PGI

PLAINS GRAINS INC.

Hard Red Winter Wheat **Regional Quality Survey**

Plains Grains Inc.

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Colorado Wheat Administrative Committee
coloradowheat.org

Idaho Wheat Commission
idahowheat.org

Oklahoma Wheat Commission
wheat.state.ok.us

Kansas Wheat Commission
kswheat.com

North Dakota Wheat Commission
ndwheat.com

South Dakota Wheat Commission
sdwheat.org

Oregon Wheat Commission
owgl.org

Washington Grain Commission
washingtongrainalliance.com

Texas Wheat Producers Board and Association
texaswheat.org

Montana Wheat & Barley Committee
wbc.agr.my.gov

Nebraska Wheat Board
nebraskawheat.gov

Wyoming Wheat Growers Association
wyomingwheat.com

Our Vision

Plains Grains, Inc. is not just an organization; it's a commitment to quality. Established in 2004 as a nonprofit initiative, PGI is the result of a collaborative effort to bridge the gap between wheat producers, grain companies, and flour millers in both domestic and international markets.

At PGI, our focus is clear: to provide quality data and facilitate the necessary wheat-quality tracking that millers need to purchase U.S. wheat. We believe in the power of regional cooperation to meet the quality and quantity demands of the wheat industry. Together, we can achieve success on a global scale.

Our Mission

1. Gather and deliver timely quality and production data.
2. Cultivate relationships between producers, elevators, grain handlers, and domestic and foreign millers.
3. Effectively market the quality characteristics of annual HRW wheat to interested buyers.

The Power of Wheat

Wheat is a cornerstone of global nutrition, providing approximately 20% of food protein and caloric intake. It's the United States' leading export crop and the fourth-leading field crop.

The most common class produced in the U.S. is Hard Red Winter (HRW) wheat, fitting into a variety of categories based on hardness, kernel color, and planting time.

Approximately half of the wheat produced in the U.S. is exported, with HRW making up approximately 58% of those exports. Mexico, Japan, and Nigeria are among the top importers of U.S. HRW wheat.

Wheat flour forms the backbone of numerous global dishes, making wheat one of the most versatile grains. Each class of wheat possesses unique characteristics that offer diverse functionality.

HRW wheat, representing 40% of total U.S. wheat production, boasts excellent milling and baking qualities, making it ideal for bread flour. It's also a preferred choice for Asian noodles, hard rolls, flatbreads, and blending.

Survey Methodology

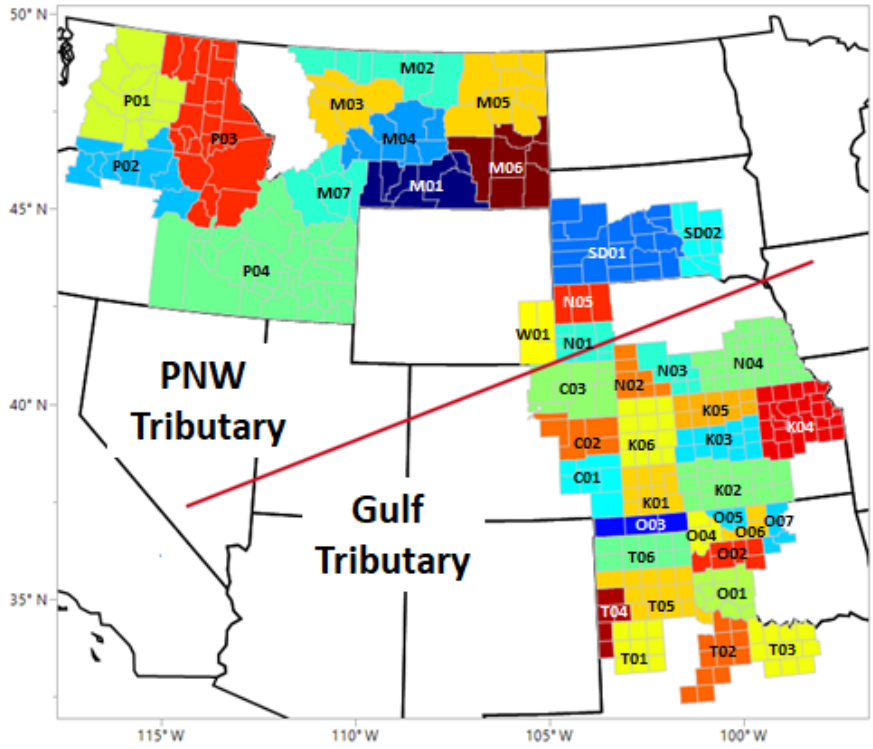
PGI facilitates quality testing on a “grainshed” basis. Grainsheds are defined by identifying key loading facilities and outlining the production region which contributes to that facility’s grain supply. By defining the production areas in this manner, PGI’s survey is able to more accurately represent and determine the quality of wheat that will come from a specific regional terminal, thereby giving buyers a truer picture of the product available to compose a shipment of Hard Red Winter (HRW) wheat.

575

Samples of Hard Red Winter

Collected from grain elevators in 40 reporting areas after at least 30% of the local harvest was complete.

The quality of wheat originating from a grainshed is determined by pulling samples from country and terminal elevators located within each defined grainshed. These samples are then immediately sent to the USDA-ARS Hard Winter Wheat Quality lab in Manhattan. KS, where they are analyzed and tested for more than 25 quality parameters. Official grade is determined at the Lincoln Grain Inspection Service office in Lincoln, NE.



Crop Production Review & Analysis

The U.S. hard red winter (HRW) wheat crop in 2024 marks a significant improvement in both abundance and balance. After two years of drought-stressed crops that limited yield and variety, this year's crop is up 28% in production compared to 2023, the highest since the 2019-20 marketing year.

The increase in planted acres, combined with more favorable growing conditions, has resulted in a sound and functional crop, offering buyers ample supply and an array of protein levels suited to diverse milling and baking needs.

Crop Production & Quality

The increase in production is supported by a strong balance of key quality factors, creating a more typical HRW wheat crop that aligns well with market expectations.

This year's harvest delivers a dependable balance of protein content, sound grade characteristics, and strong milling properties.

Flour and baking tests confirm the crop's suitability for processing, with protein levels demonstrating reliable absorption rates and strength characteristics that are essential for high-quality end products.

Improved growing conditions.

The 2024 crop benefitted from favorable weather and moisture conditions, contrasting with the prior drought years. The result is a wheat crop that is not only abundant but also balanced in terms of protein content and overall functionality.

Balanced protein levels

While protein levels are slightly lower than last year, they remain functional and capable of meeting industry standards for loaf volume and other key baking attributes. The protein is of high quality, with excellent processing properties, allowing millers and bakers to achieve the desired performance in end products.

Milling and grade characteristics.

HRW wheat kernels this year have sound milling characteristics, yielding high-quality flour suitable for various applications. These attributes ensure that this year's HRW wheat meets typical contract specifications, providing consistency and value to both domestic and international buyers.

Crop Production Review & Analysis

Extensive Testing & Representation

To accurately assess the 2024 HRW wheat crop, 575 individual samples were collected, representing 98% of total HRW production. Functionality testing were conducted on 97 composite samples to ensure the data accurately reflects this year's crop profile.

Functional testing results.

Testing of flour and baking performance indicates that protein content aligns well with typical processing characteristics, offering appropriate water absorption and dough strength. These qualities make the 2024 HRW wheat crop versatile and capable of producing high-quality baked goods.

Market-ready quality.

Reports from the domestic milling industry have been positive, with millers noting that the crop meets or exceeds typical HRW wheat specifications, assuring customers that they can expect dependable performance.

Crop Summary

In summary, the 2024 HRW wheat crop provides an ample supply with a balanced range of quality attributes suited for various processing and baking needs. Buyers can expect the following from this year's harvest:

Consistent protein levels.

While slightly lower than last year, the protein quality supports good loaf volume and product quality.

Reliable milling quality.

Sound kernel characteristics enhance the milling process, offering reliable flour yield and performance.

Meeting contract specifications.

The crop aligns well with typical HRW wheat standards, ensuring a high-value option for buyers.

This year's HRW wheat crop is a strong offering for buyers seeking consistent quality and functional versatility. After two challenging years, the 2024 crop not only rebounds in quantity but also in quality, making it a highly valuable option for the milling and baking industries.

2024 HRW Gulf-Exportable Overview

The 2024 Gulf-exportable HRW crop has exceeded expectations, despite some challenging weather in certain regions. Texas, Oklahoma, and Kansas faced persistent dry conditions and minimal freeze damage, but Colorado and Nebraska experienced improved growing conditions, resulting in impressive yields. This year's crop not only meets but often surpasses typical HRW contract specifications, ensuring exceptional quality. With its variety of protein levels adding versatility, and outstanding physical characteristics this crop is set to deliver outstanding value to our customers.

Gulf-Exportable Crop Highlights

The average **GRADE** for the 2024 Gulf-exportable crop is U.S. No. 1 HRW.
TEST WEIGHTS exceeded the 5-year average, demonstrating resilience against environmental challenges.

Uniform, dense **KERNELS** show impressive size and high-quality characteristics throughout the region.

WHEAT PROTEIN levels while slightly lower than last year, increased moisture offers buyers a wider range of protein levels for diverse applications.

WHEAT FALLING NUMBER results indicate solid performance with no quality concerns.

LABORATORY MILL EXTRACTION comparable to last year, highlighting larger kernel size and favorable flour yield.

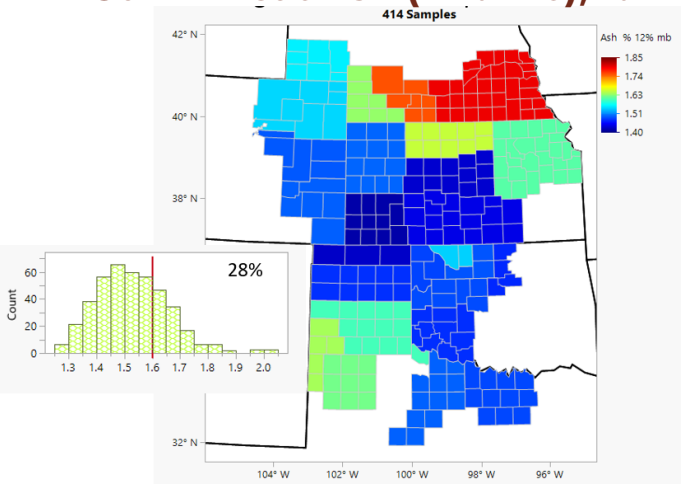
SOLVENT RETENTION CAPACITY indicates good flour performance in baking applications.

ALVEOGRAPH W VALUE showed a more extensible dough compared to last year, achieving good balance for baking needs.

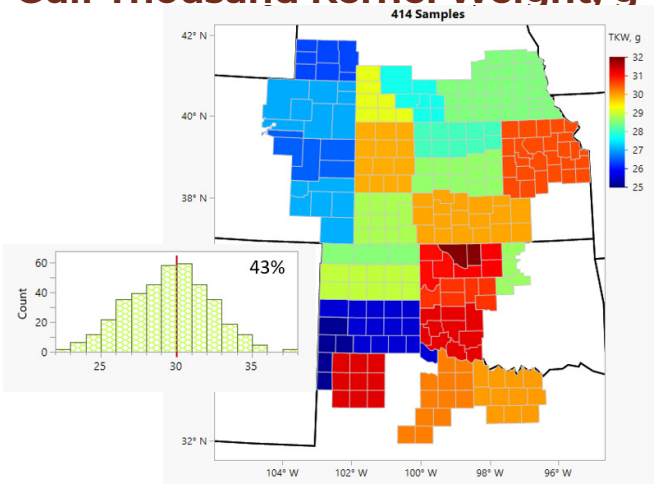
FARINOGRAPH PEAK and STABILITY tested within industry standards aligning well with previous years.

FLOUR COLOR, brighter and whiter this year with a higher L value compared to last year.

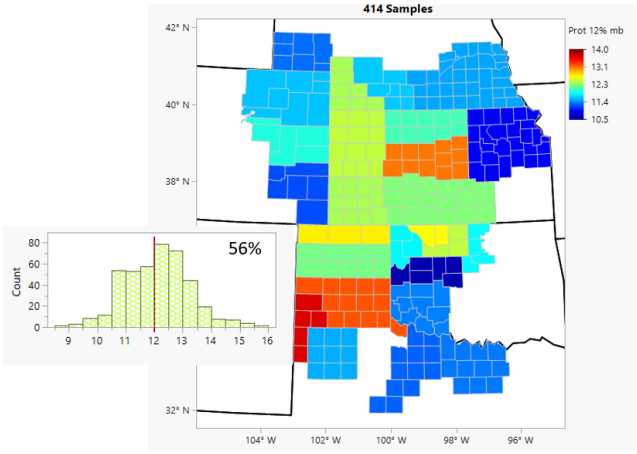
Gulf Wheat Ash (12% mb), %



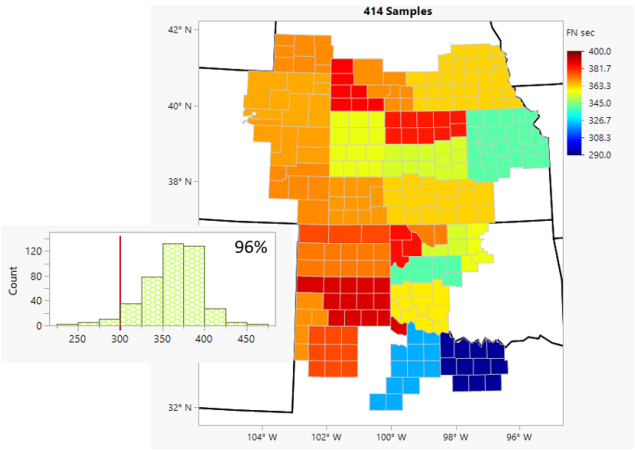
Gulf Thousand Kernel Weight, g



Gulf Wheat Protein (NIR, 12% mb), %



Gulf Wheat Falling Number, sec



2024 HRW PNW-Exportable Overview

The 2024 PNW-exportable Hard Red Winter (HRW) wheat crop has emerged from a growing season marked by variable yet generally favorable conditions, ensuring a premium product for our customers. With Washington and Oregon benefiting from ample moisture and ideal conditions, and Montana, Wyoming, Nebraska, and South Dakota enjoying timely rains, this year's harvest promises to deliver above-average yields and exceptional quality.

PNW-Exportable Crop Highlights

This year's crop boasts an average **GRADE** of U.S. No. 1 HRW, reflecting outstanding quality and consistency.

TEST WEIGHTS were significantly higher than last year indicating dense kernels.

KERNEL CHARACTERISTICS exemplify large, uniform kernels with remarkable physical traits that ensure high **MILLING EXTRACTION RATES**, consistent with last year's performance.

Favorable growing conditions offer a balanced range of **PROTEIN** levels suitable for diverse baking needs.

Low wheat **MOISTURE** levels add value for buyers and milling customers, enhancing storage and processing capabilities.

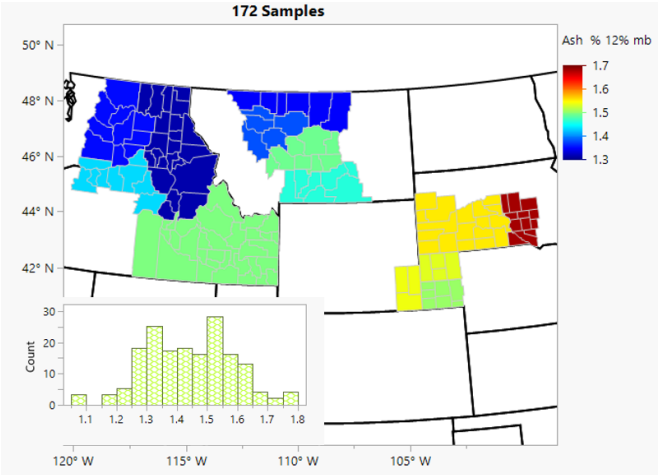
Harvested under dry conditions, this region exhibits a **FALLING NUMBER** well above industry standards, ensuring quality and performance.

With higher **FARINOGRAPH** values, this crop features longer development and stability times, leading to a functional consistent dough.

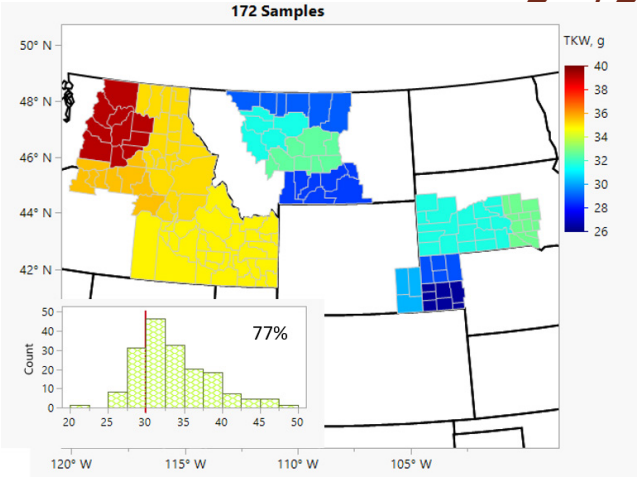
ALVEOGRAPH tests indicated a more extensible dough than last year, achieving an excellent balance for baking requirements.

FLOUR COLOR marked by increased L values will be more vibrant compared to last year.

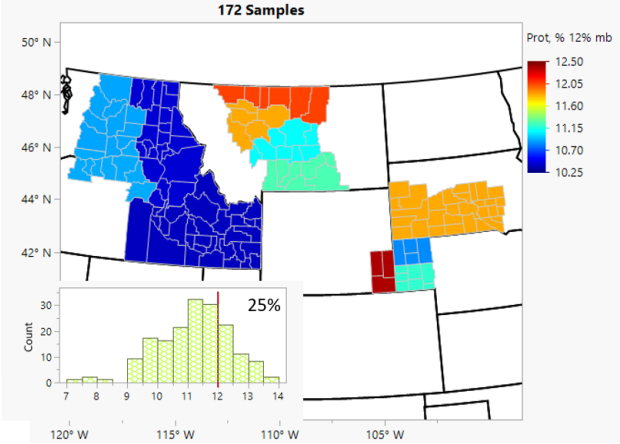
PNW Wheat Ash (12% mb), %



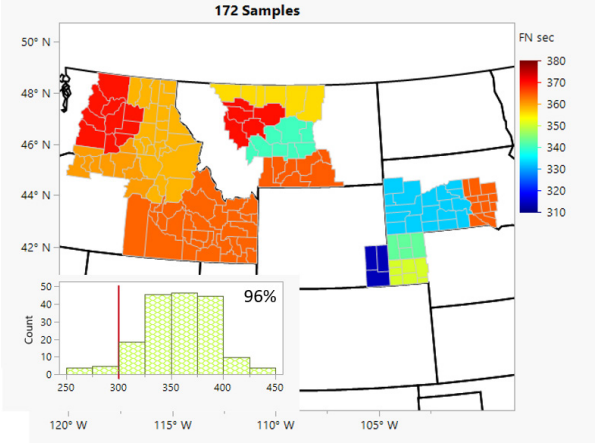
PNW Thousand Kernel Weight, g



PNW Wheat Protein (NIR, 12% mb), %



PNW Wheat Falling Number, sec

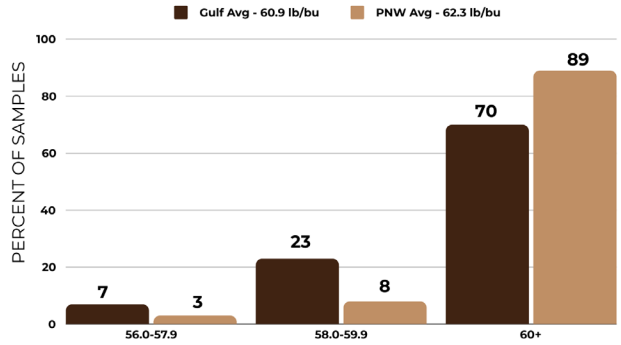


Hard Red Winter Wheat Production Charts

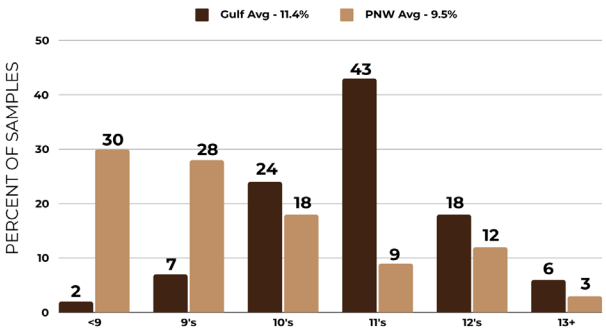
HRW Production For the Major Production States (MMT)

	2024	2023	2022	2021	2020
California	0.1	0.2	0.1	0.2	0.1
Colorado	1.7	1.9	0.9	1.8	1.1
Idaho	0.4	0.3	0.3	0.2	0.3
Kansas	7.9	5.1	6.2	9.3	7.3
Montana	2.5	2.3	1.6	1.5	2.1
Nebraska	1.2	0.9	0.7	1.1	0.9
Oklahoma	2.9	1.8	1.8	3.1	2.8
Oregon	0.1	0.1	0.1	0.1	0.1
South Dakota	1.3	0.9	1.0	0.7	0.9
Texas	2.1	2.1	1.0	1.9	1.6
Washington	0.3	0.3	0.3	0.2	0.3
Wyoming	0.1	0.1	0.0	0.1	0.1
Twelve-State Total	**20.6**	**15.8**	**14.1**	**20.1**	**17.7**
Gulf-Exportable	14.9	11.2	10.3	16.5	13.2
PNW-Exportable	5.5	4.5	3.8	3.5	4.4
Total HRW Production	**21.0**	**16.2**	**14.5**	**20.4**	**17.9**

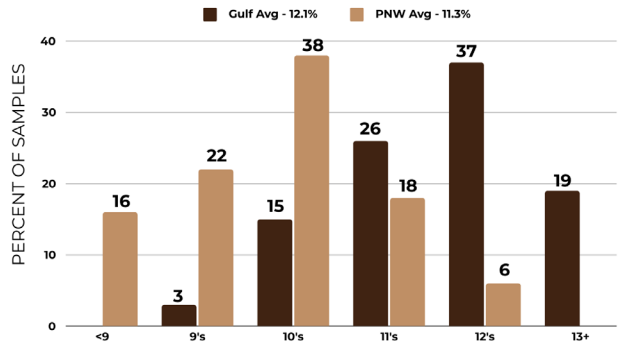
TEST WEIGHT | Pounds/Bushel



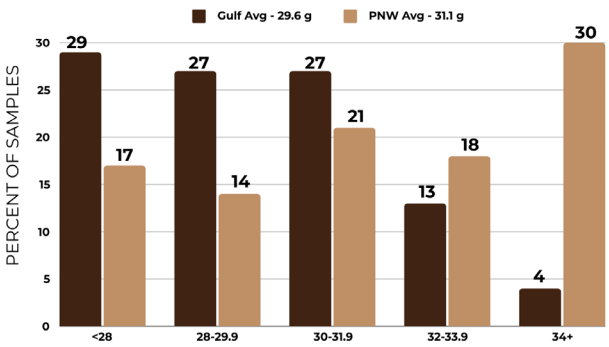
WHEAT MOISTURE | Percent



PROTEIN (12% MB)| Percent



THOUSAND KERNEL WEIGHT | Grams



Wheat Grading Characteristics

The Federal Grain Inspection Service (FGIS) of the USDA Grain Inspection, Packers and Stockyards Administration (GIPSA) sets the standard for U.S. grain grades and grade requirements. U.S. grain grades are reflective of the general quality and condition of a representative sample of U.S. wheat. These grades are based on characteristics such as test weight and include limits on damaged kernels, foreign material, shrunken and broken kernels, and wheat of contrasting classes. Each determination is made on the basis of the grain free of dockage. Grades issued used U.S. standards represent a sum of these factors.

Official U.S. Grades and Grade Requirements

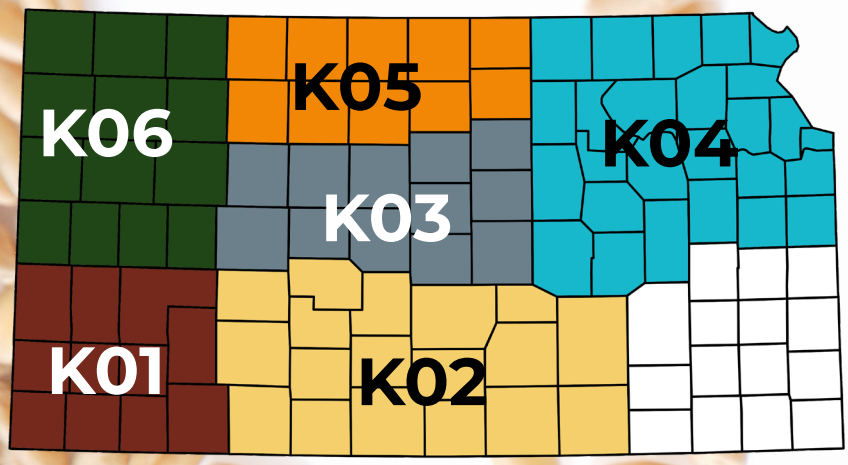
Grading Factors	Grades				
	No. 1	No. 2	No. 3	No. 4	No. 5
Hard Red Winter - Minimum Test Weights					
LB/BU	60.0	58.0	56.0	54.0	51.0
Maximum Percent Limits Of:					
DEFECTS					
Damaged Kenels					
Heat (part total)	0.2	0.2	0.5	1.0	3.0
Total	2.0	4.0	7.0	10.0	15.0
Foreign Material	0.4	0.7	1.3	3.0	5.0
Shrunken and Broken Kernels	3.0	5.0	8.0	12.0	20.0
Total*	3.0	5.0	8.0	12.0	20.0
WHEAT OF OTHER CLASSES**					
Contrasting Classes	1.0	2.0	3.0	10.0	10.0
Total***	3.0	5.0	10.0	10.0	10.0
Stones	0.1	0.1	0.1	0.1	0.1
Maximum Count Limits Of:					
OTHER MATIERIAL (1,000 gram sample)					
Animal Filth	1	1	1	1	1
Castor Beans	1	1	1	1	1
Crotalaria Seeds	2	2	2	2	2
Glass	0	0	0	0	0
Stones	3	3	3	3	3
Unknown Foreign Substance	3	3	3	3	3
Total****	4	4	4	4	4
INSECT DAMAGED KERNELS in 100 grams)	31	31	31	31	31

U.S. Sample grade is Wheat that:
(a) Does not meet the requirements for U.S. Nos. 1, 2, 3, 4, or 5; or
(b) Has a musty, sour, or commercially objectionable foreign odor (except smut or garlic odor) or
(c) Is heating or of distinctly low quality.

Includes damaged kernels (total), foreign material, shrunken and broken kernels.
Unclassed wheat of any grade may contain not more than 10.0 percent of wheat of other classes.
Includes contrasting classes.
Includes any combination of animal filth, castor beans, crotalaria seeds, gass, stones, or unknown foreign substance.

KANSAS

2024 HRW Quality Data



Kernel Quality Data						
Grainshed	Total Defects (%)	Kernel Size Large (%)	Kernel Size Medium (%)	Kernel Size Small (%)	Thousand Kernel Wt (g)	SKCS Avg Diam (mm)
K01	0.7	63.9	35.6	0.5	28.8	2.6
K02	0.8	69.1	30.2	0.7	29.5	2.6
K03	1.0	67.9	31.4	0.8	29.6	2.6
K04	1.2	77.3	21.8	0.9	30.2	2.8
K05	1.2	65.1	33.7	1.2	27.8	2.6
K06	0.8	66.1	33.1	0.8	29.4	2.5

Wheat Grading Data							
Grainshed	Grade	Dockage (%)	Test Wt (lb/bu)	Test Wt (kg/hl)	Damage Kernels (%)	Shrunken & Broken Kernels (%)	Foreign Material (%)
K01	1	0.4	60.6	79.8	0.1	0.5	0.0
K02	1	0.5	60.9	80.2	0.2	0.5	0.1
K03	1	0.4	60.0	78.9	0.3	0.7	0.0
K04	2	0.8	59.7	78.6	0.4	0.7	0.1
K05	2	0.5	58.5	77.1	0.3	0.9	0.0
K06	1	0.3	62.2	81.7	0.1	0.6	0.0

Baking Data

Grainshed	Bake Mix (min)	Bake Abs (14% mb)	Loaf Volume (cc)	Crum Grain (1-10)	Crum Texture (1-10)
K01	4.6	61.9	891.7	6.3	6.0
K02	5.1	61.8	865.0	5.0	5.8
K03	5.9	63.4	920.0	6.3	6.3
K04	5.3	60.2	812.5	5.2	4.4
K05	5.5	61.5	860.0	6.3	5.3
K06	5.1	62.4	885.0	5.3	5.3

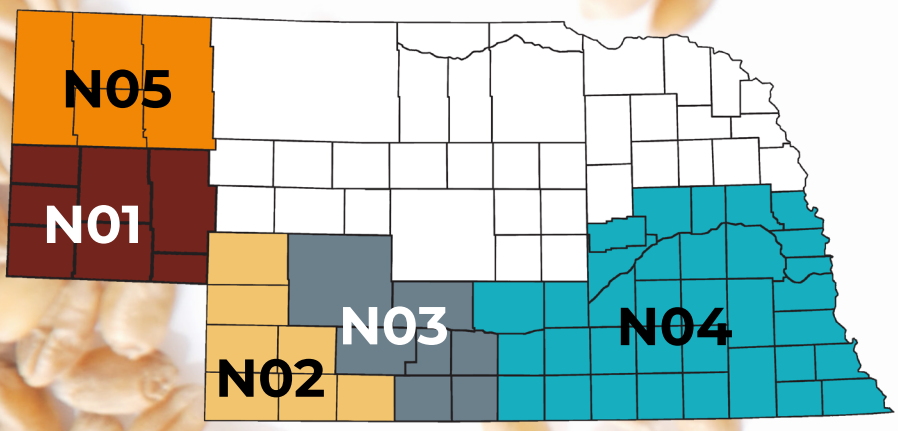
Dough Data

Grainshed	ALVEO P (mm)	ALVEO L (mm)	ALVEO W (10-4 J)	ALVEO P/L Ratio	FARINO Development Time (min)	FARINO Stability (min)
K01	72.0	105.0	235.0	0.7	5.9	10.1
K02	82.3	95.7	252.0	0.9	5.6	8.5
K03	84.0	96.5	284.5	0.9	7.2	13.7
K04	71.0	84.0	198.0	0.9	4.9	8.0
K05	77.7	87.0	233.0	1.0	6.0	11.2
K06	70.7	101.7	242.3	0.7	6.8	12.2

Flour Data

Grainshed	Buhler Flour Yield (%)	Zeleny Sedi-ment Test (cc)	NIR Flour Protein (14% mb)	Flour Ash (14% mb)	Flour Color L*	Flour Color a*	Flour Color b*
K01	74.77	49.33	11.2	0.51	91.4	-1.7	10.3
K02	75.27	52.01	11.1	0.53	91.2	-1.7	10.6
K03	75.30	57.59	11.8	0.52	90.9	-1.5	10.3
K04	75.35	41.27	10.2	0.55	90.9	-1.3	9.8
K05	74.53	44.44	11.1	0.59	90.7	-1.4	10.8
K06	75.27	49.86	11.3	0.52	90.8	-1.4	10.7

NEBRASKA
2024 HRW Quality Data



Kernel Quality Data						
Grainshed	Total Defects (%)	Kernel Size Large	Kernel Size Medium	Kernel Size Small	Thousand Kernel Wt (g)	SKCS Avg Diam (mm)
N01	1.2	54.1	44.4	1.6	26.8	2.5
N02	0.9	67.4	31.8	0.9	29.1	2.6
N03	1.4	61.3	37.7	1.0	27.2	2.5
N04	1.3	69.4	29.4	1.3	27.9	2.6
N05	0.9	59.3	39.7	1.0	28.5	2.6

Wheat Grading Data							
Grainshed	Grade	Dockage (%)	Test Wt (lb/bu)	Test Wt (kg/hl)	Damage Kernels (%)	Shrunken & Broken Kernels (%)	Foreign Material (%)
N01	1	0.6	62.1	81.6	0.0	1.1	0.0
N02	2	0.6	59.8	78.7	1.3	0.7	0.0
N03	2	0.7	58.5	77.1	0.6	0.7	0.0
N04	2	0.6	58.9	77.5	0.4	0.9	0.1
N05	1	0.8	62.2	81.8	0.1	0.8	0.1

Baking Data

Grainshed	Bake Mix (min)	Bake Abs (14% mb)	Loaf Volume (cc)	Crum Grain (1-10)	Crum Texture (1-10)
N01	4.8	62.1	848.3	6.0	5.5
N02	5.0	61.6	850.0	5.3	5.5
N03	4.5	61.3	863.3	5.8	6.0
N04	5.6	60.1	815.0	5.2	5.2
N05	4.5	60.7	828.3	5.5	5.5

Dough Data

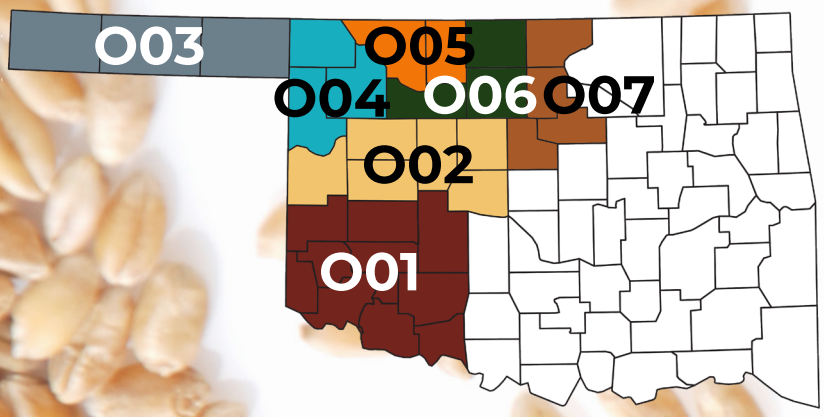
Grainshed	ALVEO P (mm)	ALVEO L (mm)	ALVEO W (10-4 J)	ALVEO P/L Ratio	FARINO Development Time (min)	FARINO Stability (min)
N01	76.3	84.7	204.3	0.9	5.5	7.9
N02	65.0	92.0	192.3	0.7	5.8	10.5
N03	67.3	82.7	176.3	0.8	5.0	9.1
N04	64.5	88.0	180.5	0.8	4.5	7.7
N05	67.7	90.3	188.3	0.8	5.6	7.2

Flour Data

Grainshed	Buhler Flour Yield (%)	Zeleny Sediment Test (cc)	NIR Flour Protein (14% mb)	Flour Ash (14% mb)	Flour Color L*	Flour Color a*	Flour Color b*
N01	74.80	51.35	11.2	0.54	90.7	-1.3	10.6
N02	75.33	47.77	10.9	0.53	91.0	-1.4	10.5
N03	74.23	42.57	11.1	0.60	90.6	-1.4	10.9
N04	75.10	39.90	10.4	0.60	90.6	-1.3	10.6
N05	74.47	50.07	10.8	0.53	90.7	-1.4	10.7

OKLAHOMA

2024 HRW Quality Data



Kernel Quality Data						
Grainshed	Total Defects (%)	Kernel Size Large (%)	Kernel Size Medium (%)	Kernel Size Small (%)	Thousand Kernel Wt (g)	SKCS Avg Diam (mm)
O01	0.9	75.4	24.2	0.6	31.6	2.7
O02	1.3	74.6	24.5	1.0	31.2	2.7
O03	0.8	59.3	40.1	0.7	28.3	2.6
O04	0.8	71.3	28.3	0.4	31.4	2.6
O05	0.9	80.5	19.0	0.5	33.6	2.8
O06	1.3	75.9	23.2	1.0	31.3	2.7
O07	1.2	68.5	30.4	1.2	28.1	2.6

Wheat Grading Data							
Grainshed	Grade	Dockage (%)	Test Wt (lb/bu)	Test Wt (kg/hl)	Damage Kernels (%)	Shrunken & Broken Kernels (%)	Foreign Material (%)
O01	1	0.5	61.1	80.4	0.1	0.6	0.2
O02	1	1.5	61.9	81.4	0.3	1.0	0.1
O03	1	0.4	61.2	80.5	0.1	0.6	0.0
O04	1	0.3	61.9	81.4	0.2	0.6	0.1
O05	1	0.6	62.6	82.3	0.1	0.7	0.2
O06	1	0.5	62.7	82.4	0.1	0.6	0.5
O07	1	1.3	60.9	80.1	0.1	0.9	0.2

Baking Data

Grainshed	Bake Mix (min)	Bake Abs (14% mb)	Loaf Volume (cc)	Crum Grain (1-10)	Crum Texture (1-10)
O01	5.0	61.6	850.0	6.3	6.7
O02	4.6	60.4	812.5	5.6	5.6
O03	4.5	62.5	836.7	5.0	4.8
O04	4.8	62.4	858.3	5.5	5.8
O05	4.6	62.0	868.3	5.3	5.3
O06	4.9	62.8	883.3	6.5	6.3
O07	4.5	61.8	858.3	5.3	5.5

Dough Data

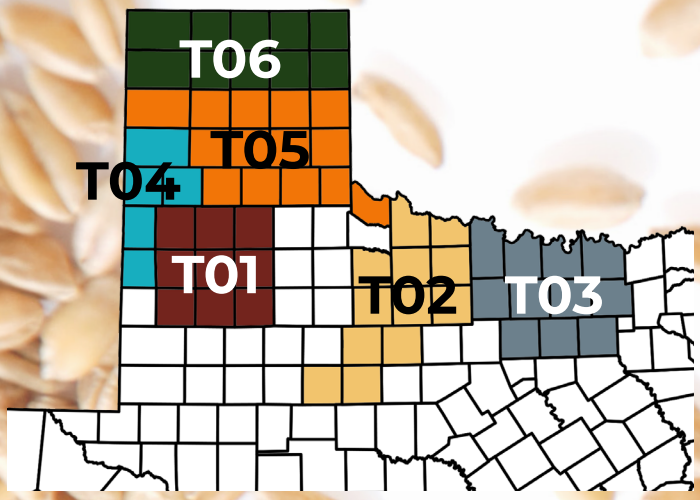
Grainshed	ALVEO P (mm)	ALVEO L (mm)	ALVEO W (10-4 J)	ALVEO P/L Ratio	FARINO Development Time (min)	FARINO Stability (min)
O01	72.5	110.5	234.0	0.7	5.1	9.3
O02	90.5	82.5	242.0	1.1	3.5	7.3
O03	96.3	66.3	227.3	1.5	5.5	8.8
O04	94.3	76.3	249.7	1.3	5.2	8.7
O05	97.7	75.3	245.3	1.3	4.2	8.9
O06	81.3	100.3	240.0	0.8	4.5	7.0
O07	75.7	98.7	231.3	0.8	4.8	7.0

Flour Data

Grainshed	Buhler Flour Yield (%)	Zeleny Sedimen Test (cc)	NIR Flour Protein (14% mb)	Flour Ash (14% mb)	Flour Color L*	Flour Color a*	Flour Color b*
O01	76.05	46.17	10.6	0.53	91.0	-1.7	10.1
O02	75.95	44.33	10.2	0.50	91.0	-1.3	10.2
O03	73.03	52.24	11.3	0.49	90.9	-1.5	10.9
O04	76.17	52.59	11.0	0.52	91.0	-1.7	10.8
O05	75.10	55.90	10.9	0.52	91.1	-1.7	10.3
O06	75.37	53.78	11.3	0.55	90.7	-1.6	10.3
O07	75.63	47.23	10.8	0.55	90.8	-1.7	10.2

TEXAS

2024 HRW Quality Data



Kernel Quality Data						
Grainshed	Total Defects (%)	Kernel Size Large (%)	Kernel Size Medium (%)	Kernel Size Small (%)	Thousand Kernel Wt (g)	SKCS Avg Diam (mm)
T01	0.9	74.0	25.6	0.5	31.0	2.7
T02	1.0	72.3	26.9	1.0	30.2	2.7
T03	1.9	76.7	22.5	0.9	30.1	2.6
T04	1.7	50.0	48.0	2.1	25.3	2.5
T05	1.3	57.5	41.3	1.3	26.9	2.5
T06	0.9	65.4	34.0	0.7	29.5	2.6

Wheat Grading Data							
Grainshed	Grade	Dockage (%)	Test Wt (lb/bu)	Test Wt (kg/hl)	Damage Kernels (%)	Shrunken & Broken Kernels (%)	Foreign Material (%)
T01	1	0.5	60.8	80.0	0.2	0.7	0.1
T02	1	0.5	60.3	79.4	0.1	0.9	0.0
T03	2	0.5	58.9	77.5	0.9	1.0	0.1
T04	2	1.0	58.0	76.4	0.1	1.6	0.1
T05	2	0.9	58.9	77.5	0.2	1.1	0.1
T06	1	0.7	60.9	80.1	0.1	0.7	0.1

Baking Data

Grainshed	Bake Mix (min)	Bake Abs (14% mb)	Loaf Volume (cc)	Crum Grain (1-10)	Crum Texture (1-10)
T01	5.4	62.0	828.3	5.3	5.0
T02	5.0	60.3	850.0	6.3	6.7
T03	4.7	60.4	792.5	4.8	5.6
T04	5.5	64.2	920.0	6.7	6.7
T05	5.7	63.1	855.0	5.2	5.6
T06	5.3	62.4	848.3	4.3	4.3

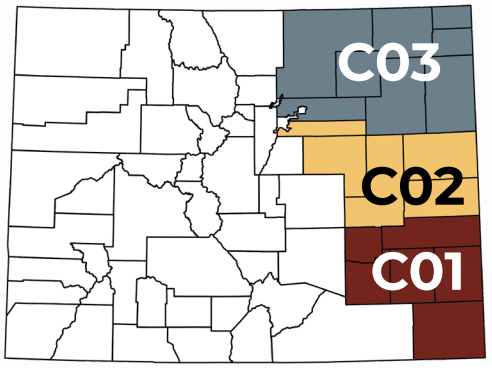
Dough Data

Grainshed	ALVEO P (mm)	ALVEO L (mm)	ALVEO W (10-4 J)	ALVEO P/L Ratio	FARINO Development Time (min)	FARINO Stability (min)
T01	87.7	87.3	249.7	1.1	6.1	10.6
T02	74.0	68.0	180.5	1.1	4.2	8.6
T03	69.0	76.5	171.0	0.9	3.8	6.2
T04	85.0	107.5	293.0	0.8	7.0	12.9
T05	93.5	89.0	283.5	1.1	5.6	11.1
T06	87.3	81.0	247.0	1.2	5.6	10.4

Flour Data

Grainshed	Buhler Flour Yield (%)	Zeleny Sediment Test (cc)	NIR Flour Protein (14% mb)	Flour Ash (14% mb)	Flour Color L*	Flour Color a*	Flour Color b*
T01	75.13	46.49	10.8	0.53	91.2	-1.7	10.2
T02	76.20	44.79	10.5	0.51	90.3	-1.3	9.8
T03	74.40	37.48	10.2	0.54	90.5	-1.1	9.1
T04	73.40	53.99	12.1	0.55	90.7	-1.7	11.0
T05	74.40	56.65	11.5	0.57	90.9	-1.8	11.3
T06	75.17	51.23	11.1	0.52	91.3	-1.9	11.3

COLORADO
2024 HRW Quality Data



Kernel Quality Data

Grainshed	Total Defects (%)	Kernel Size Large (%)	Kernel Size Medium (%)	Kernel Size Small (%)	Thousand Kernel Wt (g)	SKCS Avg Diam (mm)
C01	1.7	54.7	43.7	1.7	27.1	2.5
C02	1.3	51.5	46.1	2.4	26.2	2.5
C03	1.1	52.1	46.6	1.5	26.6	2.5

Wheat Grading Data

Grainshed	Grade	Dockage (%)	Test Wt (lb/bu)	Test Wt (kg/hl)	Damage Kernels (%)	Shrunken & Broken Kernels (%)	Foreign Material (%)
C01	2	0.4	59.9	78.8	0.1	1.6	0.0
C02	1	0.5	60.2	79.2	0.1	1.2	0.0
C03	1	0.7	60.6	79.8	0.1	1.0	0.0

Other Wheat Characteristics (non-grade data)

Grainshed	NIR Protein (12% mb)	Indv. Wheat Ash (12%mb)	Falling Number (sec)	Moisture (%)	SKCS Avg
C01	11.3	1.5	--	11.1	54.6
C02	11.5	1.5	343.7	11.6	59.1
C03	11.9	1.5	334.3	11.8	65.1

Baking Data

Grainshed	Bake Mix (min)	Bake Abs (14% mb)	Loaf Volume (cc)	Crum Grain (1-10)	Crum Texture (1-10)
C01	5.2	60.7	840.0	5.6	4.8
C02	5.2	61.3	865.0	6.3	5.3
C03	4.6	61.0	858.3	6.0	5.5

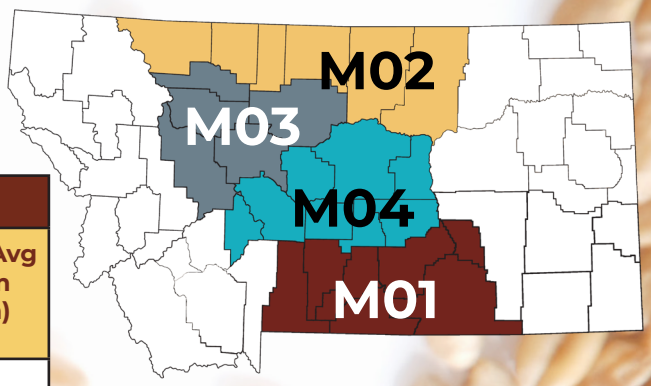
Dough Data

Grainshed	ALVEO P (mm)	ALVEO L (mm)	ALVEO W (10-4 J)	ALVEO P/L Ratio	FARINO Development Time (min)	FARINO Stability (min)
C01	61.0	102.5	205.5	0.6	5.1	9.7
C02	62.7	98.7	197.7	0.6	5.8	10.0
C03	68.7	85.0	180.7	0.8	5.4	8.2

Flour Data

Grainshed	Buhler Flour Yield (%)	Zeleny Sedimen Test (cc)	NIR Flour Protein (14% mb)	Flour Ash (14% mb)	Flour Color L*	Flour Color a*	Flour Color b*
C01	75.45	44.02	10.5	0.53	91.3	-1.4	10.0
C02	74.37	49.00	10.7	0.53	91.1	-1.3	10.4
C03	74.57	45.01	11.0	0.54	91.1	-1.4	10.8

MONTANA
2024 HRW Quality Data



Kernel Quality Data						
Grainshed	Total Defects (%)	Kernel Size Large (%)	Kernel Size Medium (%)	Kernel Size Small (%)	Thousand Kernel Wt (g)	SKCS Avg Diam (mm)
M01	1.1	55.3	43.4	1.4	29.4	2.6
M02	1.0	55.2	44.1	0.8	29.3	2.6
M03	0.8	65.5	33.8	0.8	31.2	2.7
MO4	0.6	73.3	26.4	0.4	32.2	2.7

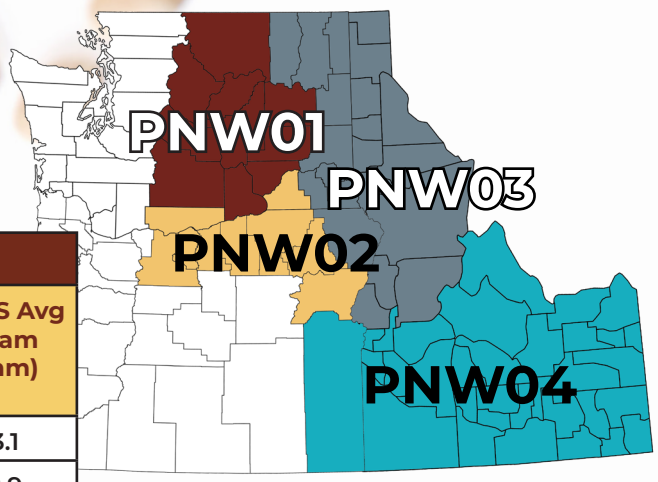
Wheat Grading Data							
Grainshed	Grade	Dockage (%)	Test Wt (lb/bu)	Test Wt (kg/hl)	Damage Kernels (%)	Shrunken & Broken Kernels (%)	Foreign Material (%)
M01	1	0.5	63.0	82.8	0.0	1.1	0.0
M02	1	0.4	62.3	81.9	0.2	0.8	0.0
M03	1	0.4	62.5	82.1	0.0	0.8	0.0
M04	1	0.4	62.6	82.3	0.0	0.6	0.0

Baking Data					
Grainshed	Bake Mix (min)	Bake Abs (14% mb)	Loaf Volume (cc)	Crum Grain (1-10)	Crum Texture (1-10)
M01	4.6	62.9	847.5	5.9	4.8
M02	5.3	63.3	793.3	5.0	4.8
M03	4.4	61.7	743.3	4.3	4.3
M04	5.8	61.2	717.5	4.0	4.8

Dough Data						
Grainshed	ALVEO P (mm)	ALVEO L (mm)	ALVEO W (10-4 J)	ALVEO P/L Ratio	FARINO Development Time (min)	FARINO Stability (min)
M01	99.5	84.5	276.0	1.2	5.5	9.5
M02	110.3	67.0	278.0	1.7	5.5	10.5
M03	103.0	66.3	240.7	1.6	4.9	8.1
M04	108.0	58.0	232.0	2.1	4.1	7.8

Flour Data							
Grainshed	Buhler Flour Yield (%)	Zeleny Sedimen Test (cc)	NIR Flour Protein (14% mb)	Flour Ash (14% mb)	Flour Color L*	Flour Color a*	Flour Color b*
M01	73.85	47.39	11.5	0.51	91.1	-1.4	10.9
M02	49.50	54.42	--	0.51	90.8	-1.6	12.1
M03	--	48.20	--	0.52	90.8	-1.4	11.0
M04	74.40	44.04	--	0.56	90.8	-1.4	10.9

PACIFIC NORTHWEST
2024 HRW Quality Data



Kernel Quality Data						
Grainshed	Total Defects (%)	Kernel Size Large (%)	Kernel Size Medium (%)	Kernel Size Small (%)	Thousand Kernel Wt (g)	SKCS Avg Diam (mm)
PNW01	0.5	91.9	8.0	0.2	41.9	3.1
PNW02	0.5	85.1	14.8	0.2	36.1	2.9
PNW03	0.7	79.5	20.2	0.3	33.8	2.8
PNW04	0.8	84.9	14.9	0.2	35.8	2.9

Wheat Grading Data							
Grainshed	Grade	Dockage (%)	Test Wt (lb/bu)	Test Wt (kg/hl)	Damage Kernels (%)	Shrunken & Broken Kernels (%)	Foreign Material (%)
PNW01	1	0.4	62.6	82.3	0.0	0.5	0.0
PNW02	1	0.4	63.3	83.2	0.0	0.5	0.0
PNW03	1	0.4	60.9	80.1	0.0	0.6	0.0
PNW04	1	0.3	61.4	80.7	0.0	0.7	0.1

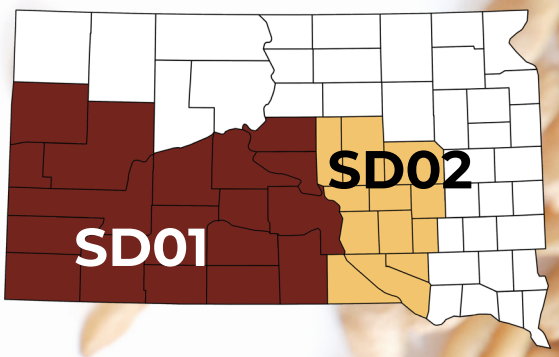
Baking Data					
Grainshed	Bake Mix (min)	Bake Abs (14% mb)	Loaf Volume (cc)	Crum Grain (1-10)	Crum Texture (1-10)
PNW01	5.0	61.1	775.0	4.8	4.4
PNW02	4.4	61.6	810.0	4.8	4.8
PNW03	6.3	60.4	780.0	4.0	4.4
PNW04	4.7	60.5	790.0	5.2	4.8

Dough Data						
Grainshed	ALVEO P (mm)	ALVEO L (mm)	ALVEO W (10-4 J)	ALVEO P/L Ratio	FARINO Development Time (min)	FARINO Stability (min)
PNW01	107.0	59.0	233.0	1.8	4.6	8.3
PNW02	92.0	68.5	221.5	1.3	4.0	6.6
PNW03	101.5	57.0	223.0	1.8	4.4	10.3
PNW04	91.0	65.0	212.0	1.4	4.8	7.5

Flour Data							
Grainshed	Buhler Flour Yield (%)	Zeleny Sediment Test (cc)	NIR Flour Protein (14% mb)	Flour Ash (14% mb)	Flour Color L*	Flour Color a*	Flour Color b*
PNW01	76.0	45.2	10.5	0.5	91.1	-1.2	10.6
PNW02	75.3	40.8	10.7	0.5	90.6	-1.3	10.9
PNW03	74.7	49.0	10.2	0.5	91.2	-1.3	11.0
PNW04	74.6	41.0	10.2	0.5	90.8	-1.3	11.2

SOUTH DAKOTA

2024 HRW Quality Data



Kernel Quality Data

Grainshed	Total Defects (%)	Kernel Size Large (%)	Kernel Size Medium (%)	Kernel Size Small (%)	Thousand Kernel Wt (g)	SKCS Avg Diam (mm)
SD01	0.9	71.3	28.1	0.8	32.3	2.7
SD02	0.8	75.9	23.2	0.9	33.7	2.7

Wheat Grading Data

Grainshed	Grade	Dockage (%)	Test Wt (lb/bu)	Test Wt (kg/hl)	Damage Kernels (%)	Shrunken & Broken Kernels (%)	Foreign Material (%)
SD01	1	0.5	62.4	82.0	0.2	0.7	0.0
SD02	1	0.4	62.2	81.8	0.2	0.5	0.0

Baking Data

Grainshed	Bake Mix (min)	Bake Abs (14% mb)	Loaf Volume (cc)	Crum Grain (1-10)	Crum Texture (1-10)
SD01	4.4	60.6	850.0	5.9	5.2
SD02	4.8	60.7	853.3	5.0	5.5

Dough Data

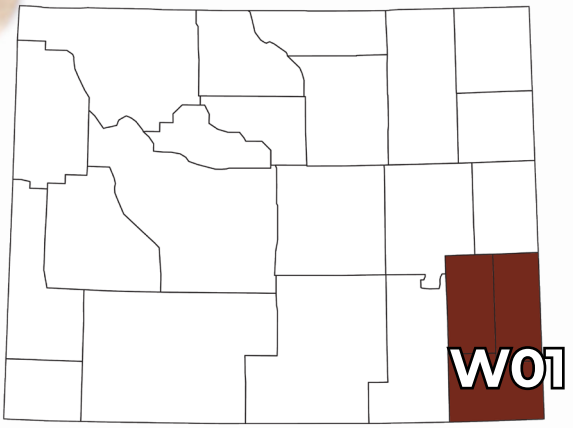
Grainshed	ALVEO P (mm)	ALVEO L (mm)	ALVEO W (10-4 J)	ALVEO P/L Ratio	FARINO Development Time (min)	FARINO Stability (min)
SD01	61.5	96.0	172.5	0.6	4.7	5.4
SD02	58.3	117.0	192.3	0.5	4.6	6.1

Flour Data

Grainshed	Buhler Flour Yield (%)	Zeleny Sed-imen Test (cc)	NIR Flour Protein (14% mb)	Flour Ash (14% mb)	Flour Color L*	Flour Color a*	Flour Color b*
SD01	76.05	46.00	10.7	0.53	91.0	-1.3	10.2
SD02	75.97	51.48	10.6	0.57	91.0	-1.0	9.0

WYOMING

2024 HRW Quality Data



Kernel Quality Data

Grainshed	Total Defects (%)	Kernel Size Large (%)	Kernel Size Medium (%)	Kernel Size Small (%)	Thousand Kernel Wt (g)	SKCS Avg Diam (mm)
W01	1.0	62.0	36.4	1.7	29.7	2.6

Wheat Grading Data

Grainshed	Grade	Dockage (%)	Test Wt (lb/bu)	Test Wt (kg/hl)	Damage Kernels (%)	Shrunken & Broken Kernels (%)	Foreign Material (%)
W01	1	0.5%	61.2	80.4	0.1	0.9	0.0

Baking Data

Grainshed	Bake Mix (min)	Bake Abs (14% mb)	Loaf Volume (cc)	Crum Grain (1-10)	Crum Texture (1-10)
W01	3.9	62.6	851.7	5.3	5.5

Dough Data

Grainshed	ALVEO P (mm)	ALVEO L (mm)	ALVEO W (10-4 J)	ALVEO P/L Ratio	FARINO Development Time (min)	FARINO Stability (min)
W01	77.7	75.3	184.7	1.1	5.4	8.0

Flour Data

Grainshed	Buhler Flour Yield (%)	Zeleny Sedimen Test (cc)	NIR Flour Protein (14% mb)	Flour Ash (14% mb)	Flour Color L*	Flour Color a*	Flour Color b*
W01	74.53	47.79	11.2	0.54	91.1	-1.4	10.7

Methods

The harvest samples were evaluated using these methods:

Grade: Official U.S. Standards for Grain. Dockage: Official USDA procedure using the Carter Dockage Tester.

Test Weight: AACC Method 55-10; the weight Per Winchester Bushel (2150.42 in3) as determined using an approved device, USDA approved. The test weight is mathematically converted to hectoliter weight: kg/hl = lb/bu x 1.292 + 1.419.

Moisture: DJ Gac 2100.

Protein: NIRT method.

Ash: AACC Method 08-01 expressed on a 14% moisture basis.

Falling Number: AACC Method 56-81B. An average value is a simple mean of sample results.

Kernel Size Distribution: Cereal Foods World (Cereal Science Today) 5:71-71, 75 (1960). Wheat is sifted with a RoTap sifter using a Tyler No. 7 screen (2.82 mm) and a Tyler No. 9 Screen (2.00 mm). Kernels retained on the No. 7 screen are classified as “Large.” Kernels passing through the No. 7 screen and retained on the No. 9 screen are “Medium.” Kernels passing through the No. 9 screen are “Small”.

Single Kernel Characterization: AACC Method 55-31 using SKCS Model 4100.

Extraction: Samples cleaned and tempered according to AACC Method 26-10A. All were milled with identical mill settings on a Buhler laboratory mill as follows: AACC Method 26-21A.

Moisture: NIR Protein: NIR Ash: AACC Method 08-01 expressed on a 14% moisture basis.

Falling Number: AACC Method 56-81B. Wet Gluten & Gluten Index: AACC Method 38-12

Farinograph: AACC Method 54-21 with 50-gram bowl.

Absorption is reported on 14% moisture basis.

Alveograph: AACC Method 54-30A.

Loaf Volume: AACC Method 10-10B producing 2 loaves per batch using wet compressed yeast and ascorbic acid. After mixing, dough is divided into two equal portions, fermented for 160 minutes, proofed and baked in “pup loaf” pans. Loaf volume is measured immediately after baking by rapeseed displacement.

PGI

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