checking the box next to that thermocouple in the first column. Click "Next" to move to the Process Calculation section.



6.3.2.9 Calculating a Process using Ball Formula

Once the heat penetration data has been evaluated, plotted, and heating factors determined, chose the heating factors to use in the final Process Calculation. CALSoft gives you the ability to use the Ball Formula to calculate a matrix of cook times based on a range of Retort Temperatures and Product Initial Temperatures (within limitations).

- [Process calculation](#)
- [Assignment of Critical Factors](#)
- [Optional Lethality Calculation Report](#)
- [Generating Final Process report](#)

6.3.2.9.1 Process calculation

The heating factors you chose are passed to the "Calculate Process" tab for use in the Ball Formula Process Calculation.

[Click Here to Expand](#)

Product Information: Enter information related to the Product, Processor, Container, and retort for which the process applies to. This information will be used on the printed Process Schedule. On the Process Values tab, the following information can be entered:

Heating Factors: (jh, fh, f2, xbh). By default, these factors came from the thermocouple chosen from the previous tab.

It is important to note that the m+g factor is determined based on your selection of retort. The m+g is the factor used in the Ball Formula that represents the difference between the retort temperature and cooling water. Traditionally, for Steam retorts, the m+g = 180°F (100°C) and for Water retorts, the m+g = 130°F (72.2°C).

The Process Factors and RT/IT ranges can be set in PREFERENCES (chose "edit Preferences at top Ribbon Menu) and chose "Process Factors" tab.

TC Correction: Thermocouple Correction corrects errors in heat penetration measurement caused by conduction of heat along the thermocouple by the introduction of heat into the product by thermocouple fittings. Thermocouple correction values should be used for conduction heating products in containers with diameters equal to or less than 307. If the standard needle type thermocouples applicable for these size cans are used in other size containers, then correction factors should still be used. The correction factor is applied against the jh value. Following are the known correction factors:

Can Diameter	Factor
202	1.36
211	1.16
300	1.10
307	1.06

Come Up Time Credit: 42% of the time entered here will be used in the Ball Formula calculation. Caution should be used when applying Come Up Time credit as limitations exist and should be understood. The application of Come Up Time Credit will be printed on the final Process Schedule.

Process Correction: The value entered here will be treated as a percentage and will extend the calculated cook time by that percentage (a 10 entered here will result in a cook time that is 10% longer than the actual calculated cook time). This correction percentage will be printed on the final Process Schedule.

Process Time Extension : The value entered here will be treated as "minutes" and will extend the calculated cook time by that amount of time (a 10 entered here will result in a cook time that is 10 minutes longer than the actual calculated cook time). You must enter a reason for the process extension. This extension and the reason will be printed on the final Process Schedule.

Product Type: Chose Low Acid Canned Food (LACF), Acidified, or Other will automatically set the z and Tref for the sterility "F" value.

- Choosing LACF: z= 18 and Tref = 250
- Choosing Acidified: z= 16 and Tref = 200
- Choosing "other" will allow you to enter your own z and Tref values.

IT/RT Range: The Ball Formula allows you to calculate a matrix of cook times based on a range of Retort Temperatures and Product Initial Temperatures (within limitations). Enter the high and low values, and the intervals, for the RT and IT that you would like to use in the process calculations.

6.3.2.9.2 Assignment of Critical Factors

CALSoft enables you to assign **Critical Factors** to the calculated process. Critical Factors assigned by the Process Authority are related to the product, container, or retort must be controlled within their limits in order to ensure the safety of the calculated process time. Click on the Critical Factors tab to assign the factors related to this process.

CALSoft transfers the Critical Factors that were recorded in the CritiCAL section for the thermocouple selected as shown below. The Critical factors and their recorded readings from the HP test are listed (in the grey columns) for your reference. You may enter the text in the "Text Used" column (the white column) that you wish to describe the critical factor. Click "ADD" to add a new Critical Factor to the list. To assign the Critical Factor to the process, click the check-box in the first column. You can also re-order the critical factors as you would like them to appear on the printed Process Schedule.

Set a Process HP: ProCAL #4214

The information below will be used to calculate a final thermal process for this product. Please check all information and then click completed

Product Information

Product: Tuna Chunks in Oil
 Processor: ABC Seafood Company
 Location: New Orleans, Louisiana
 Data File Used: C:\CALSoftData\SampleHP-01--004.dhp
 Container Type: Can
 Container Desc: CAN-3 PC STEEL
 Container Dim: 300 x 203
 Container Info: heat pen 1
 Retort Type: Horizontal-Steam
 Retort Manuf: US Boiler Works

T/C # Used: 10

Other Info:

Process Values **Critical Factors**

Inclu...	Name	Value	Units Used	Text Used
☒	Product formulation and preparation	Product formulation and preparation		Product formulation and preparation procedures consistent with those used during the heat penetration tests.
☒	Orientation	Vertical		Orientation: Vertical
☒	Tuna	154	grams	Max Tuna Fill Weight: 154 grams

Step 9 of 9

Print: Standard Detailed

Print Process Time

Close

[Click Here to Expand](#)

NOTE: the first critical factor is set by default to be "Product Formulation & Preparation Procedures". You can change this default in the Preferences section (click "Edit Preference" in the Ribbon Menu at the top).

CALSoft Setup

Collect

Process Factors

Plotting

Printing

User Info

Special Information Labels

Ball Formula Method

IT: 100.00
 RT: 250.00
 TREF: 250.00
 z: 18.00
 F: 5.00
 pc: 0.00
 Include GM in Ball Report? ☐
 TC Correction: None Used

☒ TechniCAL's 9th Deg. Ball Formula (Standard Method)
☐ Modified Ball Formula

General Method

TREF: 250.00
 z: 18.00

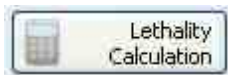
First Critical Factor Record

Name/Value: Product formulation and preparation
 Text: Product formulation and preparation procedures consistent with those used during the heat penetration tests.

6.3.2.9.3 Lethality Calculation

The Lethality Calculation Report is an optional report that can be run from the Calculate Process Tab to return a range of F values for the given Ball Heating factors for a specific Cook Time.

- To run this report select the Lethality Calculation button.



- The report then asks for an Actual Cook Time.

Options

Actual Cook Time

Cook Time

OK Cancel

The report then returns a range of F values for the given Ball Heating factors for the input Cook Time.

LETHALITY CALCULATION
Generated by CALSoft 5.0.2 © 2010 TechniCAL Inc.
Date Printed: Wednesday, May 26, 2010 10:39:13 am

PRODUCT : Tuna in Oil
CONTAINER : Pouch-168 grams-110 mm X 160 mm
RETORT : Horizontal- Steam-ABC Retort Co.
PROCESSOR : ABC Seafood Company
LOCATION : New Orleans, Louisiana
OTHER INFO : First trial run.

ProCAL Record Number : 4914
PROCESS COMPLETED : Process has not been set
FILE NAME & TC# Used : C:\Documents and Settings\mkilroy\Application Data\TCAL\CALSoft
5\Sample\HP-Sample-1.chp TC # =10

CRITICAL FACTORS:
- Product formulation and preparation procedures consistent with those used during the heat penetration tests.

PROCESS VALUES:
jh= 1.22 fh= 22.34 f2= 0.00 xbh= 0.00
jc= 1.41 fc= 22.34 F(10.00/121.11)= 5.00
m+g= 100.00 Come-Up-Time used for Credit Calculation=0.0

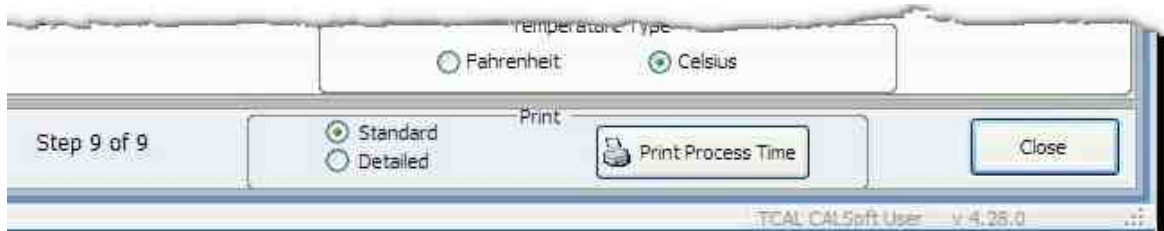
9th Degree Ball Formula Used

I.T. (deg. C)	R.T. (deg. C)	Calculated Lethality F(10.00/121.11)
65.56	121.11	5.766
65.56	122.11	7.122
65.56	123.11	8.802
66.56	121.11	5.876
66.56	122.11	7.258
66.56	123.11	8.966
67.56	121.11	5.989
67.56	122.11	7.398
67.56	123.11	9.138
68.56	121.11	6.106
68.56	122.11	7.539
68.56	123.11	9.313
69.56	121.11	6.226
69.56	122.11	7.688
69.56	123.11	9.492

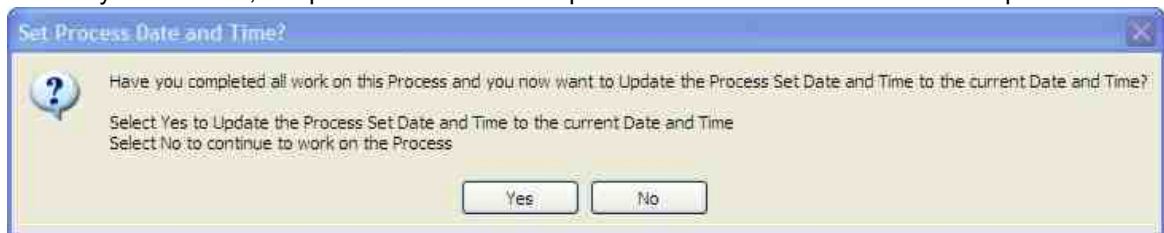
Current Page No.: 1 Total Page No.: 1 Zoom Factor: 100%

6.3.2.9.4 Generating Final Process report

Once the heating factors and process factors have been defined, and the Critical Factors assigned, the process schedule may be calculated using the Ball Formula. Click the **"Print Process Time"** button to generate the process schedule. The process schedule can be printed in Standard or Detailed format.



After clicking "Print Process Time" button, CALSoft will ask if you are completed working on this process. If you click "YES", the process will be "completed" and stamped with the current time/date. If you click NO, the process will remain "Open" and will be considered "Not Completed Yet".



The Process Schedule will be generated and displayed on the screen. You can then print the report to your printer, or you can click the button in the upper left-hand side of the page and export the report to different formats (PDF, Excel, Word, RTF, etc.).

CALCULATED PROCESS TIME
Generated by CALSoft 4.28.0 © 2010 TechniCAL Inc.
Date Printed: Monday, January 11, 2010 3:22:46 pm

PRODUCT : Tunain Oil
CONTAINER : Pouch-168grams-110 mmX 160 mm
RETORT : Horizontal-Water Spray-ABC Retort Co.
PROCESSOR : ABC Seafood Company
LOCATION : New Orleans, Louisiana
OTHER INFO :

ProCAL Record Number : 4221
PROCESS COMPLETED : 1/11/2010 3:22:46PM
FILE NAME & TC# Used : C:\CALSoftData\HP-Sample-1-001.chp TC# =10

CRITICAL FACTORS:
- Product formulation and preparation procedures consistent with those used during the heat penetration tests.

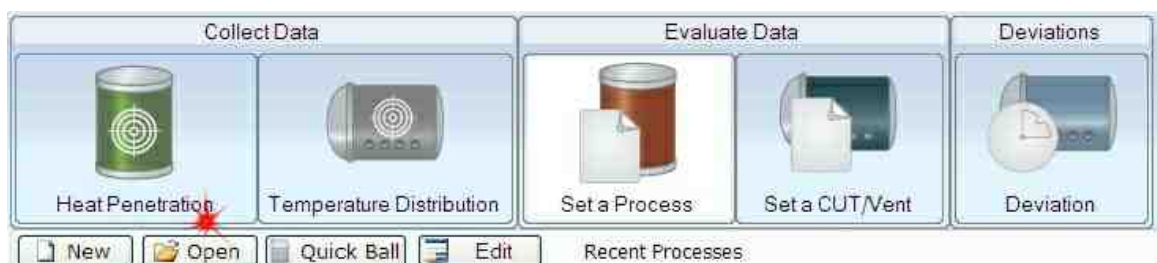
PROCESS VALUES:
jh=1.22 fh=22.34 f2=0.00 xbh=0.00
jc=1.41 fc=22.34 F(10.00/121.11)=6.00
m+g=72.22 Come-Up-Time used for Credit Calculation=0.0 Process Correction=0.00%

9th Degree Ball Formula Used

I.T. (deg. C)	R.T. (deg. C)	Calculated Process Time (minutes)	Calculated Process Time (HH:MM:SS)	Suggested Process Time (minutes)
35.00	119.00	41.30	00:41:18	42.00
35.00	120.00	38.70	00:38:42	39.00
35.00	121.00	36.46	00:36:28	37.00
36.00	119.00	41.18	00:41:11	42.00
36.00	120.00	38.58	00:38:35	39.00
36.00	121.00	36.35	00:36:21	37.00
37.00	119.00	41.06	00:41:04	42.00
37.00	120.00	38.47	00:38:28	39.00
37.00	121.00	36.23	00:36:14	37.00
38.00	119.00	40.84	00:40:57	41.00
38.00	120.00	38.35	00:38:21	39.00
38.00	121.00	36.11	00:36:07	37.00
39.00	119.00	40.82	00:40:50	41.00
39.00	120.00	38.23	00:38:14	39.00
39.00	121.00	36.00	00:36:00	36.00
40.00	119.00	40.70	00:40:43	41.00
40.00	120.00	38.11	00:38:07	39.00
40.00	121.00	35.88	00:35:53	36.00

Date Printed Monday, January 11, 2010 Page 1 of 1

6.3.3 Open Existing Process Calculation



To open and view/edit an existing CALSoft Process Calculation (ProCal Record), there are two

options:

- (1) **double click** on the ProCal record # in the "recently used" list in the MIDDLE PANEL, or
- (2) Click the **"OPEN"** button and use the "Find Fileter" (see below) to find the ProCal Record you want to open.

The record will then load into CALSoft Set Process mode and display all of the information related to that specific ProCal record.

The Find Filter allows you to search the ProCal database for a specific product, CALSoft Heat penetration data file, or specific ProCal record number. The image below is a sample of the "Find Filter" page.

Find Filter

Filter Values

Processor Information

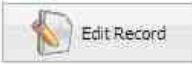
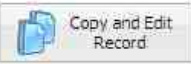
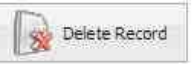
Processor:

Other Information

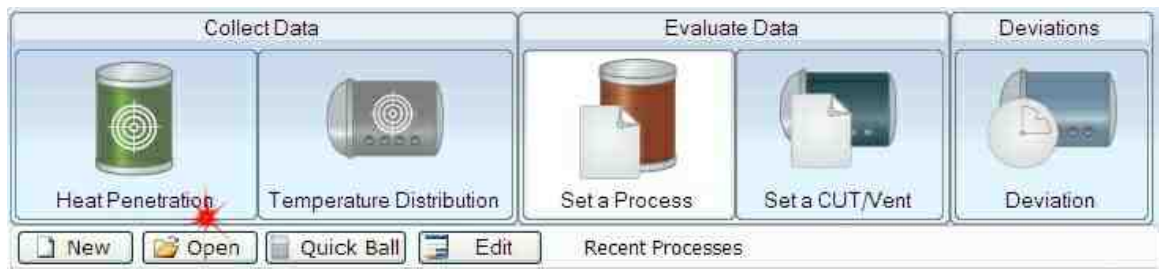
PROCAL #: CSW File Name:

 Filter  Clear

ID	Processor	Location	Container Type	Container Dim	Container Info	Product	Retort Type
----	-----------	----------	----------------	---------------	----------------	---------	-------------

 Edit Record  Copy and Edit Record  Delete Record  Close

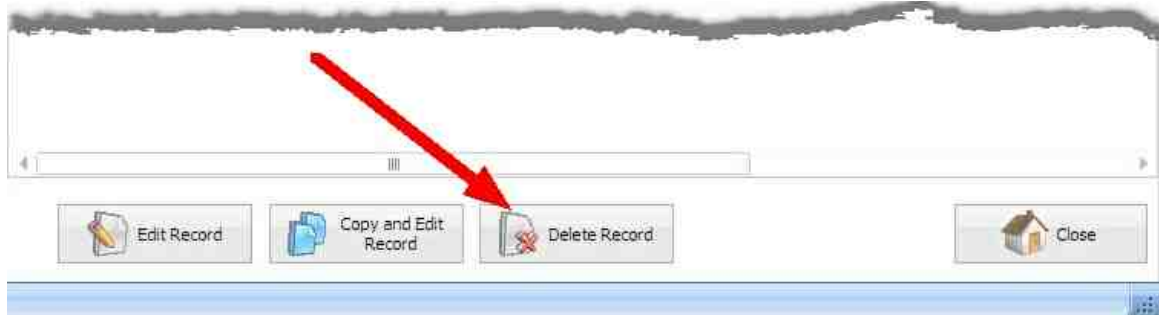
6.3.4 Delete a ProCal Record



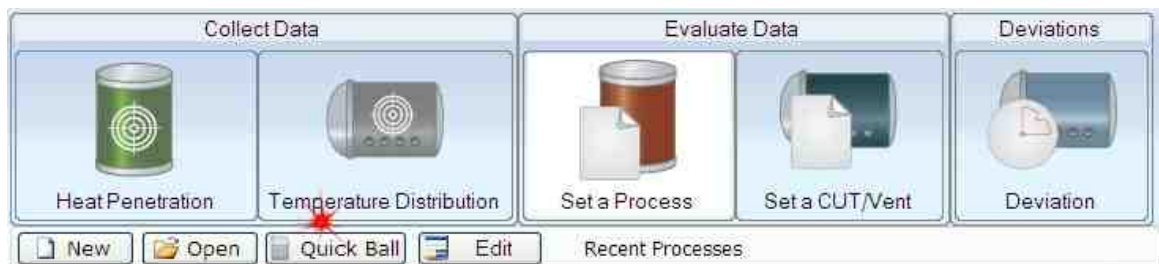
To **DELETE** a Process Calculation (ProCal Record) from the ProCal DataBase, you must follow these steps:

- (1) open the ProCal record
- (2) Click the "Delete Button" at the bottom of the "Find Filter" page.

CALSoft will warn you and then delete the record from the ProCal database upon your approval.



6.3.5 Quick Ball Formula Calculation



Click on the **"QUICK BALL"** button to quickly run a Ball Formula method calculation. You will need to enter the heating factors (j , f_h , f_2 , x_{bh}), F_o , and Retort Temperature and Initial Temperature ranges. Optional information can be added such as product name, container, retort information, and critical factors. CALSoft will save this process calculation as a record in the [ProCal database](#).

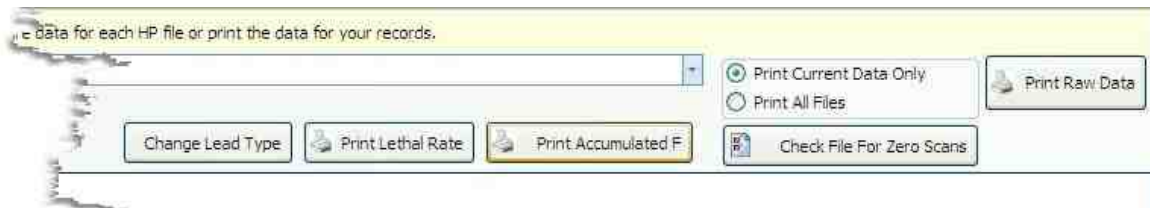
6.3.6 Reports available to help Set A Process

The following Reports are available for to you view/print in order to to assist you in evaluating each Heat Penetration data in the Set A Process section of CALSoft:

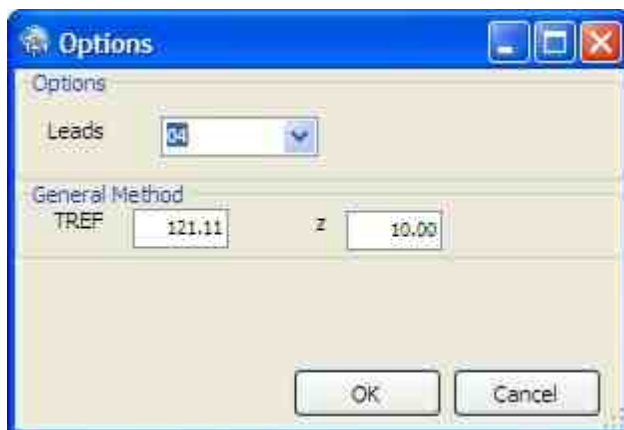
- [Lethal Rate report](#)
- [Accumulated F \(lethality\) report](#)
- [Time/Temperature report](#)
- [Formulations print](#)

6.3.6.1 Print Lethal Rate report

The "**Lethal Rate Report**" is for a single lead within an Heat Penetration data file and shows Time/Temperature/Lethal Rate/Cumulative Lethality for each data scan for that particular lead. This report can be found on the **Time/Temperature tab** for a specific HP data file in Collect-Heat Penetration... or in Set A Process. Click on **Print Lethal Rate** to run this report



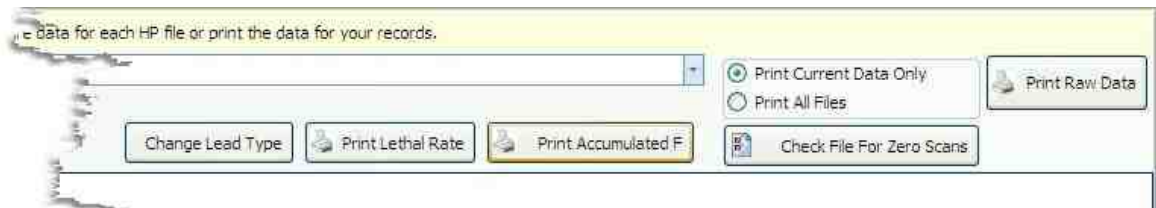
Chose the lead you wish to view the lethal rate report for and the Z and TREF to be used in the calculation.



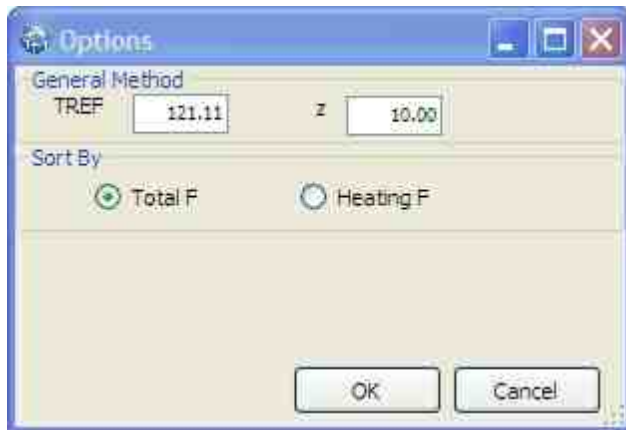
LETHAL RATE REPORT				
Generated by CALSoft 4.28.0 © 2010 TechniCAL inc				
Date Printed: Monday, January 11, 2010 12:19:03 pm				
PRODUCT	: Tuna in Oil			
CONTAINER	: Pouch-168grams-110mm X 160 mm			
RETORT	: Batch-Horizontal-WaterSpray-ABC Retort Co			
PROCESSOR	: ABC Seafood Company			
LOCATION	: New Orleans, Louisiana			
OTHER INFO	: First trial run.			
CALSOFT FILE	: C:\CALSoftData\HP-Sample-1.dhp			
z Value	10.00 deg. C			
Reference Temp	121.11 deg. C			
Process Time (HH:MM:SS)	Temperature (deg. C)	Lethal Rate	Cumulated F (min)	
00:00:00	26.14	0.000	0.00	
00:00:20	26.18	0.000	0.00	
00:00:40	26.61	0.000	0.00	
00:01:00	27.36	0.000	0.00	
00:01:20	27.67	0.000	0.00	
00:01:40	28.20	0.000	0.00	
00:02:00	28.48	0.000	0.00	
00:02:20	28.79	0.000	0.00	
00:02:40	29.28	0.000	0.00	
00:03:00	30.11	0.000	0.00	
00:03:20	31.14	0.000	0.00	
00:03:40	31.94	0.000	0.00	
00:04:00	32.74	0.000	0.00	
00:04:20	33.62	0.000	0.00	
00:04:40	34.38	0.000	0.00	
00:05:00	35.69	0.000	0.00	
00:05:20	37.06	0.000	0.00	
00:05:40	38.15	0.000	0.00	
00:06:00	39.21	0.000	0.00	
00:06:20	40.15	0.000	0.00	
00:06:40	41.25	0.000	0.00	
00:07:00	42.76	0.000	0.00	
00:07:20	44.21	0.000	0.00	
00:07:40	46.30	0.000	0.00	
00:08:00	46.38	0.000	0.00	
00:08:20	47.79	0.000	0.00	
00:08:40	49.21	0.000	0.00	
00:09:00	50.47	0.000	0.00	
00:09:20	51.69	0.000	0.00	
00:09:40	52.91	0.000	0.00	
00:10:00	54.35	0.000	0.00	
00:10:20	55.84	0.000	0.00	
00:10:40	57.54	0.000	0.00	
00:11:00	59.09	0.000	0.00	
00:11:20	60.47	0.000	0.00	
00:11:40	62.21	0.000	0.00	
00:12:00	63.84	0.000	0.00	
00:12:20	65.34	0.000	0.00	
00:12:40	67.17	0.000	0.00	
00:13:00	68.84	0.000	0.00	
00:13:20	70.44	0.000	0.00	
00:13:40	72.00	0.000	0.00	
00:14:00	73.84	0.000	0.00	
00:14:20	75.45	0.000	0.00	
Date Printed: January 11, 2010				
Page 1 of 4				

6.3.6.2 Print Accumulated F report

The "Accumulated F report" will calculate the total cumulative lethality for each lead in a given data file. The total lethality will be broken down into lethality in heating and lethality in cooling. This report can be found on the **Time/Temperature** tab for a specific HP data file in Collect-Heat Penetration... or in Set A Process. Click on **Print Accumulated F** to run this report



Chose the Z and TREF to be used in the calculation and how you want the report sorted.



ACCUMULATED F
 Generated by CALSoft 4.29.0 © 2010 TechniCAL Inc
 Date Printed: Sunday, January 24, 2010 1:17:12 pm

PRODUCT : **Tuna in Oil**
 CONTAINER : Pouch-168 grams-110 mm X 160 mm
 RETORT : Batch-Horizontal-WaterSpray-ABC Retort Co
 PROCESSOR : ABC Seafood Company
 LOCATION : New Orleans, Louisiana
 OTHER INFO : First trial run
 CALSOFT FILE : E:\development\TechniCAL\CALSoft Revision\Sample Files\HP-Sample-1.chp

z Value : 10.00 deg. C
 Reference Temp : 121.11 deg. C
 RT : 122.00 deg. C
 Come-Up Time : 00:00:00 minutes
 Heating Time (including CUT) : 00:42:20 minutes
 Sorted by Total F Ascending

	Lead Type	IT (deg C)	Heating F (min)	Cooling F (min)	Total F (min)
10	TC	25.91	4.20	2.84	7.04
06	TC	26.16	4.42	2.82	7.24
07	TC	26.41	5.59	2.30	7.89
16	TC	26.25	5.34	2.92	8.26
05	TC	26.23	5.79	2.65	8.44
08	TC	25.88	5.52	3.14	8.66
04	TC	26.14	6.38	2.73	9.11
12	TC	26.43	7.12	2.09	9.21
09	TC	26.34	6.99	2.91	9.90
14	TC	26.25	7.87	2.51	10.38
13	TC	26.26	7.70	3.03	10.73
15	TC	26.78	8.12	2.68	10.80
03	Free	28.31	40.97	1.65	42.62
01	Free	28.39	41.02	1.73	42.76

Values of 999.00 indicate that the F value is greater than 1000.
 The General Method Estimated Process Times include the Test Come-Up Time.

The General Method F values listed above are calculated in CALSoft using the Trapezoidal Method with the factors z= 10.00 deg. C and Tref=121.11 deg. C.

6.3.6.3 Print Time/Temperature report

The "Raw Data report" will print the time/temperature data from the HP test. Any LOG-DATA entered will also be included on the printout. This report can be found on the **Time/Temperature tab** for a specific HP data file in Collect-Heat Penetration... or in Set A Process. Click on **Print Raw Data** to run this report

e data for each HP file or print the data for your records.

☒ Print Current Data Only
☐ Print All Files

The TYPE of Lead and any Calibration Factors (and reference temperature used during the calibration) applied to this file will show up at the top of the report.

THERMOCOUPLES														
TYPE	1	3	4	5	6	7	8	9	10	12	13	14	15	
CALIB	FL	FL	TC	TC	TC	TC	TC	TC	TC	TC	TC	TC	TC	TC
	0.14	0.11	-0.02	0.02	-0.01	0.11	-0.06	-0.06	-0.01	0.04	-0.04	0.01	0.01	0.01
Calibration Reference Temperature	122.00													
(hh:mm:ss)														
00:00:00	28.39	28.31	26.14	26.23	26.16	26.41	25.88	26.34	25.91	26.43	26.26	26.25	26.78	26.78
00:00:20	28.39	28.31	26.14	26.23	26.16	26.41	25.88	26.34	25.91	26.43	26.26	26.25	26.78	26.78

At the end of the report, CALSoft will calculate the total cumulative lethality for each lead in that data file. The total lethality will be displayed at the end of the report and will be broken down into lethality in heating, cooling, and total.

00:45:10	95.45	83.57	89.58	101.35	108.06	100.33	103.75	99.00	100.20	107.47	94.20	96.12	104.50	
00:50:00	53.58	51.70	97.81	99.70	103.60	98.74	101.96	97.76	103.62	88.33	99.72	92.20	94.22	102.99
Cooling F:		2.73	2.65	2.82	2.30	3.14	2.91	2.84	2.09	3.03	2.51	2.68	2.92	
Heating F:		6.38	5.79	4.42	5.59	5.52	6.99	4.20	7.12	7.70	7.87	8.12	5.34	
Total F:		9.11	8.44	7.24	7.89	8.66	9.90	7.04	9.21	10.73	10.38	10.80	8.26	
The General Method F values listed above are calculated in CALSoft using the Trapezoidal Method with the factors z=10 and Tref=121.11.														

6.3.6.4 Print Formulations

The "Formulation" will print the time/temperature data from the HP test. Any LOG-DATA entered will also be included on the printout. This report can be found on the Time/Temperature tab for a specific HP data file in Collect-Heat Penetration... or in Set A Process. Click on **Print Raw Data** to run this report



PRODUCT FORMULATION
 Generated by CALSoft 4.25.0 © 2010 TechniCAL Inc
 Date Printed: Monday, January 11, 2010 12:36:20 pm

PRODUCT : Tuna in Oil
 CODE : TUNA-A5
 FORMULATION# : 1234-99
 CONTAINER : Pouch-168grams-110 mmX 160mm
 RETORT : Horizontal-Water Spray-ABC Retort Co
 PROCESSOR : ABC Seafood Company
 LOCATION : New Orleans, Louisiana
 TEST DATE/TIME : 10-22-09 12:10:27
 NOTES : First trial run.
 FILE NAME : C:\CALSoftData\HP-Sample1.chp

Ingredient	Normal Production		Heat Penetration Test
	%	Grams	Grams
Tuna	80	120.00	120.00
Oil	10	20.00	20.00
Water/Brine	10	20.00	30.00
TOTALS:	100	150.00	150.00

Product Formulation Notes:

Date Printed 1/11/2010

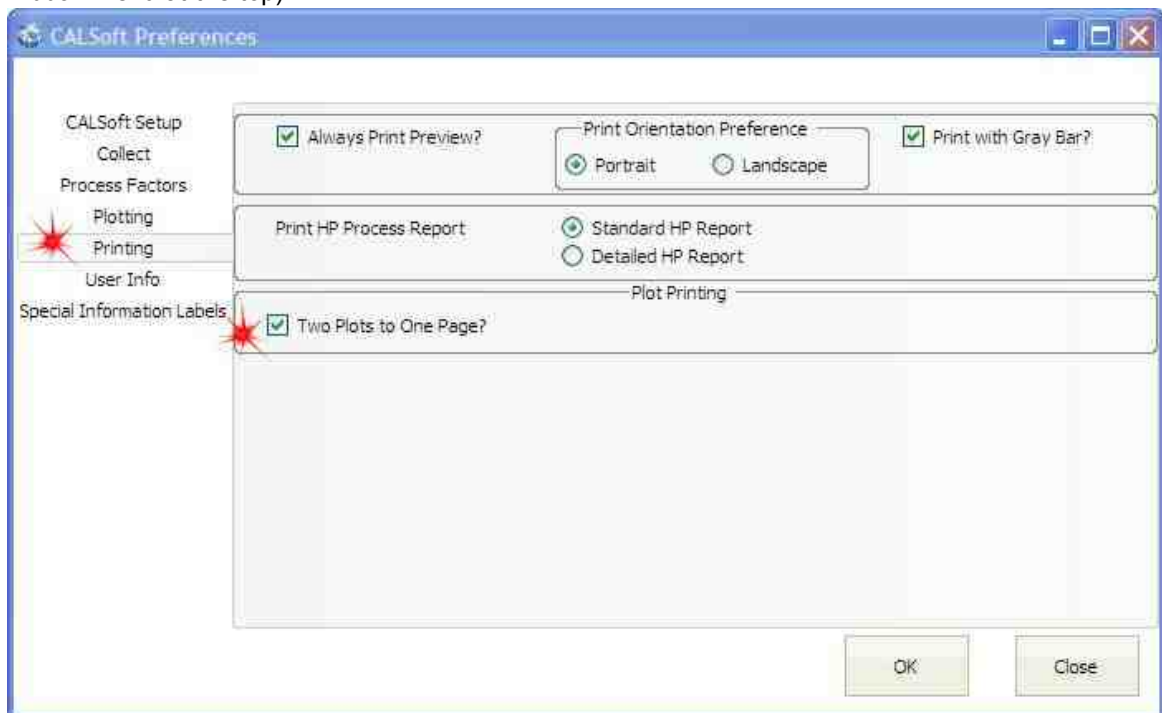
Page 1 of 1

6.3.6.5 Print Plots

The **"Print Plots"** button will print the plotted data that is displayed on the PLOTS tab in the Set A Process section. Click on **Print Plots** to run this report.



To Print TWO PLOTS PER PAGE, set the option in PREFERENCES (click Edit Preferences in the Ribbon Menu at the top).



Part



VII

7 Evaluate Data- Set a CUT/Vent



CALSoft enables you to evaluate temperature distribution data and Set A Come Up Time (CUT) or Venting Schedule.

- [What is Setting a CUT / Vent?](#)
- [Overview- Main Set A Process Dashboard](#)
- [Reports available to help Establish a Vent or CUT](#)

7.1 What is Setting a CUT / Vent?

Retort sterilizers must operate properly in order to deliver a safe thermal process to canned foods. In order to accomplish this successfully:

- (1) the adequate removal of air from the retort must be accomplished prior to the cook phase starting... and...
- (2) Temperature uniformity/stability must be achieved and maintained during the cook phase

"Setting a Come Up Time (CUT) or Venting Schedule" refers to the task evaluating Temperature Distribution data in order to validate these two items are successfully achieved in the retort. .

CALSoft enables you to Set a CUT or Vent schedule by providing tools that assist you in evaluating temperature distribution data as follows:

1. Establish a TD ProCal record
2. Load Temperature Distribution (TD) Files to be evaluated
3. For each TD file, review time/temperature data,
4. For each TD file, review the lead locations
5. For each TD file, review lethal rate plots
6. For each TD file, evaluate the temperatures using Zoom Plotting
7. Compare the minimum and maximum readings from the TD tests
8. Assign conditions to the final CUT/Vent schedule
9. Determine & print a CUT/Vent schedule

7.2 Overview- Main Set A CUT/Vent Dashboard

Click on "**Set A CUT/Vent**" button in the Main Section and the **MIDDLE PANEL** will populate and display the last 5 "recently used" Records that were established in CALSoft.

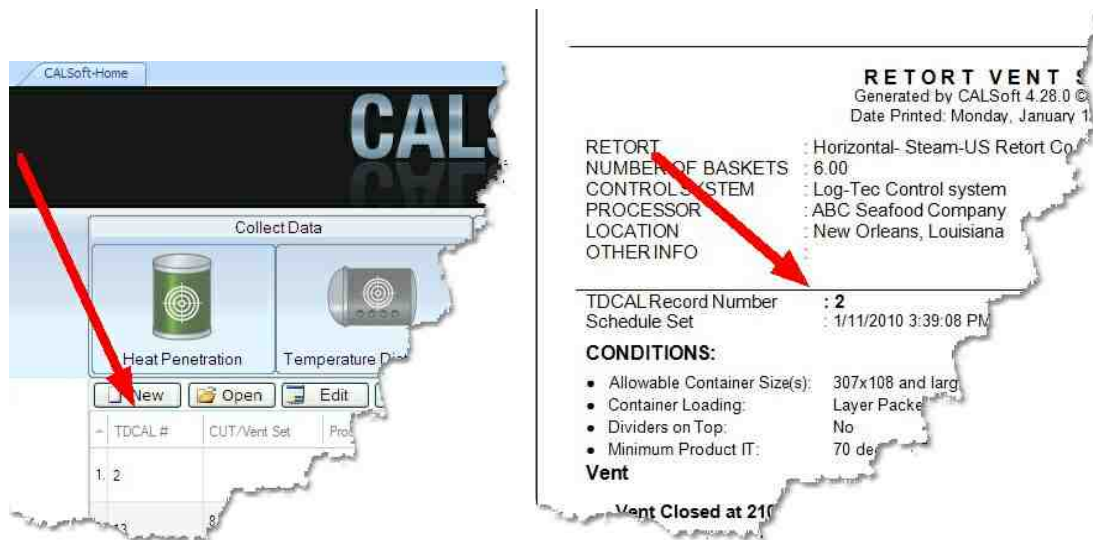


- [The CUT/Vent \(TD-Cal\) Database](#)
- [New CUT/Vent](#)
- [Open Existing CUT/Vent](#)
- [Delete a CUT/Vent Record](#)

7.2.1 The CUT/Vent (TDCal) Data-Base

When you "Set a CUT/Vent" using CALSoft, the information related to the process is stored in a database referred to as the "TD-Cal Database". For more information related to the database file and it's location, see [Process Database](#).

When you begin to Set A CUT/Vent establishment project with CALSoft, a new record is created in the TD-Cal Database. This is referred to as the TD-Cal Record Number and is the main reference to that Process Calculation. The TD-Cal Record Number is displayed on the final printed Process Schedule report and also on the main dashboard of the Set A Process page.



7.2.2 New CUT/Vent



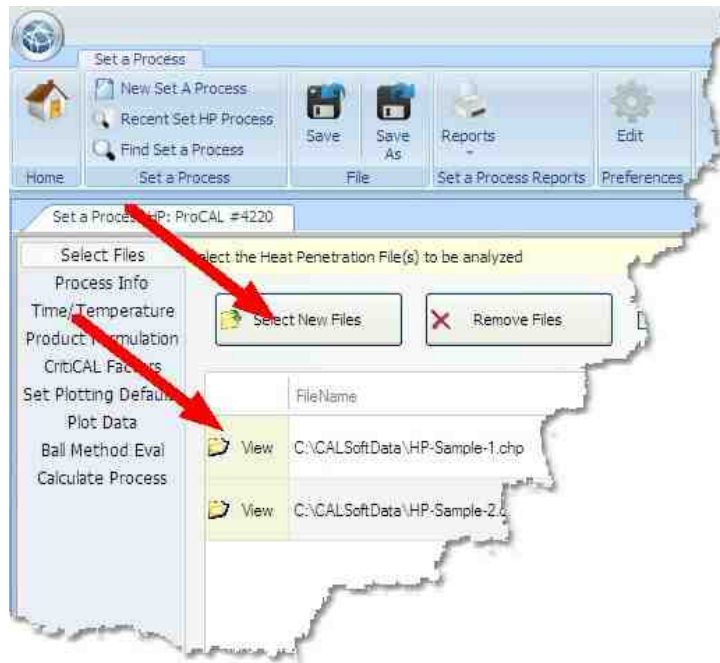
CALSoft offers users the ability to easily evaluate the temperature distribution data and establish a Come Up Time (CUT) or Venting Schedule. Chose the "**Set A CUT/Vent**" section and click on the "**NEW**" button to begin a NEW CUT/Vent project. CALSoft will then create a NEW TD-Cal record in the database. Once the TD-Cal record is set up, you can begin the process of evaluating the data and then finally establishing the CUT/Vent schedule. The steps are as follows:

- [Loading TD files to evaluate](#)
- [Set up Basic TD Informtion](#)
- [Viewing/printing/Editing Time/Temperature data](#)
- [Viewing/Printing/Editing Lead location diagrams](#)
- [Viewing Plotted data](#)
- [Using CALSoft to conduct a Min/Max analysis of all TD data](#)
- [Establishing a Vent/CUT scheudle](#)

7.2.2.1 Loading TD files to evaluate

When starting a NEW CUT/Vent establishment project, the first step after the TD-CAL record is established is to load the temperature distribution file(s) you wish to evaluate in order to establish a CUT/Vent Schedule. CALSoft allows you to load multiple temperature distribution files into one CUT/Vent exercise (TD-Cal record). Click on "**SELECT FILE**" and find the TD data files you wish to

evaluation. Once a TD data file is loaded, you can Double Click on "VIEW" to see the contents of that file.



T

7.2.2.2 Set up Basic TD Information

Once the data files are chosen for evaluation, you will be asked to enter the basic information related to this Retort. You can either (a) manually enter the Processor and Retort information, or you can (b) chose to use the information that is already in one of the TD data files that was previously loaded by selecting that file from the File Selector drop-down menu. Once a file is loaded, you can edit any of the information that populates the form. This information will be used on the final Come Up Time/Vent Schedule report.

Set a CUT/Vent: TDCAL #4

Select Files

TD Info

Enter the Information below to be used in establishing the CUT/Vent for this retort.

* Please select from the File Selector to quickly set the values below. The below values are also editable.

File

Retort

☒ Batch ☐ Continuous

Type

Manfr/Model Retort #

of Baskets Layers Jumbled

Control System

Temperature Type

☐ Celsius ☒ Fahrenheit

Processor

Plant Name

Location

Other Info

< Previous

Step 2 of 7

Next >

Close

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7.2.2.3 Viewing/printing/Editing Time/Temperature data

The Time/Temperature tab functionality in Set A CUT/Vent is the same as in Set A Process section.

[Click here to view the help.](#)

Set a CUT/Vent: TDCAL #2

Select Files

TD Info

File

Print Current Data Only

Print All Files

Print Raw Data

Print Lead Rate

Print Accumulated R

Check File For Zero Scale

Time

Time	01	02	03	04	05	06	07	08	09	10	11	12	13
00:00:00	92.77	95.44	91.30	88.60	82.88	80.71	86.91	86.79	86.79	87.01	87.11	89.72	
00:00:30	133.59	128.99	95.46	88.68	82.73	80.52	86.93	86.86	86.79	87.08	87.54	89.92	
00:01:00	158.10	148.94	100.11	88.51	82.80	81.09	86.91	86.77	86.59	87.09	88.50	89.22	
00:01:30	169.62	160.01	123.98	88.35	82.56	81.52	86.78	86.76	86.72	87.03	88.81	88.89	
00:02:00	177.24	168.85	138.51	88.23	82.58	82.27	86.99	86.87	86.74	87.09	89.33	88.71	
00:02:30	183.77	175.68	151.85	88.01	82.66	84.12	87.14	86.79	86.69	87.14	91.73	89.92	
00:03:00	188.34	181.75	162.95	87.96	82.84	85.40	87.31	86.95	86.77	87.24	92.05	89.82	
00:03:30	192.17	186.90	171.38	87.84	83.13	86.34	87.36	86.89	86.77	87.22	93.84	89.01	
00:04:00	195.12	191.04	179.06	87.74	83.50	91.88	87.69	87.02	86.80	87.29	96.68	89.14	
00:04:30	197.99	194.25	184.16	87.72	84.02	97.47	88.14	87.09	86.89	87.37	99.03	89.94	
00:05:00	199.52	196.89	189.49	87.71	84.79	102.31	88.32	87.30	86.92	87.42	105.73	89.44	
00:05:30	201.41	199.96	199.34	87.64	85.96	107.23	88.61	87.64	87.03	87.54	109.72	89.57	
00:06:00	203.00	200.92	199.89	87.64	87.85	118.78	89.11	87.95	87.03	87.72	113.83	89.93	
00:06:30	204.43	202.63	194.04	87.74	89.74	132.89	90.01	88.37	87.24	88.00	121.46	90.35	
00:07:00	205.81	204.08	197.19	87.64	92.11	149.43	90.82	89.07	87.35	88.95	128.13	90.77	
00:07:30	206.62	205.27	200.91	87.78	92.69	166.72	92.29	90.22	87.47	89.81	154.04	91.12	
00:08:00	207.49	206.40	199.99	87.87	96.81	181.78	96.24	91.59	87.60	92.90	172.62	91.77	

< Previous

Step 3 of 7

Next >

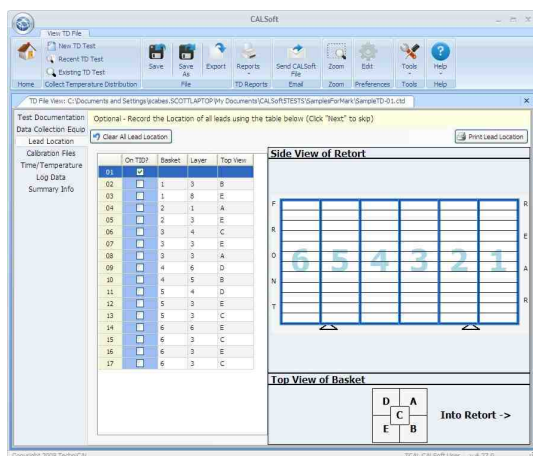
Close

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7.2.2.4 Viewing/Printing/Editing Lead location diagrams

CALSoft allows you the option to review the location of your Temperature Distribution leads in the retort. Click here to see the ["Lead Location" tab in TD Data Collection](#).



7.2.2.5 Viewing Plotted data

CALSoft allows you the ability to view plotted data for each Temperature Distribution data file:

[Min/Max Plot](#) [Pre-CUT Plot](#) [Zoom Plot](#)

[Pre-CUT Plotted data](#)

[Zoom Plot](#)



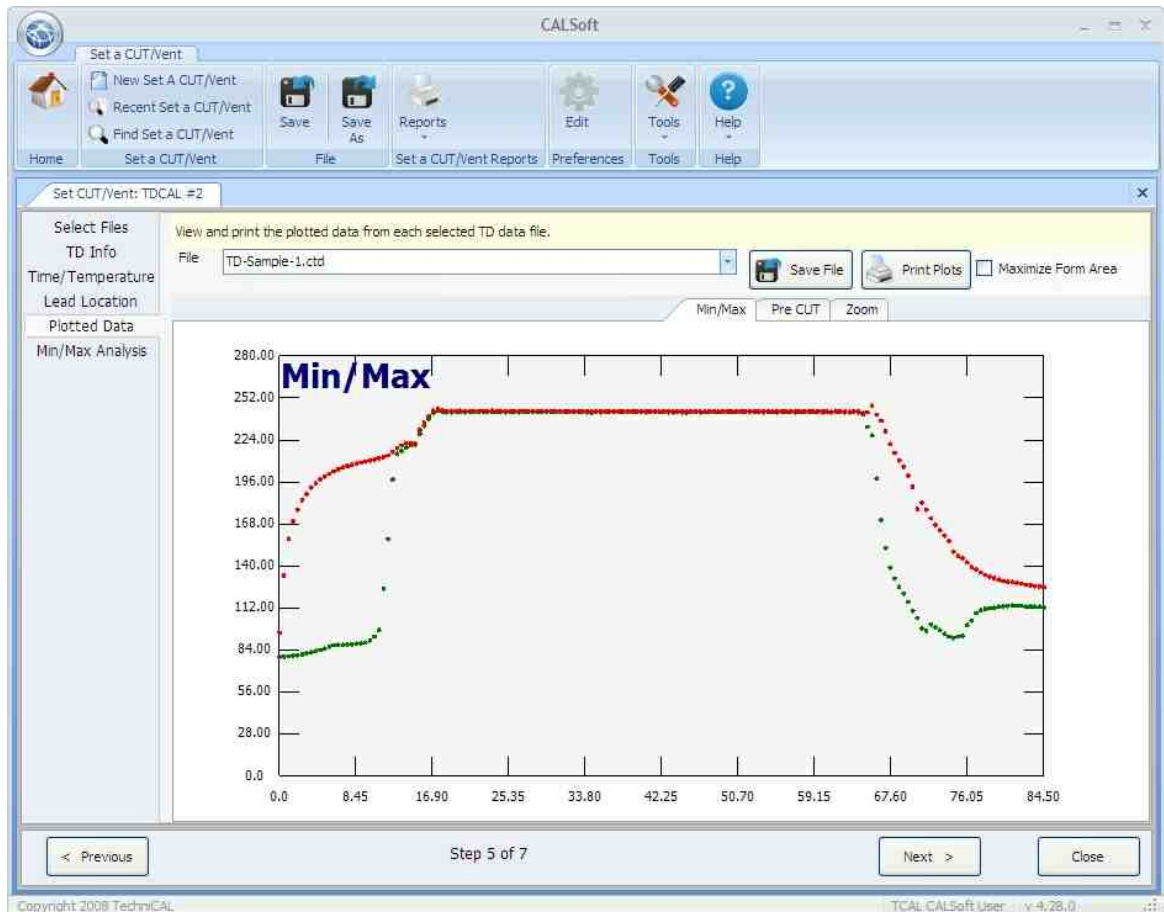
To get the most efficient use of your monitor to display your plot, chose **"Maximize Form Area"** in the top-right corner of the page. This will collapse the tabs on the right side and provide a larger area to display your plot. Uncheck to disable this option and return to the regular view.

7.2.2.5.1 Min/Max Plotted data

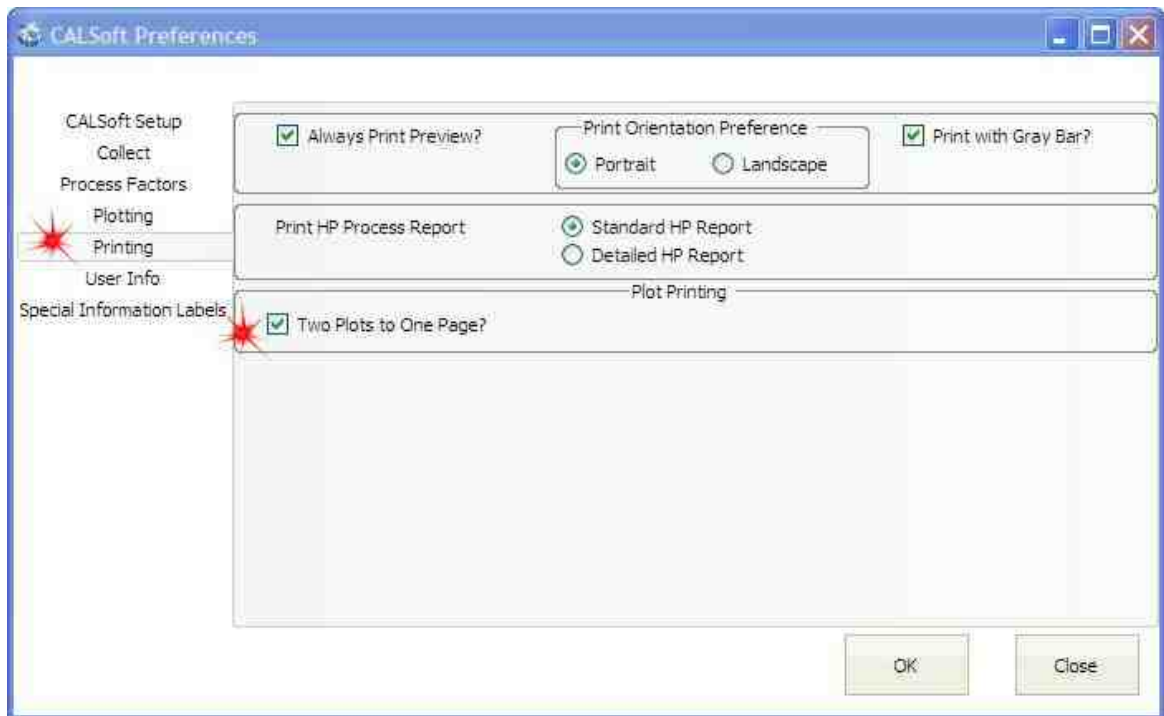
For each Temperature Distribution data file, CALSoft will plot the "Min/Max" readings for each scan. This plotted data will help you to visually evaluate the difference in the high and low temperatures in the retort during the cycle that was tested.

It should be noted that only those leads that are classified as free leads will be used in performing the Min/Max analysis. If your leads are not correctly classified, then [go to the Time Temperature Tab and click "Change Lead Type"](#).

[Click here to learn how to include "Log Entries" on the Min/Max or Min/Min printed plots](#)

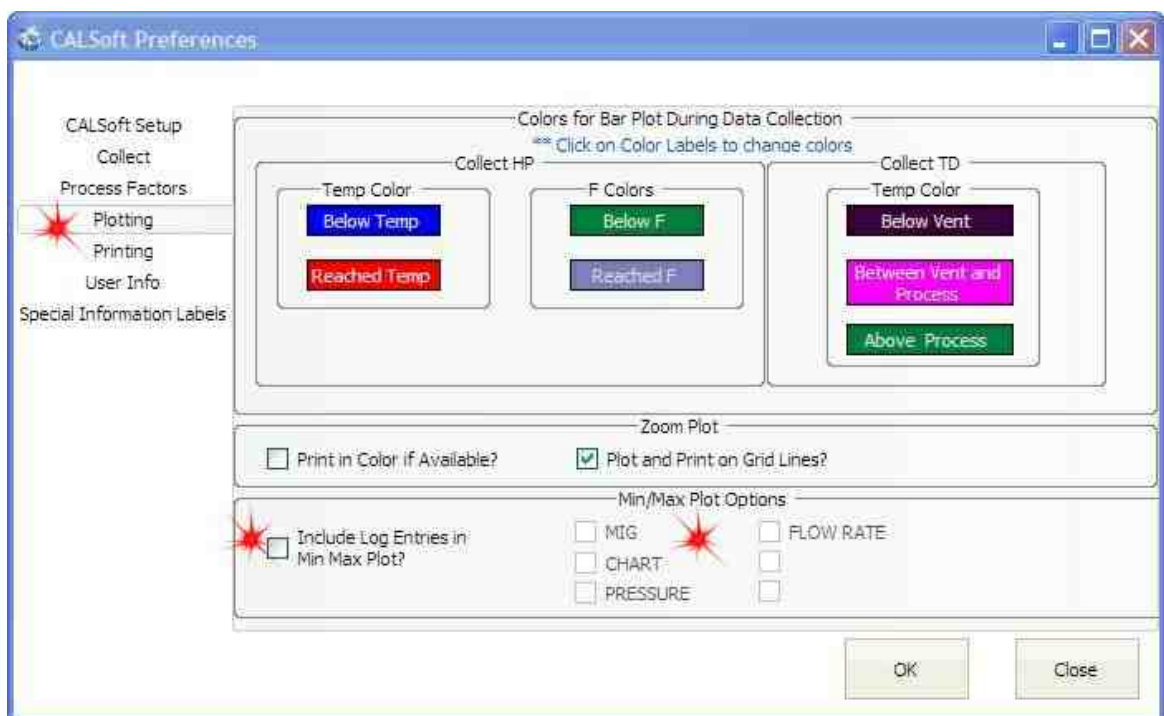


To Print TWO PLOTS PER PAGE, set the option in PREFERENCES (click Edit Preferences in the Ribbon Menu at the top).



7.2.2.5.1.1 Add Log Entries to Min/Max printout

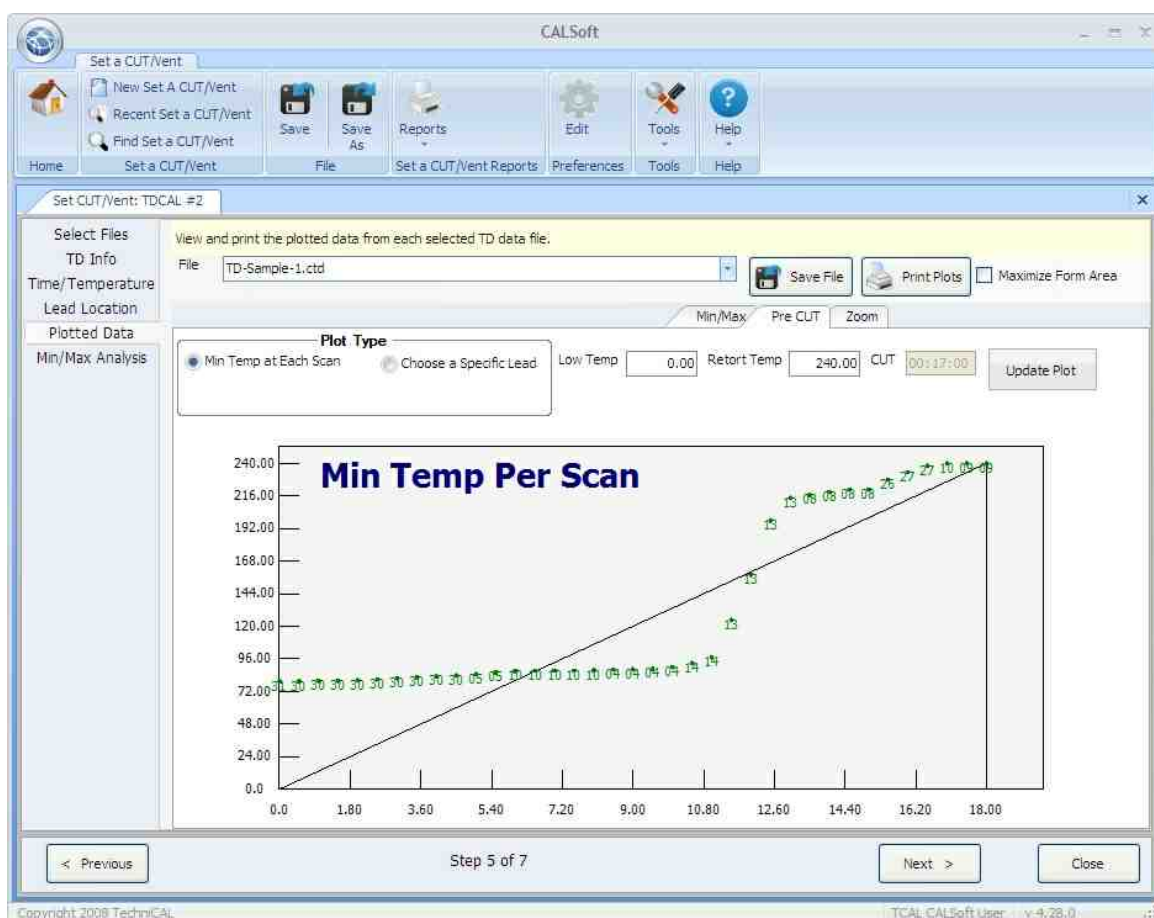
To add "**Log Entries**" to a **Min/Max or Min/Min printout**, set the option in Preferences (chose the Edit Preferences option in the Ribbon Menu)...



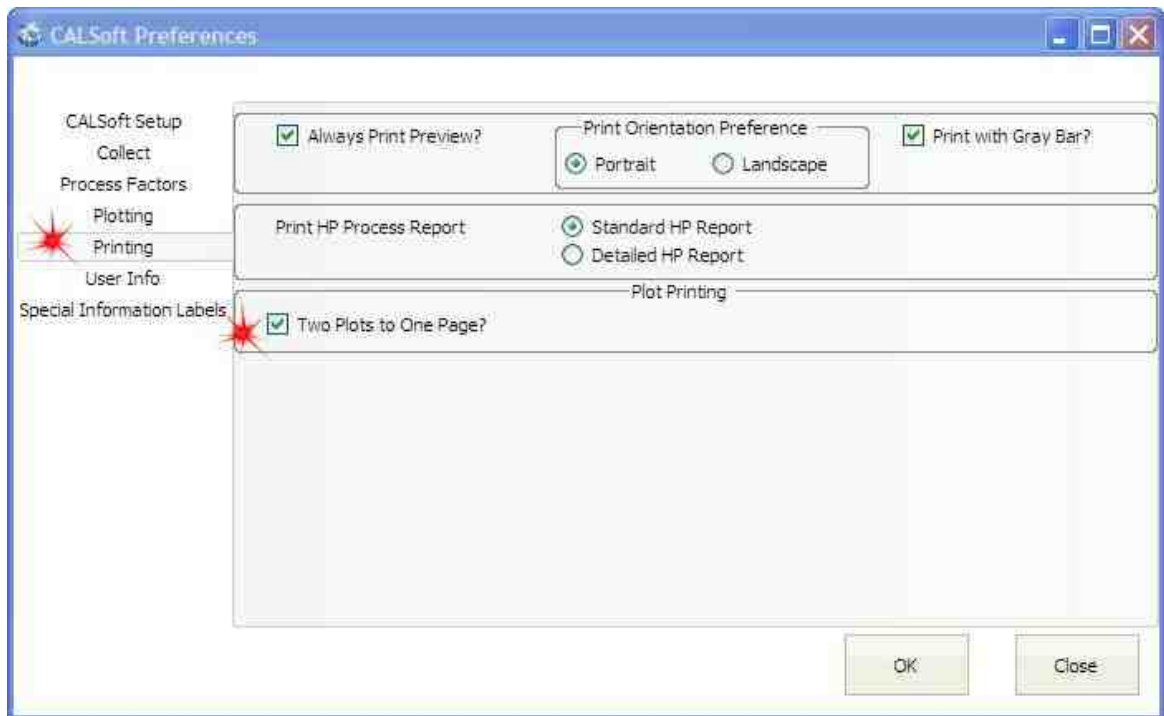
7.2.2.5.2 Pre-CUT Plotted data

For each Temperature Distribution data file, CALSoft will plot the "Pre-CUT" Plot. To generate this plot, CALSoft determines the minimum temperature at each scan and plots that related to the Come Up Time (CUT) on a time/temperature grid. A straight-line is then plotted from the start of the test through the Come Up Time (CUT). When properly used, this Pre-CUT plot will help you to determine if come up time credit can be used in the ball formula calculation.

It should be noted that only those leads that are classified as free leads will be used in performing the "Pre-Come Up" analysis. If your leads are not correctly classified, then [go to the Time Temperature Tab and click "Change Lead Type"](#).



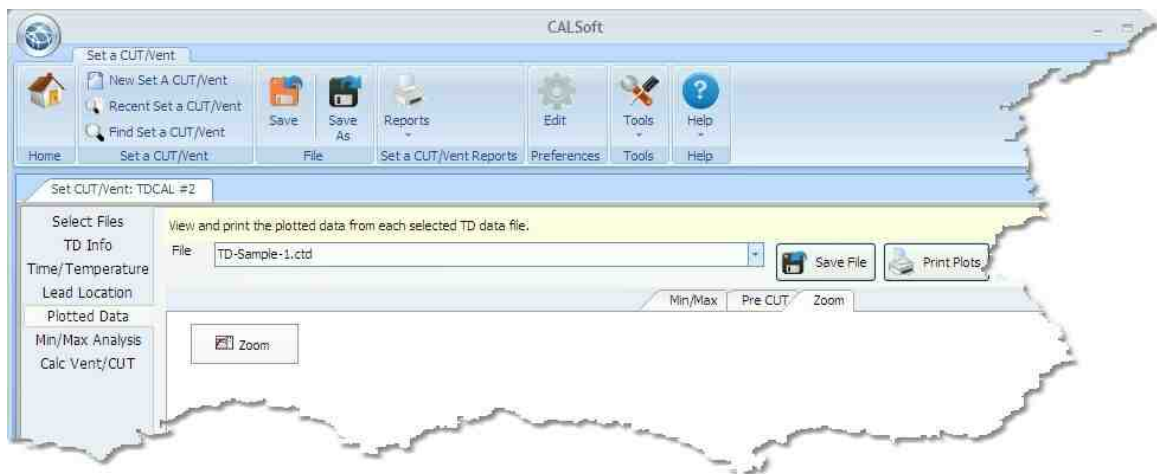
To Print TWO PLOTS PER PAGE, set the option in PREFERENCES (click Edit Preferences in the Ribbon Menu at the top).



7.2.2.5.3 Zoom Plot

Click on the **"Zoom"** tab and then the **ZOOM BUTTON** to access CALSoft's unique graphing feature. CALSoft's "Zoom" utility plots the time/temperature data on a graph and then allows you to "ZOOM IN" on the data by using your cursor to select the part of the graph you want to zoom into.

Click here for more information on [using the CALSoft Zoom Plotting Feature](#)



7.2.2.6 Using CALSoft to conduct a Min/Max analysis of all TD data

On the **Min/Max** tab, CALSoft will combine all TD data files loaded into the current TD-Cal record. You have the option to hide/show any of the data files. You can choose to display the 2 minimum readings from each scan (min/min) or the minimum and maximum from each scan (min/max). The Main Grid shows each reading (min/min or min/max) at each scan.

Enter a **"REFERENCE TEMPERATURE"** and CALSoft will scan the data and visually mark the scans where that temperature has been reached or exceeded by marking them in a different color (**Orange**). This feature will help you to determine at what time a certain temperature has been achieved during the TD tests. Multiple Files may be analyzed at once using this feature.

It should be noted that only those leads that are classified as free leads will be used in performing the Min/Max and Min/Min analysis. If your leads are not correctly classified, then [go to the Time Temperature Tab and click "Change Lead Type"](#).

Set a CUT/Vent: TDCAL #2

Select Files

TD Info

Time/Temperature

Lead Location

Plotted Data

Min/Max Analysis

CALSoft has compiled a min/max comparison of all leads from the selected TD Data Files.

Show	File Name	Target Process Temp	Controller Set Point	Scan Interval	Total Scans	Leads Eliminated
☒	A C:\CALSoftData\TD-Sample-1.ctd	240	242	30	170	06,25
☒	B C:\CALSoftData\TD-Sample-2.ctd	240	242	30	264	06,25

Enter a Reference Temperature below. Rows will change color at corresponding scan where reference temperature is met.

Reference Temperature: 80.00

☒ Min/Max ☐ Min/2nd Min

Print

Time	TC Min	Min Temp	Min Diff Ref	TC Max	Max Temp	Max Diff Ref	Diff Min and Max
00:00:00	A 31	79.40	0.60	A 02	95.44	-15.44	16.04
00:00:30	A 30	79.36	0.64	B 01	138.54	-58.54	59.18
00:01:00	A 30	79.66	0.34	B 01	159.20	-79.20	79.54
00:01:30	B 28	78.78	1.22	B 01	169.84	-89.84	91.06
00:02:00	B 28	78.18	1.82	A 01	177.34	-97.34	99.16
00:02:30	B 28	78.73	1.27	A 01	183.77	-103.77	105.04
00:03:00	B 27	77.53	2.47	A 01	188.04	-108.04	110.51
00:03:30	B 27	77.13	2.87	A 01	192.17	-112.17	115.04
00:04:00	B 27	77.50	2.50	A 01	195.12	-115.12	117.62
00:04:30	B 27	77.80	2.20	A 01	197.59	-117.59	119.79
00:05:00	B 27	77.96	2.04	A 01	199.52	-119.52	121.56

Step 6 of 7

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7.2.2.7 Establishing a Vent/CUT schedule

Once the temperature distribution data has been evaluated, you can establish the Come Up Time or Venting schedule to assign to the retort. CALSoft gives you the ability to generate and print a Come Up Time (CUT) or Vent Schedule using the information you have established.

- [Venting Schedule](#)
- [Come-Up schedule](#)
- [Adding "conditions"](#)
- [Generating Final Vent/CUT schedule report](#)

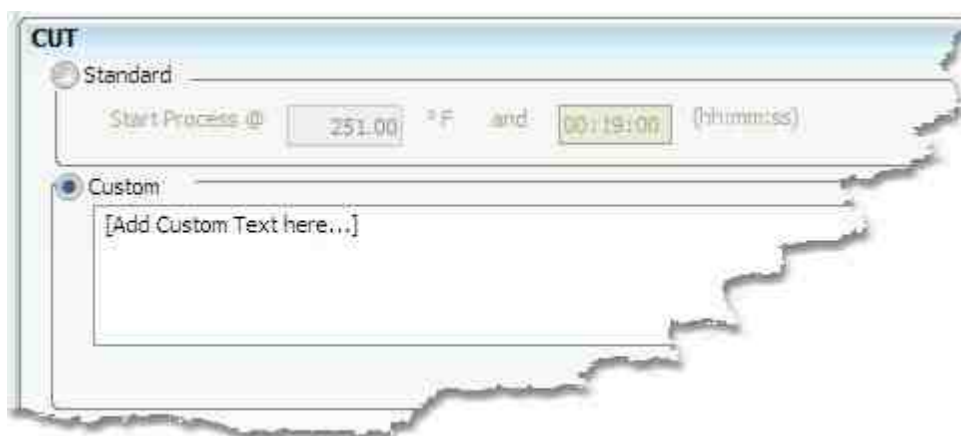
7.2.2.7.1 Venting Schedule

You can either use the standard format for a Venting Schedule and enter the Vent Closed time/temperature and Start Process time/temperature, or you can create your own custom text.

STANDARD FORMAT: Based on the retort type chosen in the drop-down menu under the **RETORT** section, the bottom section will change to either VENT or CUT. Enter the times and temperatures that you have established for the Vent or CUT.

For **STEAM** retorts, this section is labeled "**VENT**"

CUSTOM FORMAT: If you would rather enter your own description of the Vent schedule, chose the **CUSTOM** option and type your text.



The screenshot shows a dialog box titled "CUT". It has two radio buttons: "Standard" and "Custom". The "Custom" radio button is selected. Below the "Standard" section, there are input fields for "Start Process @", "°F", and "and", followed by a time input field labeled "(hh:mm:ss)". The "Custom" section contains a text area with the placeholder text "[Add Custom Text here...]".

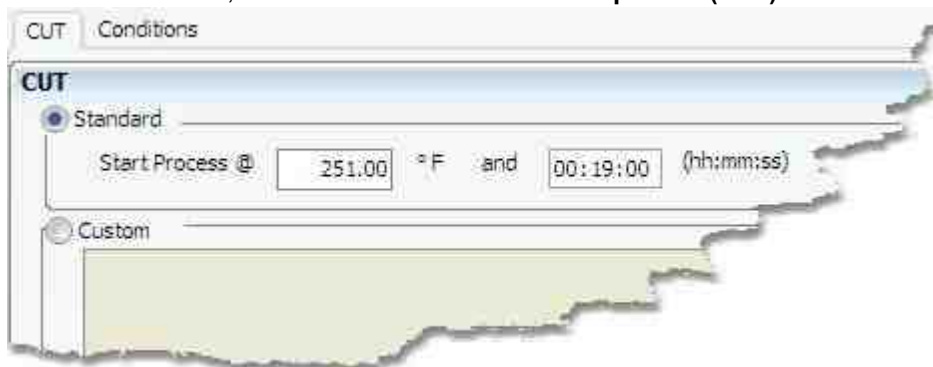
[Enter the "Conditions"](#) related to the Vent Schedule (such as loading pattern, container size, etc.) and then print/save the Vent Schedule.

7.2.2.7.2 Come-Up schedule

You can either use the standard format for a Come Up Schedule and enter the Start Process time/temperature, or you can create your own custom text.

STANDARD FORMAT: Based on the retort type chosen in the drop-down menu under the **RETORT** section, the bottom section will change to either VENT or CUT. Enter the times and temperatures that you have established for the Vent or CUT.

For **WATER** retorts, this section is labeled "**Come Up Time (CUT)**"



The screenshot shows a dialog box titled "CUT" with a "Conditions" tab. It has two radio buttons: "Standard" and "Custom". The "Standard" radio button is selected. Below the "Standard" section, there are input fields for "Start Process @", "°F", and "and", followed by a time input field labeled "(hh:mm:ss)". The "Custom" section is currently empty.

If you would rather enter your own description of the Vent or CUT, chose the **CUSTOM** option and type your text.

CUT

☐ Standard

Start Process @ 251.00 °F and 00:19:00 (h:mm:ss)

☒ Custom

[Add Custom Text here...]

Enter the **"Conditions"** related to the Vent Schedule (such as loading pattern, container size, etc.) and then print/save the Vent Schedule.

7.2.2.7.3 Adding Temperature Distribution Conditions

To finish your Vent Schedule or Come Up Time schedule, CALSoft enables you to add "conditions" to the VENT or CUT. For example, you may conclude that the vent schedule only applies to containers that are loaded in layers, not "jumble" packed. Or you may assign the Come Up Time to a particular can size. The Conditions include several pre-defined options that you can apply (use the check box) and add your specific text. Five CUSTOM fields are available at the end of the list. These "Conditions" will appear on the printed Vent or CUT schedule.

Vent Conditions

☒ Allowable Container Size(s): 307x108 cans or larger

☒ Container Loading: Jumble or layer loaded cans

☐ Basket Type:

☒ Dividers On Top: No

☐ Dividers On Bottom:

☐ Basket Type:

☐ Container Orientation:

☒ Minimum Product IT: 75 deg F

☐ Steam Supply:

Print

Print CUT/Vent

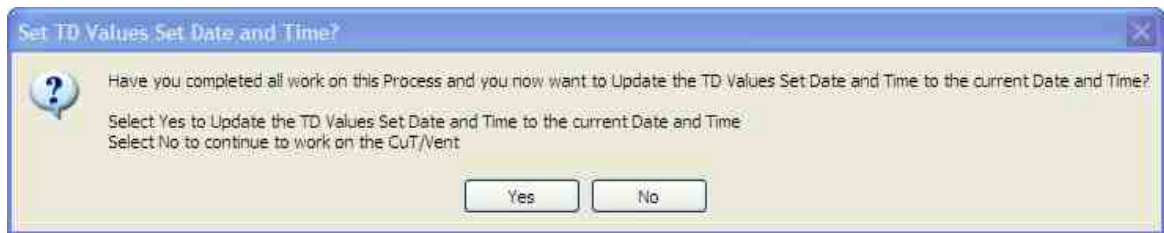
RETORT VENT S	
Generated by CALSoft 4.28.0 © 2	
Date Printed: Monday, January 11,	
RETORT	: Horizontal- Steam-US Retort Co.
NUMBER OF BASKETS	: 6.00
CONTROL SYSTEM	: Log-Tec Control system
PROCESSOR	: ABC Seafood Company
LOCATION	: New Orleans, Louisiana
OTHER INFO	:
TCAL Record Number	: 2
Schedule Set	: 1/11/2010 6:05:05 PM
CONDITIONS:	
• Allowable Container Size(s):	307x108 cans or 1
• Container Loading:	Jumble or layer lo
• Dividers on Top:	No
• Minimum Product IT:	75 deg F
Vent	
Vent Closed at 210 °F and 00:1	
Start Process at 251	

7.2.2.7.4 Generating Final Vent/CUT schedule report

Once the details of the Vent or CUT schedule have been established, and the Conditions assigned, the CUT or VENT schedule may be printed. Click the **"Print CUT/Vent"** button to generate the process schedule. The process schedule can be printed in Standard or Detailed format.



After clicking "Print CUT/Vent" button, CALSoft will ask if you are completed working on this process. If you click "YES", the CUT/Vent will be "completed" and stamped with the current time/date. If you click NO, the process will remain "Open" and will be considered "Not Completed Yet".



The Come Up Time or Vent Schedule will be generated and displayed on the screen. You can then print the report to your printer, or you can click the button in the upper left-hand side of the page and export the report to different formats (PDF, Excel, Word, RTF, etc.).

RETORT VENT SCHEDULE	
Generated by: CALSoft 4.25.0 © 2010 TechniCAL Inc	
Date Printed: Monday, January 11, 2010 6:17:58 PM	
RETORT:	Horizontal-Steam-US Retort Co.
NUMBER OF BASKETS:	6.00
CONTROL SYSTEM:	Log-Tec Control system
PROCESSOR:	ABC Seafood Company
LOCATION:	New Orleans, Louisiana
OTHER INFO:	
TD/CAL Record Number:	2
Schedule Set:	1/11/2010 6:17:58 PM
CONDITIONS:	
• Allowable Container Size(s):	307x108 cans or larger
• Container Loading:	Jubla or Layer loaded
• Dividers on Top:	No
• Racking System:	Round
• Minimum Product IT:	75 deg F
Vent	
Vent Closed at 210°F and 00:12:00 (hh:mm:ss)	
Start Process at 251°F and 00:15:00 (hh:mm:ss)	
Date Printed	Monday, January 11, 2010
Page 1 of 1	

7.2.3 Open Existing CUT/Vent



To open and view/edit an existing CALSoft CUT/Vent project (TD-Cal Record), there are two options:

1. **Double click** on the TD-Cal record # in the “recently used” list in the MIDDLE PANEL, or
2. Click the “**OPEN**” button and use the “Find Filter” (see below) to find the TD-Cal Record you want to open.

The record will then load into CALSoft Set CUT/Vent mode and display all of the information related to that specific TD-Cal record.

The Find Filter allows you to search the TD-Cal database for a specific processor, retort, CALSoft Temperature Distribution data file, or specific TD-Cal record number. The image below is a sample of the “Find Filter” page.

7.2.4 Delete a CUT/Vent Record



To DELETE a CUT/Vent (TD-Cal Record) from the TD-Cal DataBase, you must follow these steps:

- (1) open the TD-Cal record
- (2) Click the "Delete Button" at the bottom of the "Find Filter" page.

CALSoft will warn you and then delete the record from the TD-Cal database upon your approval.



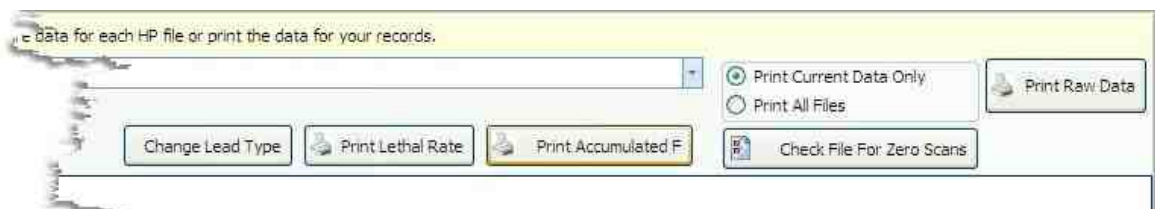
7.3 Reports available to help Establish a Vent or CUT

The following Reports are available for you to view/print in order to assist you in evaluating each Heat Penetration data in the Set A Process section of CALSoft:

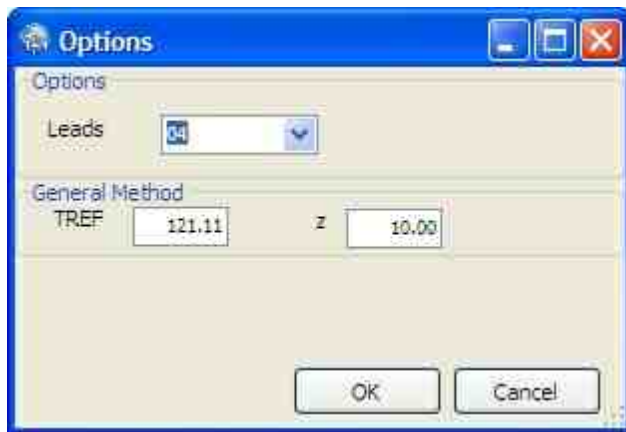
- [Lethal Rate report](#)
- [Accumulated F \(lethality\) report](#)
- [Time/Temperature report](#)
- [Formulations print](#)

7.3.1 Print Lethal Rate report

The "**Lethal Rate Report**" is for a single lead within an Heat Penetration data file and shows Time/Temperature/Lethal Rate/Cumulative Lethality for each data scan for that particular lead. This report can be found on the **Time/Temperature tab** for a specific HP data file in Collect-Heat Penetration... or in Set A Process. Click on **Print Lethal Rate** to run this report



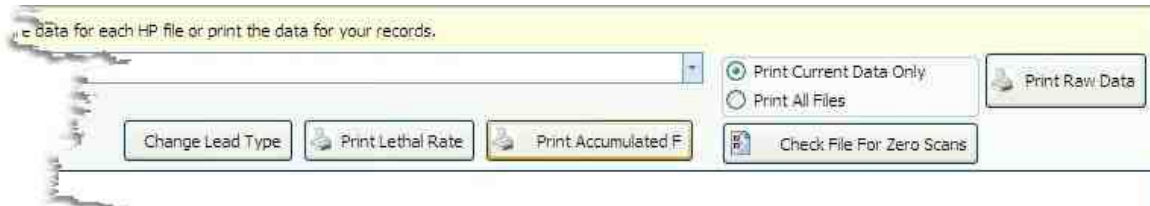
Chose the lead you wish to view the lethal rate report for and the Z and TREF to be used in the calculation.



LETHAL RATE REPORT				
Generated by CALSoft 4.28.0 © 2010 TechniCAL Inc				
Date Printed: Monday, January 11, 2010 12:19:03 pm				
PRODUCT	: Tuna in Oil			
CONTAINER	: Pouch-168grams-110mm X 160 mm			
RETORT	: Batch-Horizontal-WaterSpray-ABC Retort Co			
PROCESSOR	: ABC Seafood Company			
LOCATION	: New Orleans, Louisiana			
OTHER INFO	: First trial run.			
CALSOFT FILE	: C:\CALSoftData\HP-Sample-1.dhp			
z Value	10.00 deg. C			
Reference Temp	121.11 deg. C			
Process Time (HH:MM:SS)	Temperature (deg. C)	Lethal Rate	Cumulated F (min)	
00:00:00	26.14	0.000	0.00	
00:00:20	26.18	0.000	0.00	
00:00:40	26.61	0.000	0.00	
00:01:00	27.36	0.000	0.00	
00:01:20	27.67	0.000	0.00	
00:01:40	28.00	0.000	0.00	
00:02:00	28.48	0.000	0.00	
00:02:20	28.79	0.000	0.00	
00:02:40	29.28	0.000	0.00	
00:03:00	30.11	0.000	0.00	
00:03:20	31.14	0.000	0.00	
00:03:40	31.94	0.000	0.00	
00:04:00	32.74	0.000	0.00	
00:04:20	33.62	0.000	0.00	
00:04:40	34.38	0.000	0.00	
00:05:00	35.69	0.000	0.00	
00:05:20	37.06	0.000	0.00	
00:05:40	38.15	0.000	0.00	
00:06:00	39.21	0.000	0.00	
00:06:20	40.15	0.000	0.00	
00:06:40	41.25	0.000	0.00	
00:07:00	42.76	0.000	0.00	
00:07:20	44.21	0.000	0.00	
00:07:40	46.30	0.000	0.00	
00:08:00	46.38	0.000	0.00	
00:08:20	47.79	0.000	0.00	
00:08:40	49.21	0.000	0.00	
00:09:00	50.47	0.000	0.00	
00:09:20	51.69	0.000	0.00	
00:09:40	52.91	0.000	0.00	
00:10:00	54.35	0.000	0.00	
00:10:20	55.84	0.000	0.00	
00:10:40	57.54	0.000	0.00	
00:11:00	59.09	0.000	0.00	
00:11:20	60.47	0.000	0.00	
00:11:40	62.21	0.000	0.00	
00:12:00	63.84	0.000	0.00	
00:12:20	65.34	0.000	0.00	
00:12:40	67.17	0.000	0.00	
00:13:00	68.84	0.000	0.00	
00:13:20	70.44	0.000	0.00	
00:13:40	72.00	0.000	0.00	
00:14:00	73.84	0.000	0.00	
00:14:20	75.45	0.000	0.00	
Date Printed: January 11, 2010				
Page 1 of 4				

7.3.2 Print Accumulated F report

The "Accumulated F report" will calculate the total cumulative lethality for each lead in a given data file. The total lethality will be broken down into lethality in heating and lethality in cooling. This report can be found on the **Time/Temperature** tab for a specific HP data file in Collect-Heat Penetration... or in Set A Process. Click on **Print Accumulated F** to run this report



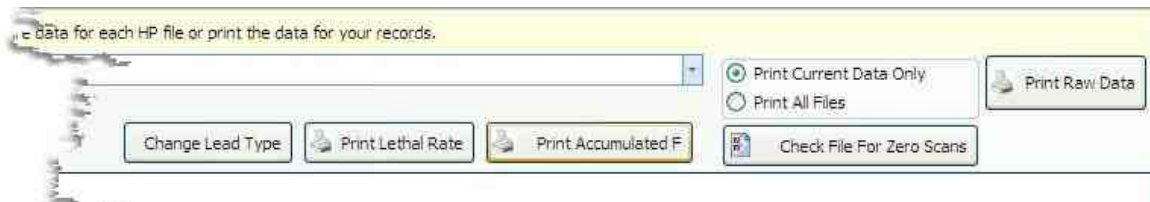
Chose the Z and TREF to be used in the calculation and how you want the report sorted.



NEED REPORT IMAGE

7.3.3 Print Time/Temperature report

The "Raw Data report" will print the time/temperature data from the HP test. Any LOG-DATA entered will also be included on the printout. This report can be found on the **Time/Temperature tab** for a specific HP data file in Collect-Heat Penetration... or in Set A Process. Click on **Print Raw Data** to run this report



The TYPE of Lead and any Calibration Factors (and reference temperature used during the calibration) applied to this file will show up at the top of the report.

THERMOCOUPLES														
	1	3	4	5	6	7	8	9	10	12	13	14	15	
TYPE	FL	FL	TC	TC	TC	TC	TC	TC	TC	TC	TC	TC	TC	
CALIB	0.14	0.11	-0.02	0.02	-0.01	0.11	-0.06	-0.06	-0.01	0.04	-0.04	0.01	0.01	
Calibration Reference Temperature	122.00													
(hh:mm:ss)														
00:00:00	28.39	28.31	26.14	26.23	26.16	26.41	25.88	26.34	25.91	26.43	26.26	26.26	26.78	
00:00:20				26.25					25.91					

At the end of the report, CALSoft will calculate the total cumulative lethality for each lead in that data

file. The total lethality will be displayed at the end of the report and will be broken down into lethality in heating, cooling, and total.

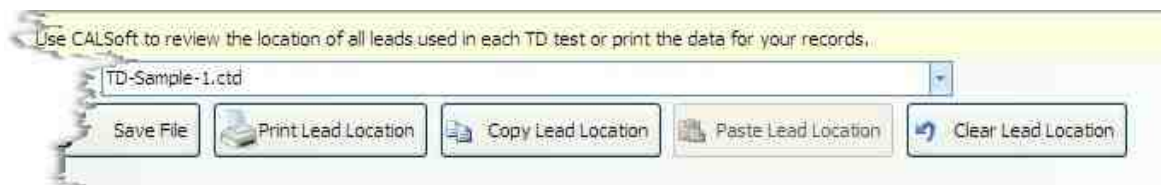
00:45:40	95.45	83.57	89.58	101.35	108.08	100.33	103.75	99.00	109.28	100.00	107.77	94.20	96.12	104.50
00:50:00	53.58	51.70	87.81	99.70	103.60	98.74	101.96	97.76	103.62	88.33	99.72	92.20	84.22	102.98

Cooling F:	2.73	2.65	2.82	2.30	3.14	2.91	2.84	2.09	3.03	2.51	2.68	2.92		
Heating F:	6.38	5.79	4.42	5.59	5.52	6.99	4.20	7.12	7.70	7.87	8.12	5.34		
Total F:	9.11	8.44	7.24	7.89	8.66	9.90	7.04	9.21	10.73	10.38	10.80	8.26		

The General Method F values listed above are calculated in CALSoft using the Trapezoidal Method with the factors z=10 and Tref=121.11.

7.3.4 Print Lead Locations

The **"Print Lead Locations"** button will print the location of the leads as recorded in the TD file. This report can be found on the **Lead Location tab** for a specific TD data file in Collect-Temperature Distribution ... or in Set A CUT/Vent. Click on **Print Lead Location** to run this report



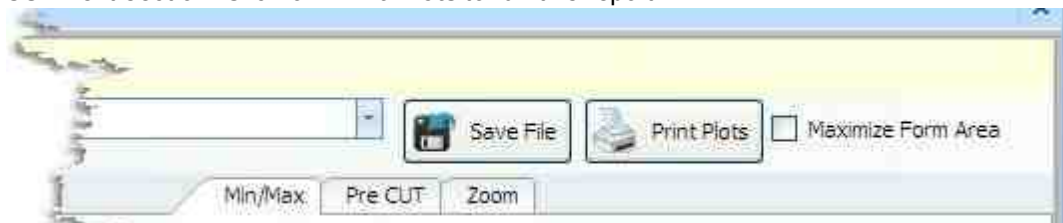
LEAD LOCATION INFORMATION			
Generated by: CALSoft 4.28.0 © 2010 TechniCAL Inc			
Date Printed: Monday, January 11, 2010 9:18:57 pm			
CONTAINER	Can-2-piece-307 X 108.5		
RETORT	Horizontal-Stream-5		
RETORT SETUP	Layered-16 Layers-Divider Sheets-6 Baskets -250 Layer		
PROCESSOR	ABC Seafood Company		
LOCATION	New Orleans, Louisiana		
TEST DATE/TIME	09-14-09 14:36:06		
NOTES			
FILE NAME	C:\CALSoftData\TD-Sample1.cdd		
Channel Number	TID Or Basket #?	Layer	Top View
01	MIG		
02	MIG		
03	1	2	B
04	1	3	C
05	1	5	E
07	1	6	C
08	1	9	E
09	2	2	D
10	2	4	E
11	2	2	C
12	2	5	D
13	3	5	E
14	3	5	D
15	3	7	B
16	3	8	C
17	4	4	E
18	4	2	C
19	4	3	E
20	5	4	C
21	4	5	E
22	4	4	C
23	5	3	E
24	5	8	A
26	5	4	E
27	5	8	B
28	5	3	E
29	5	2	C
30	5	4	E
31	5	7	C
32	5	8	A

Date Printed: Monday, January 11, 2010

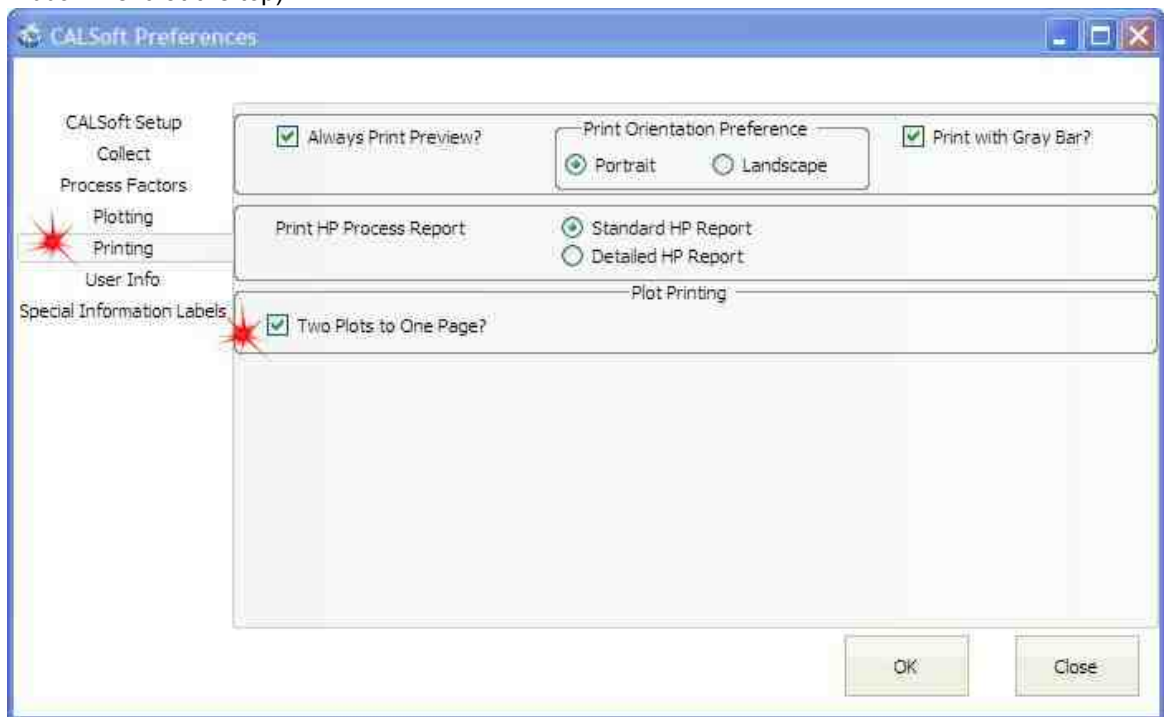
Page 1 of 1

7.3.5 Print Plots

The **"Print Plots"** button will print the plotted data that is displayed on the PLOTS tab in the Set A CUT/Vent section. Click on **Print Plots** to run this report.

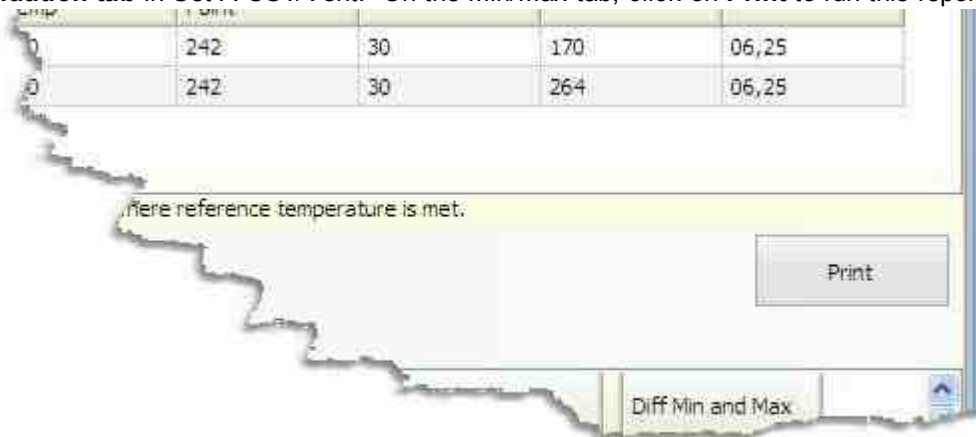


To Print TWO PLOTS PER PAGE, set the option in PREFERENCES (click Edit Preferences in the Ribbon Menu at the top).



7.3.6 Print MinMax

The "Print Min/Max" button will print the contents of the data grid from the **Min/Max (or Min/Min) Evaluation tab** in Set A CUT/Vent. On the Min/Max tab, click on **Print** to run this report



NOTE: The scan will turn **BOLD** on the printed report when the referenced temperature is met or exceeded.

MULTI FILE MIN/MAX TEMPERATURE EVALUATION

Generated by CALSoft 4.28.0 © 2010 TechniCAL Inc
Date Printed: Monday, January 11, 2010 9:27:15 pm

TDCAL ID: 2

File Location Path: C:\CALSoftData\

	FileName	Target Process	Controller SetPoint	Scan Interval	Total Scans	Leads Eliminated
A	TD-Sample-1.ctd	240.00	242.00	30	170	06.25
B	TD-Sample-2.ctd	240.00	242.00	30	264	06.25

Reference Temperature = 80.00

Only the first record with the Min Temp or Max Temp is listed.

Time	TC Min	Min Temp (deg F)	Min Diff Ref (deg F)	TC Max	Max Temp (deg F)	Max Diff Ref (deg F)	Diff Min Max (deg F)
00:00:00	A 31	79.40	0.60	A 02	95.44	-15.44	15.04
00:00:30	A 30	79.36	0.64	B 01	138.54	-68.54	59.18
00:01:00	A 30	79.66	0.34	B 01	158.20	-79.20	79.54
00:01:30	B 28	78.76	1.22	B 01	165.34	-85.34	91.06
00:02:00	B 28	78.18	1.82	A 01	177.34	-97.34	99.16
00:02:30	B 28	78.73	1.27	A 01	183.77	-103.77	105.04
00:03:00	B 27	77.53	2.47	A 01	188.04	-108.04	110.51
00:03:30	B 27	77.13	2.87	A 01	192.17	-112.17	115.04
00:04:00	B 27	77.50	2.50	A 01	195.12	-115.12	117.62
00:04:30	B 27	77.80	2.20	A 01	197.59	-117.59	119.79
00:05:00	B 27	77.96	2.04	A 01	199.52	-119.52	121.56
00:05:30	B 27	78.24	1.76	A 01	201.41	-121.41	123.17
00:06:00	B 27	78.48	1.52	A 01	203.00	-123.00	124.52
00:06:30	B 27	78.73	1.27	A 01	204.43	-124.43	125.70
00:07:00	B 27	79.31	0.69	A 01	205.61	-125.61	126.30
00:07:30	B 27	79.80	0.20	A 01	206.62	-126.62	126.82
00:08:00	B 27	80.56	-0.56	A 01	207.49	-127.49	126.93
00:08:30	B 27	81.28	-1.28	A 01	208.29	-128.29	127.01
00:09:00	B 27	82.41	-2.41	A 01	208.96	-128.96	126.55
00:09:30	B 27	84.78	-4.78	A 01	209.65	-129.65	124.89
00:10:00	B 27	88.76	-8.76	B 01	210.35	-130.35	121.59
00:10:30	A 14	92.85	-12.85	A 01	211.07	-131.07	118.22
00:11:00	A 14	97.23	-17.23	A 01	211.86	-131.86	114.63
00:11:30	B 08	120.32	-40.32	A 01	212.62	-132.62	82.30
00:12:00	B 09	136.51	-56.51	B 03	213.74	-133.74	77.23
00:12:30	B 09	157.94	-117.94	A 17	216.04	-136.04	18.40
00:13:00	B 08	211.68	-131.68	A 17	218.45	-138.45	6.76
00:13:30	B 08	216.52	-136.52	A 21	220.38	-140.38	3.96
00:14:00	B 08	219.07	-135.07	A 01	221.68	-141.68	2.61
00:14:30	B 08	220.27	-140.27	A 01	221.86	-141.86	1.59
00:15:00	B 08	220.71	-140.71	A 21	221.65	-141.65	0.94
00:15:30	B 14	225.60	-145.60	A 22	230.62	-150.62	5.02
00:16:00	B 14	231.64	-151.64	A 22	235.45	-155.45	3.81
00:16:30	B 14	236.58	-156.58	A 02	240.02	-160.02	3.44
00:17:00	B 14	241.05	-161.05	A 02	243.56	-163.56	2.51
00:17:30	B 08	243.36	-163.36	A 21	244.58	-164.58	1.22

Date Printed Monday, January 11, 2010

Page 1 of 7

Part



8 Evaluate a Deviation



CALSoft enables you to evaluate processing deviations using the Ball Formula method, heating factors properly derived from heat penetration data from the product in question, and the actual Retort Temperature (RT) and Initial Temperature (IT).

- [What is Evaluating a Deviation?](#)
- [The Deviation \(DevCal\) Data-Base](#)
- [Evaluating a Deviation using CALSoft](#)

8.1 What is Evaluating a Deviation?

A process deviation is an error or change, in a critical condition of the scheduled process, which may reduce the sterilizing value the product receives, or which raises a question regarding the public health safety and/or commercial sterility of the product. FDA defines a Process Deviation as "... Whenever any process is less than the scheduled process.....".

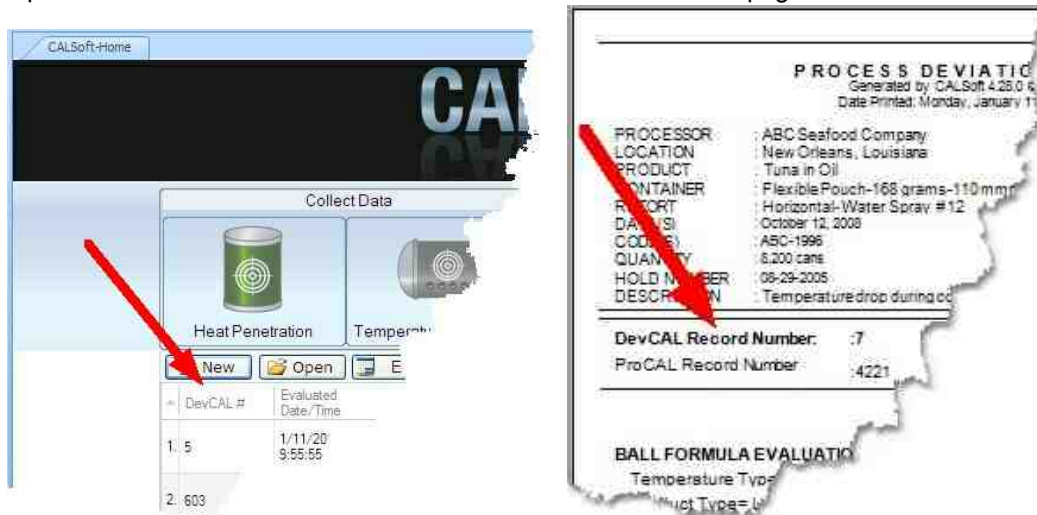
When a Process Deviation occurs, FDA states that the processor may either (a) fully reprocess that portion of the production involved or, alternatively, (b) shall set aside that portion of the production involved for further evaluation as to any potential public health significance. Such evaluation shall be made by a competent processing authority and shall be in accordance with procedures recognized by competent processing authorities as being adequate to detect any potential hazard to public health.

"Evaluating a Deviation" refers to the evaluation made by the Process Authority to determine if the product is safe. CALSoft enables Process Authorities the ability to evaluate processing deviations using the Ball Formula method, heating factors properly derived from heat penetration data from the product in question, and the actual Retort Temperature (RT) and Initial Temperature (IT). The Ball Formula will calculate an estimated F_0 value for the cook parameters provided. The Process Authority must ultimately make the decision whether to release or hold/destroy the affected product.

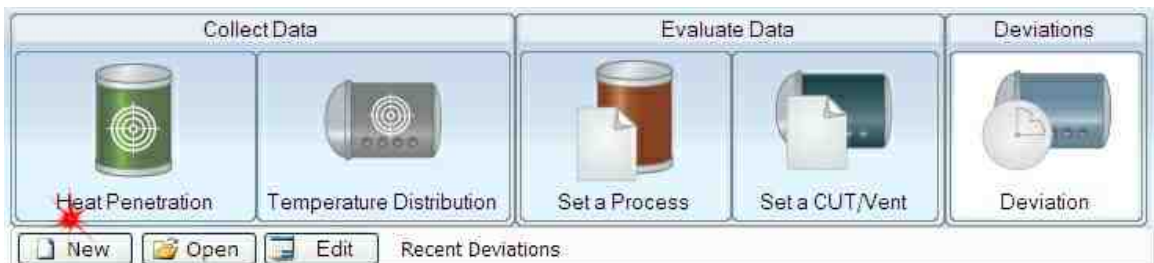
8.2 The Deviation (DevCal) Data-Base

When you "Evaluate A Deviation" using CALSoft, the information related to the evaluation is stored in a database referred to as the "Dev-Cal Database". For more information related to the database file and it's location, see [Process Database](#).

When you begin to Evaluate a Deviation with CALSoft, a new record is created in the Dev-Cal Database. This is referred to as the Dev-Cal Record Number and is the main reference to that Evaluation. The Dev-Cal Record Number is displayed on the final printed Deviation Evaluation report and also on the main dashboard of the Evaluate Deviation page.



8.3 Evaluating a Deviation using CALSoft



CALSoft is a tool that enables Process Authorities the ability to evaluate processing deviations using the Ball Formula method, heating factors properly derived from heat penetration data from the product in question, and the actual Retort Temperature (RT) and Initial Temperature (IT). The Ball Formula will calculate an estimated F_0 value for the cook parameters provided. The Process Authority must ultimately make the decision whether to release or hold/destroy the affected product.

Select the Deviations section and then click the **NEW** button to begin a new Deviation Evaluation.

8.3.1 Main Deviation Evaluation page

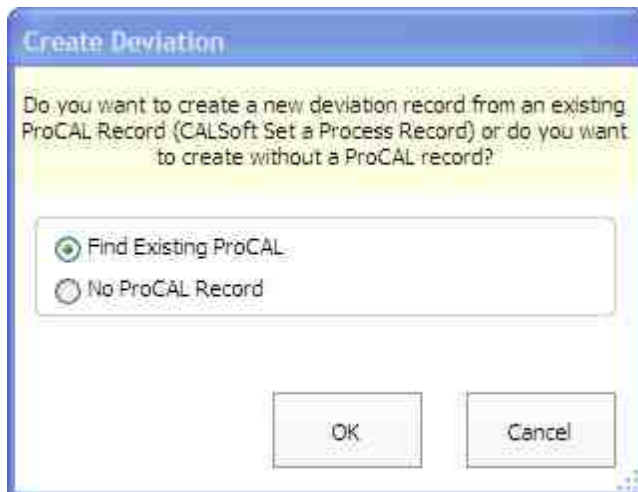
The main Deviation Evaluation Form is divided into four parts:

1. **DEVIATION INFORMATION**- Enter information here related to the product, retort, container, Date of deviation, codes affected, and an explanation of what happened. This information will be used on the printed Evaluation report.
2. **BALL FORMULA EVALUATION** - Enter the ball formula heating factors to be used in the sterility calculation, along with the ACTUAL Retort Temperature, Product Initial Temperature, and Come Up Time (if Come Up Time credit can be applied).
3. **RESULTS**- Enter the desired F value that must be achieved for "minimum health" and "commercial sterility"
4. **COMMENTS** - Enter information the person who conducted the evaluation, the date, and the disposition of the product.

The screenshot shows the 'Evaluate a Deviation' window in CALSoft. The window has a menu bar with 'Home', 'Evaluate a Deviation', 'File', 'Eval Deviation Reports', 'Preferences', 'Tools', and 'Help'. Below the menu bar is a toolbar with icons for 'New Evaluated Deviation', 'Recent Evaluate Deviation', 'Find Evaluate Deviation', 'Save', 'Save As', 'Reports', 'Edit', 'Tools', and 'Help'. The main area is titled 'Evaluate Deviation: DevCAL #8' and contains a yellow warning bar: 'The information below will be used to evaluate a deviation for a process. Please check all information and then click completed'. The form is divided into four sections:
Deviation Information: Fields for Processor, Location, Product, Container, Retort, Date(s), Code(s), Quantity, Hold #, and Description.
Ball Formula Evaluation: Temperature (Fahrenheit/Celsius), Product Type (LACF/Acidified/Other), F values (F: 18.00 / 250.00), Actual IT, Actual RT, Actual CUT, and a note: '** 42% of the Come Up Time Entered here will be used by Ball Formula to Calculate Lethality'.
Results: Checkboxes for 'Include in Report?' for Commercial Sterility and Minimum Health, and a 'Calculate' button.
Comments: Fields for 'Evaluated By', 'Date' (1/11/2010), and 'Product Disposition', along with a 'Print Process Deviation Evaluation' button.
The bottom of the window shows 'Copyright 2008 TechniCAL' and 'TCAL CALSoft User v 4.28.0'.

8.3.2 Use Existing ProCal record to evaluate Deviation

Once you begin a new Deviation Evaluation project, CALSoft will ask you if the product in question is included in an existing ProCal record within CALSoft. If so, you can chose that ProCal record and load the product's heating factors into the Deviation Evaluation system. If there is no ProCal record for this product, you will simply have to enter the information manually.



If you chose to use a product that has a ProCal record in CALSoft, find the associated ProCal record and load it into the Evaluate Deviation feature. The ProCal record will be loaded as a separate tab BEHIND the Deviation record. If you need to refer to the data, plots, or other parts of the Process Calculation, you can simply click the tab with the ProCal record to toggle between that and the Deviation Evaluation.



Also, if you chose to use a product that has a ProCal record, CALSoft will populate many of the fields on the Deviation Evaluation page, using the information from that ProCal Record.

8.3.3 Enter information about deviation

The first section of the Deviation evaluation tab is to enter information about the Deviation itself.

The next sections of the page include:

- [Using the Ball Formula to evaluate the Deviations](#)
- [Deviation Evaluation Results](#)
- [Generating Final Deviation Evaluation report](#)

8.3.4 Using Ball Formula calculation to evaluate deviation

The second section of the Deviation evaluation tab is to enter information relative to the Ball Formula heating factors and actual processing conditions in order to calculate a sterility value for the product affected by the Deviation.

Ball Formula Evaluation

Temperature: ☒ Fahrenheit ☐ Celsius

Product Type: ☒ LACF ☐ Acidified ☐ Other F: 18.00 / 250.00

jh: 1.22 fh: 22.34 f2: 0.00 xbh: 0.00 m+g: 130.00 TC Correction: None Used

Actual IT: 32.00 Actual RT: 32.00 Actual Cook Time: 0.00

Actual CUT: 0.00 *** 42% of the Come Up Time Entered here will be used by Ball Formula to Calculate Lethality

Come Up Time Credit: NOTE: only add the ACTUAL Come Up Time (CUT) if you are sure that credit can be given for lethality in the Come Up phase. The Ball Formula allows 42% of the Come up to be applied to the sterility calculation.

ACTUAL IT & RT & COOK TIME: Enter the Actual IT and RT and Cook Time experienced by the affected product during the deviation. Caution must be taken in assigning the correct RT and IT and Cook Time to the sterility equation.

m+g: The m+g is the factor used in the Ball Formula that represents the difference between the retort temperature and cooling water. Traditionally, for Steam retorts, the m+g = 180°F (100°C) and for Water retorts, the m+g = 130°F (72.2°C). If an existing ProCal record is being used for this evaluation, the m+g is assigned based on the type of retort used for the Heat Penetration test from which the heating factors were derived.

TC Correction: Thermocouple Correction corrects errors in heat penetration measurement caused by conduction of heat along the thermocouple by the introduction of heat into the product by thermocouple fittings. Thermocouple correction values should be used for conduction heating products in containers with diameters equal to or less than 307. If the standard needle type thermocouples applicable for these size cans are used in other size containers, then correction factors should still be used. The correction factor is applied against the jh value. If an existing ProCal record is being used for this evaluation, the TC Correction is carried over to the Deviation evaluation if the original ProCal record was created using a TC Correction.

The next section of the page include:

- [Deviation Evaluation Results](#)
- [Generating Final Deviation Evaluation report](#)

8.3.5 Deviation Evaluation Results

The third section of the Deviation evaluation tab is to calculate the Sterility value using the Ball Formula method.

Results

☒ Include in Report? Commercial Sterility 6.00 Over

☒ Include in Report? Minimum Health 2.90 Over

Calculated Lethality 7.79

[Calculate](#)

Commercial Sterility: this is the value as determined by the Process Authority to be the minimum limit for "Commercial Sterility".

Minimum Health: this is the value as determined by the Process Authority to be the minimum limit for "Minimum Health"

Include in Report (Check Boxes): the check boxes next to each value will determine if those values print on the Evaluation report.

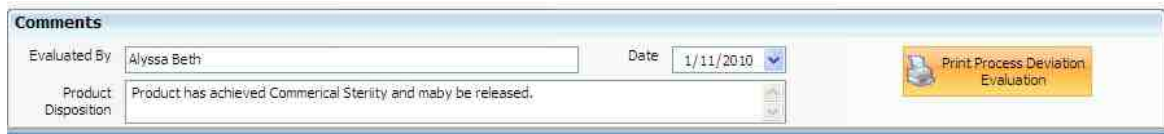
Calculated Lethality: when the CALCULATE button is clicked, CALSoft will use the heating factors and actual processing parameters to calculate the sterility value (F value) with the Ball Formula. It will be displayed if the calculated lethality is OVER or UNDER the targets for Commercial Sterility and Minimum health.

The next section of the page includes:

- [Generating Final Deviation Evaluation report](#)

8.3.6 Generating Final Deviation Evaluation report

Once the information for the Deviation has been recorded and the sterility calculation conducted, you may print a report of the Evaluation for your files.



Evaluated By: You may chose to document who conducted this evaluation.

Date: This is the date of the evaluation.

Product Disposition: Enter your disposition of the product in this text box.

PRINT: this prints a Report of the Deviation Evaluation.

PROCESS DEVIATION EVALUATION

Generated by: CALSoft 4.23.0 © 2010 TechniCAL Inc.
Date Printed: Monday, January 11, 2010 11:04:52 pm

PROCESSOR : ABC Seafood Company
LOCATION : New Orleans, Louisiana
PRODUCT : Tuna in Oil
CONTAINER : Flexible Pouch-168 grams-110mm X 160 mm
RETORT : Horizontal-Water Spray #12
DATE(S) : October 12, 2008
CODE(S) : ABC-1996
QUANTITY : 8,200 cans
HOLD NUMBER : 08-29-2008
DESCRIPTION : Temperature drop during cook phase due to temporary power outage.

DevCAL Record Number : 7

ProCAL Record Number : 4221

BALL FORMULA EVALUATION: 9th Degree Ball Formula Used

Temperature Type= Fahrenheit

Product Type= LACF (z: 18.00/250.00)

h= 1.22

fh= 22.34

f2= 0.00

xbh= 0.00

m+g= 130.00

Actual IT=75.00

Actual RT=248.00

Actual CUT=0.0

Actual Cook Time=43.00

Target Values:

Commercial Sterility = 6.00

Minimum Health = 2.90

Calculated Lethality = 7.79

Comments:

Evaluated By= Alyssa Beth

Evaluated Date= 1/11/2010 11:04:52 PM

Product Disposition= Product has achieved Commercial Sterility and may be released.

Date Printed Monday, January 11, 2010

Page 1 of 1

Part



IX

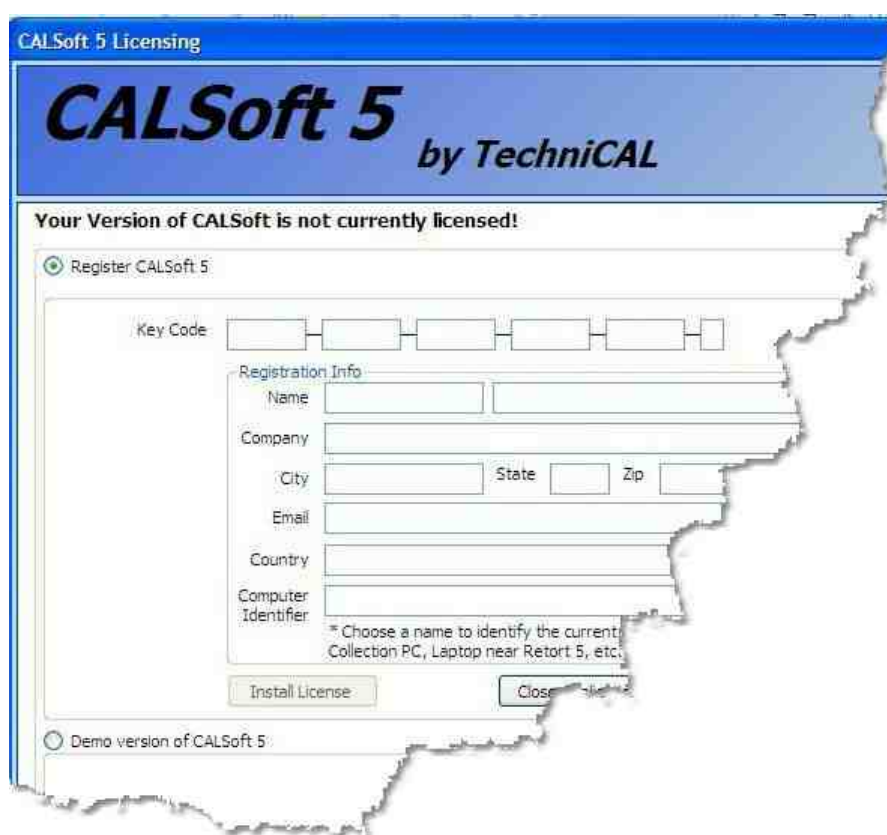
9 Other Tools/Features

CALSoft includes other tools and features:

- [Fh Conversion](#)
- [Temperature Conversion](#)
- [Lethal Rate table](#)
- [CALPlex diagnostic](#)
- [Quick Viewer](#)

9.1 Software Security/Activation Code

CALSoft5 requires a valid Activation Code during installation and before first use. This Activation Code was supplied by TechniCAL when the software was purchased. Connection to the internet is required to activate the CALSoft5 software. However, internet connection is not required to actually run CALSoft5 after activation is complete.



Each purchased license of CALSoft5 may be used by only one person at a time. Therefore, your CALSoft 5 Activation Codes has limited use and can only be used to install CALSoft on up to two (2) of your computers.

If you misplace your Activation Code, please contact TechniCAL (support@tcal.com) to obtain another copy of the code. However, please note that each activation code can only be used to install CALSoft on up to two (2) computers. Each user should have their own individual

activation code.

9.1.1 Automatic updates

CALSoft5 includes a feature to automatically check for updates if an internet connection is detected.

If an update is available, you will be notified and given the choice to install the update or skip and not install. To ensure that you have the most current working version of CALSoft, it is recommended that you install any updates that are available.

9.2 File management

CALSoft creates three different types of files:

1. [Heat Penetration and Temperature Distribution Data Files](#) (data files xxx.CHP or xxx.CTD)
2. [Calibration Files](#): (data files xxx.CLB)
3. [Process & Vent/CUT Calculations and Deviation Evaluation](#) (Records in a ProCal Database)

9.2.1 Heat Penetration and Temperature Distribution Data Files:

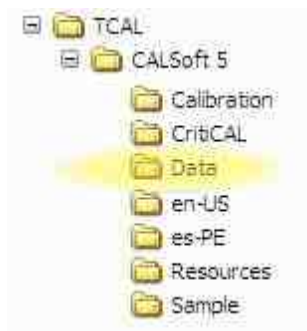
CALSoft5 separate creates separate files for each Heat Penetration (HP) and Temperature Distribution (TD) test that is conducted. CALSoft5 uses different file extensions to differentiate between HP and TD files:

Heat Penetration = xxx.CHP

Temperature Distribution= xxxxx.CTD

Upon first use of CALSoft, these data files are stored by default in the CALSoft subdirectory titled "Data".

However, data files can be stored in any location you desire. Each time a new HP or TD test is conducted, the location will default to the last location in which a file was saved.



9.2.2 Calibration Files

Calibration files can be collected using CALSoft. These files include offsets for each of the 32 channels based on a reference temperature. By default, calibration files are stored in the CALSoft subdirectory titled "Calibration". CALSoft5 uses the file extension ".clb" for Calibration files:



NOTE: older Calibration files from previous versions of CALSoft may be used with CALSoft 5.

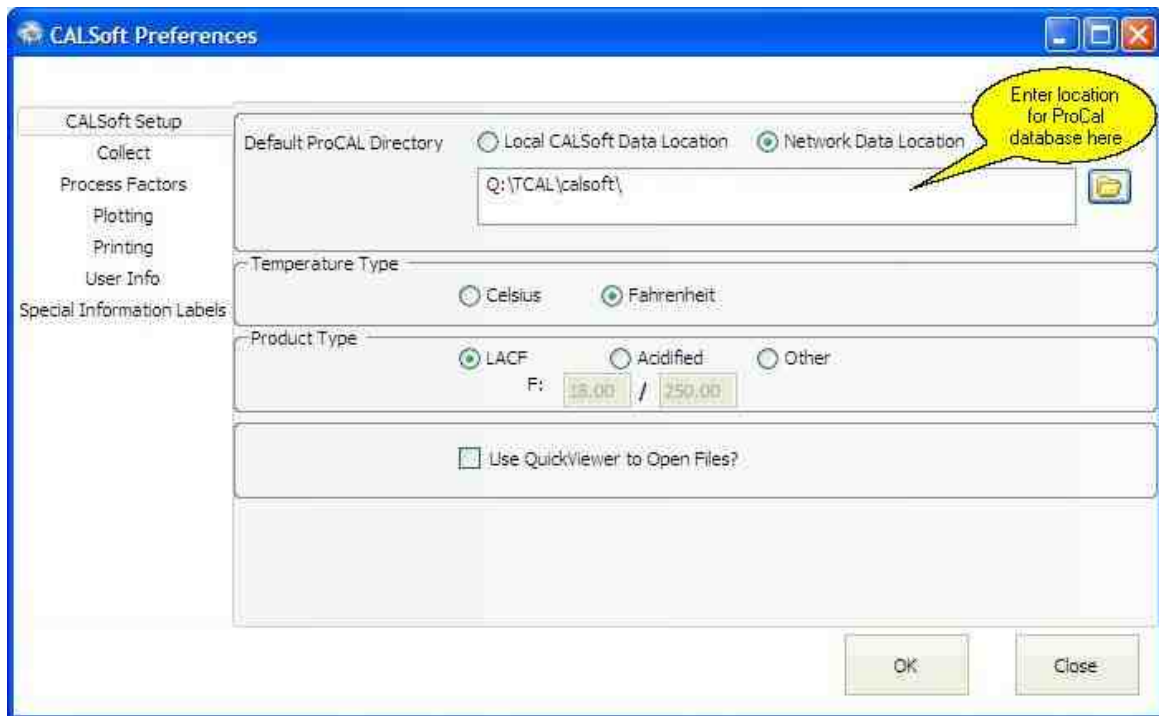
These files can be viewed in the [Calibration feature](#).

9.2.3 Process Database

CALSoft keeps the following information in a database:

- When a new thermal process is calculated using CALSoft
- When a new Come-up time or vent schedule is established using CALSoft
- When a deviation evaluation is conducted using CALSoft

The information related to these results is stored in a "calculation" database which is named the "ProCal5.mdb" database. Upon first use of CALSoft, the ProCal5.mdb database is created and stored in the CALSoft subdirectory. However, you can move and set the location of the ProCal5.mdb database under the "Preferences".



Records in the database correlate to a specific calculation/evaluation exercise conducted by the user. This is referred to as follows:

- Process Calculations – “ProCAL” records
- Come Up time or Vent Schedule Establishments- “TDCAL” records
- Deviation Evaluations – “DevCAL” records

9.3 Fh Conversion

The fh of a product is dependent not only the nature of the product, but on the container dimensions. CALSoft’s fh Conversion Utility allows you to convert the fh of a product from one container size to another based on the equations by Shultz and Olson (convection heating) and Olson and Jackson (conduction heating).

CAUTION: there are limitations on the conversion of fh values from one product to another. If you are unsure of these limitation and how they may apply to your product, please consult a competent Process Authority for advice.

To use the fh Conversion Utility choose the TOOLS option from the Ribbon menu in any of the CALSoft sections.



The fh Conversion Utility worksheet will appear. The following information needs to be completed to perform the fh conversion:

 A screenshot of a dialog box titled 'Convert fh'. It has a 'Type of Heating' section with two radio buttons: 'Convection' (selected) and 'Conduction'. Below this are two columns of input fields: 'Diameter' and 'Height'. The first row is labeled 'Original Container Dimensions' and the second row is labeled 'Desired Container Dimensions'. Each row has a text box for Diameter, a multiplication symbol 'X', and a text box for Height. Below these, there are two more text boxes: 'fh of Original Container' (containing '0.00') and 'fh of Desired Container' (containing '0.0' with '(estimated)' to its right). At the bottom are 'Print' and 'Cancel' buttons.

Convection / Conduction heating

Container dimensions of original container

Container dimensions of desired container

fh of original container

Once this information is entered, the estimated converted fh will automatically be listed in the fh of Desired Container field. To print this fh Conversion, click the Print button.

9.4 Temperature Conversion

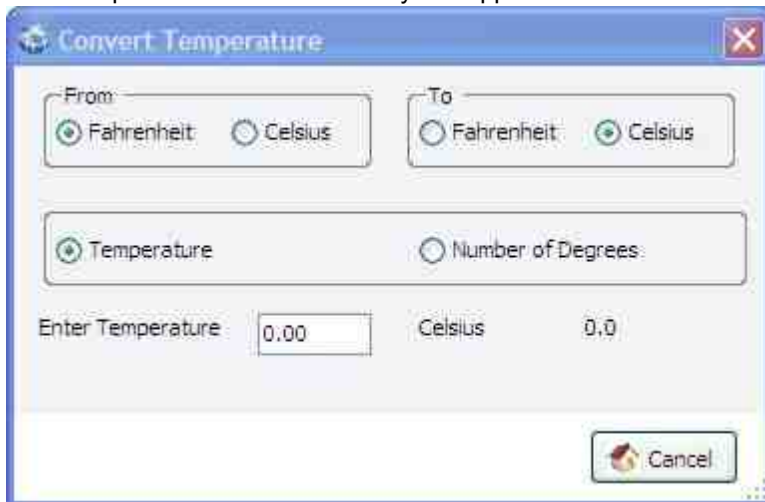
CALSoft's Temperature Conversion Utility allows you to convert individual temperatures from Fahrenheit to Celsius and vice-versa.

The utility also allows the conversion of a number of degrees from Fahrenheit to Celsius. For example, z-values are not temperatures, but a number of degrees. A z-value of 18 F° converts to a z-value of 10 C°. The temperature conversion utility will allow you to perform these conversions also.

To perform a temperature conversion, choose the TOOLS option from the Ribbon menu in any of the CALSoft sections. .



The Temperature Conversion Utility will appear.



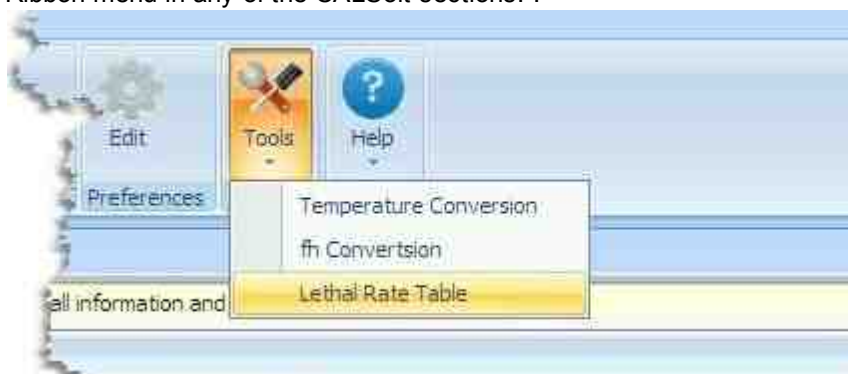
To perform a conversion you must specify the following information:

- Scale to convert from or scale to convert to
- Whether conversion is Temperature or Number of Degrees
- Temperature to convert

Once this information is entered the conversion will automatically be performed and the converted temperature will appear in the shaded field in the lower right hand corner of the dialog box.

9.5 Lethal Rate table

It is possible to print Lethal Rate tables for any Temperature Range, Temperature Increment, z Value and Reference Temperature combination. To access this feature, choose the TOOLS option from the Ribbon menu in any of the CALSoft sections. .



Enter the desired parameters and select the **CALCULATE** button to have CALSoft calculate the tables.

Temperature Range		Temperature Increment	z Value	Ref Temp	
From:	250.00	1	18	250.00	☒ Fahrenheit ☐ Celsius
To:	260.00				
					Calculate

The Lethal Rate table will be generated by CALSoft. You can view or Print the table.

Lethal Rate Table

Temperature Range		Temperature Increment	z Value	Ref Temp	
From	250.00	1	18	250.00	☒ Fahrenheit ☐ Celsius
To	260.00				Recalculate

Tenths of a Degree

Temp	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
250	1.000	1.013	1.026	1.039	1.053	1.066	1.080	1.094	1.108	1.122
251	1.136	1.151	1.166	1.181	1.196	1.212	1.227	1.243	1.259	1.275
252	1.292	1.308	1.325	1.342	1.359	1.377	1.395	1.413	1.431	1.449
253	1.468	1.487	1.506	1.525	1.545	1.565	1.585	1.605	1.626	1.647
254	1.668	1.690	1.711	1.733	1.756	1.778	1.801	1.824	1.848	1.872
255	1.896	1.920	1.945	1.970	1.995	2.021	2.047	2.073	2.100	2.127
256	2.154	2.182	2.210	2.239	2.268	2.297	2.326	2.356	2.387	2.417
257	2.448	2.480	2.512	2.544	2.577	2.610	2.644	2.678	2.712	2.747
258	2.783	2.818	2.855	2.891	2.929	2.966	3.005	3.043	3.082	3.122
259	3.162	3.203	3.244	3.286	3.328	3.371	3.415	3.459	3.503	3.548

9.6 CALPlex diagnostic

Run the CALPlex Diagnostic report to gather information that may be required when troubleshooting your CALPlex datalogger. Enter basic information about your CALPlex Datalogger and then click EMAIL TO TechniCAL. Make sure you are connected to the CALPlex datalogger and that it is powered on and connected to thermocouple containers. This will scan CALPlex and create a text file of technical information.

CALPlex Diagnostic

This utility will print a report diagnosing the performance of your CALPlex datalogger. This report will help Technical troubleshoot your CALPlex datalogger if you experience any problems. Please make sure the CALPlex datalogger is connected to your computer and turned on. Then follow the directions below and create a diagnostic report for submission.

1. Enter your error/problem or suggestion below. Please specify the section in CALSoft any error message that was shown and please give us as much detail on as you can on how to recreate the error or suggestion.
2. Select to Email Tech Support to TCAL
3. We will call or email back a response.

CALSoft Section:

CALPlex Serial Number:

Details/How did you get this error/Describe your suggestion:

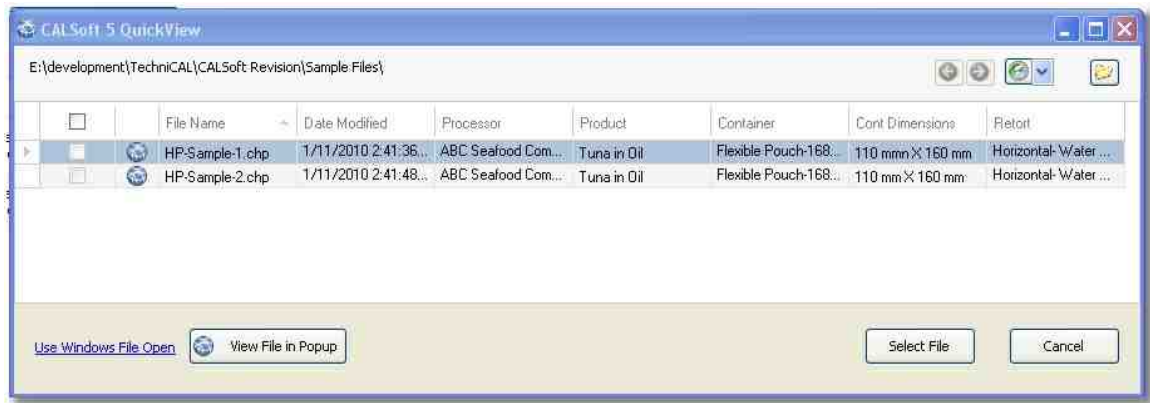
 Email to TCAL  Close

9.7 Quick Viewer

The CALSoft QuickViewer is a file opening utility that allows the user to view important CALSoft file information before opening (or including) the File. Fields included for viewing are Product, Processor, Location, Container, and Retort information. All files that are contained in the selected directory are displayed in a table. You may sort any of the columns by **clicking on the column header**. To change the directory, click on the **Folder icon** in the top-right of the window.

In [Set a Process](#) or [Set a CUT/Vent](#) select the checkbox to select one or more files to include in your project. In [Collect HP](#) or [Collect TD](#) the checkbox is not available because those utilities only allow for review of one file at a time.

To switch back to the standard "Windows view" for opening files, click "**Use Windows File Open**".



9.8 CritiCAL Template

"CritiCAL" is a feature within CALSoft that gives you the option of recording **CRITICAL FACTORS** associated with each thermocoupled container in the heat penetration test. The default CritiCAL template grid includes many common critical factors. To view or change the default factors to be used in the template when the CritiCAL Feature is used (in Heat Penetration testing), click on "CritiCAL Template" from the CALSoft main dashboard.

(click here for more information on how to [use the CritiCAL feature during a Heat Penetration test](#)).

- There are 5 "Custom ingredients" that you can customize to fit your needs. Double click on the blue, underlined text ("Ingredient#") to change.
- The "units used" may also be changed by double-clicking on the unit.
- If you click "Save as Default", these factors will be used the next time a new HP test is conducted and the CritiCAL feature is used

Customize Critical

Customize CritiCAL Factors

 **Select All** *Select the hyperlink below to change the Custom Name or Change the Units Used.

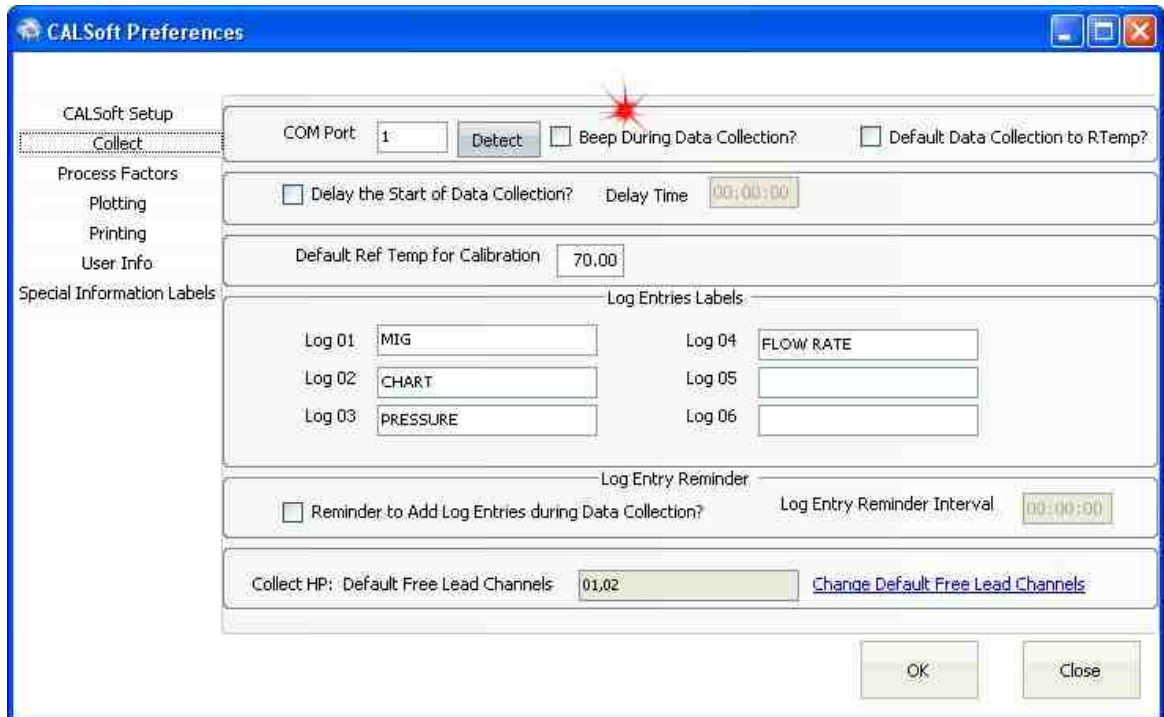
Show	Name	Units Used
☒	TC Position	mm AB
☐	Location	
☐	Orientation	
☒	Tuna	grams
☒	Oil	grams
☐	Water	grams
☐	Ingredient#4	ounces
☐	Ingredient#5	ounces
☒	Tare Weight	grams
☒	Gross Weight	grams
☒	Net Weight	grams
☐	Drain Weight	grams
☐	Residual Gas	cc
☐	Particle Size	inches
☐	Pre-Impale	
☐	Post-Impale	
☐	Pre-Headspace (Gross)	mm
☐	Pre-Headspace (Temp)	E
☐	Post-Headspace (Gross)	32nds/inch
☐	Post-Headspace (Temp)	E
☐	Pre pH	
☐	Post pH	
☐	Pre Viscosity	centipoise
☐	Post Viscosity	centipoise

 **Save as Default**
CritiCAL Viewer

 **Cancel**

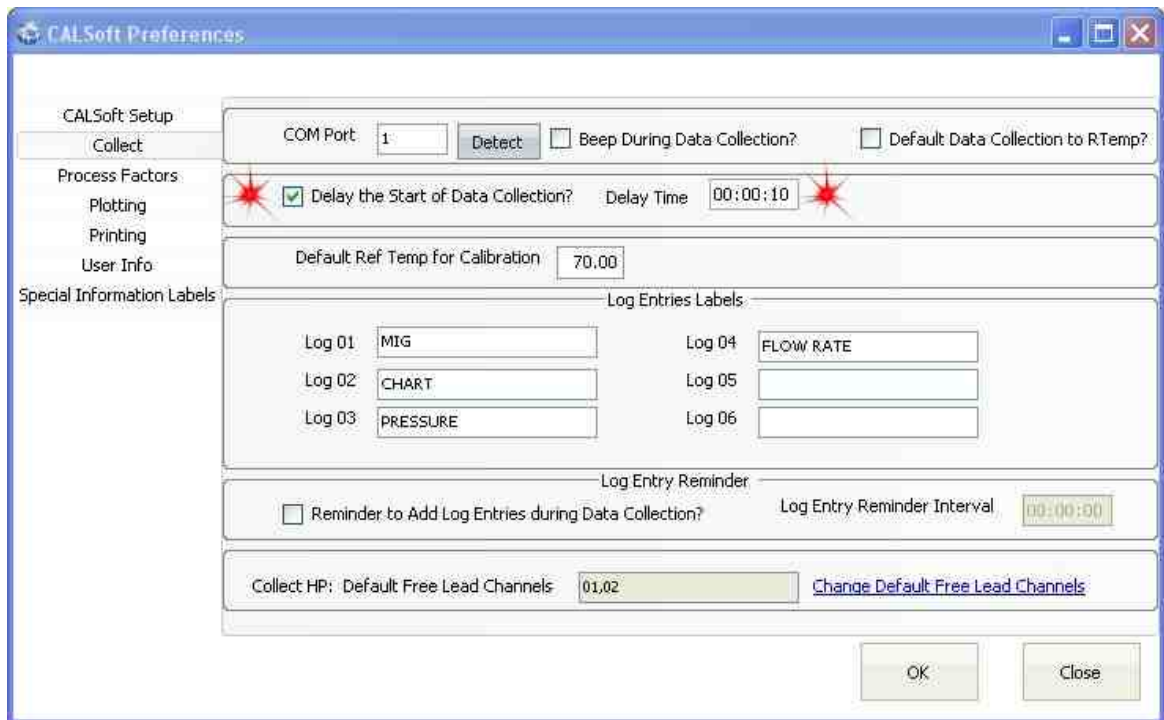
9.9 Beep When Scanning During Data Collection

You may set CALSoft to make an audible sound ("Beep") after each scan during HP or TD data collection. To do this, go to PREFERENCES (in the Ribbon menu of any section, or on the main Dashboard) and chose the COLLECT tab on the right. Then check "Beep During Data Collection". To turn off this feature, un-check "Beep During Data Collection".



9.10 Delay Start of Data Collection

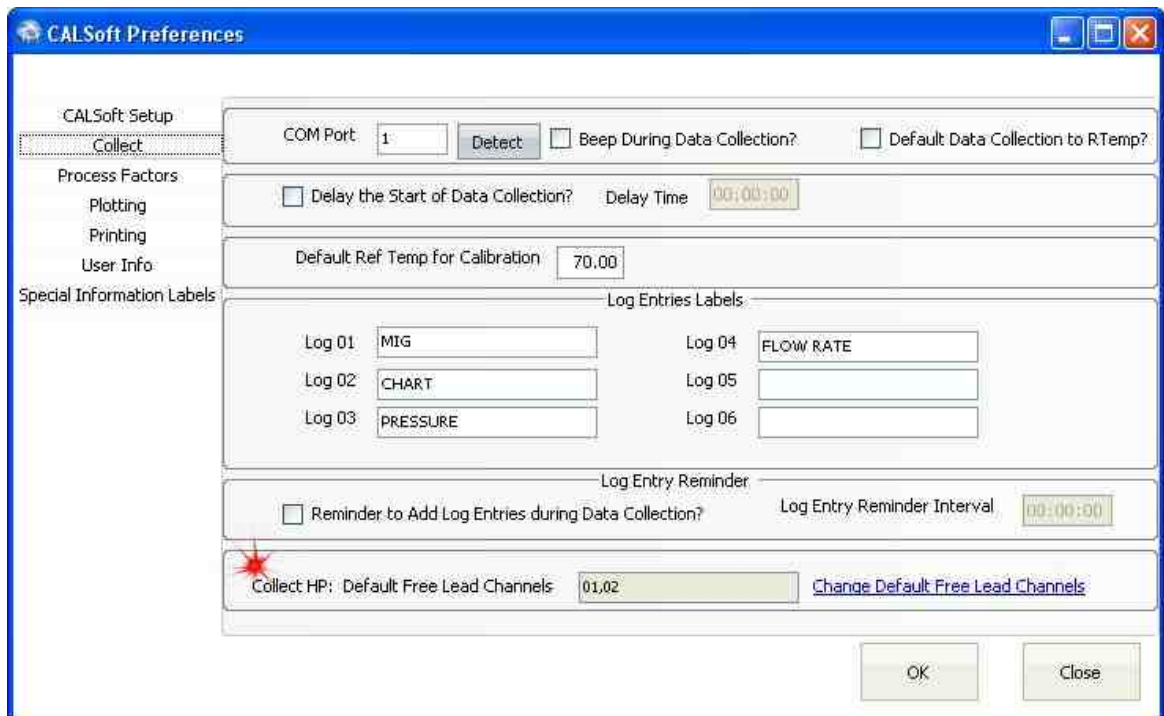
You may choose to delay the start of data-collection. This will give you time to synchronize the start of data-collection in CALSoft with the start of the retort. To delay the start of data-collection, go to PREFERENCES (in the Ribbon menu of any section, or on the main Dashboard) and choose the COLLECT tab on the right. Then check "Delay The Start of Data Collection" and enter a time (hours, minutes, seconds) that you want to wait until data collection begins. To turn off this feature, uncheck "Delay The Start of Data Collection"



9.11 Collect HP Set Default Free Leads

The user can know set in their preferences which leads will default to Free leads for a new HP collection file.

This is set in the Preferences Collect tab.



To change this value from the first two channels select the Change Default Free Lead Channels link. This link will launch the Collect HP: Set Default Free Leads Form and on this form the user can select which channels will be the default free leads for a Collect HP test.

Set as Default	Channel #
☒	01
☒	02
☐	03
☐	04
☐	05
☐	06
☐	07
☐	08
☐	09
☐	10
☐	11
☐	12
☐	13
☐	14
☐	15
☐	16
☐	17
☐	18
☐	19

Apply Cancel

After selecting Apply the new defaults will be set.

Index

- A -

Assignment of Critical Factors 111

- B -

Backup File 57, 85

Ball Formula Method 92

- C -

Calibration 56, 85

CALPlex Data Collection 17

Collect Data- Heat Penetration 13

Collect HP Set Default Free Leads 175

- F -

Fh Conversion 166

- G -

General Method 93

Generating Final Process report 114

- I -

Importing Files into CALSoft 5 45

- L -

Lethal Rate table 169

Lethality Calculation Report (Optional) 112

- M -

Manual File Creation HP 53

Manual File Creation TD 82

- P -

Plotting data 101

Process calculation 110

- Q -

Quick Ball Formula Calculation 117

- R -

RTemp Data Collection 18

- S -

Software Security/Activation Code 163

- T -

Temperature Conversion 167

The Process Calculation (ProCal) Data-Base 94

- W -

What is Evaluating a Deviation? 154

What is heat penetration? 13

What is Setting a CUT / Vent? 127

What is Setting A Process? 91

- Z -

Zoom plotting 61, 85

Endnotes 2... (after index)

Back Cover