



Artisan Bread Flour Quality & Formulation

Artisan bread is gaining popularity with the increasing health-based claims over conventional bread. In addition, the clean label, authenticity, and sensorial creativity are boosting this trend even further. Sourdough, Baguette, Ciabatta, Vienna, and Italian loaves are a few popular artisanal breads that are showing up on supermarket shelves.

What flour is best for artisan bread?

Hard red spring and hard red winter wheat kernels are usually used for artisan bread flour.¹ The protein content usually falls within the range of 10.5-12.5% and the ash content is usually within the range of 0.48-0.55%. Additionally, enrichment of artisan bread flour with nutrients is possible.²

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Flour components that affect artisan bread baking quality



1 Proteins

Gluten proteins mix with water to form a viscoelastic dough. This viscoelasticity gives the ability to retain gas during fermentation and baking. The quality and quantity of these proteins affects water absorption and ensures that the artisan bread flour performs well during the baking process. Dry vital wheat gluten absorbs water nearly twice its weight.

2 Starch

Starch is present in both the native and damaged form. Native starch is simply the starch as it exists in the unmilled grain. A small percentage of the starch granules are damaged in the milling process. Some damaged starch must be present to assure proper absorption as well as good fermentation and crust coloring. While damaged starch isn't a big portion of flour's component, it may affect the dough and cause stickiness if it is present in large amounts.

Both native and damaged starch gelatinization takes place in the oven in the presence of water. Gelatinized starch sets the structure of baked goods. Some damaged starch is good to help provide added softness to artisan bread for an extended shelf life.

3 Enzymes

Amylases are a group of starch degrading enzymes. In cereals, alpha-amylase is found in the endosperm, bran, and germ. Alpha amylases can be quantified using falling number tests. The falling number should be 250 seconds. This is sufficient amylase activity to support fermentation and gassing without added sugar. Flours of low amylase activity (Falling Number greater than 350 seconds) should be supplemented with diastatic malt. Most millers will add an appropriate dosage of malted barley flour. Check your COA or flour specifications to be sure. The falling number is a representation of sprout damage, enzymatic activity, and water absorption properties.



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4 Bran

Bran could be up to 19% in whole wheat flours. This is why whole wheat bread has a denser volume. Bran adds flavor, color, nutrients, and texture to the bread. It also reduces mixing tolerance due to its disruptive nature. If bran is added separately as an ingredient, it needs to be soaked first for at least one hour.

5 Ash

Ash is present at 0.5% of most unbleached white flour and is an indication of how well the flour milling process has removed the bran. Ash doesn't affect water absorption or mixing, but it does disrupt gluten formation. Too much ash would affect dough volume and the color of the final product. However, artisan bread is more forgiving of color as they are almost all off-white.

Ash levels in flour for artisan bread can be higher, as compared to white pan bread, due to this final quality attribute. Some flours milled for artisan bread production may have ash levels of 0.55% to 0.60%. Some specialty flours may have higher ash levels in the 0.80% to 0.9% range. These higher ash flours will require additional water in the mix.

6 Granulation

The granulation in whole wheat flour (extra-fine, fine, medium, coarse, or extra-coarse) undeviatingly affects the texture of the finished product. Coarse flour leads to a denser bread with an earthier, unrefined crumb texture. Finer flour provides a more refined crumb texture with a smoother mouthfeel.



Evaluating the baking quality of flour

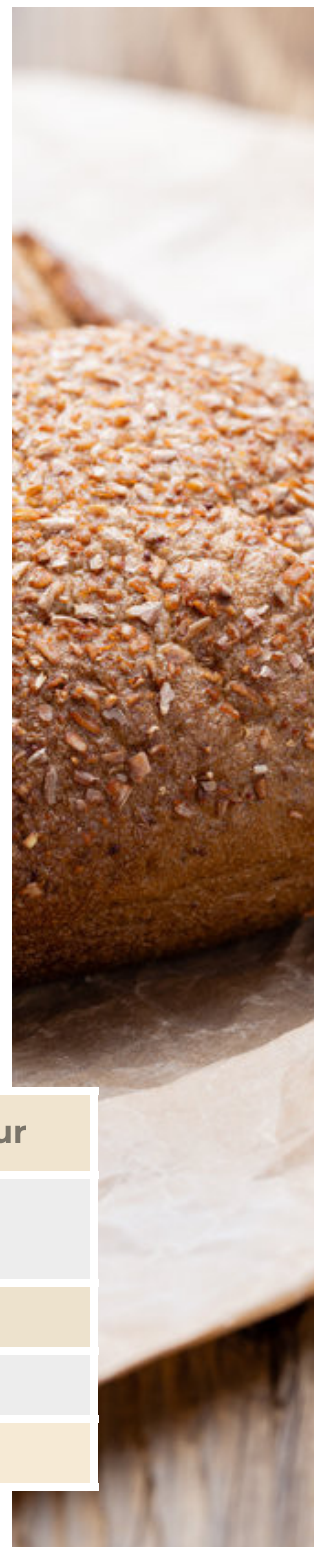
The Farinograph is the most common method for measuring the baking qualities of bread flour. Another popular instrument is the Mixolab. Both the [Farinograph](#) and [Mixolab](#) measure and record the dough strength over time. These readings are crucial for:¹⁸

- Understanding water absorption, mixing time and mixing tolerance.
- Analyzing the effect of flour improvers on dough handling properties.
- Setting quality control measures to manage wheat crop changes
- Adapting wheat and flour mixtures to comply with flour specifications.

FARINOGRAPH PARAMETERS

Parameter	Artisan Bread Flour	Bread Flour
Water Absorption (500 BU)	64.9	62.9
Development Time (min)	14.9	2.2
Stability (min)	15.3	10.5
Mixing Tolerance Index	17	20

PRO TIP: Another helpful tool is the [Alveograph](#). This data is invaluable for assessing dough performance and evaluating extensibility and elasticity balance and is utilized by many millers and bakers.



Baguette Formula



Traditional French baguettes are typically produced from a relatively lean formula that can contain sugar or shortening. The dough is prepared with a preferment, taking up to 10 hours to make. The weight is usually a function of loaf length. One made up to 46 cm (18 inches) long produces a 1 pound (454 g) loaf, and 60 cm (24 inches) long for a 650–700 g loaf. Baguettes have a high crust-to-crumb ratio. Therefore, they lose significant water content during baking and cooling, and can over bake (dehydrate) easily.^{11, 12}

Ingredients	Cold Fermented Baguette (Baker's %)	Baguette with Polish (Baker's %)*	
		Polish	Dough
Bread Flour	100.0	33	67
Water	70.0	33	37
Instant Yeast	0.2	0.34	0.48
Salt	2.0	-	2.0
Polish**	-	-	66.0

*Based on 5Kg flour weight. Polish flour is at 1.65Kg and Final dough is at 3.350 Kg

**Amount of polish and dough water are functions of the water absorption target (usually 80%). Here, it would be 3.3 Kg for a 5kg flour weight.

Ingredient Label: flour, water, salt and yeast

THE BENEFITS OF AGED FLOUR

Aged flour, also known as matured flour, has been exposed to air and oxidized. During the process of oxidation, the sulfur-containing amino acids react and aid to form disulfide bridges between the gluten molecules. This aging is more predominant in sacks of flour, as they sit on shelves longer before they are used. The flour is allowed to naturally oxidize while in these bags. The natural aging of flour is often expensive, especially for bulk flour. Therefore, chemical aging by using ascorbic acid and/or Azodicarbonamide (ADA) can work. However, the latter is avoided by the artisan bread and clean label community. During the aging process, oxidation naturally bleaches the flour and gives it a lighter color.



Baguette

Method

For small scale cold baguette:

1. Mix all the ingredients in the mixer till full dough development.
2. Give it a bulk ferment of 45 mins - 1 hr, divide and shape, then refrigerate 8 to 12 hours. Make sure fermenting racks are covered.
3. Take it out of the refrigerator and bring the dough to room temperature before baking it in the oven. Oven should be set to 232°C (450°F).
4. Score your baguette and place it immediately into the oven. Injection steam your baguette for 30 seconds after bread is placed in the oven.
5. Bake for 25 mins or until internal temperature hits 93°C (200°F).

For large scale baguette with poolish:

1. Mix all the poolish and set aside for a minimum of 2 hours.
2. Place all the dough ingredients in the mixer and mix till full dough development.
3. Give it a bulk ferment of 4-6 hrs at 5°C (41°F), folding the dough every 60 minutes. Immediately use a low stress divider and shaper after the last fold, to divide and shape the dough.
4. Oven should be set to 232°C (450°F) for zone 1, 218°C (425°F) for zone 2 and 204°C (400°F) for zone 3 and beyond.
5. Proof the dough in a controlled environment (90% humidity) until it doubles its size, usually about 1 to 1.5 hours.
6. Water score your baguette and transfer it immediately into the oven. Injection steam your baguette for 30 seconds, and bake with a thermal profiler till you hit an 80% arrival, usually about 25 mins.
7. Depan immediately after it exits from the oven, so that it cools faster on the cooling conveyor.
8. Package the baguette when the internal temperature reaches 37°C (100°F)



“ Can I skip folding dough during the long fermentation times?

Folding the dough during refrigerated fermentation reinforces the gluten networks, making the dough stronger. This helps prevent gas from escaping the dough during long bulk fermentation. By passing this step would create a weak dough. One that will not hold up to high output lines, resulting in small uniform cell structure, and additional final proofing time.

“ Is water absorption related to the moisture of the flour?

Yes, how much water you can add into the dough is dependent on how much water is already in the flour. For example, if the flour water absorption capacity is 65% and it comes in at 13% moisture, you can add 1% more water to your dough, making it 66%.

“ Can wheat or flour with high ash content be used for making artisan bread?

Higher ash content is a result of bran left in white or refined flours. The increase in flour extraction rate results in higher cross-contamination of the non-endosperm. This further results in lower-quality baking properties. The ash content of patent flours is usually lower than clear flours. More about the impact of ash content in baking is available in this article. Since artisan bread has an off-white color to its rustic appearance, there is room to increase this ash content, sometimes from 0.5 to 0.6%



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