CONTROLLING FINISHED DOUGH TEMPERATURE

THE BAKERS OBSESSION

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WHY CONTROL FINISHED DOUGH TEMPERATURE?

One of the most important skills a baker must learn is the ability to accurately control dough temperature.

The benefits are clear and immediate, temperature control plays a crucial role in:

- ✓ *Time management – more predictability in the overall production schedule.*
- ✓ *Product consistency*
- ✓ *Crust, crumb, and flavor characteristics*
- ✓ *Shelf life*

TEMPERATURE & GLUTEN

Temperature also affects gluten development:

- At warmer temperatures gluten in bread dough exhibits less elastic properties
- At cooler temperatures it exhibits more elasticity and even more stability.

Optimum gluten development can be more difficult to achieve at either end of the temperature spectrum.

SYMPTOMS OF TOO HIGH OR LOW A FINISHED DOUGH TEMPERATURE.

Excessively Cool Conditions

Dough
- Matures slowly & remains green for a long time
- Is moist
- Is not firm but rather flows

Bread
- Lack of volume
- Increased colour

Excessively Warm Conditions

Dough
- Matures quickly gets old very fast
- Is dry & tends to form a skin
- Firms up very quickly
- Turns short (less elastic) very rapidly
- Loses fermentation stability

Bread
- Lack of colour & volume
- Dryness & staling

MAJOR FACTOR CALCULATION

To calculate the Major Factor (MF) which is static in value we must take into consideration the three factors which affect Finished Dough Temperature:

- Room temperature (RT)
- Flour Temperature (FT)
- Required Water Temperature (RWT)

To obtain Optimum Finished Dough Temperature (ODT) of 29°c +/- 1°c

WATER is the most convenient ingredient to alter in temperature,

therefore we must determine the Required Water Temperature (RWT) to influence the Finished Dough Temperature.

A simple thermometer and the **Major Factor Calculation** are used to determine the RWT:

$$\frac{\text{Major Factor (MF)} - \text{Flour Temp (FT)} - \text{Room Temp (RT)}}{\text{Required Water Temp (RWT)}} =$$

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ESTABLISHING YOUR MAJOR FACTOR

Record your:

Flour Temperature (FT)		Room Temperature (RT)		Water Temperature (WT)
26°c	+	26°c	+	16°c

Make the dough to optimum development ensuring you reach window and record the

Finished Dough Temperature 31°c

Its important to note that the mixing process will produce some friction, affecting the finished dough temp. This is one of the reasons the MF will vary from bakery to bakery

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BAKE HOUSE ALLOWANCE

You have now established your required mixing time to take dough to Window. In our example your dough finished at 31°c and not the Optimum Finished Dough Temperature of 29°c .

This means we have include a Bake house Allowance (BA) by using the following rule:

For every 1°c above or below a RDT (29°c) we add or subtract 1.5°c

If we apply this rule:

31°c is 2 °c above 29°c

therefore

-2 x 1.5 = - 3°c

Bake House Allowance = - 3°c

This may need to be tried a few times until consistency is born.

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NOW YOU HAVE CONSISTENCY

You can calculate your Major Factor:

Flour Temperature (FT)	26°c	+
Room Temperature (RT)	26°c	+
Water Temperature (WT)	16°c	+
Bake House Allowance (BA)	-3°c	=
Major Factor	65°c	

In baking formulas where a lower or higher RDT is necessary its just a matter of employing the same principle to the RWT.

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NOW YOU WILL HAVE PROCESS CONTROL OVER YOUR FINISHED DOUGH TEMPERATURE

Use your MF on a daily basis along with your room & flour Temp to calculate your RWT:

Major Factor (MT)	65 °c	-
Room Temperature (RT)	°c	-
Flour Temperature (FT)	°c	=
Required Water Temp (RWT)	°c	

Its important to remember that at change of wheat season you will need to reassess your required mix time to achieve window and then recalculate your Major Factor

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