General Mills
Convenience
& Foodservice

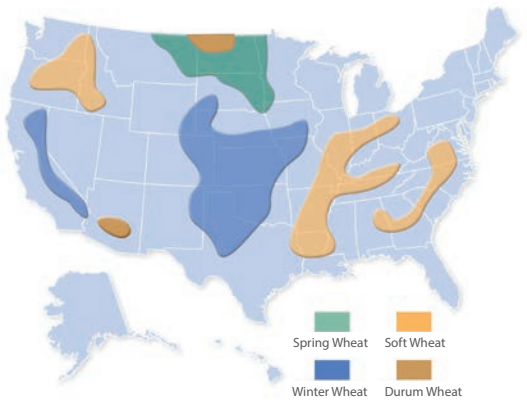
When we talk flour we are talking wheat flour. Because wheat is the most commonly distributed cereal grain in the world, a reference to flour is generally a reference to wheat flour. And just as flour is not “just flour”, wheat is not “just wheat”. So to better understand flour, we first need to understand wheat.

WHEAT CATEGORIES

Wheat can be classified by three major categories: growing season, bran color and kernel hardness.

Growing Season - Winter vs. Spring

There are two distinct growing seasons for wheat. Winter Wheat is planted in the fall, lies dormant during the winter months and is harvested during late spring to early summer. Winter wheat is grown in regions where the winters are mild. Winter Wheat flours range between 10 and 12% protein and have medium gluten strength.



Spring wheat is planted in the spring and harvested during late summer. The production of spring wheat is concentrated in the northern Great Plain states where the winters are too cold for winter wheat to survive. Spring wheat flours range between 12 and 14% protein and have high gluten strength.

Bran Color - Red vs. White

The next category is bran color. The bran is the outer protective coating of the wheat kernel. Wheat can be classified as either red or white.

Kernel Hardness - Hard vs. Soft

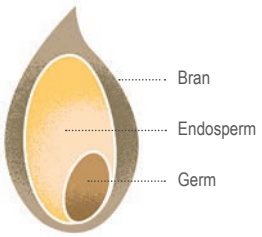
The final classification is kernel hardness. This wheat characteristic has the greatest impact of all three on the baking qualities of the flour produced. Hard wheat flours have a medium to high protein content and stronger gluten forming proteins than soft wheat. Hard wheat flours are used in yeast raised goods such as breads, bagels and pizza crusts. Soft wheat flours are low in protein and therefore low in gluten strength. Soft wheat flours are used for chemically leavened goods, such as cakes, cookies and biscuits.

WHEAT CLASSES AND THEIR USES

These three categories are used to distinguish between the major wheat classifications. In the United States, there are six main classes of wheat. The quality characteristics vary between the wheat classes and determine the end-product usage. Below is a chart listing the six wheat classes and their basic uses:

WHEAT CLASSES	USES
Hard Red Winter **Hard Red Spring** **Hard White**	Breads and other yeast raised products
Soft Red Winter **Soft White**	Cakes, crackers, cookies and pastries
Durum	Macaroni, noodles and other pastas

Flour Milling



Now that we have an understanding for the different types of wheat available, we'll start our discussion on flour. The place to begin is at the mill where the flour is produced. General Mills currently owns 5 wheat flour mills: Buffalo, NY; Kansas City, MO; Avon, IA; Great Falls, MT; and Vernon, CA.

The Goal of the Miller

The goal of the milling process is to separate as fully as possible the endosperm from the bran and the germ portion of the wheat kernel. The endosperm is then further reduced into a fine powder that we call flour. The amount of flour obtained from the wheat is known as the extraction. The actual proportion of endosperm to the total wheat kernel is about 83%, but true extraction rates run between 73 and 76%. The balance of the material from the wheat kernel, called mill feed, is sold off to the feed industry.

The Milling Process

Before the milling process begins the wheat is cleaned and then tempered. Weed seeds, dirt, and other foreign materials are removed by the grain cleaning equipment. In the tempering process, the moisture content of the wheat is increased to toughen the bran coat assisting in the separation of the endosperm. The increased moisture also mellows the endosperm allowing for more efficient reduction into flour.

In the mill the wheat is sent through a system of corrugated steel grinding rolls and sifters. This process of grinding and sifting is repeated until all of the endosperm is removed and only the bran remains. The particles of endosperm are graded through the sifting process, according to size, and are sent to the appropriate part of the system for further reduction. The reduction system consists of smooth steel rollers and sifters that reduce the endosperm particles into finished flour. Throughout this process the miller has the ability to collect or divert specific flour streams, which differ analytically, in order to produce specific finished flour.

FLOUR ANALYSIS

Ash- an index of flour extraction.Ash is a measure of the mineral content of flour. The mineral content of the wheat kernel is concentrated in the bran layer. Ash is a measure of the degree of endosperm separation from the bran during milling. The objective of the miller is to separate the endosperm from the bran as completely as possible. The closer the miller gets to the bran level, the higher the ash level becomes. Higher extraction will result in higher ash levels.

Protein - the “framework” of Bread

Wheat flour is unique because it is the only cereal grain that possesses a significant amount of gluten-forming proteins. Gluten and protein are closely related but not synonymous. When combined with water under mixing stress, the proteins in the flour will form what is called gluten. This gluten structure is responsible for providing extensibility, elasticity and gas-retaining properties to yeast leavened baked goods. The quantity of the gluten is proportionate to the amount of protein in the flour. The amount of gluten will increase as the protein content increases.

Protein Quality vs. Quantity

To buy flour purely by a protein quantity will not necessarily guarantee baking performance. Protein quality is a key component and can be affected by many agronomic factors such as the amount of rainfall, fertilizer usage, temperature stressed, etc. A quality miller is going to balance protein quantity with the appropriate quality testing to prepare the best flours available for specific baking needs.

MEASURING QUALITY

Quality of flour is defined by its ability to consistently perform in the production of a finished baked-good. The ultimate quality test is completed when the baker uses the flour. Bake tests are completed based on the application that best suits the particular flour.

Protein quality can be measured indirectly with dough-testing devices such as the Farinograph. The farinograph measures the resistance of a flour and water dough to mechanical mixing. This resistance is recorded as a curve on a graph. The farinograph curve provides the miller with useful information regarding the dough strength, mixing tolerance, and absorption (water holding) characteristics of a flour.

FLOUR TREATMENTS

Bleaching - makes the flour whiter

The term “bleaching” is a traditional baking industry term that describes the process of whitening. Technically speaking, the carotenoid (yellow) pigments in the flour are oxidized to produce whiter flour. Oxidization will occur naturally, over time, with the exposure of flour to air. Historically, millers would age flour for several weeks to achieve white flour. This natural oxidation, however, was an irregular process requiring considerable time and space. Today, the bleaching process is accomplished by the use of chemical bleaching agents. Flours treated with these bleaching agents must be labeled as bleached flour.

Maturing - strengthening of the flour

For hard wheat flour, the term maturing implies the strengthening of dough forming properties, thus improving gas retention of the gluten. Common maturing agents include potassium bromate (used mainly in the mid-west and the east) and ascorbic acid (used mainly in the west). Breads treated with these agents will generally exhibit increased loaf volume, finer grain and improved external characteristics.

Malting - addition of malted barley flour

Malted barley flour is added to hard wheat flours to assist yeast fermentation. During the dough forming stage, malted barley flour provides specific enzyme activity that converts the starches in the wheat flour into simple sugars. These sugars are then available as a food source for the yeast to maintain proper fermentation activity. Malted barley flour also aids in proper crust browning.

Enrichment - addition of nutrients to the the flour

Enriching replaces the vitamins and minerals loss during the milling process. The standard flour enrichment includes iron and the B vitamins, thiamin, riboflavin, niacin and folic acid. The enrichment of flour has no effect on the baking performance or caloric value of flour.

WHAT FLOUR TO USE?

Noted below are some of the general flour categories known to the baking industry. The terms used are not regulated by any Federal standard, therefore may vary from miller to miller. The brands listed are some of the most popular General Mills Bakery Flours.

Cake flour

Finest milled, lowest extraction flour from soft red winter or soft white winter wheat. This enriched and bleached flour is used in producing fine high-ratio, chiffon, and angel food cakes as well as assorted cookies

Purasnow®

Pastry flour

Fine milled, low extraction flour from soft red winter or soft white winter wheat for use in biscuitspie crusts, cookies and brownies, pound and sheet cakes. The flour is available either bleached or unbleached.

East: Cameo®

West: Cameo®

and sheet cakes. The flour is available either bleached or unbleached.

East: Helmet®, Golden Shield®, Cameo®

West: Sperry® Cake & Pastry, Sureflake®, Cameo®

All Purpose flour

All-purpose flour milled from selected blends of hard and/or soft wheat for the production of a wide variety of baked goods. The flour is available either bleached or unbleached. Used in a variety of baked goods including cookies, soft rolls, sweet goods, biscuits, pizza, breading.

Gold Medal® H&R All Purpose Flour

Winter Patent flour

Flour milled from a select blend of hard winter wheat. Used to produce artisan and pan style breads, buns, soft rolls, sweet goods, Neapolitan and thick crust pizza, and specialty baked goods.

East: King Wheat®

West: Sperry® Blossoms, Big Loaf™

National: Harvest King®, Gold Medal®

Neapolitan Flour

Spring Patent flour

Flour milled from a select blend of primarily hard spring wheat. Used to produce variety breads, pizza crusts, sweet goods, hard and soft rolls.

Gold Medal Superlative®

Gold Medal Full Strength®

High Gluten flour

High protein flour milled from select blends of hard spring wheat. Performs well in bagels, thin crust pizza, hard rolls, hearth breads.
National: All Trumps®, Remarkable
West: King Kaiser®, Supreme Hygluten

Specialty flours

Besides the basic flour types listed above, millers will offer a variety of specialty flours too. Specialty flours often refer to the whole wheat, the ryes, semolina and durum, and instantized flours.

Whole Wheat Flour is simply the entire wheat kernel milled to a specific granulation and packed.
Gold Medal® Stone Ground Whole Wheat,
Stone Ground Wheatalaxa®

Rye Flour is milled from 100% whole rye. The products are also available in various granulation specifications.
Gold Medal® Cream of Rye,
Gold Medal® OOO Rye

Semolina and Durum Flour are both products of durum wheat. Semolina is the coarsely ground durum endosperm and is primarily used for long goods pasta such as linguine and spaghetti. Durum flour is the fine, reduced flour milled from durum wheat and is generally used in short goods pasta such as elbow macaroni and shells.
Gold Medal® Semolina No. 1
Sperry® Extra Fancy Durum Patent Flour

Instantized flour is quick mixing flour produced using a special agglomeration process. This flour mixes very quickly into liquids and produces lump-free batters and gravies.
Gold Medal® Wondra®

To learn more about General Mills Flour, talk with your sales rep or visit GeneralMillsCF.com

WHEAT TYPES	FLOUR TYPES	PROTEIN CONTENT	GLUTEN FORMING	DOUGH STRENGTH	WATER ABSORPTION	MIX TIME	FLOUR USES	GENERAL MILLS BRANDS
Hard Spring		12 - 14%	High	High	High 60 - 65%	Long 11 - 14 min		
	High-Gluten	13.4 - 14.4	↓	↓	↓	↓	Bagels, Hearth Breads, Thin Crust Pizza	All Trumps King Kaiser Supreme/Remarkable
	Strong Spring Patent	12.8 - 13.2	↓	↓	↓	↓	Pizza Crusts, Hearth Breads	Hi-Power
	Spring Patent	12.4 - 12.8	↓	↓	↓	↓	Pizza Crusts, Breads, Rolls	Full Strength Superlative
Hard Winter		10 - 12%	Med	Med	Med 50 - 60%	Med 8 - 12 min		
	Winter Patent	11 - 12	↓	↓	↓	↓	Pan Breads, Artisan Breads, Sweet Doughs Thick Crusts Pizza	Harvest King King Wheat Big Loaf Sperry Blossoms Gold Medal Neapolitan
	All-Purpose	10 - 11	↓	↓	↓	↓	Thick Crust Pizza Quick Breads, Cookies	Gold Medal H&R
Soft Winter		7 - 9%	Low	Low	Low	SHORT		
	Pastry	8 - 9	↓	↓	↓	↓	Cookies, Brownies, Sheet Cakes	Helmet Golden Shield Sperry Cake and Pastry Cameo
	Cake	7 - 8	↓	↓	↓	↓	High Ratio Cakes, Angel Food, Chiffon	Purasnow

Regions: National East West

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