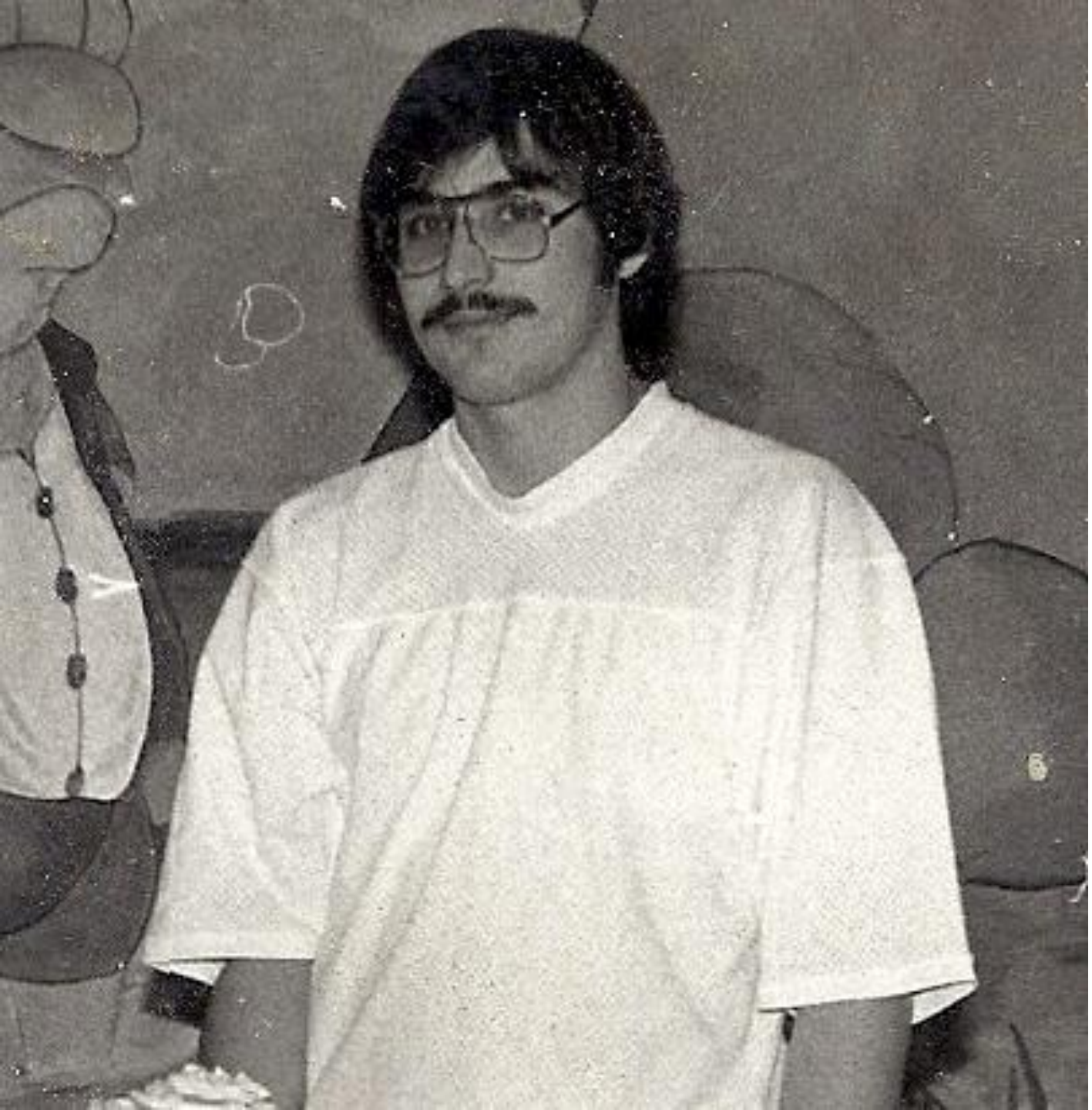
Pizza Crust Boot Camp™

Presented by Tom Santos and Curt Wagner
From General Mills

Want to Improve Your Pizza Culinary Expertise?

Get More Details at Booth Number: 807



Tom Santos

National and Regional Flour Sales and Technical Support

42 Years in Bakery, Pizza and Flour Industry

Bakery Owner 1980-1998

General Mills 1997-Present

Curt Wagner

Corporate Chef; CEPC,
Flour

39 Years in the Baking and Pastry Industry

Developed a Sugar-Free and No Sugar Added Dessert line "Remember When Desserts"

4 Medals in AFC Competitions

General Mills Booth - 807

Dough Making Demos

- 12:30 PM at GM Booth Tuesday/Wednesday
- 2:00 PM at GM Booth Tuesday/Wednesday

Pizza Crust Bootcamp™

- Part 1 – Technical
  - 9:30AM-11AM Tuesday
- Part 2 – Practical
  - 3:30-5PM Wednesday

Ingredient Functionality

Can You Answer the Question…

What Does It Do In My Dough?

What Does It Do In My Dough?

Primary Ingredients

- Flour
- Water
- Salt
- Yeast

Optional Ingredients

- Sugar
- Oil

Flour

Structure

Extensibility

Gas Retention

Flour Treatments

Bleaching: Makes flour whiter

Bromating: process of treating flour with potassium bromate to mature the flour. Also known as the "Bakers Helper", it strengthens dough forming properties

Enrichment: replacing vitamins and minerals lost during the milling process

High Protein Flour

Function of High Protein Flour

Serving size	
	% Daily Value*
Tolerant to mixing and fermentation	
Develops crisp crusts with a chew	
Minimizes soakage of sauce	
Spring Wheat	
Protein Level	13.3+%
Gluten Strength	High
Dough Strength	High
Absorption Potential	56-62%

* The % Daily Value (DV) tells you how much a nutrient contributes to a daily diet.

Function of Bread Flour

Serving size

	% Daily Value*
Excellent go-between Flour	
Spring Wheat	
Softer Mouth Feel	
Good choice for pan style	
Can be stretched for thin crust	
Protein Level	12.4-12.9%
Gluten Strength	Medium
Dough Strength	Medium
Absorption Potential	53-60%

* The % Daily Value (DV) tells you how much a nutrient contributes to a daily diet.

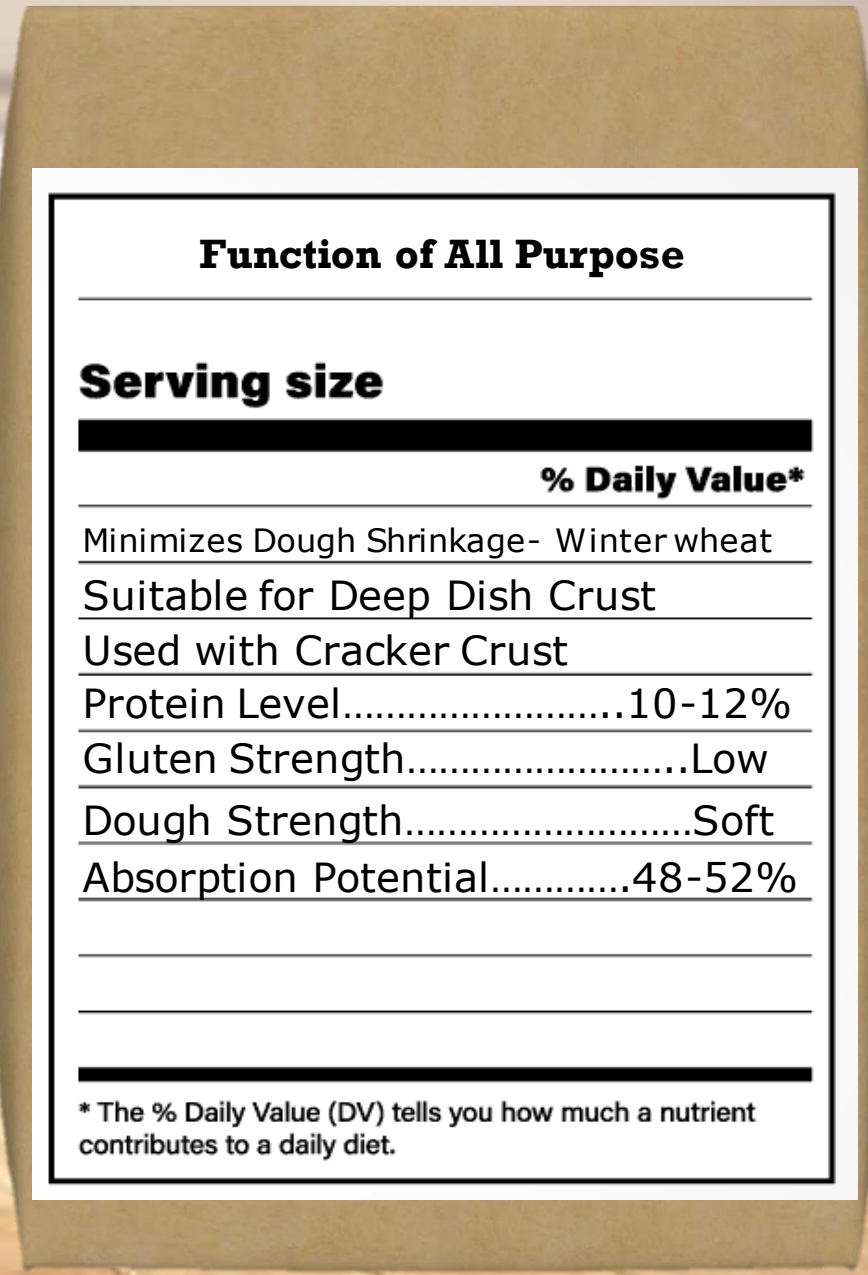
Artisan and Neapolitan

Function of Flour

Serving size

	% Daily Value*
High Heat Oven/Hearth Tolerance	
European Style Domestic Winter Wheat	
Select Blend of Hard Winter Wheat	
Protein Level…….11.8-12.1%	
Gluten Strength…Lower Medium	
Dough Stretch*……Soft	
Absorption Potential……+/-62%	

* The % Daily Value (DV) tells you how much a nutrient contributes to a daily diet.



Function of All Purpose

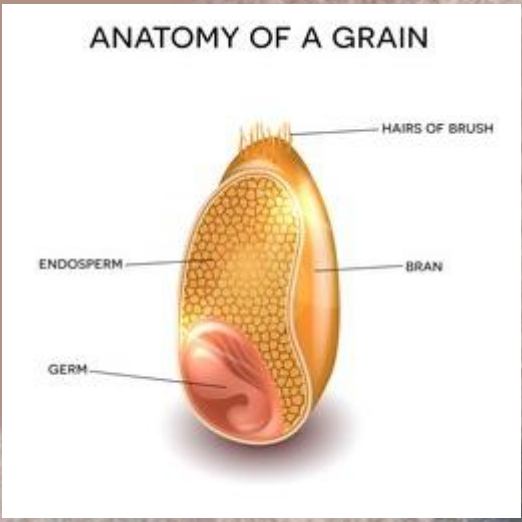
Serving size

	% Daily Value*
Minimizes Dough Shrinkage- Winter wheat	
Suitable for Deep Dish Crust	
Used with Cracker Crust	
Protein Level.....10-12%	
Gluten Strength.....Low	
Dough Strength.....Soft	
Absorption Potential.....48-52%	

* The % Daily Value (DV) tells you how much a nutrient contributes to a daily diet.

Whole Wheat Flour

- Milled from 100% of the wheat kernel
- Usage level of 20-40% total flour
- Great whole grain food
- Adds flavor and texture to pizza
- Good option for serving pizza in schools




White Whole Wheat Flour
Whole Wheat Flour

Whole Grain and Pizza

‘We recommend that pizza that is labeled "whole grain " or "whole wheat" only be labeled as such when the flour ingredient in the crust is made entirely from whole grain flours or whole wheat flour, respectively.’

February 17, 2006

Guidance for Industry and FDA Staff

Whole Grain Label Statements

U.S. Department of Health and Human Services

Food and Drug Administration

Baker's Percent:

Flour = 100%
Other ingredients are a percentage of the flour

Ingredient	Weight	Bakers %
Flour	100 lbs.	100
Water	56 lbs.	56
Salt	2 lbs.	2
Sugar	4 lbs.	4
Oil	6 lbs.	6
Yeast	1 lb.	1
Total	**169 lbs.**	**169%**

Water's Function in the Dough:

A Solvent

Hydration

Temperature Control

Usage 54-75%

Salt & Sugar's Function in the Dough:

- Helps Control Fermentation
- Browning the Crust
- Keeping Quality
- Salt Usage: 1-2.5%
- Sugar Usage: 0-5%

Oil/Shortening's Function in the Dough:

- Lubrication
- Extensibility
- Browning
- Tenderness
- Quality Keeping
- Usage: 0-14%

Olive Oil

Corn Oil

Lard

Canola Oil

Yeast's Function in the Dough:

- Leavening Action
- Dough Conditioning
- Flavor and Aroma Development
- Usage: 0.25 - 3%

Instant yeast

Instant Yeast: **a dry yeast that comes in smaller granules** than active dry yeast, absorbs liquid rapidly, and does not need to be rehydrated or proofed before being mixed into flour.

- **Dry**
- **Dissolves quickly**
- **No need to rehydrate**
- **Constant activity**

Active Dry Yeast

Active Dry Yeast: A form of dry yeast in which the yeasts are not killed but made dormant through dehydration.

- **Dry**
- **Need to rehydrate**
- **5:1 minimum water to yeast**
- **Stronger "Yeasty" flavor**
- **Live and dead cells present**

Compressed

Compressed Yeast: Compressed yeast is a fresh cream yeast that has been drained from most of its water and compressed into small blocks.

- **Never Freeze Compressed Yeast**
- **Wet**
- **Refrigerated storage**
- **Portable**
- **Perishable**
- **No need to rehydrate**

Basic Dough Formulas

Technical Disclaimer*

Based on our experience, dough processing will make a difference, but here is a starting point…

Basic Dough Formulas – Spring Wheat

Pizza Type	NY Thin	NE Hand Tossed Pizza	Detroit
Flour Type	**Spring Wheat**	**Spring Wheat**	**Spring Wheat**
Formula	13.3+% High Protein	12.3+% Mid Protein Patent	12.3+% Mid Protein Patent
Flour	100	100	100
Water	56	53	50
Salt	2	1.5	1.2
Sugar	1	2	1.4
Oil	4	6	0
Yeast (instant)	0.75	1	1.2
Semolina	0	0	12

Basic Dough Formulas – Winter Wheat

Pizza Type	Deep Dish	Cracker	Neapolitan
Flour Type	**All Purpose/H&R**	**All Purpose/H&R**	**All Purpose/H&R**
Formula	10.5-11.5%	10-11%	11.7-12.2%
Flour	100	100	100
Water	56	50	63
Salt	1.5	2	2.25
Sugar	2.5	4	0
Oil	8	2	0
Yeast (instant)	0.5	1	0.25

Wheaten Style Pizza Formula

Ingredient	Bakers %	Weight
Whole Wheat Flour	40	10 lb
High Gluten Flour	60	15 lb
Water	64	16 lb
Salt	2	8 oz
Honey	6	1 lb. 8 oz
Oil	4	1 lb.
Yeast (instant)	0.75	3 oz

Wheat Market Update

- Improved drought conditions in Spring Wheat Planting region
- Still concern about dryness in Winter Wheat Growing region
- Russia/Ukraine extended safe passage deal 60 days (market was hoping for 120 days)
- Bank concerns and debt weighing on markets (US Dollar)
- Supply Chain has improved since we talked last year.

Food Safety Flour Video

30

Please Do Not Eat Raw Dough or Batter

- "Flour is derived from a grain that comes directly from the field and typically is not treated to kill bacteria," says Leslie Smoot, Ph.D., a senior advisor in FDA's Office of Food Safety
- Risks associated with the consumption of raw dough are harmful strains of E Coli (STECS) and Salmonella
- Common "kill steps" applied during food preparation and/or processing (so-called because they kill bacteria that cause infections) include boiling, baking, roasting, microwaving, and frying. But with raw dough, no kill step has been used.

Flour Detective Video Playlist

Six in-depth lessons on flour available to watch by **anyone**. Playlist available **here**!

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General Mills Convenience & Foodservice

6 videos Last updated on Apr 4, 2022

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Questions?

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Ready for a slice of success?

Scan this QR code for exclusive access to our pizza crust expertise sample site.

Presented by Tom Santos and Curt Wagner

Booth #807

Session 2: How to Make Dough

Presented by Tom Santos and Curt Wagner
From General Mills


Sweet Buns
Bakery
General Mills
Convenience & Foodservice

So, You Want to Make Dough?

Scaling Ingredients

Mixing

Fermentation

Make-up

Scaling Ingredients

Consistency = Quality

Weight

Accuracy

Zero Out

Suggested Order

Consistency = Quality

1. Water
2. Dry – hydrate the flour
3. Oil – develop the gluten

Step 1: Water

Add water

Step 2: Dry

Mix for one minute to allow the water to hydrate the flour

Step 3: Oil

Add the oil and continue mixing

Function of Mixing

Consistency = Quality

1. Disperses and combines ingredients
2. Develops gluten protein network

Mixing Time Factors

Consistency = Quality

1. Flour Protein
2. Absorption
3. Formulation
4. Temperature
5. Mixer Type
6. Batch Size

Mix Time by Protein Level

	Protein Level	Gluten Strength	Dough Strength	Mix Time
All-Purpose	10 – 12%	Low	Soft	5 - 7
Bread Flour	12 – 13%	Med	Med	7 - 10
High Gluten	13 – 14%	High	Stiff	10 - 14

Mix times will be dependent upon processing method

Flour + Water + Mix = Gluten

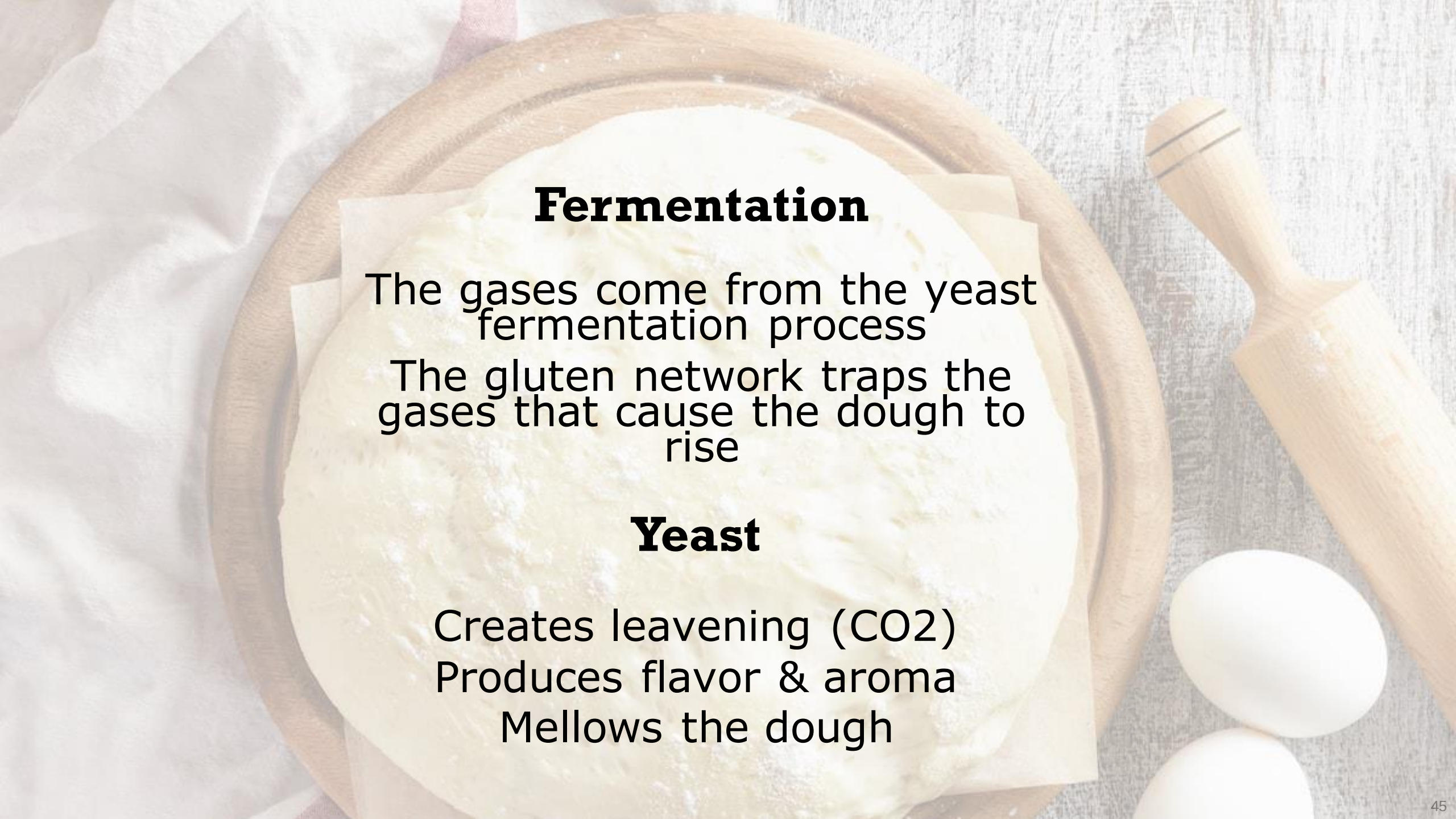
Gluten is the structure of the dough

4 Minutes

6 Minutes

8 Minutes

10 Minutes



Fermentation

The gases come from the yeast fermentation process

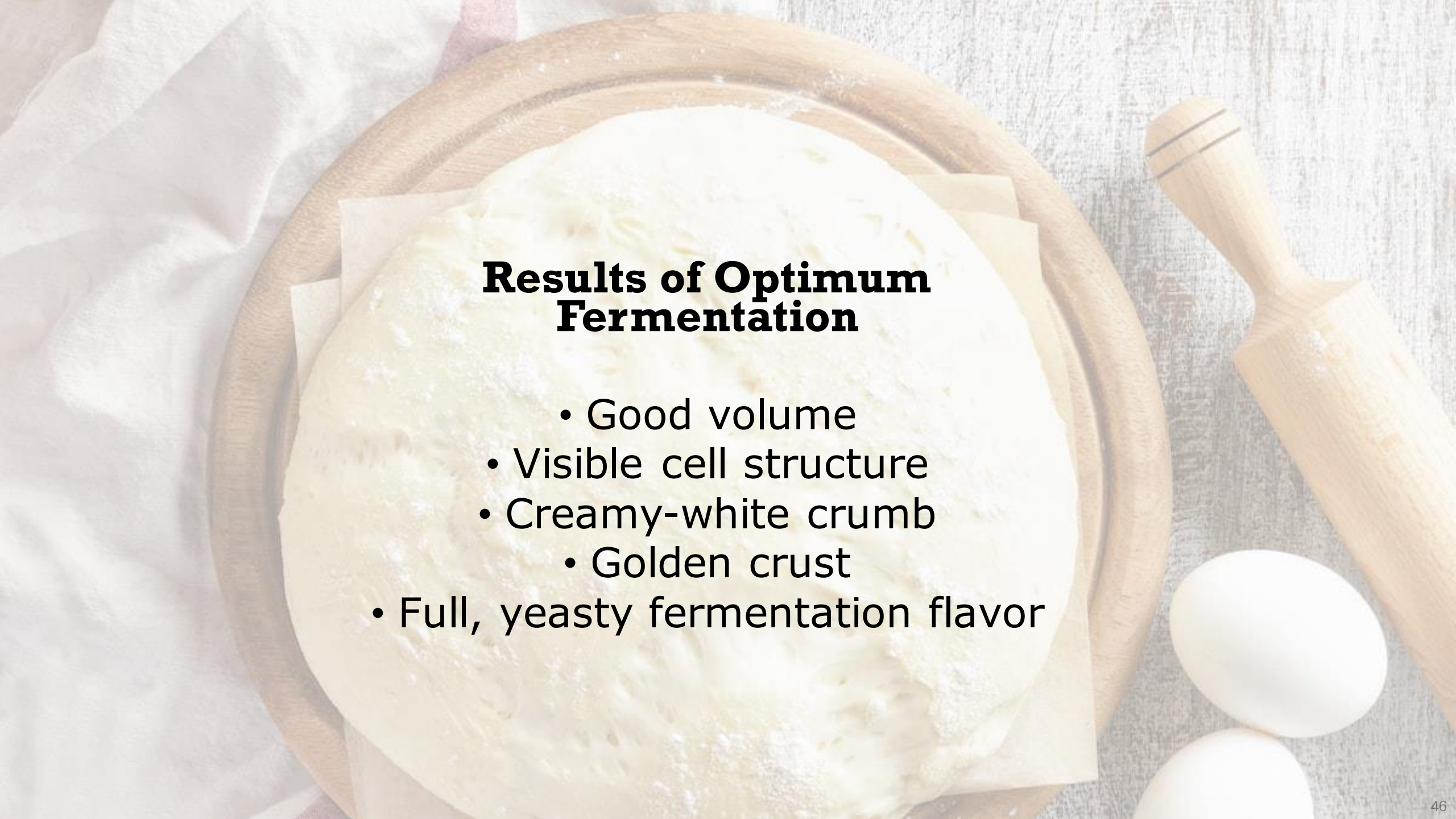
The gluten network traps the gases that cause the dough to rise

Yeast

Creates leavening (CO_2)

Produces flavor & aroma

Mellows the dough



Results of Optimum Fermentation

- Good volume
- Visible cell structure
- Creamy-white crumb
- Golden crust
- Full, yeasty fermentation flavor

Non-Optimum Fermentation

Over-Fermented

- Flat
- Irregular, open grain
- Bad beer odor
- Gummy-grayish crumb
- Lack of browning

Under-Fermented

- Flat
- Tight, dense grain
- Bland flavor
- Gummy-grayish crumb
- Lack of browning

Temperature Control

A thermometer is one of the best investments you can make to control your dough performance and costs.

An 18°F increase in dough temperature could double yeast activity.

Therefore...

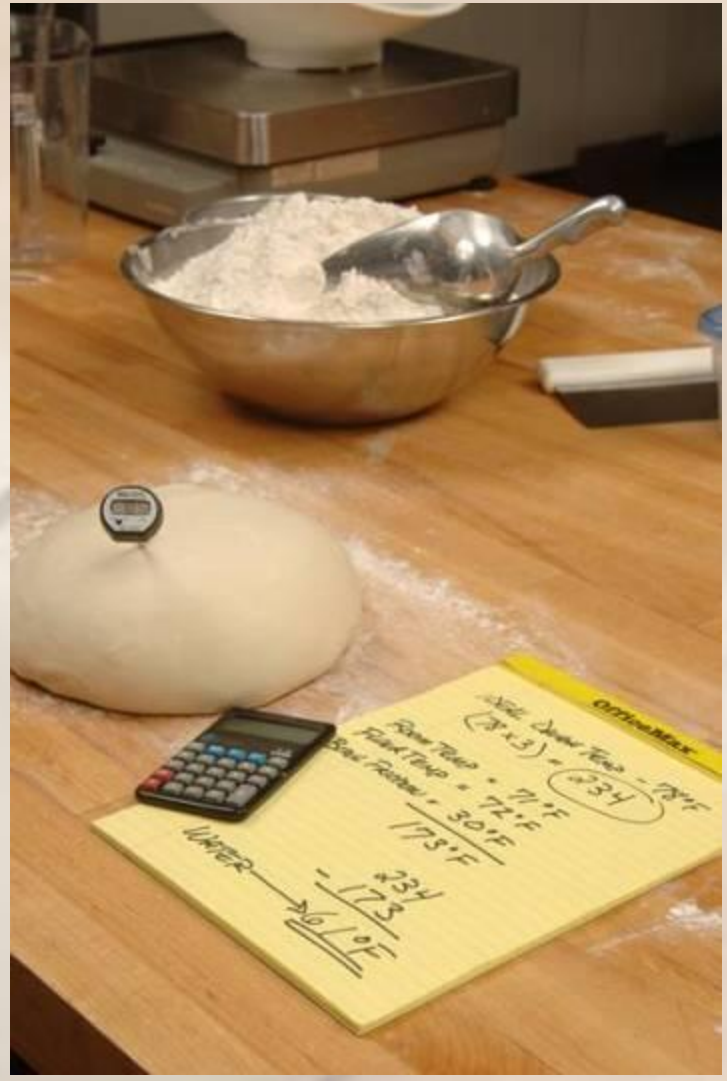
An 80°F dough will rise twice as fast as a 62°F dough!


96°F
88°F
76°F

Dough Temperature

Affected by:

- Flour temperature
- Room temperature
- Bowl friction (heat from mixing)
- Water temperature



Temperature Control:

- Your water temperature is the easiest variable to adjust when controlling your dough temperature

Determining your ideal dough temperature:

- Keep track of your dough temperatures for each batch
- Select the temperature which provide the best finished product

Water Temperature Chart

Flour Temperature \ Room Temperature	40	42	44	46	48	50	52	54	56	58	60	62	64	66	68	70	72	74	76	78	80	82	84	86	88	90
40	110	108	106	104	102	100	98	96	94	92	90	88	86	84	82	80	78	76	74	72	70	68	66	64	62	60
42	108	106	104	102	100	98	96	94	92	90	88	86	84	82	80	78	76	74	72	70	68	66	64	62	60	58
44	106	104	102	100	98	96	94	92	90	88	86	84	82	80	78	76	74	72	70	68	66	64	62	60	58	56
46	104	102	100	98	96	94	92	90	88	86	84	82	80	78	76	74	72	70	68	66	64	62	60	58	56	54
48	102	100	98	96	94	92	90	88	86	84	82	80	78	76	74	72	70	68	66	64	62	60	58	56	54	52
50	100	98	96	94	92	90	88	86	84	82	80	78	76	74	72	70	68	66	64	62	60	58	56	54	52	50
52	98	96	94	92	90	88	86	84	82	80	78	76	74	72	70	68	66	64	62	60	58	56	54	52	50	48
54	96	94	92	90	88	86	84	82	80	78	76	74	72	70	68	66	64	62	60	58	56	54	52	50	48	46
56	94	92	90	88	86	84	82	80	78	76	74	72	70	68	66	64	62	60	58	56	54	52	50	48	46	44
58	92	90	88	86	84	82	80	78	76	74	72	70	68	66	64	62	60	58	56	54	52	50	48	46	44	42
60	90	88	86	84	82	80	78	76	74	72	70	68	66	64	62	60	58	56	54	52	50	48	46	44	42	40
62	88	86	84	82	80	78	76	74	72	70	68	66	64	62	60	58	56	54	52	50	48	46	44	42	40	38
64	86	84	82	80	78	76	74	72	70	68	66	64	62	60	58	56	54	52	50	48	46	44	42	40	38	36
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80	70	68	66	64	62	60	58	56	54	52	50	48	46	44	42	40	38	36	34	32	30	28	26	24	22	20
82	68	66	64	62	60	58	56	54	52	50	48	46	44	42	40	38	36	34	32	30	28	26	24	22	20	18
84	66	64	62	60	58	56	54	52	50	48	46	44	42	40	38	36	34	32	30	28	26	24	22	20	18	16
86	64	62	60	58	56	54	52	50	48	46	44	42	40	38	36	34	32	30	28	26	24	22	20	18	16	14
88	62	60	58	56	54	52	50	48	46	44	42	40	38	36	34	32	30	28	26	24	22	20	18	16	14	12
90	60	58	56	54	52	50	48	46	44	42	40	38	36	34	32	30	28	26	24	22	20	18	16	14	12	10

Using the water temperature chart*

The intersection of the Room Temperature column with the Flour Temperature row reveals the needed Water Temperature for a 75°F dough temperature

Example Shown:

If room temperature is 72°F and flour temperature is 60°F a 58°F degree water temperature would needed to achieve a finished dough temperatue of 75°F.

***Chart is based on targeting a 75°F ideal dough temperature with an estimated friction factor of 35°F.**

Points marked in Blue will need ice to achieve the proper dough temperature.

Fermentation Time

Attribute	Fresh	Retarded
Age of dough	3 – 12 hours	12 – 72 hours
Yeast Level	Higher	Lower
Dough temp	Warm (85 – 95)	Cool (75 – 85)
Fermentation	Fast	Slow

Fresh Dough

Goal is to produce multiple, smaller batches in order to maintain a supply of fresh dough

Advantages:

- More refrigeration space
- Accurately anticipate demand

Concerns:

- Requires mixing during the day
- Short shelf-life of dough
- Potential for inconsistent product
- Flavor profile

Fresh Dough Method

Mix

Ferment/Proof

Make Up

Use/Hold

Retarded Dough

Goal:

- Dough produced during off-peak time
  - Scaled and placed in retarder
    - Held for extended period
    - "Stable" until ready to use

Concerns:

- Dough temperature is critical
- Cooler space required
- Dough management skill

Advantages:

- Minimizes need for accurate production planning
- Good level of dough consistency

Retarded Dough Method

Mix

Divide/Round

Retard

Warm Up

Make Up

Retarded Dough Method

Dough Tray – Cross Stack - Nestle

Emergency Dough

Emergency dough formula:

- Increase yeast level – double?
- Increase sugar level – double?
- Warmer dough temperatures >95°F

Should only be used in an emergency, then destroyed!

Got a Problem?

Dough ball didn't rise

Dough ball rising too much

Dough ball gets "crusty"

Bubbles in my crust

My crust doesn't brown

Dough is too springy

Reasons Your Dough May Not Rise

- Dead or old yeast
- Yeast not properly rehydrated
- Not enough yeast
- Too cold: the dough or storage
- Not enough fermentation time
- Poor gluten network

Reasons Your Dough is Rising Too High

- Too much yeast
- Dough too warm out of the mixer
- Storage conditions too warm
- Too much fermentation time
- Check your salt levels

Reasons Your Dough is Crusted Over

Dough is drying out!

- Lightly coat dough balls with oil
- Keep dough balls covered
- Avoid heavy drafts or fans

Reasons Your Dough is Too Springy

Dough is too tight:

- Allow the dough to warm-up
- Let the dough "rest" at room temperature
- Increase mix time
- Increase liquid level

Reasons Your Dough Doesn't Brown

Pale all over:

- Old dough - no residual sugar
- Add some sugar to your formula
- Add milk solids to your formula

Reasons Your Dough Doesn't Brown

White pockets on the bottom:

- Build up of steam between dough and pan
- Press out air pockets during make-up
- Corn meal dusting on bottom
- Try a pan with holes or a screen

Pale across the bottom:

- Inadequate bottom heat
- Excessive top heat
- Proper rotation on deck oven
- Try a pan or screen

Reasons Your Dough Has Bubbles in the Crust

Improperly proofed dough:

- Under proofed
- Over proofed
- Dock the dough

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Addendum

Specialty Ingredients: Create Your Signature

Herbs

Flavorings

Sweeteners

Herbs & Seeds

- Good alone or in combination
- Often used to season oil
- No major functional effect on the dough
- Flavor intensities will vary, so experiment!
- Usage level: 2 to 5 oz/ 100 lb. flour

Herbs

Herb	Flavor	Affinities
Basil	Spicy, mint	Tomato, mozzarella, chicken, sauces
Oregano	Strong, rich	Tomato, beef, pork, garlic, mushrooms
Rosemary	Piney/pungent	Lamb, poultry, pork, tomato
Marjoram	Pungent; lavender-like	Mushroom, vegetables. meats
Chives	Mild scallion	Cheese, poultry, tomato
Thyme	Clove-like	Mushroom, meats
Parsley	Mild, carrrot-like	Pairs well with most other herbs

Flavorings: Onion and Garlic

- Use enough to produce a hint of flavor!
- Be careful, these will impart a dough relaxing effect
- Usage level: 1 to 3 oz per 100 lb. flour

Flavorings: Jalapeno

- Scrape seeds out and dice
- Incorporate during last minutes of mixing
- Could use canned, but will have less “bite”
- Additional thought:
- Add 1 – 3% coarse ground corn meal to the dough
- Usage level: 8 to 10 oz per 100 lb. flour

Flavorings: Parmesan Cheese

- Usage level: 2 to 3 lb. per 100 lb. flour
- Good rich flavor
- Blends well with herbs and spices

Sweeteners

Try different options other than plain white sugar, such as honey, molasses and brown sugar for a unique taste!

Creating Your Signature

<u>Honey Wash</u>

- Equal parts of honey and water
- Heat until it clarifies, cool and use
- Brush on the bone before baking