

Application Note:

Using the ThermoBiscuit™ and BreadScope™ for Industrial Bread Production Quality Control

Objectives:

Collect time vs temperature data for product and oven.
Generate a standard production report of baking process.

Required Materials:

1. Measurement System

- ThermoBiscuit with (ThermoSleeve & Strap)
- BreadScope
- GateWay™
- DataLink Lab software with ZoneCue™ & Bread Profile™ add-in modules

2. Multiple strap bread pan with mold size of at least 3"x4"x7"

3. Bread dough

4. Bread profile temperatures such as...

Baking Start	usually ~ 95°F (slightly above proofing)
Yeast kill	usually ~ 140°F
Starch coagulation	usually ~ 165°F
Enzyme kill	usually ~ 185°F
Final core temperature	usually ~ 202°F

5. Oven zone parameters such as ...

Number of oven zones	6 zones
Length of each oven zone	20 feet
Oven belt speed	5.714 feet per minute
(120 foot oven with 21 minute bake time = 5.714 feet/minute)	

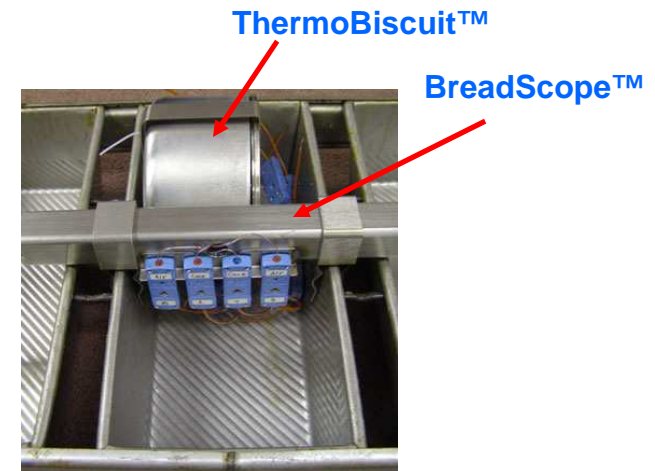
Procedure for collecting temperature data

Step 1. Setup ThermoBiscuit as a data logger

- (1a) Install batteries in the ThermoBiscuit (do not replace ThermoBiscuit cover yet).
- (1b) Connect ThermoBiscuit to the BreadScope.
- (1c) Start DataLink software on a laptop.
- (1d) Set up ThermoBiscuit as a data logger following the instructions in ThermoBiscuit Quick Start Guide.
- (1e) Copy down the keycode, required for data download.

Note: ThermoBiscuit is now collecting temperature data from BreadScope probes

- (1f) Close the software DataLink.
- (1g) Replace and secure the ThermoBiscuit cover.



Procedure for collecting temperature data (cont'd)

Step 2. Prepare hardware for placement in pan

- (2a) Install the ThermoSleeve onto ThermoBiscuit
- (2b) Adjust the BreadScope probe positions to measure the bread core temperature and the oven air temperature.
 - Channels 3 and 6 for bread probes
 - Channels 4 and 5 for air probes



Procedure for collecting temperature data (cont'd)

Step 3. Install the ThermoBiscuit system in a production bread pan.

- (3a) Take the ThermoBiscuit / BreadScope system to a location near the oven entrance.
- (3b) Remove a single bread pan filled with proofed dough from the production line.
- (3c) Remove the dough from one of the central molds.
- (3d) Position the ThermoBiscuit system into the empty mold and place the BreadScope such that the product core temperature probes are positioned in the center of each mold with proofed dough.
- (3e) Attach the Channel 1 probe to the inside bottom surface of the bread mold carrying the ThermoBiscuit.
- (3f) Fasten the Channel 2 probe to measure air temperature inside the bread mold carrying the ThermoBiscuit.
- (3g) Return the bread pan with ThermoBiscuit / BreadScope system to the production line.

Note: ThermoBiscuit is now traveling with bread pan toward the oven.

Procedure for collecting temperature data (cont'd)

Step 4. Getting ready to download data

(4a) Wait for ThermoBiscuit / BreadScope to exit the oven.

CAUTION- DEVICES ARE HOT! POSSIBLE BURN HAZARD!

(4b) Remove bread pan with ThermoBiscuit / BreadScope from the production line.

(4c) Remove ThermoBiscuit / BreadScope system from the bread pan and place on a suitable surface. Do not unplug probe connectors.

(4d) Remove ThermoSleeve and strap from ThermoBiscuit

Note: ThermoBiscuit is now ready for download.

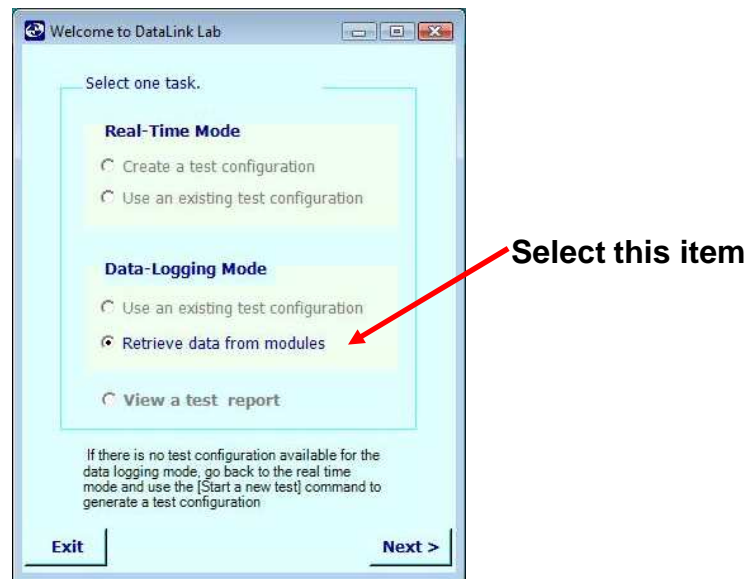


Procedure for collecting temperature data (cnt'd)

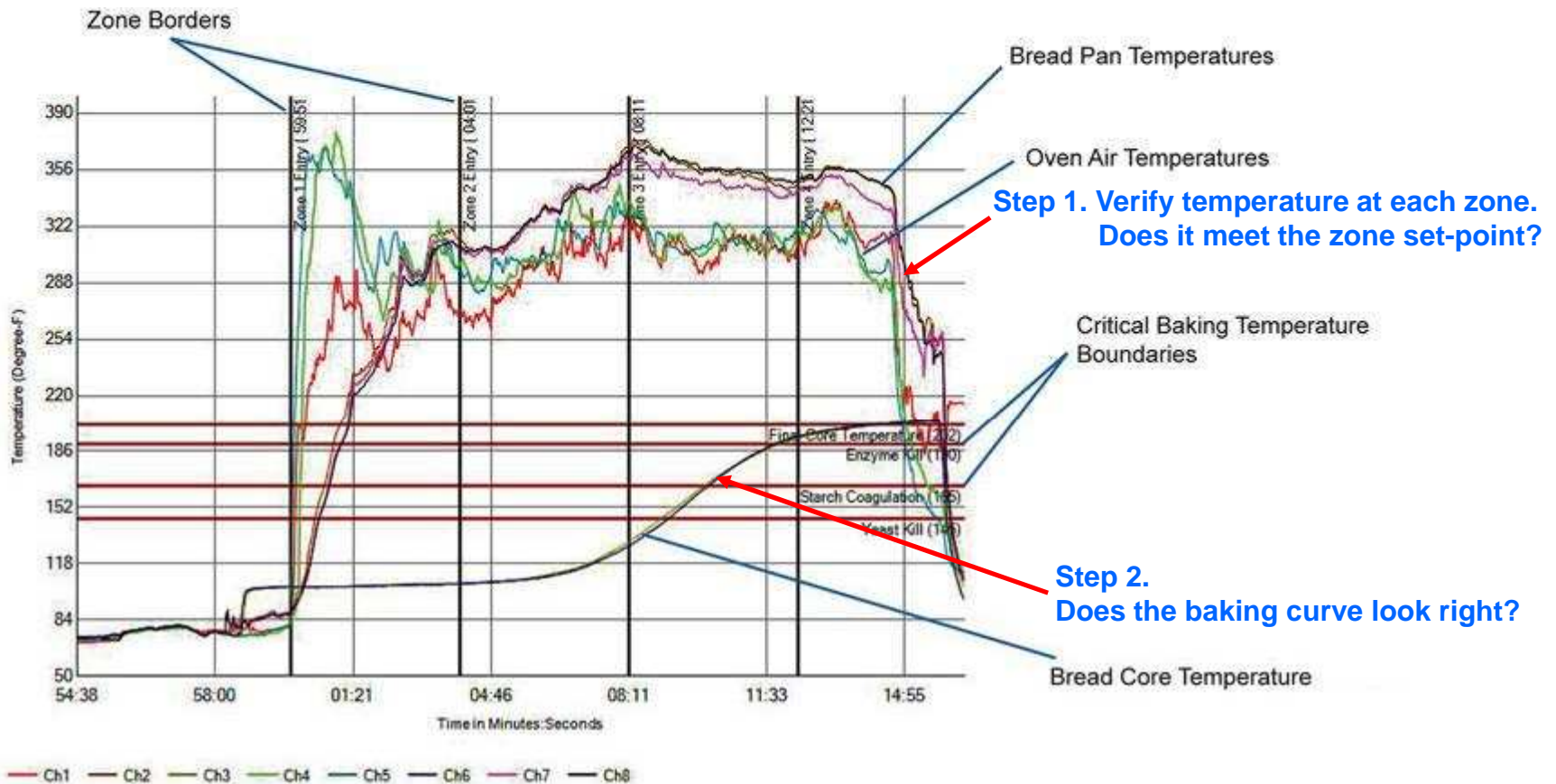
Step 5. Download temperature data

- (5a) Place the ThermoBiscuit / BreadScope system next to the laptop.
- (5b) Start the DataLink software and select [Retrieve data from a data logger].
- (5c) Follow instructions in ThermoBiscuit Quick Start Guide to download data.
- (5d) Remember to save the Excel report and the JPEG data chart.

Note: Data report is now available for review.



Baking Analysis using temperature curves



Baking Analysis of Bread Profile

Bread Baking Profile

Start Time	2009-12-16T10:59:51		
End Time			
Total Bake Time	21	Minutes	42 Seconds

Is the baking time duration correct?

Channel 3-Bread Core Temperature			
Yeast Kill at 145	66.05	%	
Starch Coag. at 165	70.97	%	
Enzyme Kill at 190	79.34	%	
Final Core Temp. at 202	13.21	%	

Does the bread profile meet expectation?

Channel 6-Bread Core Temperature			
Yeast Kill at 145	66.82	%	←
Starch Coag. at 165	71.43	%	←
Enzyme Kill at 190	78.88	%	←
Final Core Temp. at 202	13.9	%	←

- Time duration from the beginning to yeast kill
- Time duration from the beginning to starch coagulation
- Time duration from the beginning to enzyme kill
- Time duration stays above 202° Fahrenheit

Scenario 1. Zone temperatures do not reach the setpoint

- Step 1. Compare temperature data from the BreadScope air probes (Channels 4 & 5) to confirm that they are consistent.
- Step 2. Compare temperature readings from Step 1 with the data from the air temperature probe located in the empty mold (Channel 2) to confirm that they are consistent.
- Step 3. Verify that the readings of bread pan bottom temperature probe (Channel 1) meets the baking requirement.
- Step 4. If there are any inconsistencies in the three steps above, verify the oven thermometer reading.

Scenario 2. Baking Profile does not meet specification

- Step 1. Compare bread core temperature readings (Channels 3 and 6) to confirm that they are consistent.
- Step 2. Verify that the readings of bread pan bottom temperature probe (Channel 1) meets the baking requirement.
- Step 3. Verify the starting temperature of the bread core readings (Channels 3 and 6) meets the bread proofing temperature specification.
- Step 4. If there are any inconsistencies at the three steps above, verify the bread proofing configuration and the bread ingredients.
- Step 5. Re-run the test to confirm the baking profile consistency.

Senario 3. Generate a standard baking profile for production

Step 1. Use the Excel report to provide a **bread profile table**.

Step 2. Use the JPEG chart to provide a **bread baking curve**.


Step 3. Generate a specific report for each product line configuration:

- Different oven zones / zone temperature set points

- Different bread ingredients

- Different bread pan size and depth

Step 4. Run every week to verify oven conformity and ensure production consistency.



*We are sure you will find
ThermoBiscuit system
useful for your production lines.*

Please enjoy its convenience and benefits.