

# *South African Wheat Crop*

*Quality Report 2022/2023 Season*







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# South African

## Commercial Wheat Quality of the 2022/2023 Season

### Acknowledgements

With gratitude to:

- The South African Winter Cereal Industry Trust (SAWCIT) for its financial support in conducting this survey.
- Agbiz Grain and its members for providing the samples to make this survey possible.
- The Crop Estimates Committee (CEC) of the Department of Agriculture, Land Reform and Rural Development (DALRRD) for providing production related figures.
- South African Grain Information Service (SAGIS) for providing supply and demand figures relating to wheat and wheat products.

### Summary

The 2022/23 season's commercial wheat crop, set at 2 110 000 tons and almost 8% lower than the previous season, was still the fourth largest crop of the last 20 years. A total area of 566 800 hectares was utilised for wheat production during this season and the average yield was 3.72 tons per hectare (Figures obtained from the CEC).

The whole wheat protein average of 12.1% increased by 0.2% compared to the previous season. The percentage samples from this crop survey with a protein content equal or higher than 12.5% (minimum protein content for Super Grade) was 44% (37% and 42% during the previous two seasons respectively). The hectoliter mass averaged 79.8 kg/hl, similar to the 79.9 kg/hl of the previous season. 4% of the samples reported values below the minimum requirement of 76 kg/hl for Super Grade, Grade 1 and Grade 2. The ten-year national average is 80.2 kg/hl.

The average falling number this season was 361 seconds. 6% (21) of the samples analysed gave falling number values below 250 seconds and of these 16 (5%) were below 220 seconds. The average mixogram peak time was 3.3 minutes compared to the 3.2 minutes of the previous season. The ten-year average is 3.0 minutes.

### Introduction

This report provides the results of the twenty-fifth annual wheat crop quality survey performed by the Southern African Grain Laboratory NPC (SAGL). SAGL was established in 1997 on request of the Grain Industry. SAGL is an ISO 17025 accredited testing laboratory and participates in a number

of proficiency testing schemes, both nationally and internationally as part of our ongoing quality assurance procedures to demonstrate technical competency and international comparability.

During the harvesting season (October to December for the southern production regions and November to January for the northern production regions), a representative sample of each delivery of wheat was taken according to the prescribed wheat regulation by the commercial grain storage companies.

A sub-sample of each of these grading samples was collected in a container according to class and grade per silo bin/bag/bunker/dam at each depot. This composite sample was then divided and a 3 kg sample was forwarded to SAGL for the annual wheat crop quality survey. SAGL analysed 335 samples to provide as best possible a proportional representation of the production of wheat in all the different production regions.

The samples were graded and the thousand kernel mass determined. Sub-samples were milled on a Quadromat Junior mill for mixograph analyses. Composite samples per class and grade for each production region, 65 samples in total, were milled on a Bühler MLU 202 laboratory mill. Moisture, protein, ash and colour determinations were done and RVA analyses conducted. Rheological analyses, namely gluten, mixogram, farinogram, alveogram, extensogram and 100-gram baking tests, were then performed. Multi-mycotoxin analyses were performed on 40 samples randomly selected to represent the different production regions..



The results (as averages per region) are made available weekly on the SAGL website ([www.sagl.co.za](http://www.sagl.co.za)) soon after the first samples are received. The report, in an easy to page format, is available on the website. Hard copy reports are also distributed to Directly Affected Groups and interested parties.

In addition to the quality information compared over a number of seasons, production figures (obtained from the CEC) relating to hectares planted, tons produced and yields obtained on a national as well as provincial basis, over a ten season period, are provided in this report. Sales figures of seed sold by the commercial grain storage companies were requested to calculate national total quantities per cultivar.

SAGIS supply and demand figures over several seasons are presented in table and graph format. Information with regards to the processing of wheat per province, the manufacture, import and export of wheat products as well as the manufacture of pan baked products nationally and also per bakery group, is incorporated into the report.

Data on wheat imported for domestic use during the 2021/22 (previous) season is included and compared to the quality of the local crop over the corresponding period.

The national bread wheat grading regulations as published in the Government Gazette of 29 November 2019 are provided as the last section of the report.

The goal of this crop quality survey is to accumulate quality data on the commercial wheat crop on a national level. This valuable data reveals general tendencies and highlights quality differences in the commercial wheat produced in different local production regions. A detailed database containing reliable analytical data collected over several seasons is essential to enable industry to comment on proposed legislative levels and to supply reliable data for targeted research projects.

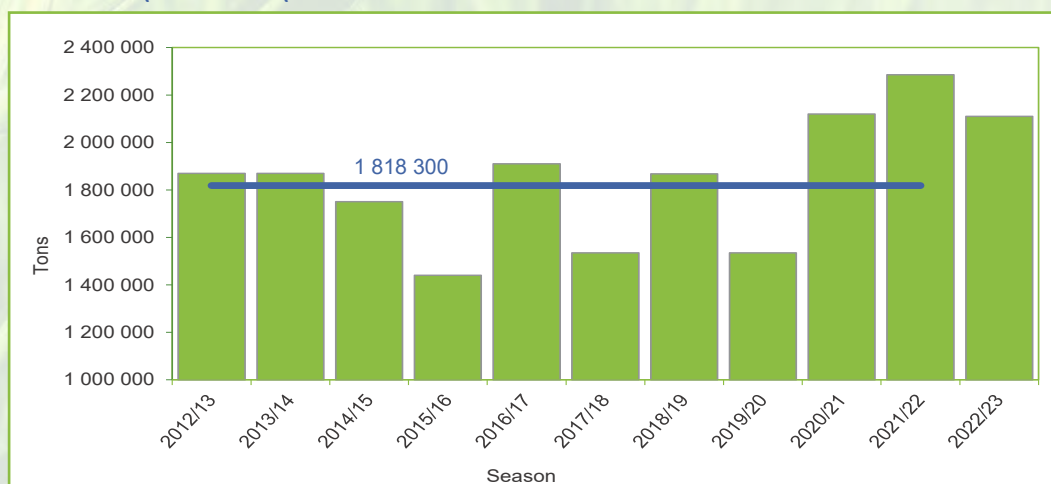
## Production

Wheat contributed 79% to the total winter cereal crop production in South Africa this season. Other winter crops produced are malting barley, canola, cereal oats and sweet lupines.

South Africa (comprising nine provinces) is divided into 36 crop production regions with wheat planted in approximately 28 of these regions. Please see Figure 1 (RSA Provinces map) and Figure 2 (RSA Crop Production Regions map) on pages 30 and 31.

The national CEC's estimated total production figures were revised, using as basis for the calculations, SAGIS' published figures of actual deliveries. Figures to determine on-farm usage and retentions obtained from a wheat utilisation survey conducted by DALRRD, were added to the SAGIS delivery figures to calculate the final crop production figures.

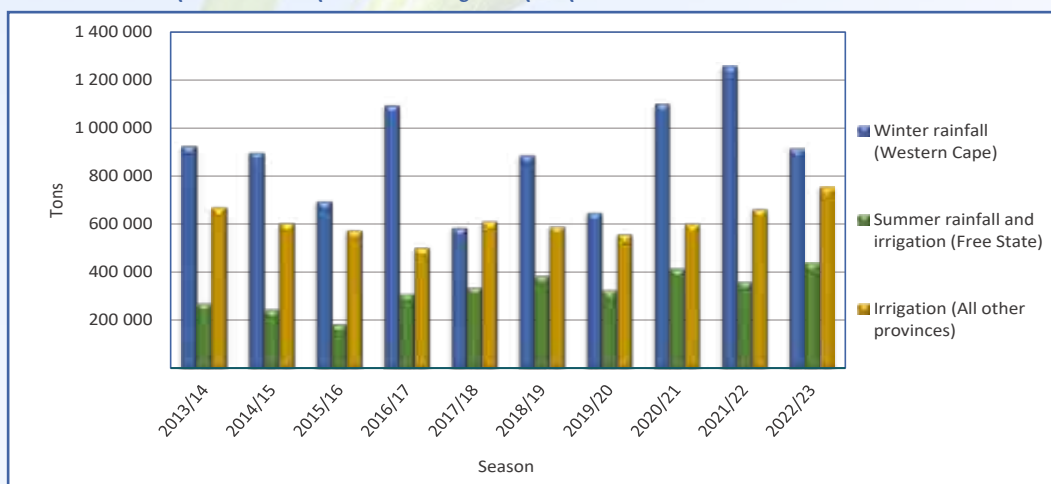
Graph 1: Wheat production in the RSA from the 2012/13 to 2022/23 seasons



Figures provided by the CEC.

The final production figure of 2 110 000 tons is 16% higher than the ten-year production average of 1 818 300 tons (2012/13 to 2021/22 seasons). The Western Cape produced 918 000 tons of wheat this season, representing a year on year decrease of 27% and a 44% contribution to the total crop. The Free State's wheat production (436 800 tons) increased by 21% year on year. The irrigation areas of the Northern Cape, the third largest wheat producing area this season, produced 338 500 tons, 23% more than last season. The remainder of the wheat was produced mainly in Limpopo with 187 000 tons, representing an increase of 6% compared to the 2021/22 season and North West, where production decreased by 2% to 93 800 tons. Please see Graphs 1 and 2.

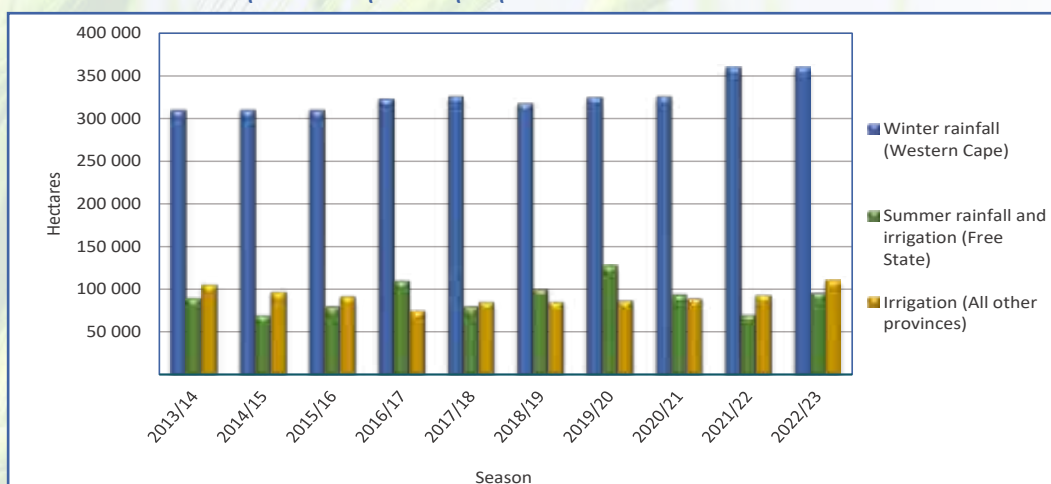
Graph 2: Wheat production figures per production area over ten seasons



Figures provided by the CEC.

The area utilised for wheat production increased by 8% to 566 800 hectares compared to the 2021/22 season. Hectares cultivated under wheat in the Western Cape were the same as the previous season, while the wheat production area in the Free State increased by 37% year on year. Nationally, dry land and irrigation areas increased by 5% and 17% respectively year on year. Please see Graph 3.

Graph 3: Area planted per production area over ten seasons



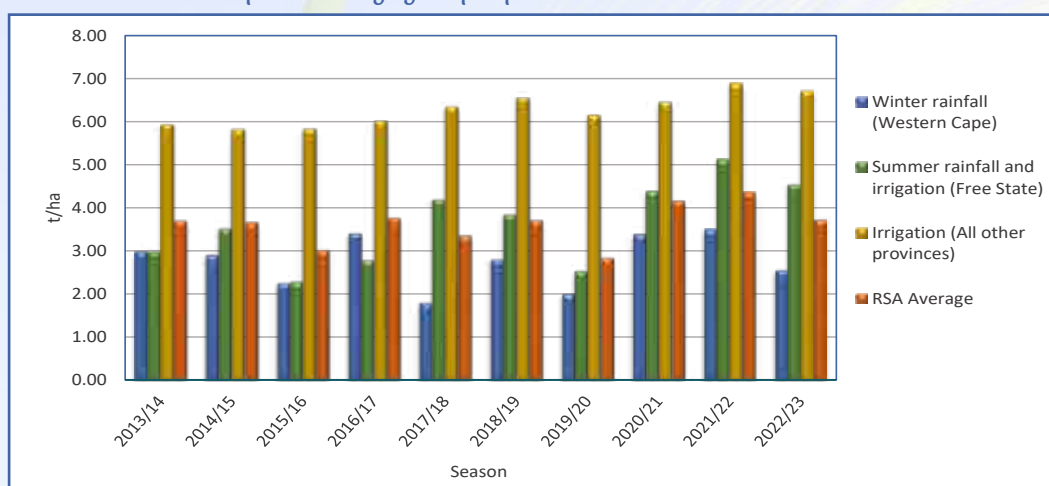
Figures provided by the CEC.

The yield in the main production areas ranged from 2.55 tons per hectare (t/ha) in the winter rainfall area of the Western Cape to 7.20 t/ha for irrigation wheat produced in the Northern Cape. The Free State (summer rainfall and irrigation areas) averaged 4.55 t/ha. The national yield average decreased from 4.36 t/ha in the previous season to 3.72 t/ha this season. Please see Graph 4 as well as Table 1 on the next page.

The figures illustrated in Graphs 2 to 4 are based on the total production figure per province as provided by the CEC and reported in Table 1.



Graph 4: Average yield per production area over ten seasons



Figures provided by the CEC.

Table 1 provides an overview of the dry land versus irrigation wheat production over the last two seasons.

**Table 1: Wheat production overview over two seasons**

Province	Type of production	2022/2023			2021/2022		
		Hectares planted, ha	Production, tons	Yield, t/ha	Hectares planted, ha	Production, tons	Yield, t/ha
Western Cape	Dryland	354 100	873 750	2.47	356 200	1 236 000	3.47
	Irrigation	5 900	44 250	7.50	3 800	24 000	6.32
	<b>Total</b>	<b>360 000</b>	<b>918 000</b>	<b>2.55</b>	<b>360 000</b>	<b>1 260 000</b>	<b>3.50</b>
Northern Cape	Dryland	-	-	-	-	-	-
	Irrigation	47 000	338 500	7.20	35 500	275 125	7.75
	<b>Total</b>	<b>47 000</b>	<b>338 500</b>	<b>7.20</b>	<b>35 500</b>	<b>275 125</b>	<b>7.75</b>
Free State	Dryland	49 000	134 800	2.75	30 000	82 000	2.73
	Irrigation	47 000	302 000	6.43	40 000	278 000	6.95
	<b>Total</b>	<b>96 000</b>	<b>436 800</b>	<b>4.55</b>	<b>70 000</b>	<b>360 000</b>	<b>5.14</b>
Eastern Cape	Dryland	1 500	6 600	4.40	1 150	4 675	4.07
	Irrigation	4 500	33 600	7.47	2 650	20 405	7.70
	<b>Total</b>	<b>6 000</b>	<b>40 200</b>	<b>6.70</b>	<b>3 800</b>	<b>25 080</b>	<b>6.60</b>
KwaZulu-Natal	Dryland	250	750	3.00	-	-	-
	Irrigation	8 950	59 980	6.70	8 500	56 950	6.70
	<b>Total</b>	<b>9 200</b>	<b>60 730</b>	<b>6.60</b>	<b>8 500</b>	<b>56 950</b>	<b>6.70</b>
Mpumalanga	Dryland	-	-	-	-	-	-
	Irrigation	4 000	27 600	6.90	4 100	28 300	6.90
	<b>Total</b>	<b>4 000</b>	<b>27 600</b>	<b>6.90</b>	<b>4 100</b>	<b>28 300</b>	<b>6.90</b>
Limpopo	Dryland	5 000	16 500	3.30	3 500	11 770	3.36
	Irrigation	24 000	170 500	7.10	23 000	164 450	7.15
	<b>Total</b>	<b>29 000</b>	<b>187 000</b>	<b>6.45</b>	<b>26 500</b>	<b>176 220</b>	<b>6.65</b>
Gauteng	Dryland	250	1 170	4.68	-	-	-
	Irrigation	850	6 200	7.30	1 100	7 425	6.75
	<b>Total</b>	<b>1 100</b>	<b>7 370</b>	<b>6.70</b>	<b>1 100</b>	<b>7 425</b>	<b>6.75</b>
North West	Dryland	2 000	7 500	3.75	300	1 050	3.50
	Irrigation	12 500	86 300	6.90	13 700	94 850	6.92
	<b>Total</b>	<b>14 500</b>	<b>93 800</b>	<b>6.47</b>	<b>14 000</b>	<b>95 900</b>	<b>6.85</b>
RSA	Dryland	412 100	1 041 070	2.53	391 150	1 335 495	3.41
	Irrigation	154 700	1 068 930	6.91	132 350	949 505	7.17
	<b>Total</b>	<b>566 800</b>	<b>2 110 000</b>	<b>3.72</b>	<b>523 500</b>	<b>2 285 000</b>	<b>4.36</b>

Figures provided by the CEC.

# Supply and Demand

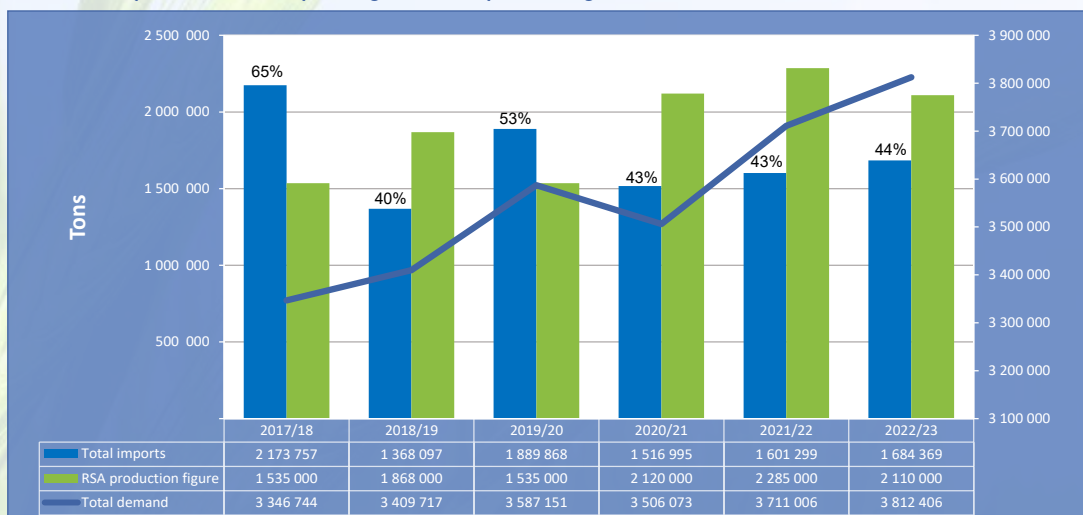
World wheat production for the 2022/23 season is estimated at 789.49 million metric tons according to the *World Agricultural Supply and Demand Estimates (WASDE) report 642 of 9 November 2023*, world production for 2023/24 is projected to be 781.98 million metric tons.

South Africa is a net importer of wheat and relies on imports to supply local demand. Wheat processing demand (human, animal and gristing) during the 2022/23 (3 490 601 tons) and 2021/22 (3 384 445 tons) seasons were the highest and third highest respectively of the last 25 seasons. The ten-year average amount where exceeded by 8% and 5% during these two seasons.

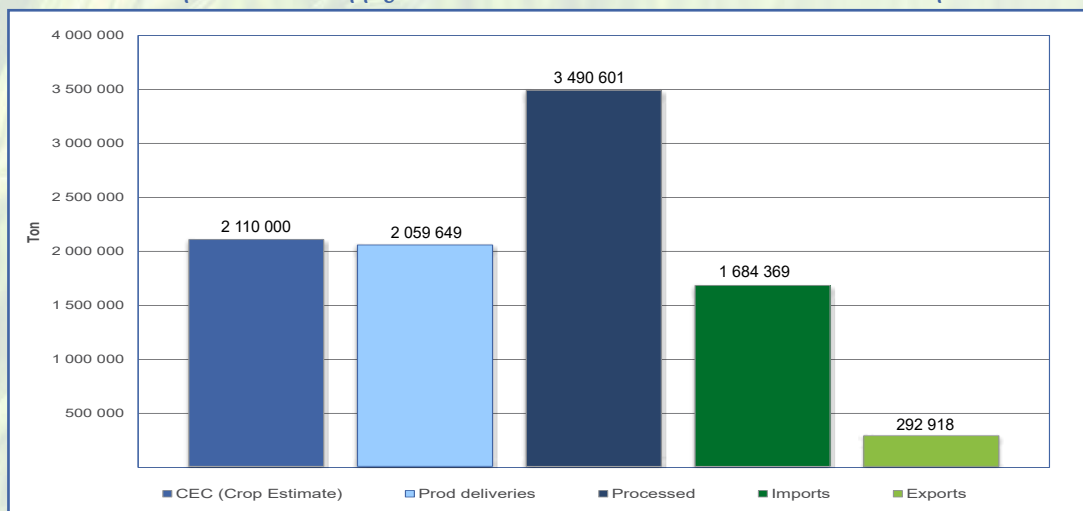
During the 2022/23 season, 1 684 369 tons of wheat were imported. This figure is 5% higher than the amount of wheat imported during 2021/22. The ten-year import average is 1 644 161 tons. 24% of the wheat imported during the 2021/22 season for local consumption, originated in Australia, followed by Lithuania (20%). In 2022/23 the largest amount of wheat was imported from Poland (31%). Please see pages 75 to 86 for the quality of the wheat imported during 2021/22. 271 192 tons of local wheat were exported to countries such as Zimbabwe, Botswana and Namibia during the corresponding period.

The South African wheat marketing season commences on the 1st of October every year.

Graph 5: Wheat import figures as a percentage of the total demand over six seasons



Graph 6: Wheat supply and demand overview 2022/23 season (Oct - Sep)



Figures provided by SAGIS, (Publication date: 2023-10-25)

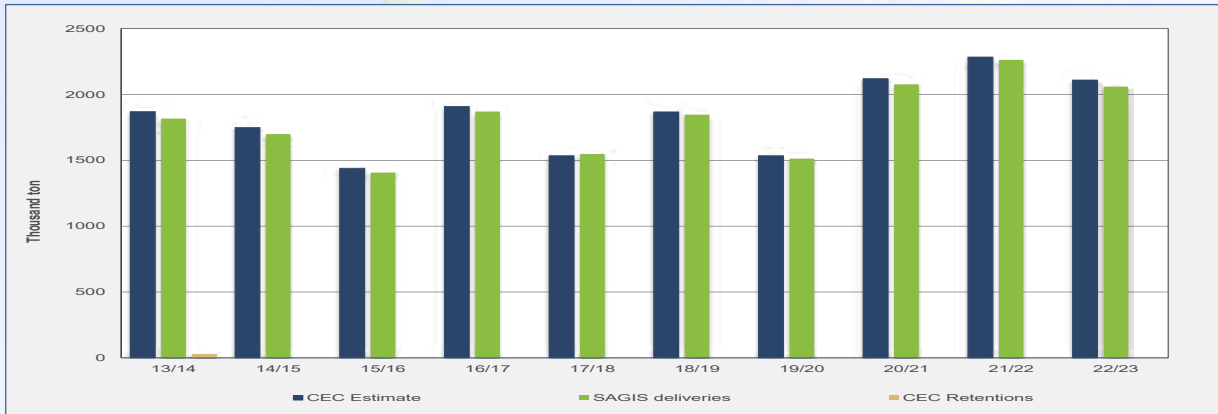


**WHEAT: SUPPLY AND DEMAND TABLE BASED ON SAGIS' INFO** Publication date: 2023-10-25

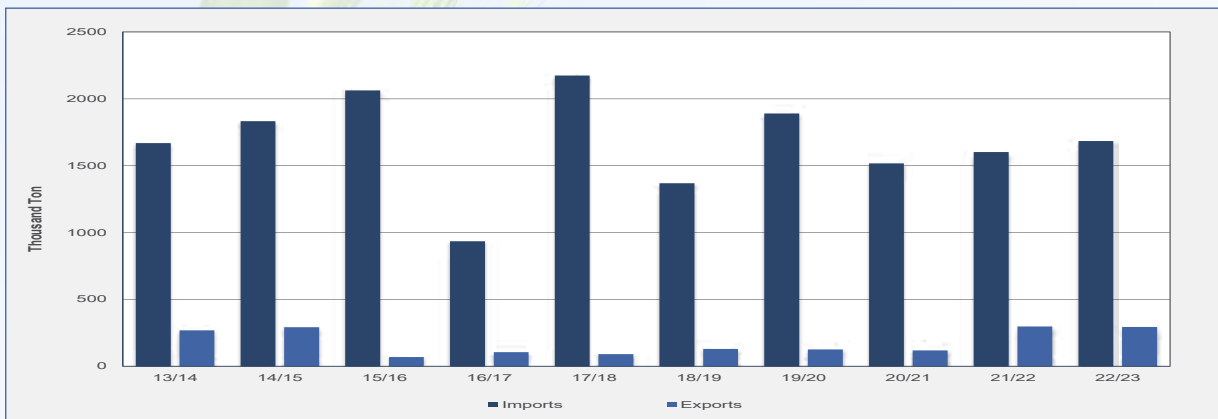
	Season (Oct - Sep)																	Current Season Oct - Sep 22/23***	10 Year average 2012/13 - 2021/22
	06/07	07/08	08/09	09/10	10/11	11/12	12/13	13/14	14/15	15/16	16/17	17/18	18/19	19/20	20/21	21/22			
	12																		
<b>CEC (Crop Estimate)</b>	2 105 000	1 905 000	2 130 000	1 958 000	1 430 000	2 005 000	1 870 000	1 870 000	1 750 000	1 440 000	1 910 000	1 535 000	1 868 000	1 535 000	2 120 000	2 285 000	2 110 000	1 818 300	
<b>CEC (Retention)</b>	40 000	42 000	43 000	29 000	27 000	26 500	30 000	30 000	0	0	0	0	0	0	0	0	6 500		
<b>SUPPLY</b>																			
Opening stock (1 Oct)	582 000	376 000	509 000	694 000	579 000	478 000	651 180	489 253	488 526	596 823	827 232	341 424	721 534	539 079	364 908	467 404	625 083		
Prod deliveries	2 045 000	1 876 000	2 130 000	1 910 000	1 389 000	1 973 000	1 837 137	1 816 981	1 689 546	1 406 752	1 870 525	1 547 486	1 847 171	1 513 300	2 077 136	2 262 938	2 059 649		
Imports	777 000	1 396 000	1 192 000	1 285 000	1 649 000	1 724 000	1 393 215	1 668 412	1 832 441	2 062 765	934 765	2 173 757	1 368 097	1 889 868	1 516 995	1 601 299	1 684 369		
Surplus	32 000	0	13 000	0	23 000	14 000	0	0	15 151	8 807	9 249	5 611	11 994	9 812	14 438	4 448	762		
<b>Total supply</b>	<b>3 436 000</b>	<b>3 648 000</b>	<b>3 844 000</b>	<b>3 889 000</b>	<b>3 640 000</b>	<b>4 189 000</b>	<b>3 881 532</b>	<b>3 974 646</b>	<b>4 035 664</b>	<b>4 075 147</b>	<b>3 641 771</b>	<b>4 068 278</b>	<b>3 948 796</b>	<b>3 952 059</b>	<b>3 973 477</b>	<b>4 336 089</b>	<b>4 369 863</b>		
<b>DEMAND</b>																			
Processed	2 820 000	2 845 000	2 857 000	3 017 000	2 945 000	3 202 000	3 040 086	3 175 834	3 112 718	3 144 414	3 163 196	3 229 861	3 254 656	3 437 768	3 355 869	3 384 445	3 490 601		
-human	2 818 000	2 844 000	2 849 000	2 991 000	2 944 000	3 066 000	3 008 378	3 122 134	3 109 022	3 142 077	3 160 660	3 226 649	3 251 410	3 414 602	3 347 677	3 364 789	3 450 793		
-animal	2 000	1 000	8 000	26 000	1 000	136 000	31 694	53 695	3 696	2 337	2 536	3 212	3 246	23 166	8 192	19 656	39 808		
-gristing	0	0	0	0	0	0	14	5	0	0	0	0	0	0	0	0	0		
-bio-fuel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Withdrawn by producers	7 000	12 000	12 000	14 000	6 000	4 000	3 934	3 127	1 320	1 834	1 880	884	941	1 767	4 049	7 033	6 565		
Released to end-consumers	4 000	2 000	5 000	3 000	6 000	7 000	7 322	3 095	2 802	1 907	1 256	1 990	2 186	1 269	1 453	1 426	1 403		
Seed for planting purposes	17 000	22 000	26 000	17 000	13 000	18 000	15 998	18 198	22 705	18 800	24 067	18 237	19 222	16 595	20 561	19 377	18 612		
Net receipts(-)/displ(+)	1 000	26 000	19 000	15 000	13 000	19 000	19 990	16 172	7 468	12 435	5 101	4 992	3 523	4 410	5 653	1 615	2 307		
Deficit	0	9 000	0	4 000	0	0	713	1 243	0	0	0	0	0	0	0	0	0		
Exports	211 000	223 000	231 000	240 000	179 000	288 000	304 236	268 451	291 828	68 525	104 847	90 780	129 189	125 342	118 488	297 110	292 918		
<b>Total Demand</b>	<b>3 060 000</b>	<b>3 139 000</b>	<b>3 150 000</b>	<b>3 310 000</b>	<b>3 162 000</b>	<b>3 538 000</b>	<b>3 392 279</b>	<b>3 486 120</b>	<b>3 438 841</b>	<b>3 247 915</b>	<b>3 300 347</b>	<b>3 346 744</b>	<b>3 409 717</b>	<b>3 587 151</b>	<b>3 506 073</b>	<b>3 711 006</b>	<b>3 812 406</b>		
- processed p/month	376 000	509 000	694 000	579 000	478 000	651 000	489 253	488 526	596 823	827 232	341 424	721 534	539 079	364 908	467 404	625 083	557 457		
- months' stock	235 000	237 100	238 100	251 400	245 400	266 800	253 341	264 653	259 393	262 035	263 600	269 155	271 221	286 481	279 656	282 037	290 883		
	1.6	2.1	2.9	2.3	1.9	2.4	1.9	1.8	1.8	3.2	1.3	2.7	2.0	1.3	1.7	2.2	1.9		

Note: \*\*\*Figures for current season up to date

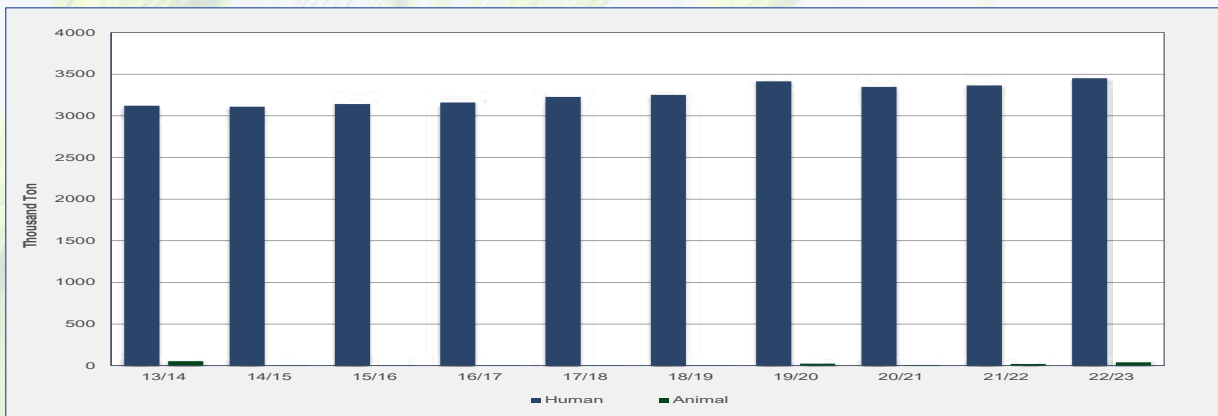
Graph 7: Wheat: CEC Estimate, Retentions and SAGIS deliveries over ten seasons



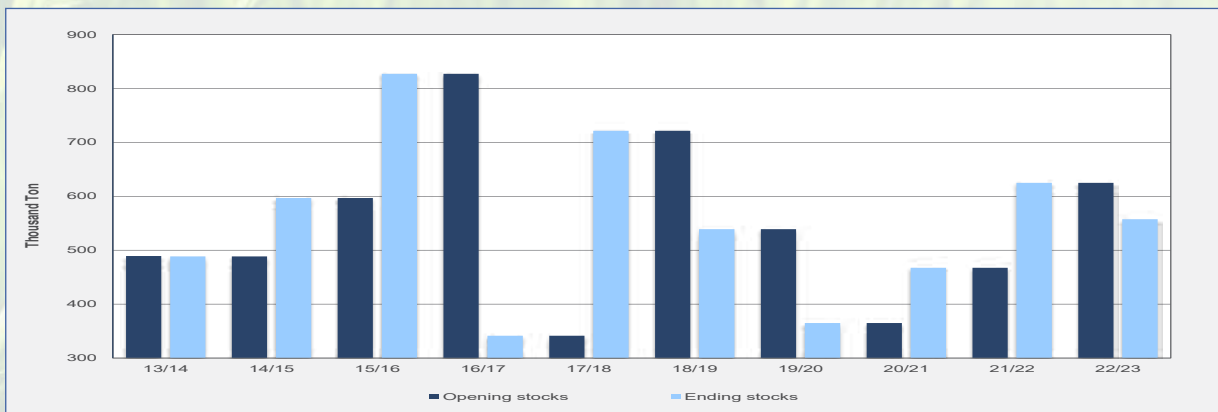
Graph 8: Wheat: Imports and exports over ten seasons



Graph 9: Wheat: RSA consumption over ten seasons



Graph 10: Wheat: Opening and ending stocks over ten seasons



Figures provided by SAGIS, 22/23 figures (Oct - Sep)



**WHOLE WHEAT PROCESSED PER PROVINCE**

**PROGRESSIVE: October 2018 to September 2019 (Full 2018/19 Marketing Year)**

	Northern Cape Eastern Cape	Western Cape	KwaZulu-Natal Mpumalanga	Limpopo North West	Free State	Gauteng	Total
Processed	267 196	608 601	671 189	50	613 125	1 115 427	<b>3 275 588</b>

**PROGRESSIVE: October 2019 to September 2020 (Full 2019/20 Marketing Year)**

	Northern Cape Eastern Cape	Western Cape	KwaZulu-Natal Mpumalanga	Limpopo North West	Free State	Gauteng	Total
Processed	320 797	662 672	726 082	8 724	628 759	1 131 769	<b>3 478 803</b>

**PROGRESSIVE: October 2020 to September 2021 (Full 2020/21 Marketing Year)**

	Northern Cape Eastern Cape	Western Cape	KwaZulu-Natal Mpumalanga	Limpopo North West	Free State	Gauteng	Total
Processed	318 435	667 940	690 889	1 965	558 378	1 145 318	<b>3 382 925</b>

**PROGRESSIVE: October 2021 to September 2022 (Full 2021/22 Marketing Year)**

	Northern Cape Eastern Cape	Western Cape	KwaZulu-Natal Mpumalanga	Limpopo North West	Free State	Gauteng	Total
Processed	274 275	688 180	684 546	856	620 001	1 142 505	<b>3 410 363</b>

**PROGRESSIVE: October 2022 to September 2023 (2022/23 Marketing Year)**

	Northern Cape Eastern Cape	Western Cape	KwaZulu-Natal Mpumalanga	Limpopo North West	Free State	Gauteng	Total
Processed	286 574	658 507	714 902	421	608 844	1 260 215	<b>3 529 463</b>

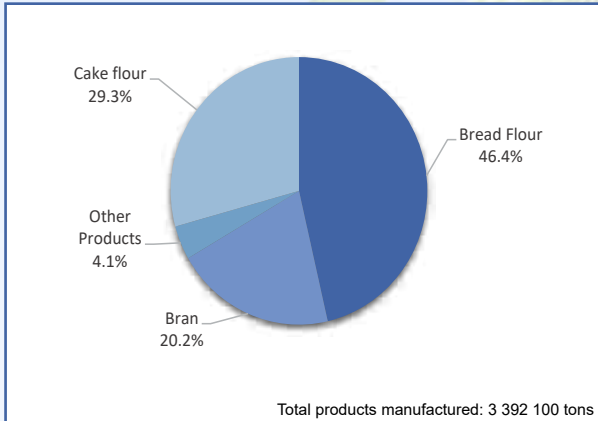
Publication Date: 2023/10/25

\* Please note that included are the products destined for exports

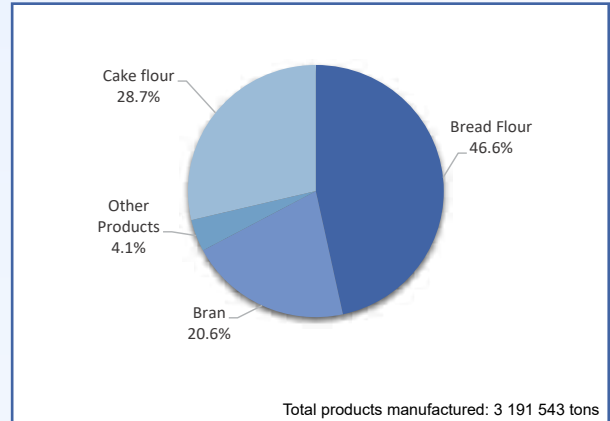
# SAGIS Wheat Product Information

Please see graphs 11 to 16 below as well as the tables on pages 10 and 11 for wheat product and pan baked product figures received by SAGIS. Figures for pan baked products manufactured per bakery group, are provided on pages 12 and 13.

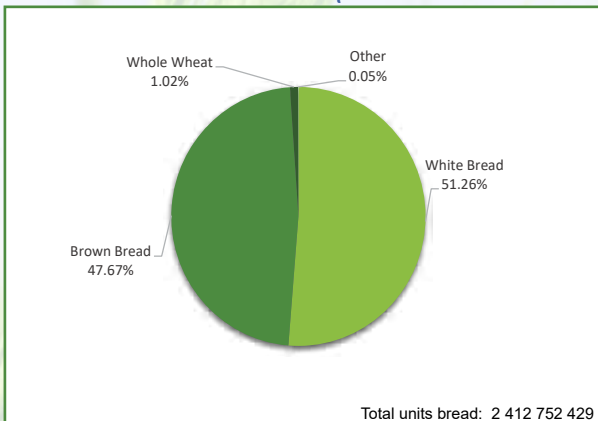
Graph 11: Wheat products manufactured from Oct 2021 - Sept 2022



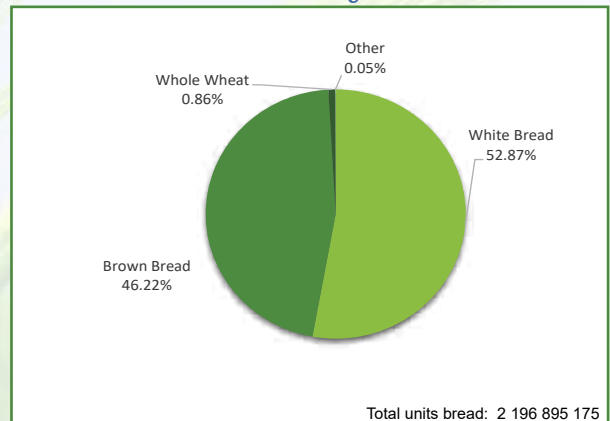
Graph 12: Wheat products manufactured from Oct 2022 - Aug 2023



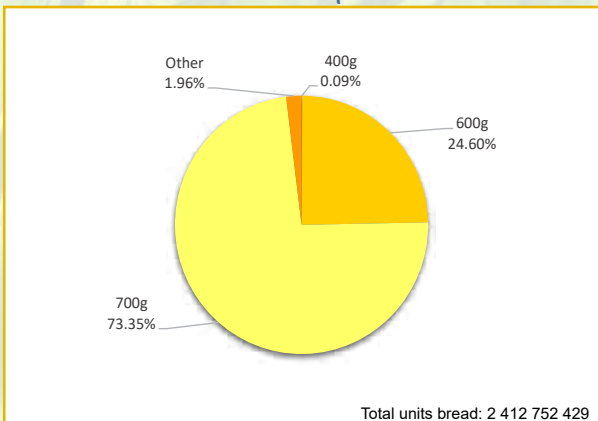
Graph 13: Pan baked bread per type from Oct 2021 - Sept 2022



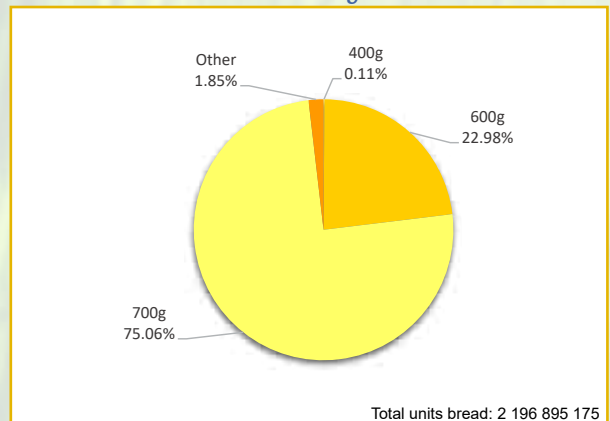
Graph 14: Pan baked bread per type from Oct 2022 - Aug 2023



Graph 15: Pan baked bread per mass Oct 2021 - Sept 2022



Graph 16: Pan baked bread per mass Oct 2022 - Aug 2023





WHEATEN PRODUCTS MANUFACTURED PER MARKETING YEAR					
	Marketing year: Oct 2018 - Sep 2019 Manufactured Tons Progressive: 12 Months	Marketing year: Oct 2019 - Sep 2020 Manufactured Tons Progressive: 12 Months	Marketing year: Oct 2020 - Sep 2021 Manufactured Tons Progressive: 12 Months	Marketing year: Oct 2021 - Sep 2022 Manufactured Tons Progressive: 12 Months	Marketing year: Oct 2022 - Sep 2023 Manufactured Tons Progressive: 11 Months (Oct - Aug)
Cake Flour	953 185	1 016 500	996 325	993 216	915 697
Self-Raising Flour	19 464	19 179	18 302	16 228	14 730
White Bread Flour	1 131 181	1 174 102	1 248 539	1 289 487	1 225 262
Brown Bread Flour	396 131	396 342	310 161	279 856	255 937
Other Flour (Industrial)	108 941	124 713	116 786	117 568	111 553
Whole Wheat Meal	5 445	8 072	6 706	6 106	5 873
Bran	669 835	703 550	680 402	684 976	658 340
Semolina	7 192	4 138	4 537	4 663	4 151
<b>Total</b>	<b>3 291 374</b>	<b>3 446 596</b>	<b>3 381 758</b>	<b>3 392 100</b>	<b>3 191 543</b>

WHEATEN PRODUCTS IMPORTED PER MARKETING YEAR					
	Marketing year: Oct 2018 - Sep 2019 Manufactured Tons Progressive: 12 Months	Marketing year: Oct 2019 - Sep 2020 Manufactured Tons Progressive: 12 Months	Marketing year: Oct 2020 - Sep 2021 Manufactured Tons Progressive: 12 Months	Marketing year: Oct 2021 - Sep 2022 Manufactured Tons Progressive: 12 Months	Marketing year: Oct 2022 - Sep 2023 Manufactured Tons Progressive: 11 Months (Oct - Aug)
Cake Flour	5 934	5 254	3 985	4 205	4 565
Self-Raising Flour	50	35	25	24	4
White Bread Flour	11 436	12 383	10 116	13 947	12 135
Brown Bread Flour	8 353	8 088	7 120	6 888	5 297
Other Flour (Industrial)	0	0	0	0	0
Whole Wheat Meal	0	0	0	0	0
Bran	5 742	7 329	7 086	7 574	8 210
Semolina	0	0	0	0	0
<b>Total</b>	<b>31 515</b>	<b>33 089</b>	<b>28 332</b>	<b>32 638</b>	<b>30 211</b>

WHEATEN PRODUCTS EXPORTED PER MARKETING YEAR					
	Marketing year: Oct 2018 - Sep 2019 Manufactured Tons Progressive: 12 Months	Marketing year: Oct 2019 - Sep 2020 Manufactured Tons Progressive: 12 Months	Marketing year: Oct 2020 - Sep 2021 Manufactured Tons Progressive: 12 Months	Marketing year: Oct 2021 - Sep 2022 Manufactured Tons Progressive: 12 Months	Marketing year: Oct 2022 - Sep 2023 Manufactured Tons Progressive: 11 Months (Oct - Aug)
Cake Flour	5 667	4 719	1 310	1 869	2 319
Self-Raising Flour	248	2 201	3 685	3 808	2 654
White Bread Flour	4 271	5 612	4 407	5 363	9 976
Brown Bread Flour	5 404	17 019	11 097	9 177	13 040
Other Flour (Industrial)	61	70	21	0	0
Whole Wheat Meal	27	21	14	11	11
Bran	1 118	1 022	0	0	199
Semolina	8	17	7	13	10
<b>Total</b>	<b>16 804</b>	<b>30 681</b>	<b>20 541</b>	<b>20 241</b>	<b>28 209</b>

PAN BAKED PRODUCTS MANUFACTURED PER YEAR					
	Marketing year: Oct 2018 - Sep 2019 Manufactured Units Progressive: 12 Months	Marketing year: Oct 2019 - Sep 2020 Manufactured Units Progressive: 12 Months	Marketing year: Oct 2020 - Sep 2021 Manufactured Units Progressive: 12 Months	Marketing year: Oct 2021 - Sep 2022 Manufactured Units Progressive: 12 Months	Marketing year: Oct 2022 - Sep 2023 Manufactured Units Progressive: 11 Months ( Oct - Aug)
<b>WHITE BREAD</b>					
400g (Units)	1 580 130	1 503 633	1 916 490	1 694 463	980 229
600g (Units)	268 757 988	247 511 992	242 926 271	255 130 078	236 919 572
700g (Units)	883 820 063	880 836 097	906 178 166	988 154 742	913 962 742
Other (Units)	13 142 668	10 640 346	9 185 895	11 825 665	9 581 421
<b>White Bread (Total Units)</b>	<b>1 167 300 849</b>	<b>1 140 492 068</b>	<b>1 160 206 822</b>	<b>1 236 804 948</b>	<b>1 161 443 964</b>
<b>BROWN BREAD</b>					
400g (Units)	811 216	659 354	366 727	360 750	1 379 328
600g (Units)	338 257 246	359 714 338	362 220 781	337 902 579	267 302 692
700g (Units)	813 553 145	840 722 226	805 850 607	797 206 075	732 666 218
Other (Units)	17 669 489	15 706 019	14 445 645	14 670 901	14 152 148
<b>Brown Bread (Total Units)</b>	<b>1 170 291 096</b>	<b>1 216 801 937</b>	<b>1 182 883 760</b>	<b>1 150 140 305</b>	<b>1 015 500 386</b>
<b>WHOLE WHEAT</b>					
400g (Units)	13 968	12 305	11 678	11 010	10 975
600g (Units)	595 774	564 692	502 886	481 868	458 277
700g (Units)	6 023 626	5 847 337	5 397 378	4 369 143	2 359 605
Other (Units)	22 413 722	20 240 473	19 734 109	19 686 320	16 004 582
<b>Whole Wheat (Total Units)</b>	<b>29 047 090</b>	<b>26 664 807</b>	<b>25 646 051</b>	<b>24 548 341</b>	<b>18 833 439</b>
<b>OTHER</b>					
400g (Units)	38 205	21 651	24 759	14 070	15 090
600g (Units)	397 131	216 720	128 498	109 541	91 972
700g (Units)	112 121	110 366	70 805	62 119	24 666
Other (Units)	3 721 635	1 730 533	1 057 879	1 073 105	985 658
<b>Other (Total Units)</b>	<b>4 269 092</b>	<b>2 079 270</b>	<b>1 281 941</b>	<b>1 258 835</b>	<b>1 117 386</b>
<b>Total</b>	<b>2 370 908 127</b>	<b>2 386 038 082</b>	<b>2 370 018 574</b>	<b>2 412 752 429</b>	<b>2 196 895 175</b>



**PAN BAKED PRODUCTS MANUFACTURED PER BAKERY GROUP PER MARKETING YEAR**

SUPERMARKET GROUPS	Oct 2018 - Sept 2019	Oct 2019 - Sept 2020	Oct 2020 - Sept 2021	Oct 2021 - Sept 2022
<b>WHITE BREAD</b>				
400g (Units)	606 900	435 794	220 462	222 924
600g (Units)	114 444 552	101 611 890	96 281 265	104 353 834
700g (Units)	6 986 343	6 017 531	5 733 674	7 370 730
Other (Units)	1 299 940	1 148 119	1 292 005	1 814 900
<b>White Bread (Total Units)</b>	<b>123 337 735</b>	<b>109 213 334</b>	<b>103 527 406</b>	<b>113 762 388</b>
<b>BROWN BREAD</b>				
400g (Units)	292 319	197 268	108 295	119 173
600g (Units)	145 809 635	153 594 543	163 353 889	155 206 196
700g (Units)	5 445 780	4 378 811	4 648 966	5 204 174
Other (Units)	1 203 893	1 036 721	647 030	865 212
<b>Brown Bread (Total Units)</b>	<b>152 751 627</b>	<b>159 207 343</b>	<b>168 758 180</b>	<b>161 394 755</b>
<b>WHOLE WHEAT</b>				
400g (Units)	0	0	0	0
600g (Units)	495 269	488 165	443 080	426 799
700g (Units)	1 740 562	1 713 047	1 933 139	2 102 161
Other (Units)	4	0	0	0
<b>Whole Wheat (Total Units)</b>	<b>2 235 835</b>	<b>2 201 212</b>	<b>2 376 219</b>	<b>2 528 960</b>
<b>OTHER</b>				
400g (Units)	0	0	0	0
600g (Units)	0	0	0	0
700g (Units)	0	0	0	0
Other (Units)	2 130 828	1 583 457	910 678	850 306
<b>Other (Total Units)</b>	<b>2 130 828</b>	<b>1 583 457</b>	<b>910 678</b>	<b>850 306</b>
<b>Total</b>	<b>280 456 025</b>	<b>272 205 346</b>	<b>275 572 483</b>	<b>278 536 409</b>

Note: Supermarket chain stores who will submit one return for all processing units in the specific group.

BAKERY GROUPS	Oct 2018 - Sept 2019	Oct 2019 - Sept 2020	Oct 2020 - Sept 2021	Oct 2021 - Sept 2022
<b>WHITE BREAD</b>				
400g (Units)	165 688	136 279	0	0
600g (Units)	84 113 612	79 850 986	87 869 366	96 555 426
700g (Units)	820 062 468	817 929 774	843 809 594	888 591 779
Other (Units)	2 605 639	2 159 109	1 791 049	2 462 060
<b>White Bread (Total Units)</b>	<b>906 947 407</b>	<b>900 076 148</b>	<b>933 470 009</b>	<b>987 609 265</b>
<b>BROWN BREAD</b>				
400g (Units)	181 022	144 912	0	0
600g (Units)	104 643 715	120 455 384	127 335 203	115 746 595
700g (Units)	761 916 315	792 552 789	759 962 904	733 826 197
Other (Units)	12 770 639	11 546 359	11 418 698	11 415 983
<b>Brown Bread (Total Units)</b>	<b>879 511 691</b>	<b>924 699 444</b>	<b>898 716 805</b>	<b>860 988 775</b>
<b>WHOLE WHEAT</b>				
400g (Units)	0	0	0	0
600g (Units)	0	0	0	0
700g (Units)	3 937 854	3 835 162	3 206 902	2 008 170
Other (Units)	22 403 350	20 227 987	19 716 636	19 676 075
<b>Whole Wheat (Total Units)</b>	<b>26 341 204</b>	<b>24 063 149</b>	<b>22 923 538</b>	<b>21 684 245</b>
<b>OTHER</b>				
400g (Units)	0	0	0	0
600g (Units)	0	0	0	0
700g (Units)	0	0	0	0
Other (Units)	0	0	0	66 809
<b>Other (Total Units)</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>66 809</b>
<b>Total</b>	<b>1 812 800 302</b>	<b>1 848 838 741</b>	<b>1 855 110 352</b>	<b>1 870 349 094</b>

Note: Plant bakeries who will submit one return for all the processing units in the specific group.

**PAN BAKED PRODUCTS MANUFACTURED PER BAKERY GROUP PER MARKETING YEAR**

INDEPENDENT BAKERIES	Oct 2018 - Sept 2019	Oct 2019 - Sept 2020	Oct 2020 - Sept 2021	Oct 2021 - Sept 2022
<b>WHITE BREAD</b>				
400g (Units)	135 349	325 777	1 059 148	803 922
600g (Units)	34 042 890	31 384 458	29 800 163	23 614 453
700g (Units)	39 407 253	40 654 695	41 524 028	55 358 272
Other (Units)	6 396 891	5 037 458	4 287 887	5 826 804
<b>White Bread (Total Units)</b>	<b>79 982 383</b>	<b>77 402 388</b>	<b>76 671 226</b>	<b>85 603 451</b>
<b>BROWN BREAD</b>				
400g (Units)	26 445	3 172	2 696	795
600g (Units)	44 596 357	42 025 354	38 133 521	33 209 283
700g (Units)	34 054 069	32 609 567	31 072 223	47 313 482
Other (Units)	1 413 562	1 002 647	647 331	763 902
<b>Brown Bread (Total Units)</b>	<b>80 090 433</b>	<b>75 640 740</b>	<b>69 855 771</b>	<b>81 287 462</b>
<b>WHOLE WHEAT</b>				
400g (Units)	0	0	0	0
600g (Units)	1 937	1 651	2 601	2 504
700g (Units)	112 768	105 837	92 436	118 795
Other (Units)	5 134	4 689	4 685	4 583
<b>Whole Wheat (Total Units)</b>	<b>119 839</b>	<b>112 177</b>	<b>99 722</b>	<b>125 882</b>
<b>OTHER</b>				
400g (Units)	76 101	0	0	0
600g (Units)	0	0	0	0
700g (Units)	1 396 277	0	0	0
Other (Units)	0	5 742	6 573	10 832
<b>Other (Total Units)</b>	<b>1 472 378</b>	<b>5 742</b>	<b>6 573</b>	<b>10 832</b>
<b>Total</b>	<b>161 665 033</b>	<b>153 161 047</b>	<b>146 633 292</b>	<b>167 027 627</b>

Note: Privately owned independent bakeries not part of a group.

INDEPENDENT SUPERMARKETS	Oct 2018 - Sept 2019	Oct 2019 - Sept 2020	Oct 2020 - Sept 2021	Oct 2021 - Sept 2022
<b>WHITE BREAD</b>				
400g (Units)	672 193	604 941	634 994	658 750
600g (Units)	36 156 934	34 661 823	29 949 818	30 630 511
700g (Units)	17 363 999	16 227 832	15 096 585	16 610 799
Other (Units)	2 840 198	2 294 760	1 821 228	1 698 820
<b>White Bread (Total Units)</b>	<b>57 033 324</b>	<b>53 789 356</b>	<b>47 502 625</b>	<b>49 598 880</b>
<b>BROWN BREAD</b>				
400g (Units)	311 430	314 002	254 758	229 694
600g (Units)	43 207 539	43 636 601	37 978 553	33 694 966
700g (Units)	12 136 981	11 179 951	10 159 491	10 820 150
Other (Units)	2 281 395	2 119 486	1 732 586	1 597 971
<b>Brown Bread (Total Units)</b>	<b>57 937 345</b>	<b>57 250 040</b>	<b>50 125 388</b>	<b>46 342 781</b>
<b>WHOLE WHEAT</b>				
400g (Units)	13 968	12 305	11 678	11 010
600g (Units)	98 568	74 876	56 720	52 565
700g (Units)	232 442	193 245	164 901	140 017
Other (Units)	5 234	7 843	12 788	5 662
<b>Whole Wheat (Total Units)</b>	<b>350 212</b>	<b>288 269</b>	<b>246 087</b>	<b>209 254</b>
<b>OTHER</b>				
400g (Units)	38 205	21 651	24 759	14 070
600g (Units)	321 030	216 720	128 695	109 541
700g (Units)	112 121	110 366	70 805	62 119
Other (Units)	194 530	141 334	140 628	145 158
<b>Other (Total Units)</b>	<b>665 886</b>	<b>490 071</b>	<b>364 887</b>	<b>330 888</b>
<b>Total</b>	<b>115 986 767</b>	<b>111 817 736</b>	<b>98 238 987</b>	<b>96 481 803</b>

Note: Supermarket chain stores (which are individually owned under a franchise agreement) will submit an individual or combined return for each processing unit (e.g. Spar, OK, Seven Eleven, Saverites, Foodzones, etc.)



## *Assuring the quality of South African wheat*

South Africa operates in a free market economic system and participation by wheat-breeding and seed companies in the process for the release of bread wheat varieties is highly recommended. A new or introduction cultivar is only released for planting if it possesses improved agronomical as well as improved flour quality characteristics compared to the cultivars planted commercially in a specific area.

The classification of wheat cultivars is an attempt to provide the wheat industry with new cultivars that perform well agronomically and possess suitable milling, rheological and baking characteristics. Analytical procedures and classification norms are compiled in conjunction with wheat breeders, millers, bakers and storage companies to ensure market-directed and quality-driven wheat production in the interest of wheat producers and processors. The availability of new and improved wheat varieties is important as a constant demand exists for higher yields, better quality, better processing properties and increased disease resistance.

Classification norms use cultivars as biological quality standards as a frame of reference against which new breeding lines are evaluated. Only cultivars that are successfully grown commercially and possess acceptable agronomical and quality characteristics may be considered as biological quality standards.

As the breeding and development of new wheat varieties with suitable quality characteristics is an expensive, long-term project, classification norms and quality standards are provided to breeders as guidelines that should stand the test of time. Changing the classification norms and establishing new quality standards are for this reason thoroughly investigated and carefully considered to ensure that the long-term goals of breeding programs are achieved. Recent amendments include introducing a new biological quality standard (SST 0117) for the dry land Southern (Winter rainfall) areas, an update to the determination of the 100 g bread evaluation scores and the inclusion of the Konica Minolta CM-5 colour results as part of the quality evaluation norms.

The effect of climate, rainfall, environmental interaction, cultivation practices and other factors that influence wheat quality, makes the use of fixed criteria or norms for classification purposes impractical. For this reason, cultivars are used as biological quality standards, and acceptable deviations from the standard are established as classification norms. Producers continuously strive to improve the wheat yield and quality by selecting the best cultivars for commercial production in a specific area. High grading standards are set to ensure adequate quality control.

The evaluation of wheat breeder lines and the approval of a new cultivar for release are, since April 2018, performed by the Wheat Forum Cultivar and Technical Committee. A line approved for release, is registered as a cultivar in accordance with the Plant Breeders' Act, Act 15 of 1976, by the applicable breeder company (plant breeder's rights are a form of Intellectual Property rights).

The Wheat Forum requested that two documents, namely 'Analysis Procedure and Evaluation Norms for the Release of Bread Wheat Breeder Varieties for the RSA', as well as the Cultivar List be hosted on the website of the SAGL. SAGL was also appointed as responsible party for the maintenance of the aforementioned documents.

The cultivar list hosted on the SAGL website is named the Wheat Forum Cultivar List, to distinguish this list from any other lists in existence. The criteria for listing a cultivar on the Wheat Forum Cultivar List is the minuted approval of the cultivar by the Cultivar and Technical Committee of the Wheat Forum. Approval indicates that the cultivar has passed the evaluation process as described in the 'Analysis Procedure and Evaluation Norms for the Release of Bread Wheat Breeder Varieties for the RSA' document.

Any addition or elimination of a cultivar to/from the Wheat Forum Cultivar List, shall be based on a resolution documented in Minutes of meetings of the Wheat Forum Cultivar and Technical Committee. The Wheat Forum Cultivar List shall be updated annually upon receipt of the Minutes of the Wheat Forum Cultivar and Technical Committee meeting. The latest revision of both these documents are available on the SAGL website.



Since wheat is a self-pollinating crop, meaning that grain produced has the same genetic composition as the parent, grain can be harvested and replanted as seed, which results in less seed being sold. In South Africa, approximately 70% of wheat is planted with farm saved seed. As a result, the investment in the development of new cultivars is only covered by a small portion of the market. A lack of return on investment therefore prevents new seed companies and new cultivars from entering the market. This situation is however not unique to South Africa. In order to address this issue, various End Point Royalty systems were investigated and the outcome was a proposal to establish a statutory levy for breeding and technology, in addition to the industry levy that has been implemented for many years.

After meetings and consultations with stakeholders and various experts, the South African Cultivar & Technology Agency NPC (SACTA) was established in June 2016. SACTA has been mandated by role-players in the different industries to administer the breeding and technology levy and makes payments to the seed companies from funds collected by means of the levies. The payments are made annually and are based on the calculated market share of each seed company. It is envisaged that this system will eventually be implemented for all self-pollinating crops.

## *Wheat grades*

The latest bread wheat grading regulations were published in the Government Gazette No. 42862, dated 29 November 2019. The regulations are detailed in Government Notice NO. R. 1547 of 29 November 2019. According to these regulations the classes of wheat are Bread Wheat and Other Wheat. The grades for Bread Wheat are Super Grade, Grade 1, Grade 2 and Grade 3. No grades are determined for Class Other Wheat.

The 335 representative crop samples of the 2022/23 season received were graded as follows: 31% was graded Super Grade, 16% was graded Grade 1, 14% was graded Grade 2, 10% was graded Grade 3 and 29% Class Other Wheat (COW). Please refer to Graphs 17 to 20 for the percentage of wheat crop quality survey samples graded per Class and grade over the last four seasons.

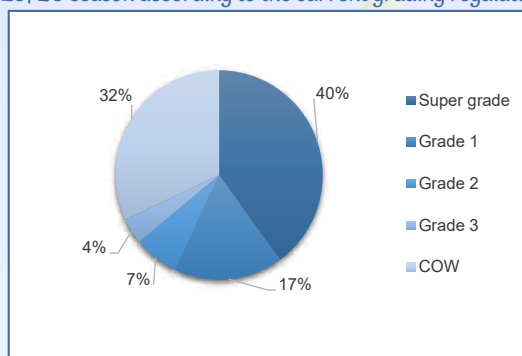
Of the 95 samples received that were downgraded to COW, 17% had falling number values below 220 seconds, 4% had hectolitre mass values below 74 kg/hl, 33% had screening levels higher than 3%, 36% had other grain and unthreshed ears levels exceeding 1%, 18% had total damaged kernels levels higher than 2%, 34% had combined/collective deviation levels exceeding 5% and 12% had field fungi levels higher than 2%. Other deviations reported were protein contents lower than 9.5% (5%), foreign matter (2%), insect damaged kernel (7%) and sprouted kernel percentages (6%) exceeding the maximum permissible deviation.

44% of the downgraded samples originated from the Western Cape, 19% from the Free State and 37% from the irrigation areas.

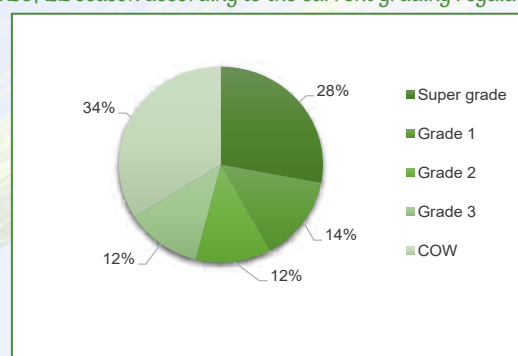
29% of wheat crop quality survey samples originating in the Free State were graded Super Grade. 39% of the wheat crop samples from the irrigation areas and 26% of wheat crop samples from the Western Cape Province graded Super Grade.



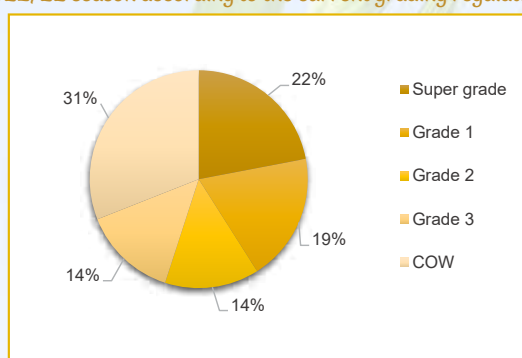
Graph 17: Percentage of samples per Class and grade in the 2019/20 season according to the current grading regulations



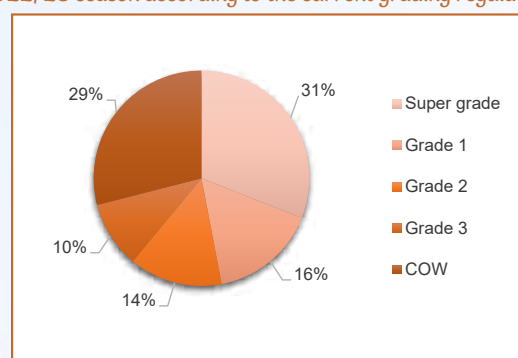
Graph 18: Percentage of samples per Class and grade in the 2020/21 season according to the current grading regulations



Graph 19: Percentage of samples per Class and grade in the 2021/22 season according to the current grading regulations



Graph 20: Percentage of samples per Class and grade in the 2022/23 season according to the current grading regulations



### Wheat seed sold by commercial grain storage companies to wheat producers for the 2022 planting season

Cultivar	%	Cultivar	%
SST 0166	43.50	PAN 3644	0.45
SST 0117	11.09	SST 835	0.37
SST 0187	8.89	SST 087	0.33
SST 0147	5.76	SST 8175	0.30
SST 056	4.46	SST 8177	0.25
SST 015	3.46	PAN 3373	0.21
PAN 3497	2.67	SST 374	0.16
SST 88	2.41	SST 806	0.12
SST 895	1.72	SST 398	0.09
PAN 3541	1.58	Koedoes	0.089
SST 0127	1.40	Renoster	0.087
SST 8205	1.37	Duzi	0.060
PAN 3161	1.24	SST 316	0.037
SST 356	0.95	SST 387	0.020
SST 8154	0.92	SST 875	0.019
Matlabas	0.90	SST 096	0.0152
SST 843	0.87	SST 3149	0.0150
PAN 3400	0.84	Koonap	0.0070
SST 8135	0.84	SST 3156	0.0068
SST 884	0.81	SST 3176	0.0061
PAN 3471	0.68	SST 347	0.0059
SST 8156	0.52	PAN 3368	0.0028
PAN 3111	0.49	SST 877	0.0008
			<hr/> <hr/>
			100

**Table 2: Bread Wheat Grading Table - Government Notice No. R. 1547 of 29 November 2019**

Grade	Minimum			Maximum percentage permissible deviation (m/m)									
	Hectolitre mass, kg/hl	Falling number, seconds	Protein content, %	A	B	C	D	E	F	G	H	I	J
Super Grade	76	220	12.5	5	2	0.5	3	1	0.5	1	0.5	2	5
Grade 1	76	220	11.5	5	2	0.5	3	1	0.5	1	0.5	2	5
Grade 2	76	220	10.5	5	2	0.5	3	1	0.5	1	0.5	2	5
Grade 3	74	220	9.5	5	2	0.5	3	1	0.5	1	0.5	2	5
Class Other Wheat	<74	<220	<9.5	>5	>2	>0.5	>3	>1	>0.5	>1	>0.5	>2	>5
Minimum size of working samples	1.5 kg unsifted	300 g cleaned	Apparatus instructions cleaned	25 g sifted	25 g sifted	100 g sifted	500 g unsifted	50 g sifted	100 g sifted	100 g sifted	100 g sifted	25 g sifted	-

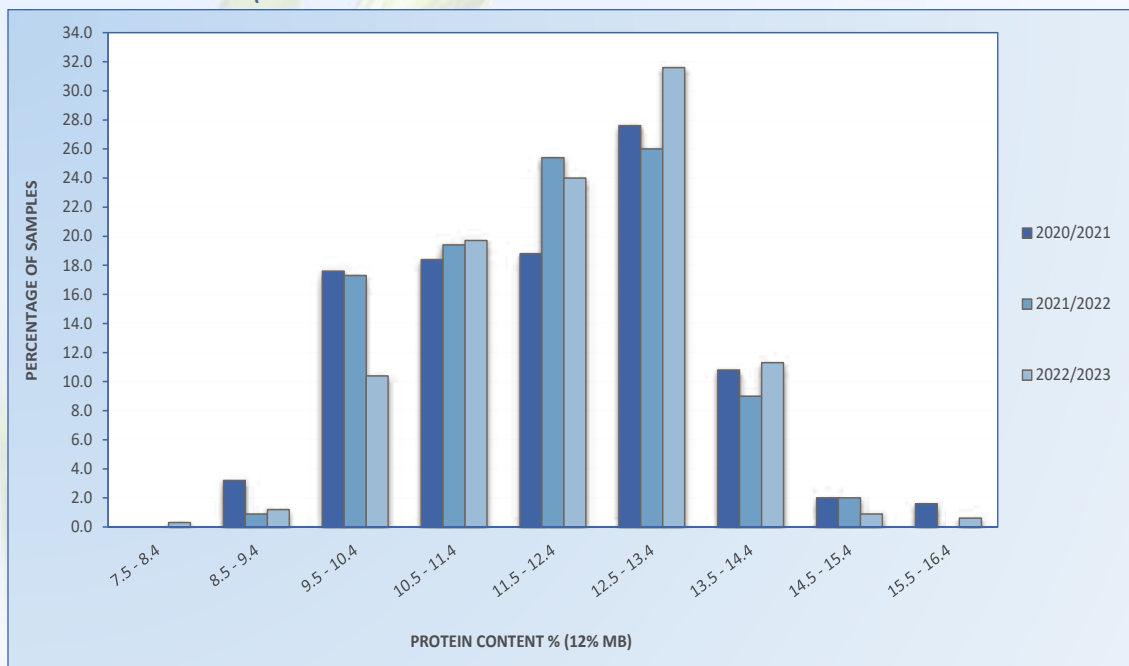


## Crop quality of the 2022/23 season

All national, seasonal and regional averages provided in this report are weighted averages.

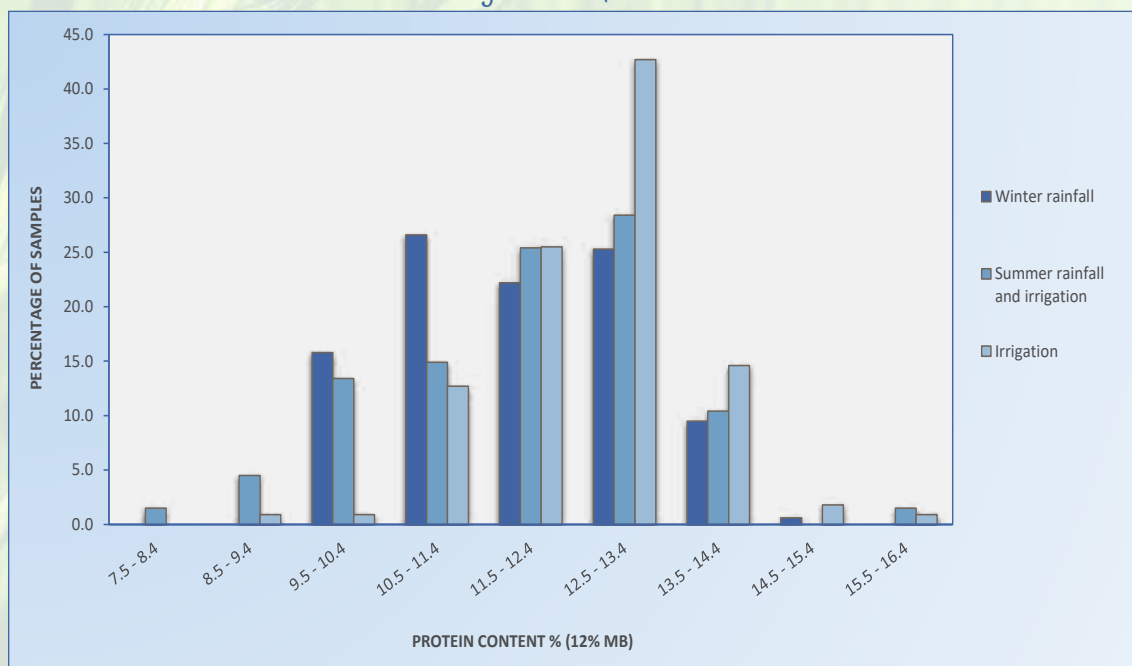
The national whole wheat protein average increased slightly from 11.9% in the previous season to 12.1%. The ten-year national average is 12.2%. Protein content is generally a function of the growing environment (soil and climatic conditions) as well as fertiliser application. Please see Graphs 21 and 22 for the protein content distribution over the last three seasons and between the three major production areas during 2022/23.

Graph 21: Protein content distribution over the last three seasons



The Irrigation areas reported the highest whole wheat protein average, namely 12.6%. The production regions in the Winter rainfall area of the Western Cape averaged 11.8% and the Summer rainfall and irrigation areas of the Free State 11.9%.

Graph 22: Protein content distribution between the three production areas during the 2022/23 season



Flour protein content is on average 0.5 to 1.2% lower than that of whole wheat and averaged 11.0% this season, slightly (0.1)% percent higher than the previous season. The difference in the protein content between the whole wheat and flour protein, can be attributed to the removal of the bran and aleuron layer as well as the germ during milling. The protein content is reported on a 12% moisture basis.

The average hectoliter mass of 79.8 kg/hl is 0.1 kg/hl lower than the previous season and 0.4 kg/hl lower than the ten-year national average of 80.2 kg/hl. Twelve samples (4%) reported values below the 76 kg/hl minimum level for Super grade, Grade 1 and Grade 2 wheat. Seven of these samples originated in the Free State, three in Limpopo and one each in the Western Cape and Northern Cape. Regional averages ranged from 79.0 kg/hl in the Free State, 79.8 kg/hl in the Western Cape and 80.3 kg/hl in the Irrigation areas.

The average 1000 kernel mass, reported on a 13% moisture basis, decreased from 40.3 g last season to 37.0 g this season. The 2020/21 season's average was 38.2 g. Averages over production areas varied from 35.9 g in the Summer rainfall and irrigation areas of the Free State to 37.2 g in the Irrigation areas and 37.3 g in the Winter rainfall areas. The weighted average percentage screenings obtained with a 1.8 mm slotted sieve was 1.69%, compared to the 1.20% and 1.63% of the previous two seasons respectively. The Summer rainfall and irrigation areas reported the highest average percentage, namely 2.38% and the Irrigation areas the lowest of 1.15%. 31 (9%) of the 335 samples exceeded the 3% maximum permissible screenings level for Super grade to Grade 3. More than half of these samples (52%) originated in the Winter Rainfall areas and 29% in the Summer rainfall and irrigation areas of the Free State.

The national weighted average falling number value was 361 seconds, higher than the 341 seconds of last season's average. The ten-year weighted average value is 364 seconds. 21 (6%) of the samples analysed for this survey reported falling number values below 250 seconds, 16 (5%) of these were below 220 seconds and were downgraded to COW as a result. These samples originated from KwaZulu-Natal (N=10), the Free State (N=5) and North West (N=1). Last season 9% of the samples analysed as part of the survey, was downgraded to COW due to a low falling number. Falling number values this season ranged between 116 and 858 seconds. All falling number values reported, are corrected for the altitude at which the test is performed.

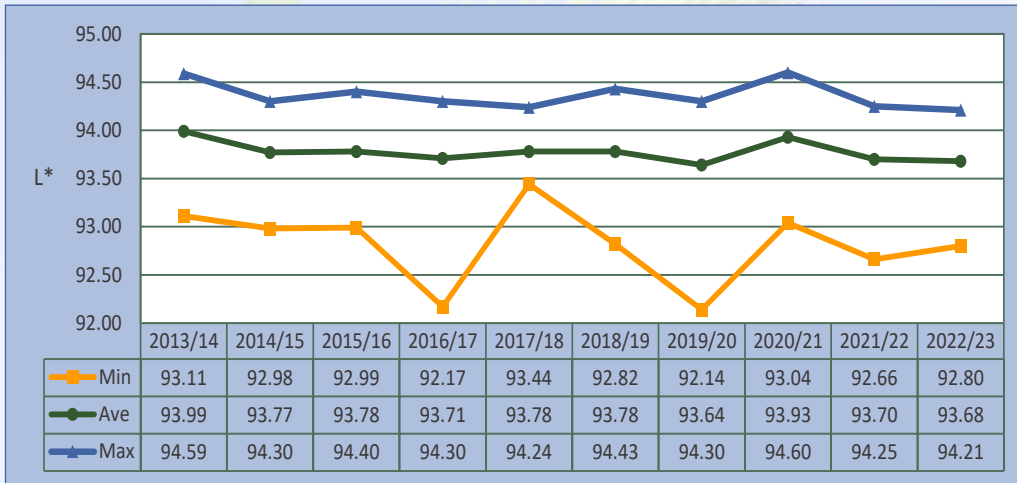
The weighted mixogram peak time on flour milled on the Quadromat Junior mill averaged 3.3 minutes compared to the 3.2 minutes of the 2021/22 season. The ten-year average is 3.0 minutes. The weighted mixogram peak time of the flour from the Bühler mill was 3.1 minutes, slightly higher than the 2.9 minutes of the previous season. Mixing time is a measure of optimum dough development and thus also of protein quality.

Extraction rate is an indication of the flour yield that can be obtained from a given amount of wheat. The extraction rate achievable on industrial scale mills is a number of percentage points higher than on laboratory scale mills due to an increase in roller surface area. Industrial type mills are also set to obtain optimum extraction rates within certain quality parameters, whereas the milling procedure and laboratory scale mill at SAGL is not set to optimise extraction but rather indicate differences in milling quality. Composite samples per class and grade per production region are cleaned, tempered/conditioned and then milled to facilitate flour and dough quality assessment. The weighted average Bühler MLU 202 laboratory mill extraction for the composite samples was 73.8% compared to the 73.9% of the previous season.

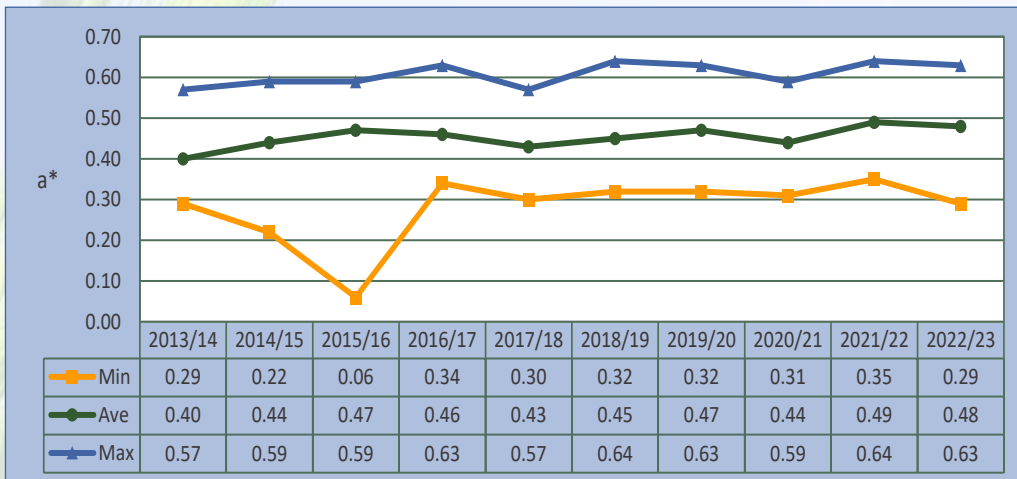
Colour is an important parameter of milled wheat since the colour of wheat flour affects the colour of the finished product, like the crumb colour of a loaf of bread. In general, a bright white colour flour is more desirable for most products. The dry colour determination by means of a Konica Minolta CM-5 spectrophotometer has been implemented on the composite flour samples ten seasons ago (since 2013/14). The CIE L\*a\*b\* (CIELAB) colour model uses lightness (L\*) and two colour values (a\* and b\*), these colour coordinates define where a specific sample's colour lies in a Cartesian graph. L\* represents lightness (100 being white and 0 being black), a\* represents green to red variation and b\* represents variation from blue to yellow. Please see Graphs 23 (L\*), 24 (a\*) and 25 (b\*) for a comparison of the ranges in the CIE L\*a\*b\* values obtained. The minimum and maximum values are based on a single composite sample's result in a specific season.



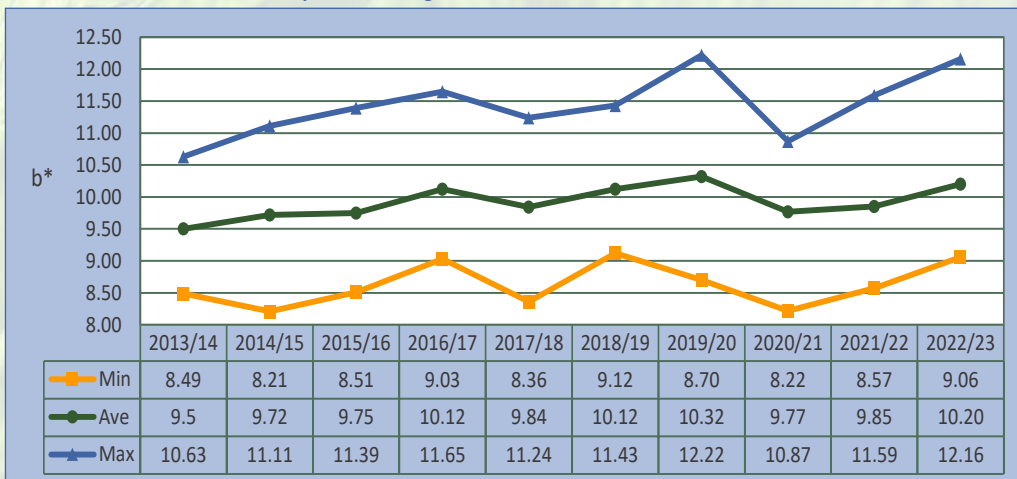
Graph 23: Range of L\* values over ten seasons



Graph 24: Range of a\* values over ten seasons



Graph 25: Range of b\* values over ten seasons



The average ash content was 0.59 % on a dry basis (moisture free basis), on par with the previous season's average of 0.60%. According to the Wheat product regulations (Government Notice No. R. 405 of 5 May 2017), cake flour's ash content should not exceed 0.65%, white bread flour's ash content should be between 0.60 to 1.00% and that of all-purpose wheat flour between 0.55 and 0.75%.

The Rapid Visco Analyser (RVA) average peak viscosity of the samples analysed was 2297 cP (centipoise) (1179 – 2912 cP), the minimum viscosity 1799 cP (877 – 2218 cP) and the final viscosity 2593 cP (1294 – 3400 cP). The range of the values are provided in brackets. The previous season the average peak viscosity was 2081 cP (1213 - 2705 cP), the minimum viscosity 1619 cP (948 – 2007 cP) and the final viscosity 2326 cP (1339 – 3004 cP). The RVA test parameters were kept constant during all the analyses. Results are reported on a 14% moisture basis.

The wet gluten (14% mb) averaged 29.5% and the dry gluten, also on a 14% moisture basis, 9.8%. The previous season, these values averaged 28.9% and 9.6% respectively. The average gluten index value was 96 (equal to last season) and ranged between 87 and 99. The gluten index provides an indication of the gluten strength (higher being better) and is not influenced by the protein content. A value between 70 and 100 is generally accepted as good quality for pan bread baking purposes.

The farinograph analysis resulted in an average water absorption of 59.4% (60.0% the previous season) and an average development time of 5.4 minutes (5.7 minutes the previous season). The stability value of 12.6 minutes was almost three minutes longer than the previous average (9.7 minutes). The mixing tolerance index was 31, compared to the previous season's average of 42 BU.

The average alveogram strength was 41.4 cm<sup>2</sup> and the average P/L value 0.66 (42.5 cm<sup>2</sup> and 0.77 the previous season). The distensibility of the dough (130 mm) increased on average compared to the previous season (121 mm). The average stability value decreased from 86 mm to 80 mm this season.

The average extensogram strength increased from 103 cm<sup>2</sup> in the previous season to 109 cm<sup>2</sup>. The maximum height in Brabender Units was also higher than last season, 411 BU in 2022/23 versus 393 BU in 2021/22. The average extensibility value this season (192 mm) was equal to the previous season's 191 mm.

The 100 g loaves baked using the straight-dough optimised bread making method, received an evaluation rated as "Excellent". The basis for this evaluation refers to the relationship between the protein content and the bread volume.

Please see the results provided per individual production region on pages 35 to 56.

Mycotoxin analyses were performed on 40 wheat samples, randomly selected to represent different regions. The samples were tested by means of a SANAS ISO/IEC 17025 accredited multi-mycotoxin method using UPLC-MS/MS. With this technique simultaneous quantification and confirmation of Aflatoxin B<sub>1</sub>, B<sub>2</sub>, G<sub>1</sub>, G<sub>2</sub>, Fumonisin B<sub>1</sub>, B<sub>2</sub>, B<sub>3</sub>, Deoxynivalenol, 15-ADON, HT-2 Toxin, T-2 Toxin, Zearalenone and Ochratoxin A are possible in one run.

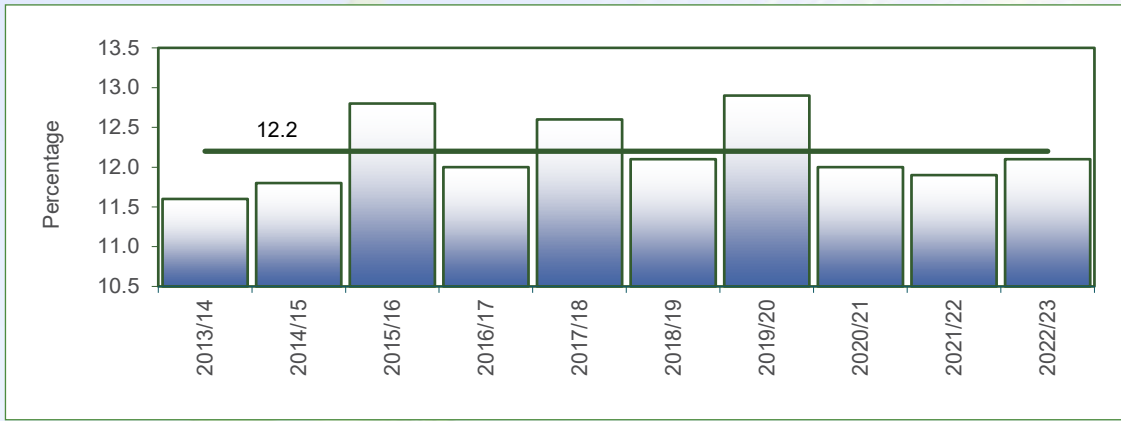
17 samples (43%) tested positive for deoxynivalenol (DON) residues, four of these samples exceeded the national maximum allowable level of 2 000 µg/kg for cereal grain intended for further processing. The average value of the 17 positive results was 1 780 µg/kg (ppb) and the highest value measured 6 463 µg/kg. Last season, 14 samples (35%) tested positive for DON residues with an average value of 484 µg/kg (ppb), the highest value obtained was 1 085 µg/kg. 15-ADON residues were found on 12 of the samples (30%) with the average of the positive samples 154 µg/kg. In 2021/22 13% of the samples (5 samples) tested positive for 15-ADON residues. As in the previous season, a single sample also tested positive for Zearalenone residues. Please see the mycotoxin results in Table 6 on pages 58 and 59.



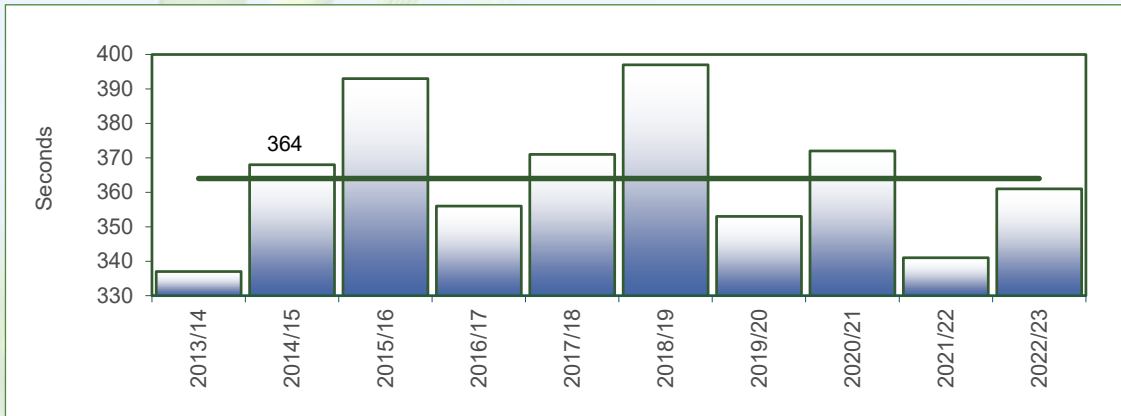
**Table 3: Weighted average results for the last three seasons**

Region	2022/23					2021/22					2020/21				
	Protein (12% mb), %	FN, sec	Hlm, kg/hl	Mixo PT, min	n	Protein (12% mb), %	FN, sec	Hlm, kg/hl	Mixo PT, min	n	Protein (12% mb), %	FN, sec	Hlm, kg/hl	Mixo PT, min	n
1	12.1	403	80.4	2.8	4	12.2	405	79.0	3.1	4	11.5	404	79.0	2.7	4
2	12.0	378	78.5	3.3	13	10.6	366	77.1	3.4	4	10.6	387	77.7	3.3	11
3	12.4	400	79.1	3.2	63	11.2	397	78.7	3.2	57	10.7	418	77.7	3.0	64
4	11.5	397	80.5	3.2	23	10.7	369	78.7	3.0	15	10.7	417	78.4	3.2	24
5	11.1	388	80.6	3.1	32	11.1	391	80.6	2.9	26	11.3	386	78.8	2.8	8
6	11.6	398	80.8	3.0	23	10.8	368	79.5	3.0	26	11.6	343	78.7	2.8	22
7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10	13.0	361	81.5	2.7	21	12.6	357	82.4	2.8	39	13.1	369	82.5	2.7	22
11	12.3	358	80.0	3.2	23	12.1	335	80.4	2.9	16	12.6	410	81.2	2.9	6
12	-	-	-	-	-	11.3	293	80.7	3.1	1	-	-	-	-	-
13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
14	13.2	316	80.1	3.1	2	14.1	348	81.4	3.7	6	13.9	397	78.1	3.8	4
15	12.4	372	79.8	3.1	17	11.8	337	79.6	3.2	4	-	-	-	-	-
16	13.2	319	78.7	3.9	2	-	-	-	-	-	-	-	-	-	-
17	-	-	-	-	-	13.5	360	78.7	2.9	2	14.5	422	78.9	3.8	1
18	12.3	306	80.1	3.3	2	11.8	299	79.6	3.3	2	13.5	367	78.7	2.8	2
19	-	-	-	-	-	13.3	340	80.4	4.2	10	13.3	366	79.0	3.6	5
20	-	-	-	-	-	12.0	311	80.2	3.5	11	12.6	380	79.1	3.5	8
21	11.9	319	80.4	3.4	2	13.7	360	67.0	3.0	3	12.6	399	76.1	2.9	1
22	13.1	291	79.0	3.6	10	11.9	251	78.1	3.0	1	13.3	385	69.9	2.8	2
23	11.5	317	78.6	3.9	24	12.0	288	77.9	3.3	17	12.6	413	81.3	3.0	5
24	11.4	314	79.7	3.4	12	11.8	336	78.5	3.1	14	12.8	363	77.1	3.2	6
25	10.6	301	76.9	3.2	2	11.8	241	82.3	4.0	7	14.9	173	73.5	4.0	5
26	12.1	313	80.2	3.7	7	12.1	302	79.3	3.5	19	15.0	277	77.5	5.0	5
27	-	-	-	-	-	13.6	273	78.9	3.0	3	-	-	-	-	-
28	12.5	288	78.6	3.6	10	12.7	244	80.0	3.8	17	13.3	282	79.1	3.5	21
29	-	-	-	-	-	10.0	372	79.9	2.9	1	12.7	345	83.3	2.4	1
30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
32	-	-	-	-	-	-	-	-	-	-	12.9	271	79.4	3.7	3
33	12.1	416	81.4	3.8	11	12.0	366	82.8	3.5	10	12.1	368	82.5	3.3	9
34	-	-	-	-	-	12.9	235	78.7	3.1	5	12.9	347	81.2	2.7	1
35	11.7	376	77.7	4.0	10	12.1	345	83.6	3.1	2	-	-	-	-	-
36	13.3	251	80.8	4.0	22	12.9	216	81.9	3.1	13	12.7	311	80.2	3.3	10
Ave.	12.1	361	79.8	3.3	335	11.9	341	79.9	3.2	335	12.0	372	78.9	3.2	250

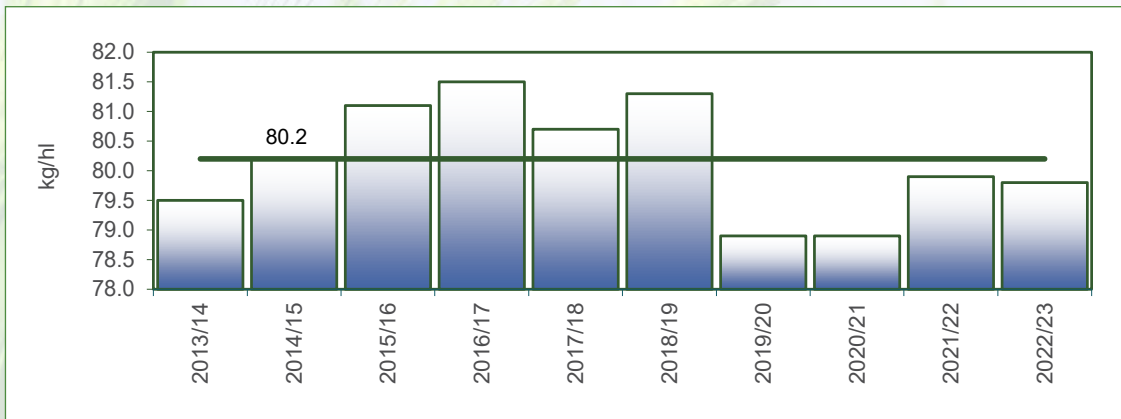
Graph 26a: Weighted average whole wheat protein (12% mb) over ten seasons



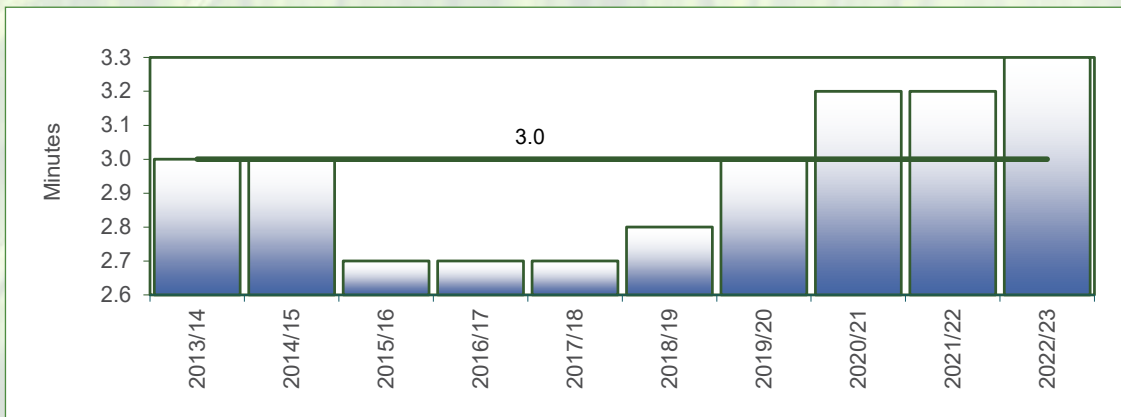
Graph 26b: Weighted average falling number over ten seasons



Graph 26c: Weighted average hectolitre mass over ten seasons



Graph 26d: Weighted average mixogram peak time (Quadromat mill) over ten seasons





**Table 4: Comparison of Flour Quality over the last four seasons**

Flour Quality 2022/23 season			
Flour protein (12% mb) (%)	11.0	Farinogram abs. (14% mb) (%)	59.4
Bread volume 100 g (cm <sup>3</sup> )	966	Farinogram dev. time (min)	5.4
Mixogram (Bühler) peak time (min)	3.1	Alveogram strength (cm <sup>2</sup> )	41.4
Wet gluten (14% mb) (%)	29.5	Alveogram P/L	0.66
Dry gluten (14% mb) (%)	9.8	Extensogram strength (cm <sup>2</sup> )	109

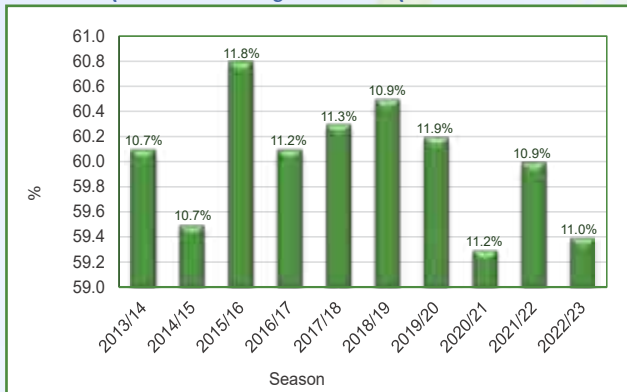
Flour Quality 2021/22 season			
Flour protein (12% mb) (%)	10.9	Farinogram abs. (14% mb) (%)	60.0
Bread volume 100 g (cm <sup>3</sup> )	1065	Farinogram dev. time (min)	5.7
Mixogram (Bühler) peak time (min)	2.9	Alveogram strength (cm <sup>2</sup> )	42.5
Wet gluten (14% mb) (%)	28.9	Alveogram P/L	0.77
Dry gluten (14% mb) (%)	9.6	Extensogram strength (cm <sup>2</sup> )	103

Flour Quality 2020/21 season			
Flour protein (12% mb) (%)	11.2	Farinogram abs. (14% mb) (%)	59.3
Bread volume 100 g (cm <sup>3</sup> )	1104	Farinogram dev. time (min)	5.6
Mixogram (Bühler) peak time (min)	2.9	Alveogram strength (cm <sup>2</sup> )	38.3
Wet gluten (14% mb) (%)	29.9	Alveogram P/L	0.63
Dry gluten (14% mb) (%)	10.1	Extensogram strength (cm <sup>2</sup> )	99

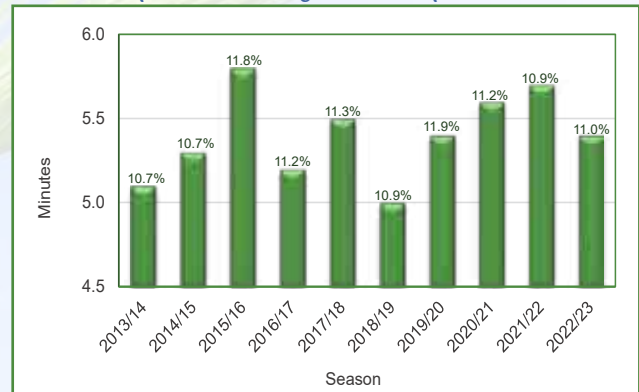
Flour Quality 2019/20 season			
Flour protein (12% mb) (%)	11.9	Farinogram abs. (14% mb) (%)	60.2
Bread volume 100 g (cm <sup>3</sup> )	1130	Farinogram dev. time (min)	5.4
Mixogram (Bühler) peak time (min)	2.6	Alveogram strength (cm <sup>2</sup> )	42.6
Wet gluten (14% mb) (%)	31.1	Alveogram P/L	0.60
Dry gluten (14% mb) (%)	10.6	Extensogram strength (cm <sup>2</sup> )	112

## Graph 27a-h: Comparison of rheological quality over ten seasons (Flour protein content (12% mb) is indicated above each bar)

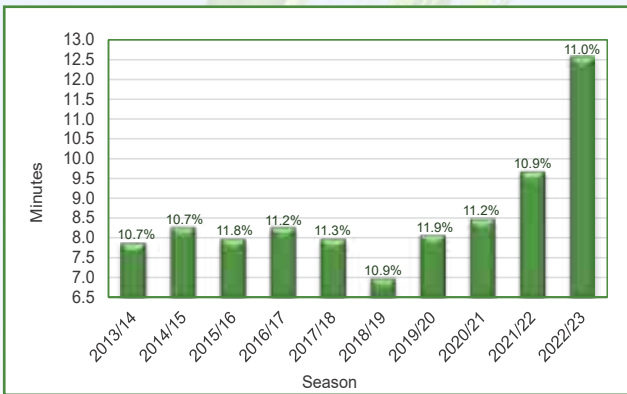
Graph 27a: Farinogram absorption (14%mb)



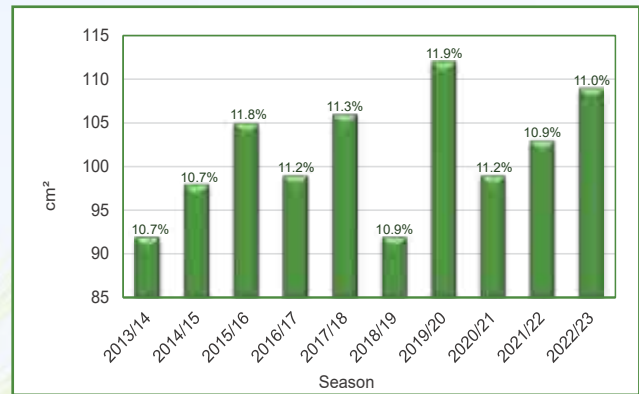
Graph 27b: Farinogram development time



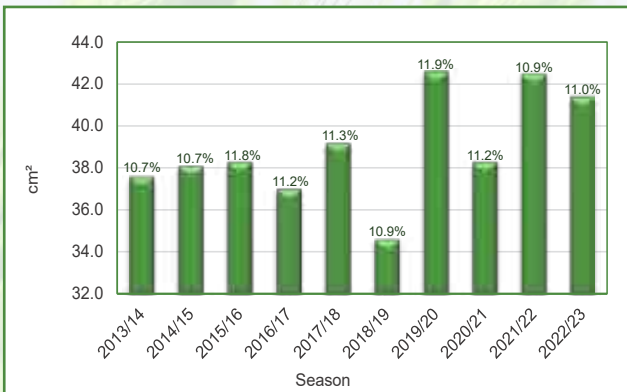
Graph 27c: Farinogram stability



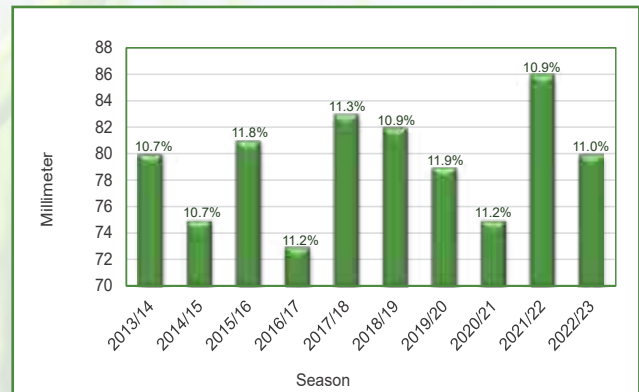
Graph 27d: Extensogram strength



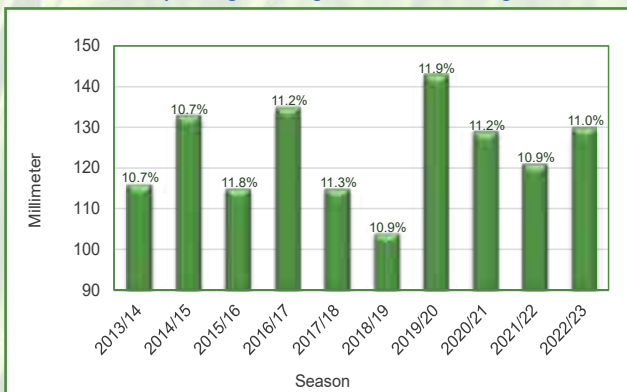
Graph 27e: Alveogram strength



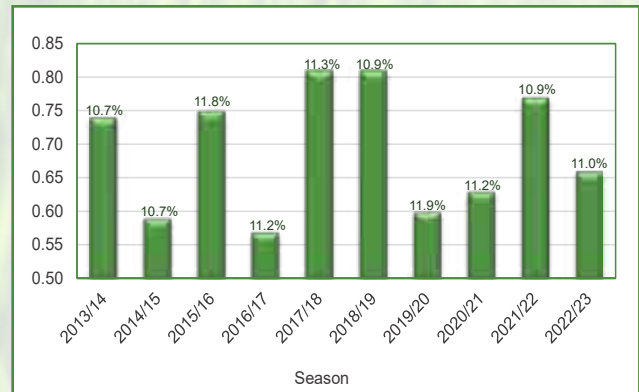
Graph 27f: Alveogram stability



Graph 27g: Alveogram distensibility



Graph 27h: Alveogram P/L





# Regional Quality Summary

## Winter Rainfall Area

### (Western Cape)

The Western Cape Province has a Mediterranean climate, characterised by cool, wet winters and hot dry summers. More than 80% of the rainfall occurs in winter between April and September, making the Western Cape a predominantly winter rainfall area. Arable land in this area covers approximately 1.5 million hectares, with winter cereals (wheat, barley, canola and oats) the major crops cultivated. This season, the Western Cape accounted for almost half of the wheat produced in South Africa. The Swartland (on the West Coast) and the Rûens (Southern Cape) are the main distinguishable geographic regions of the winter rainfall area.

These two separate wheat farming regions are divided into sub regions according to soil and climatic characteristics. The Swartland region is divided into four sub regions: High Rainfall, Middle Swartland, Koringberg and Sandveld. The Rûens region is divided into three sub regions namely the Western Rûens, Southern Rûens and Eastern Rûens.

The Rûens generally receives higher rainfall than the Swartland, but some areas of the Swartland have better, deeper soils. Wheat is generally planted from the second half of April until the middle of June and harvested during October and November.

The hectolitre mass averaged 79.8 kg/hl compared to the previous season's 79.2 kg/hl. The thousand kernel mass averaged 37.3 g, 2.8 g lower than the previous season and just above the national average of 37.0 g. The average falling number was 395 seconds, again the highest of the three production areas. The whole wheat protein content averaged 11.8% (12% mb), a 0.7% increase compared to the previous season.

The average percentage screenings of 1.78% was 0.35% higher than in the 2021/22 season. This season is the third consecutive season in which the Winter rainfall area's screening percentage is not the highest of the three production areas. The average mixogram peak time (Quadromat Junior mill) equalled the 3.1 minutes of the previous season. The Bühler extraction averaged 72.4% (average of wheat grades Super to Grade 3 and COW), compared to the 73.1% in 2021/22. The average Konica Minolta CM-5 L\* value (indicating lightness) equalled the previous 93.97. This colour value indicate a white/light flour that is preferred by millers and bakers and which also compares well to previous seasons. The average ash content was 0.60%.

The flour protein content averaged 10.8%, slightly higher than the 10.6% of the previous season. The average wet and dry gluten values were 29.2% and 9.7% (14% mb). The gluten index average of 96 was the same as the previous season. The average farinogram absorption was 59.6% and the development time 4.8 minutes, the stability averaged 14.4 minutes. The average alveogram strength was 42.4 cm<sup>2</sup> (39.1 cm<sup>2</sup> previously) and the P/L value averaged 0.72. The average strength on the extensogram was 106 cm<sup>2</sup> compared to 91 cm<sup>2</sup> last season. The mixogram peak time on the Bühler milled flour averaged 3.0 minutes, compared to the 2.7 minutes in the previous season. The 100-gram baking test showed on average an excellent relationship between protein content and bread volume.

## Summer Rainfall and Irrigation Area

### (Free State)

The summer rainfall area (predominantly the Free State Province) is a major dryland wheat production region of South Africa. Considerable variation in precipitation, soil types and average temperature occurs from east to west. The Free State is therefore commonly divided into four distinct dryland wheat production regions, namely: the South Western Free State, North Western Free State, Central Free State and Eastern Free State.

Rainfall, particularly the distribution thereof through the growing season, is important for successful wheat production in the summer rainfall areas. Planting dates vary from early to late according to region and commences in May and continues until July. Harvesting takes place from late November/early December to January.



The average hectolitre mass was 79.0 kg/hl, the lowest average of the three production areas. The average in 2021/22 was 78.8 kg/hl. The thousand kernel mass of 35.9 g was 3.8 g lower than the previous season and still the lowest of the three areas. The average percentage screenings was 2.38%, the highest average of the different production areas. The average whole wheat protein content of 11.9% was 0.3% lower than in the previous season. The falling number averaged 307 seconds, again the lowest average of the three production areas.

The mixogram (Quadromat Junior) peak time of 3.7 minutes was slightly longer than the 3.5 minutes of the previous season. The national average was 3.3 minutes. The average Bühler extraction percentage in the Free State was 73.3% compared to this season's national average of 73.5%. The Konica Minolta CM-5 L\* value of 93.50 equaled the 2021/22 season's value. The average ash content was 0.57% and the average flour protein content 0.3% lower than the previous season at 10.7%. The wet gluten content (14% mb) was 29.1%, the dry gluten 9.5% and the gluten index averaged 97.

The average farinogram water absorption of 59.4% showed a 0.9% decrease compared to the previous season's 60.3% but equaled the national average value. The development time averaged 5.6 minutes and the stability 11.5 minutes, compared to the 5.9 and 9.9 minutes respectively in 2021/22. The average alveogram strength of 39.7 cm<sup>2</sup> was almost 4 cm<sup>2</sup> lower than in the previous season, while the extensogram strength decreased by 5 cm<sup>2</sup> to 101 cm<sup>2</sup> compared to last season. The Bühler milled flour had an average mixograph peak time of 3.2 minutes, the same as in the previous season. The national average is 3.1 minutes this season. The 100-gram baking test showed that the relationship between protein content and bread volume was excellent between the different grades.

## Irrigation Areas

### (Northern Cape, North West, Mpumalanga, Gauteng, Limpopo and KwaZulu-Natal)

The irrigation wheat production area of South Africa can generally be divided into four main geographic regions – the Cooler Central irrigation region in the Northern Cape, the Warmer Northern irrigation region in the North West, Limpopo and Gauteng provinces, the Highveld region in Mpumalanga and the Free State and lastly, the KwaZulu-Natal region.

Planting commences as early as the second half of May and continues until July depending on the region. Harvesting takes place from the end of October to December also depending on the specific region.

As in the previous season, the irrigation wheat had the highest weighted average hectolitre mass of the three production areas, namely 80.3 kg/hl. This value is however 1 kg/hl lower than in the 2021/22 season. The thousand kernel mass decreased by 3.8 g to 37.2 g. The average falling number was 344 seconds, 327 seconds in the previous season. The screenings averaged 1.15%, again the lowest of the three areas as observed in the previous five seasons.

The whole wheat protein content was on average 12.6% and similar to the 12.5% of the previous season. The flour protein content was 11.3%, equal to the previous season. The mixogram (Quadromat Junior) peak time averaged 3.4 minutes, similar to the previous season and the national average. The average Bühler extraction was 75.7%, again the highest of the three areas.

The dry colour L\* value was 93.56, similar to the previous season. The ash content averaged 0.61%. The average wet and dry gluten values as well as the gluten index were 30.1%, 10.1% and 96 respectively, all equal to the previous season. The average farinogram water absorption was 59.2% (60.1% during the previous season), the development time and stability averaged 5.8 minutes and 11.8 minutes respectively.

Alveogram strength averaged 42.0 cm<sup>2</sup> and the P/L 0.49 (44.5 cm<sup>2</sup> and 0.62 respectively the previous season). The average extensogram strength was 119 cm<sup>2</sup>, 8 cm<sup>2</sup> higher than last season. The mixogram peak time averaged 3.2 minutes. The relationship between protein content and 100 g bread volume was shown to be excellent.

***Production area and climatic condition information were obtained from the ARC-Small Grain's National Small Grain Cultivar Evaluation Programme reports.***



**Table 5: Regional quality weighted averages**

	Winter rainfall area (Western Cape)			Summer rainfall and Irrigation area (Free State)			Irrigation areas			RSA Average		
<b>Number of samples per area</b>	158			67			110			335		
<b>Regions</b>	1 - 6			21 - 28			10 - 11, 12 - 20, 29 - 36			All		
<b>Hectolitre mass dirty, kg/hl</b>	79.8			79.0			80.3			79.8		
<b>1000 kernel mass (13% mb), g</b>	37.3			35.9			37.2			37.0		
<b>Falling number, sec</b>	395			307			344			361		
<b>Screenings (1.8 mm sieve), %</b>	1.78			2.38			1.15			1.69		
<b>Protein (12% mb), % (WWF)</b>	11.8			11.9			12.6			12.1		
<b>Mixogram peak time, min (Quadromat Junior)</b>	3.1			3.7			3.4			3.3		
<b>Composite samples per class and grade</b>	<i>Super</i>	<i>B1</i>	<i>B2</i>	<i>Super</i>	<i>B1</i>	<i>B2</i>	<i>Super</i>	<i>B1</i>	<i>B2</i>	<i>Super</i>	<i>B1</i>	<i>B2</i>
	<i>B3</i>	<i>COW</i>		<i>B3</i>	<i>COW</i>		<i>B3</i>	<i>COW</i>		<i>B3</i>	<i>COW</i>	-
<b>Composite samples, n = 69</b>	5	6	5	6	5	3	8	6	5	19	17	13
	4	3		6	-		1	2		11	5	
<b>Bühler extraction, %</b>	72.3	72.2	72.5	74.3	73.6	71.8	75.7	75.7	76.0	74.4	73.9	73.7
	73.1	72.1		72.7	-		76.0	75.1		73.1	73.3	
<b>Flour colour, KJ (wet)</b>	-5.0	-5.0	-5.0	-5.0	-4.9	-4.8	-5.0	-5.0	-5.0	-5.0	-5.0	-5.0
	-5.0	-5.0		-4.9	-		-4.9	-5.0		-4.9	-5.0	
<b>Flour colour, Konica Minolta CM-5 (dry)</b>												
<b>L*</b>	94.02	93.94	93.98	93.41	93.53	93.27	93.50	93.59	93.61	93.60	93.69	93.67
	93.94	93.98		93.67	-		93.65	95.53		93.76	93.80	
<b>a*</b>	0.48	0.47	0.45	0.51	0.44	0.44	0.53	0.52	0.51	0.51	0.48	0.47
	0.49	0.47		0.43	-		0.29	0.50		0.44	0.48	
<b>b*</b>	10.01	9.93	10.40	9.98	10.51	10.69	10.05	10.38	10.70	10.02	10.26	10.58
	9.72	10.01		10.31	-		9.10	10.55		9.99	10.23	
<b>Ash (db), %</b>	0.58	0.62	0.59	0.59	0.55	0.58	0.60	0.61	0.61	0.59	0.60	0.60
	0.61	0.59		0.57	-		0.63	0.60	-	0.59	0.59	

WWF = Whole Wheat Flour

**Table 5: Regional quality weighted averages (continue)**

Regions	Winter rainfall area (Western Cape)			Summer rainfall and Irrigation area (Free State)			Irrigation areas			RSA Average		
	1 - 6			21 - 28			10 - 11, 12 - 20, 29 - 36			All		
Composite samples per class and grade	Super	B1	B2	Super	B1	B2	Super	B1	B2	Super	B1	B2
	B3	COW		B3	COW		B3	COW		B3	COW	
Composite samples, n = 69	5	6	5	6	5	3	8	6	5	19	17	13
	4	3		6	-		1	2		11	5	
Flour protein (12% mb), %	12.3	11.1	10.2	12.1	10.8	9.9	12.2	11.2	10.3	12.2	11.1	10.2
	9.2	10.8		9.8	-		10.6	11.1		9.6	10.9	
Wet gluten (14% mb), %	33.3	29.8	27.8	32.7	29.1	27.3	32.8	29.8	27.4	32.9	29.6	27.5
	24.3	29.8		26.5	-		25.3	29.7		25.6	29.7	
Dry gluten (14% mb), %	11.3	10.0	9.1	10.9	9.7	8.8	11.1	9.9	9.2	11.1	9.9	9.1
	7.9	10.0		8.4	-		8.6	9.8		8.2	9.9	
Gluten Index	95	96	97	96	97	97	95	96	96	95	96	96
	97	96		97	-		99	97		97	96	
Farinogram: Water absorption (14% mb), %	60.6	60.4	59.1	60.3	59.4	59.1	60.1	59.4	58.1	60.3	59.7	58.7
	58.3	59.2		58.7	-		55.7	59.2		58.3	59.2	
Farinogram: Development time, min	5.7	5.2	4.3	6.9	5.5	4.7	6.6	7.1	4.0	6.5	6.0	4.3
	4.0	4.6		4.8	-		2.2	5.2		4.2	4.8	
Farinogram: Stability, min	20.0	14.7	12.5	14.7	12.5	7.5	14.0	11.5	8.1	15.8	12.9	9.7
	9.0	14.7		9.6	-		20.0	8.9		10.3	12.4	
Alveogram: Strength (S), cm <sup>2</sup>	49.1	45.2	39.6	49.0	40.0	30.7	46.6	42.5	34.5	48.0	42.7	35.6
	34.4	40.8		34.6	-		44.0	40.4		35.4	40.6	
Alveogram: P/L	0.59	0.69	0.74	0.57	0.74	1.06	0.45	0.56	0.49	0.52	0.66	0.72
	0.92	0.67		0.89	-		0.47	0.49		0.86	0.60	
Extensogram: Strength, cm <sup>2</sup>	131	106	99	137	102	68	134	115	97	134	108	91
	80	109		80	-		137	121		85	113	
Mixogram peak time, min	2.7	3.1	3.1	3.3	3.2	2.7	3.1	3.2	3.1	3.1	3.2	3.0
	3.0	3.0		3.4	-		5.2	3.5		3.4	3.2	
Relationship between protein and bread volume	EX	EX	EX	EX	EX	EX	VG	EX	EX	EX	EX	EX
	EX	EX		EX	-		EX	EX		EX	EX	

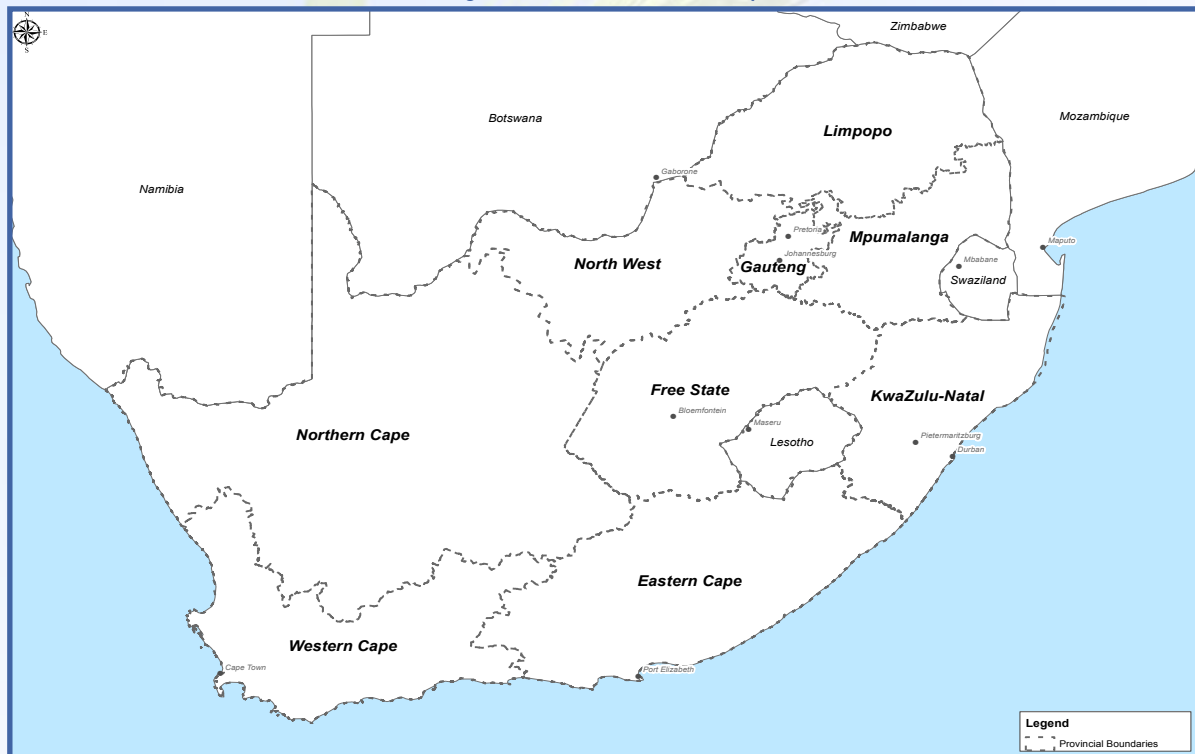
EX = Excellent



# RSA Production Regions

The RSA is divided into 9 provinces as illustrated in Figure 1.

Figure 1: RSA Provinces map



Provincial map with gratitude to SiQ.

The 9 provinces are divided into 36 grain production regions.

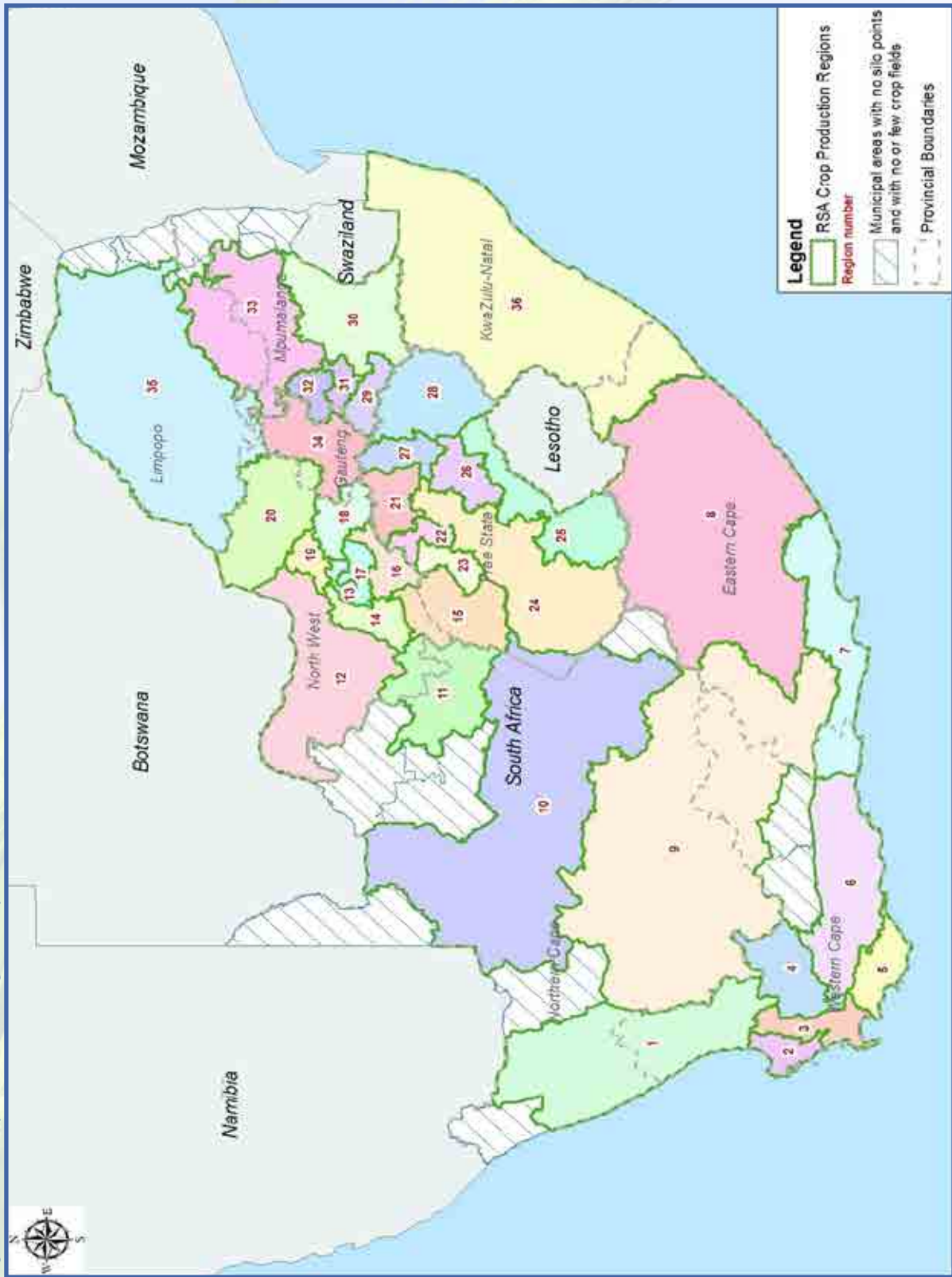
The regions are distributed as follows:

- Region 1: Namakwaland
- Regions 2 to 4: Swartland
- Regions 5 and 6: Rûens
- Regions 7 and 8: Eastern Cape
- Region 9: Karoo
- Region 10: Griqualand West
- Region 11: Vaalharts
- Regions 12 to 20: North West
- Regions 21 to 28: Free State
- Regions 29 to 33: Mpumalanga
- Region 34: Gauteng
- Region 35: Limpopo
- Region 36: KwaZulu-Natal

Please see the Crop Production Regions map on the next page.

The production regions from which wheat samples were received for the crop quality survey of the 2022/23 production season, are named and described on pages 32 to 34. All the silo/intake stands as well as the type of storage structure, situated in a particular region, are provided.

Figure 2: RSA Crop Production Regions map



Regional map with gratitude to Agbiz Grain and SIQ.



# Grain Production Regions

Silo/Intake stands per region indicating type of storage structure

## Region 1: Namakwaland Region

Kaap Agri Graafwater (*Bags/Bins*)

## Region 2: Swartland Western Region

Kaap Agri Darling (*Bins*) Overberg Agri Bergrivier (*Bins*)  
Kaap Agri Vredenburg (*Bins*) Overberg Agri Koperfontein (*Bins*)

## Region 3: Swartland Central Region

Kaap Agri Doornkuil (*Bunkers*) Overberg Agri Moorreesburg (*Bins*)  
Kaap Agri Eendekuil (*Bins*) Overberg Agri Moravia (*Bins*)  
Kaap Agri Klipheuwel (*Bins*) Afgri Eensgezindt (*Bunkers*)  
Kaap Agri Malmesbury (*Bins*) Afgri Eenboom (*Bunkers*)  
Kaap Agri Piketberg (*Bins*) Afgri Klipfontein (*Bunkers*)  
Kaap Agri Pools (*Bins*) Afgri Malandam (*Bunkers*)  
Kaap Agri Ruststasie (*Bins*) BKB Grainco Melkboom (*Bunkers*)  
Overberg Agri Koringberg (*Bins*) BKB Grainco Pampoenkraal (*Bunkers*)

## Region 4: Swartland Eastern Region

Kaap Agri Ceres (*Bunkers*) Kaap Agri Porterville (*Bins*)  
Kaap Agri Ceres (*Bins*) Kaap Agri Riebeeck-Wes (*Bins*)  
Kaap Agri Gouda (*Bins*) Overberg Agri Leliedam (*Bins*)  
Kaap Agri Halfmanshof (*Bins*) BKB Grainco Winterhoek (*Bunkers*)

## Region 5: Rûens Western Region

Overberg Agri Bredasdorp (*Bags/Bins/Bunkers*) Overberg Agri Napier (*Bags/Bins*)  
Overberg Agri Caledon (*Bins/Bunkers*) Overberg Agri Ou Plaas (*Bunkers*)  
Overberg Agri Jongensklip (*Bunkers*) Overberg Agri Ou Plaas (*Bunkers*)  
Overberg Agri Klipdale (*Bags/Bins*) Overberg Agri Proteem (*Bags/Bins*)  
Overberg Agri Krige (*Bags/Bins/Bunkers*) Overberg Agri Rietpoel (*Bags/Bins/Bunkers*)  
Overberg Agri Lemoenskop (*Bunkers*)

## Region 6: Rûens Eastern Region

SSK Albertinia (*Bins*) SSK Krombeks (*Bins*)  
SSK Ashton (*Bags/Bins*) SSK Proteem (*Bags/Bins*)  
SSK Heidelberg (*Bins*) SSK Riversdal (*Bins*)  
SSK Herold (*Bins*) SSK Swellendam (*Bags/Bins*)  
SSK Karringmelk (*Bags/Bins*)

## Region 10: Griqualand-West Region

GWK Douglas (*Bags/Bins*) GWK Trans Oranje (*Bags/Bins/Bunkers*)  
GWK Luckhoff (*Bins*) OVK Havenga Brug (*Bins*)  
GWK Marydale (*Bins*) OVK Morgenzon (*Bins*)  
GWK Modderivier (*Bags/Bins/Bulk*) OVK Oranjerivier (*Bins/Bunkers*)  
GWK Prieska (*Bins/Dams*) OVK Prieska (*Bins/Bunkers*)  
GWK Rietrivier (*Bins*) OVK Rietrivier (*Bins*)

# Grain Production Regions

Silo/Intake stands per region indicating type of storage structure

## Region 11: Vaalharts Region

GWK	Barkly-Wes ( <i>Bins/Bulk</i> )	Senwes	Jan Kempdorp ( <i>Bins</i> )
GWK	Jan Kempdorp ( <i>Bags/Bunkers</i> )	Senwes	Magogong ( <i>Bins</i> )
Senwes	Hartswater ( <i>Bins</i> )	Senwes	Tadcaster ( <i>Bins</i> )

## Region 14: North West Southern Region

NWK	Barberspan ( <i>Bins</i> )	NWK	Taaibospan ( <i>Bins</i> )
NWK	Delareyville ( <i>Bins</i> )	Senwes	Amalia ( <i>Bins</i> )
NWK	Excelsior ( <i>Bins</i> )	Senwes	Hallatshope ( <i>Bins</i> )
NWK	Geysdorp ( <i>Bins</i> )	Senwes	Migdol ( <i>Bins</i> )
NWK	Migdol ( <i>Bins</i> )	Senwes	Schweizer-Reneke ( <i>Bins</i> )
NWK	Nooitgedacht ( <i>Bins</i> )		

## Region 15: North West Southern Region

GWK	Christiana ( <i>Bins</i> )	Senwes	Hoopstad ( <i>Bins</i> )
Senwes	Bloemhof ( <i>Bins</i> )	Senwes	Kingswood ( <i>Bins</i> )
Senwes	Christiana ( <i>Bins</i> )	Senwes	Kruising ( <i>Bunkers</i> )
Senwes	Helpman Depot 726 ( <i>Bags</i> )	Senwes	Poppieland ( <i>Bunkers</i> )
Senwes	Hertzogville ( <i>Bins</i> )		

## Region 16: North West Central Eastern Region

Senwes	Klerksdorp ( <i>Bins</i> )	Senwes	Makwassie ( <i>Bins</i> )
Senwes	Regina ( <i>Bins</i> )	Senwes	Strydpoort ( <i>Bins</i> )
Senwes	Bamboesspruit ( <i>Bins</i> )	Senwes	Wolmaranstad ( <i>Bins</i> )
Senwes	Leeudoringstad ( <i>Bins</i> )		

## Region 18: North West Central Region (Ventersdorp)

NWK	Bodenstein ( <i>Bins</i> )	Senwes	Makokskraal ( <i>Bins</i> )
NWK	Coligny ( <i>Bins</i> )	Senwes	Potchefstroom( <i>Bins</i> )
Senwes	Buckingham ( <i>Bins</i> )	Senwes	Ventersdorp Silo A ( <i>Bins</i> )
Senwes	Enselspruit ( <i>Bins</i> )	Senwes	Ventersdorp Silo B ( <i>Bins</i> )

## Region 21: Free State North-Western Region (Viljoenskroon)

Afgri	Kommandonek ( <i>Bunkers</i> )	Senwes	Vierfontein ( <i>Bins</i> )
Senwes	Attie ( <i>Bins</i> )	Senwes	Viljoenskroon G232 ( <i>Bins</i> )
Senwes	Groenbloem ( <i>Bins</i> )	Senwes	Viljoenskroon G266 ( <i>Bins</i> )
Senwes	Heuningspruit ( <i>Bins</i> )	Senwes	Vredefort ( <i>Bins</i> )
Senwes	Koppies ( <i>Bins</i> )	Senwes	Weiveld ( <i>Bins</i> )
Senwes	Rooiwal ( <i>Bins</i> )		

## Region 22: Free State North-Western Region (Bothaville)

Senwes	Allanrigde ( <i>Bins</i> )	Senwes	Odendaalsrus ( <i>Bins</i> )
Senwes	Bothaville Silo A ( <i>Bins</i> )	Senwes	Schoonspruit ( <i>Bins</i> )
Senwes	Bothaville Silo B ( <i>Bins</i> )	Senwes	Schuttendraai ( <i>Bins</i> )
Senwes	Mirage ( <i>Bins</i> )	Senwes	Misgunst ( <i>Bunkers</i> )

## Region 23: Free State North-Western Region (Bultfontein)

Senwes	Bultfontein ( <i>Bins</i> )	Senwes	Tierfontein ( <i>Bins</i> )
Senwes	Losdoorns ( <i>Bins</i> )	Senwes	Wesselsbron ( <i>Bins/Bunkers</i> )
Senwes	Protespan ( <i>Bins</i> )	Senwes	Willemsrust ( <i>Bins</i> )



# Grain Production Regions

Silo/Intake stands per region indicating type of storage structure

## Region 24: Free State Central Region

Senwes	Bloemfontein ( <i>Bins</i> )	Senwes	Petrusburg ( <i>Bins</i> )
Senwes	Brandfort ( <i>Bins</i> )	Senwes	Theunissen ( <i>Bins</i> )
Senwes	De Brug ( <i>Bins</i> )	Senwes	Van Tonder ( <i>Bins</i> )
Senwes	Geneva ( <i>Bins</i> )	Senwes	Welgeleë ( <i>Bins</i> )
Senwes	Hennenman ( <i>Bins</i> )	Senwes	Winburg ( <i>Bins</i> )
Senwes	Kroonstad ( <i>Bins</i> )		

## Region 25: Free State South-Western Region

Afgri	Bethlehem ( <i>Bins</i> )	OVK	Marseilles ( <i>Bins</i> )
Afgri	Slabberts ( <i>Bins</i> )	OVK	Modderpoort ( <i>Bins</i> )
OVK	Clocolan ( <i>Bins</i> )	OVK	Tweespruit ( <i>Bins</i> )
OVK	Ficksburg ( <i>Bins</i> )	OVK	Westminster ( <i>Bins</i> )
OVK	Fouriesburg ( <i>Bins</i> )	Senwes	Dewetsdorp ( <i>Bins</i> )

## Region 26: Free State South-Eastern Region

Afgri	Kaallaagte ( <i>Bins</i> )	Afgri	Monte Video ( <i>Bins</i> )
Afgri	Libertas ( <i>Bins</i> )	Afgri	Senekal ( <i>Bins</i> )
Afgri	Marquard ( <i>Bins</i> )	Senwes	Arlington ( <i>Bins</i> )
Afgri	Meets ( <i>Bins</i> )	Senwes	Steynsrus ( <i>Bins</i> )

## Region 28: Free State Eastern Region

Afgri	Afrikaskop ( <i>Bins/Bunkers</i> )	VKB	Jim Fouché ( <i>Bins</i> )
Afgri	Eeram ( <i>Bins</i> )	VKB	Memel ( <i>Bins</i> )
Afgri	Harrismith ( <i>Bins</i> )	VKB	Reitz ( <i>Bins</i> )
Afgri	Kransfontein ( <i>Bins/Bunkers</i> )	VKB	Tweeling ( <i>Bins</i> )
VKB	Ascent ( <i>Bins</i> )	VKB	Villiers ( <i>Bins/Bulk</i> )
VKB	Cornelia ( <i>Bins</i> )	VKB	Vrede ( <i>Bins</i> )
VKB	Daniëlsrus ( <i>Bins</i> )	VKB	Warden ( <i>Bins</i> )
VKB	Frankfort ( <i>Bins</i> )	VKB	Windfield ( <i>Bins</i> )

## Region 33: Mpumalanga Northern Region

Afgri	Arnot ( <i>Bins</i> )	Afgri	Middelburg ( <i>Bins</i> )
Afgri	Driefontein ( <i>Bins</i> )	Afgri	Pan ( <i>Bins</i> )
Afgri	Lydenburg ( <i>Bins</i> )	Afgri	Stoffberg ( <i>Bins</i> )
Afgri	Marble Hall ( <i>Bins</i> )	Afgri	Wonderfontein ( <i>Bins</i> )

## Region 35: Limpopo Region

Afgri	Northam Silo ( <i>Bins</i> )	VKB	Nylstroom ( <i>Bins</i> )
VKB	Alma ( <i>Bins</i> )	VKB	Potgietersrus ( <i>Bins</i> )
VKB	Lehau ( <i>Bins</i> )	VKB	Roedtan ( <i>Bins</i> )
VKB	Naboomspruit ( <i>Bins</i> )	VKB	Settlers ( <i>Bins</i> )
VKB	Nutfield ( <i>Bins</i> )	VKB	Warmbad ( <i>Bins</i> )

## Region 36: KwaZulu-Natal Region

Afgri	Bergville ( <i>Bins/Bunkers</i> )	Afgri	Mizpah ( <i>Bins</i> )
Afgri	Bloedrivier ( <i>Bins</i> )	Afgri	Paulpietersburg ( <i>Bins</i> )
Afgri	Chelmsford dam ( <i>Bunkers</i> )	Afgri	Pietermaritzburg ( <i>Bins</i> )
Afgri	Dannhauser ( <i>Bins</i> )	Afgri	Vryheid ( <i>Bins</i> )
Afgri	Dundee ( <i>Bins</i> )	Afgri	Winterton ( <i>Bins/Bunkers</i> )

# South African quality data per production region

WINTER RAINFALL WHEAT

PRODUCTION REGION	(1) Namakwaland Region					(2) Swartland Western Region				
	<b>WHEAT</b>									
	<b>ave</b>	<b>min</b>	<b>max</b>	<b>stdev</b>		<b>ave</b>	<b>min</b>	<b>max</b>	<b>stdev</b>	
Protein (12% mb), %	12.1	11.2	13.7	1.14		12.0	9.9	14.9	1.39	
Falling number, sec	403	345	454	48.31		378	333	407	22.75	
Moisture, %	11.4	11.2	11.5	0.14		11.2	10.7	11.6	0.28	
1000 Kernel mass (13% mb), g	38.9	36.3	42.0	2.77		35.3	32.5	38.1	2.00	
Hectolitre mass (dirty), kg/hl	80.4	79.0	81.3	0.98		78.5	76.0	80.9	1.34	
Screenings (<1.8 mm sieve), %	3.14	2.65	3.80	0.49		2.45	0.54	4.64	1.35	
Total damaged kernels, %	2.11	1.64	3.08	0.67		0.81	0.22	1.48	0.37	
Combined deviations, %	5.46	4.47	7.08	1.13		4.26	1.80	6.62	1.28	
<b>Number of samples</b>	<b>4</b>					<b>13</b>				
<b>MIXOGRAM (Quadromat Junior)</b>										
	<b>ave</b>	<b>min</b>	<b>max</b>	<b>stdev</b>		<b>ave</b>	<b>min</b>	<b>max</b>	<b>stdev</b>	
Peak time, min	2.8	2.6	2.9	0.14		3.3	2.8	4.3	0.50	
Tail height (6 min), mm	52	50	53	1.41		51	45	56	3.30	
<b>Number of samples</b>	<b>4</b>					<b>13</b>				
<b>COMPOSITE SAMPLES</b>										
<b>CLASS AND GRADE</b>	<b>Super</b>	<b>B1</b>	<b>B2</b>	<b>B3</b>	<b>COW</b>	<b>Super</b>	<b>B1</b>	<b>B2</b>	<b>B3</b>	<b>COW</b>
Bühler Extraction, %	-	70.4	-	-	-	70.1	70.9	70.7	-	72.2
<b>FLOUR</b>										
Protein (12% mb), %	-	11.1	-	-	-	12.4	11.2	10.1	-	11.1
Moisture, %	-	13.3	-	-	-	13.6	13.5	13.2	-	13.9
Ash (db), %	-	0.65	-	-	-	0.58	0.66	0.59	-	0.59
Colour, KJ (wet)	-	-5.0	-	-	-	-5.0	-5.0	-5.0	-	-5.0
Colour, Konica Minolta CM5 (dry)										
L*	-	94.16	-	-	-	94.18	93.94	94.05	-	93.99
a*	-	0.42	-	-	-	0.42	0.30	0.40	-	0.43
b*	-	9.52	-	-	-	10.18	10.16	12.16	-	10.80
<b>RVA</b>										
Peak Viscosity, cP	-	2234	-	-	-	2342	2827	2585	-	2597
Minimum viscosity (Trough), cP	-	1618	-	-	-	1678	1923	1929	-	1874
Final Viscosity, cP	-	2553	-	-	-	2721	3311	3058	-	3053
Peak Time, min	-	7.00	-	-	-	7.00	7.00	7.00	-	7.00
<b>GLUTEN</b>										
Wet gluten (14% mb), %	-	30.1	-	-	-	33.5	29.0	-	-	29.9
Dry gluten (14% mb), %	-	10.0	-	-	-	11.3	10.0	-	-	9.8
Gluten Index	-	96	-	-	-	97	98	-	-	96
<b>FARINOGRAM</b>										
Water absorption (14% mb), %	-	61.7	-	-	-	60.5	58.4	55.9	-	58.1
Development time, min	-	4.2	-	-	-	6.2	6.0	4.1	-	5.1
Stability, min	-	11.2	-	-	-	20.0	16.4	19.3	-	15.0
Mixing tolerance index, BU	-	30	-	-	-	17	24	3	-	23
<b>EXTENSOGRAM (45 min pull)</b>										
Area, cm <sup>2</sup>	-	99	-	-	-	119	104	113	-	122
Maximum height, BU	-	397	-	-	-	422	400	485	-	452
Extensibility, mm	-	182	-	-	-	209	188	174	-	199
<b>ALVEOGRAM</b>										
Strength (S), cm <sup>2</sup>	-	46.9	-	-	-	47.1	43.0	41.7	-	41.9
Stability (P), mm	-	101	-	-	-	79	76	79	-	76
Distensibility (L), mm	-	116	-	-	-	161	161	117	-	138
Configuration ratio (P/L)	-	0.87	-	-	-	0.49	0.47	0.68	-	0.55
<b>MIXOGRAM</b>										
Peak time, min	-	3.1	-	-	-	2.7	3.2	4.3	-	2.9
<b>100 g BAKING TEST</b>										
Loaf volume, cm <sup>3</sup>	-	910	-	-	-	1062	1047	1017	-	884
Evaluation (see page 67)	-	0	-	-	-	0	0	0	-	0



# *Rheological Graphs Per Production Region*

MIXOGRAM

1



2



FARINOGRAM

1

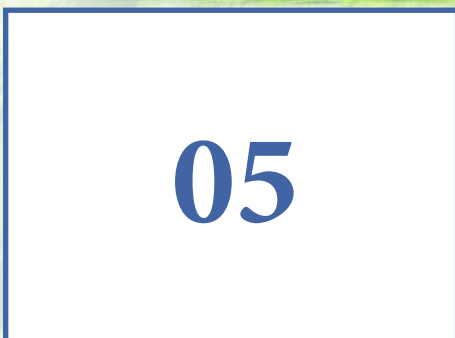


2

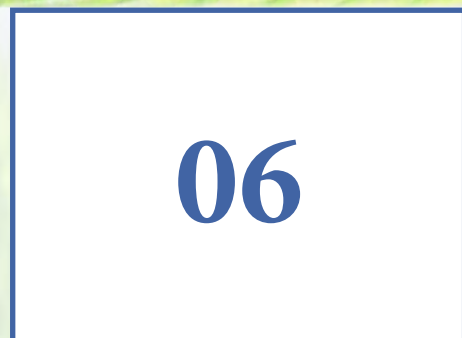


EXTENSOGRAM

1

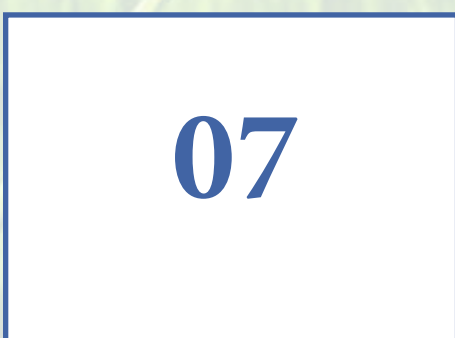


2



ALVEOGRAM

1



2



# South African quality data per production region

WINTER RAINFALL WHEAT

PRODUCTION REGION	(3) Swartland Central Region				(4) Swartland Eastern Region					
	<b>WHEAT</b>									
	ave	min	max	stdev	ave	min	max	stdev		
Protein (12% mb), %	12.4	10.0	14.3	1.12	11.5	9.8	13.3	1.10		
Falling number, sec	400	339	574	38.17	397	356	475	27.00		
Moisture, %	10.8	10.0	11.7	0.45	10.8	9.9	11.4	0.45		
1000 Kernel mass (13% mb), g	34.9	30.2	40.1	2.74	36.9	33.9	43.1	2.45		
Hectolitre mass (dirty), kg/hl	79.1	74.5	82.7	1.61	80.5	77.1	84.5	1.68		
Screenings (<1.8 mm sieve), %	2.15	0.13	5.75	0.86	1.63	0.13	2.88	0.89		
Total damaged kernels, %	0.85	0.00	2.50	0.55	0.77	0.08	1.24	0.29		
Combined deviations, %	3.88	1.29	7.49	1.25	3.07	1.29	5.84	1.35		
Number of samples	63				23					
<b>MIXOGRAM (Quadromat Junior)</b>										
	ave	min	max	stdev	ave	min	max	stdev		
Peak time, min	3.2	2.6	3.9	0.29	3.2	2.3	3.6	0.27		
Tail height (6 min), mm	54	46	65	3.66	52	46	62	4.03		
Number of samples	63				23					
<b>COMPOSITE SAMPLES</b>										
CLASS AND GRADE	Super	B1	B2	B3	COW	Super	B1	B2	B3	COW
Bühler Extraction, %	71.6	72.3	72.9	73.4	72.0	72.4	72.5	72.8	72.5	-
<b>FLOUR</b>										
Protein (12% mb), %	12.3	11.0	10.1	9.0	11.4	12.1	11.1	10.4	9.1	-
Moisture, %	14.0	13.6	13.4	13.4	13.3	13.6	13.6	13.5	13.4	-
Ash (db), %	0.60	0.59	0.57	0.63	0.59	0.58	0.58	0.57	0.58	-
Colour, KJ (wet)	-5.0	-5.0	-5.0	-5.0	-5.0	-5.0	-5.0	-5.0	-5.0	-
Colour, Konica Minolta CM5 (dry)										
L*	94.02	94.03	94.05	94.09	94.20	94.11	94.14	94.21	94.21	-
a*	0.53	0.49	0.49	0.49	0.49	0.46	0.45	0.43	0.41	-
b*	9.78	9.90	9.93	9.51	10.05	10.22	10.22	9.94	10.05	-
<b>RVA</b>										
Peak Viscosity, cP	2481	2521	2580	2732	2486	2268	2423	2470	2450	-
Minimum viscosity (Trough), cP	1700	1865	1889	1984	1738	1664	1778	1828	1731	-
Final Viscosity, cP	2876	2955	3062	3051	2913	2641	2874	2946	2965	-
Peak Time, min	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	-
<b>GLUTEN</b>										
Wet gluten (14% mb), %	33.8	29.5	27.3	24.1	30.9	32.8	29.2	28.6	23.8	-
Dry gluten (14% mb), %	11.4	9.8	8.9	7.8	10.3	10.8	9.9	9.2	7.6	-
Gluten Index	96	96	97	97	94	96	97	97	98	-
<b>FARINOGRAM</b>										
Water absorption (14% mb), %	60.9	60.9	59.7	57.6	60.2	60.1	59.9	59.7	58.1	-
Development time, min	5.4	5.1	5.0	5.3	5.3	6.2	6.2	4.0	4.5	-
Stability, min	20.0	15.5	11.4	10.6	20.0	20.0	20.0	12.3	10.2	-
Mixing tolerance index, BU	12	27	32	33	14	11	14	29	32	-
<b>EXTENSOGRAM (45 min pull)</b>										
Area, cm <sup>2</sup>	134	106	99	86	122	137	114	105	89	-
Maximum height, BU	463	397	377	441	462	469	465	404	410	-
Extensibility, mm	218	197	188	139	198	213	186	191	157	-
<b>ALVEOGRAM</b>										
Strength (S), cm <sup>2</sup>	52.9	48.6	39.0	34.6	46.3	49.5	48.6	42.2	36.5	-
Stability (P), mm	91	98	89	88	88	84	88	89	90	-
Distensibility (L), mm	141	123	105	93	126	142	134	117	94	-
Configuration ratio (P/L)	0.65	0.80	0.85	0.95	0.70	0.59	0.66	0.76	0.96	-
<b>MIXOGRAM</b>										
Peak time, min	2.9	2.9	2.9	3.2	3.1	2.9	3.0	2.9	3.1	-
<b>100 g BAKING TEST</b>										
Loaf volume, cm <sup>3</sup>	970	874	847	800	989	917	888	885	835	-
Evaluation (see page 67)	0	0	0	0	0	1	0	0	0	-



# *Rheological Graphs Per Production Region*

MIXOGRAM

3



4



FARINOGRAM

3



4



EXTENSOGRAM

3



4



ALVEOGRAM

3



4



# South African quality data per production region

WINTER RAINFALL WHEAT

PRODUCTION REGION	(5) Rüens Western Region				(6) Rüens Eastern Region					
	<b>WHEAT</b>									
	<b>ave</b>	<b>min</b>	<b>max</b>	<b>stdev</b>	<b>ave</b>	<b>min</b>	<b>max</b>	<b>stdev</b>		
Protein (12% mb), %	11.1	9.6	13.5	1.06	11.6	10.0	13.5	1.15		
Falling number, sec	388	341	455	25.90	398	327	461	38.74		
Moisture, %	11.5	10.5	12.2	0.32	11.6	11.1	12.0	0.26		
1000 Kernel mass (13% mb), g	41.0	35.4	46.4	2.56	40.3	36.9	44.4	1.68		
Hectolitre mass (dirty), kg/hl	80.6	77.9	82.8	1.50	80.8	79.0	82.5	0.99		
Screenings (<1.8 mm sieve), %	1.15	0.10	3.52	0.70	1.15	0.25	2.44	0.72		
Total damaged kernels, %	0.66	0.16	2.45	0.48	1.18	0.18	2.00	0.55		
Combined deviations, %	2.45	0.58	4.44	0.82	2.90	0.72	4.70	1.27		
<b>Number of samples</b>	<b>32</b>				<b>23</b>					
<b>MIXOGRAM (Quadromat Junior)</b>										
	<b>ave</b>	<b>min</b>	<b>max</b>	<b>stdev</b>	<b>ave</b>	<b>min</b>	<b>max</b>	<b>stdev</b>		
Peak time, min	3.1	2.6	3.7	0.29	3.0	2.4	3.9	0.33		
Tail height (6 min), mm	50	43	58	3.30	52	45	60	3.63		
<b>Number of samples</b>	<b>32</b>				<b>23</b>					
<b>COMPOSITE SAMPLES</b>										
<b>CLASS AND GRADE</b>	<b>Super</b>	<b>B1</b>	<b>B2</b>	<b>B3</b>	<b>COW</b>	<b>Super</b>	<b>B1</b>	<b>B2</b>	<b>B3</b>	<b>COW</b>
Bühler Extraction, %	73.6	73.5	73.0	72.8	72.2	73.7	73.7	73.1	73.7	-
<b>FLOUR</b>										
Protein (12% mb), %	12.3	11.3	10.2	9.2	10.1	12.3	11.2	10.2	9.3	-
Moisture, %	14.2	13.8	13.6	13.6	13.3	13.3	14.0	13.7	12.9	-
Ash (db), %	0.56	0.61	0.58	0.62	0.58	0.59	0.60	0.62	0.61	-
Colour, KJ (wet)	-5.0	-5.0	-5.0	-5.0	-5.0	-5.0	-5.0	-5.0	-5.0	-
Colour, Konica Minolta CM5 (dry)										
L*	93.99	93.55	93.79	93.68	93.74	93.78	93.79	93.79	93.78	-
a*	0.46	0.57	0.45	0.58	0.50	0.52	0.58	0.49	0.48	-
b*	10.13	10.01	9.98	9.75	9.19	9.75	9.79	9.97	9.56	-
<b>RVA</b>										
Peak Viscosity, cP	2517	2519	2632	2644	2899	2525	2600	2518	2647	-
Minimum viscosity (Trough), cP	1735	1881	1895	1958	2111	1810	1894	1877	1992	-
Final Viscosity, cP	2958	3026	3165	3141	3316	2971	3067	3009	3132	-
Peak Time, min	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	-
<b>GLUTEN</b>										
Wet gluten (14% mb), %	33.3	30.6	28.0	24.4	28.5	33.1	30.2	27.2	25.0	-
Dry gluten (14% mb), %	11.1	10.3	9.1	8.0	9.9	11.7	9.9	9.1	8.2	-
Gluten Index	91	91	96	96	98	95	97	96	95	-
<b>FARINOGRAM</b>										
Water absorption (14% mb), %	59.7	60.6	59.7	58.1	59.3	61.7	60.6	60.4	59.4	-
Development time, min	5.4	5.1	4.2	3.5	3.3	5.2	4.4	4.4	2.5	-
Stability, min	20.0	13.5	10.4	9.1	9.2	20.0	11.4	9.3	6.1	-
Mixing tolerance index, BU	18	27	35	36	35	18	30	39	53	-
<b>EXTENSOGRAM (45 min pull)</b>										
Area, cm <sup>2</sup>	126	108	89	78	82	137	104	90	65	-
Maximum height, BU	480	374	348	358	336	466	356	331	284	-
Extensibility, mm	195	209	182	155	176	215	210	194	157	-
<b>ALVEOGRAM</b>										
Strength (S), cm <sup>2</sup>	46.3	43.6	39.4	34.3	34.3	49.5	40.2	35.8	32.0	-
Stability (P), mm	81	89	86	85	81	89	81	84	87	-
Distensibility (L), mm	136	122	124	101	107	138	132	114	96	-
Configuration ratio (P/L)	0.60	0.73	0.69	0.84	0.76	0.64	0.61	0.74	0.91	-
<b>MIXOGRAM</b>										
Peak time, min	2.6	2.8	2.8	3.0	3.0	2.6	3.6	2.6	2.6	-
<b>100 g BAKING TEST</b>										
Loaf volume, cm <sup>3</sup>	943	894	874	844	916	1068	936	863	976	-
Evaluation (see page 67)	0	0	0	0	0	0	0	0	0	-



## *Rheological Graphs Per Production Region*

MIXOGRAM

5



6



FARINOGRAM

5



6



EXTENSOGRAM

5



6

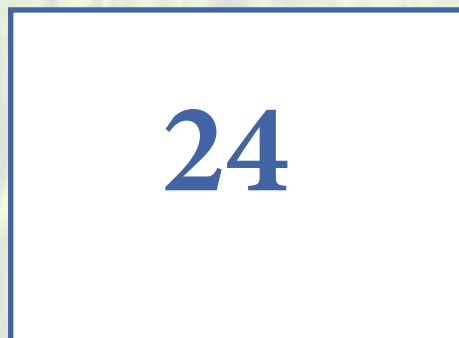


ALVEOGRAM

5



6



# South African quality data per production region

## IRRIGATION WHEAT

PRODUCTION REGION	(10) Griqualand West Region					(11) Vaalharts Region				
	<b>WHEAT</b>									
	ave	min	max	stdev		ave	min	max	stdev	
Protein (12% mb), %	13.0	11.2	13.8	0.75		12.3	10.8	13.6	0.76	
Falling number, sec	361	287	417	40.91		358	261	450	39.46	
Moisture, %	10.8	9.7	11.8	0.54		11.1	10.6	11.7	0.24	
1000 Kernel mass (13% mb), g	35.5	32.1	38.9	1.75		36.3	30.7	42.4	3.45	
Hectolitre mass (dirty), kg/hl	81.5	79.2	84.4	1.22		80.0	75.5	83.1	2.01	
Screenings (<1.8 mm sieve), %	0.72	0.14	1.48	0.40		1.33	0.14	5.00	1.29	
Total damaged kernels, %	0.19	0.08	0.48	0.09		0.23	0.00	0.48	0.14	
Combined deviations, %	1.17	0.48	1.95	0.43		2.50	0.58	6.30	1.56	
Number of samples	21					23				
<b>MIXOGRAM (Quadromat Junior)</b>										
	ave	min	max	stdev		ave	min	max	stdev	
Peak time, min	2.7	2.4	3.5	0.26		3.2	2.5	4.3	0.48	
Tail height (6 min), mm	52	48	60	3.11		49	43	56	3.37	
Number of samples	21					23				
<b>COMPOSITE SAMPLES</b>										
CLASS AND GRADE	Super	B1	B2	B3	COW	Super	B1	B2	B3	COW
Bühler Extraction, %	75.8	76.0	75.3	-	-	77.1	77.5	77.9	-	76.4
<b>FLOUR</b>										
Protein (12% mb), %	12.2	11.3	10.2	-	-	12.2	11.7	10.4	-	11.7
Moisture, %	13.9	13.7	14.0	-	-	13.7	13.4	13.5	-	13.4
Ash (db), %	0.63	0.64	0.65	-	-	0.59	0.64	0.59	-	0.61
Colour, KJ (wet)	-5.0	-5.0	-5.0	-	-	-5.0	-5.0	-5.0	-	-5.0
Colour, Konica Minolta CM5 (dry)										
L*	93.79	93.70	93.56	-	-	93.62	93.56	93.86	-	93.75
a*	0.63	0.58	0.57	-	-	0.54	0.60	0.50	-	0.54
b*	10.66	10.84	11.51	-	-	10.25	10.53	10.59	-	10.44
<b>RVA</b>										
Peak Viscosity, cP	2237	2440	2455	-	-	2155	2280	2303	-	2151
Minimum viscosity (Trough), cP	1768	1915	1880	-	-	1830	1909	1846	-	1850
Final Viscosity, cP	2422	2708	2695	-	-	2279	2443	2520	-	2286
Peak Time, min	7.00	7.00	7.00	-	-	6.80	6.93	7.00	-	6.80
<b>GLUTEN</b>										
Wet gluten (14% mb), %	34.1	32.7	29.1	-	-	33.4	31.1	27.9	-	31.5
Dry gluten (14% mb), %	11.3	10.4	9.3	-	-	11.2	10.3	9.1	-	10.5
Gluten Index	87	87	87	-	-	98	97	98	-	97
<b>FARINOGRAM</b>										
Water absorption (14% mb), %	60.7	60.2	58.1	-	-	59.7	59.3	57.8	-	58.4
Development time, min	5.4	4.4	4.1	-	-	6.3	5.4	3.4	-	4.1
Stability, min	9.4	8.3	6.2	-	-	12.3	10.0	7.1	-	8.4
Mixing tolerance index, BU	38	39	52	-	-	32	37	51	-	39
<b>EXTENSOGRAM (45 min pull)</b>										
Area, cm <sup>2</sup>	107	87	83	-	-	119	105	90	-	115
Maximum height, BU	347	310	320	-	-	412	358	332	-	390
Extensibility, mm	224	204	186	-	-	214	215	198	-	217
<b>ALVEOGRAM</b>										
Strength (S), cm <sup>2</sup>	38.5	36.7	29.5	-	-	41.7	35.5	31.2	-	38.5
Stability (P), mm	67	68	63	-	-	62	58	53	-	58
Distensibility (L), mm	160	155	137	-	-	182	171	176	-	192
Configuration ratio (P/L)	0.42	0.44	0.46	-	-	0.34	0.34	0.30	-	0.30
<b>MIXOGRAM</b>										
Peak time, min	2.7	2.3	2.7	-	-	3.1	3.0	3.0	-	3.6
<b>100 g BAKING TEST</b>										
Loaf volume, cm <sup>3</sup>	1106	1093	977	-	-	1183	1100	1052	-	1078
Evaluation (see page 67)	0	0	0	-	-	0	0	0	-	0



## *Rheological Graphs Per Production Region*

MIXOGRAM

10



11



FARINOGRAM

10



11



EXTENSOGRAM

10



11



ALVEOGRAM

10



11



# South African quality data per production region

## IRRIGATION WHEAT

PRODUCTION REGION	(14) North West Southern Region				(15) North West South-Eastern Region					
	ave	min	max	stdev	ave	min	max	stdev		
<b>WHEAT</b>										
Protein (12% mb), %	13.2	13.1	13.2	0.07	12.4	9.7	13.8	1.08		
Falling number, sec	316	311	321	7.07	372	207	858	138.60		
Moisture, %	11.2	11.1	11.2	0.07	11.1	10.4	11.9	0.41		
1000 Kernel mass (13% mb), g	38.2	36.6	39.7	2.19	38.0	32.3	43.5	3.01		
Hectolitre mass (dirty), kg/hl	80.1	79.2	80.9	1.20	79.8	77.2	82.5	1.44		
Screenings (<1.8 mm sieve), %	1.30	1.05	1.54	0.35	1.39	0.05	3.20	0.84		
Total damaged kernels, %	1.19	0.84	1.54	0.49	0.40	0.06	1.66	0.37		
Combined deviations, %	3.28	3.19	3.36	0.12	2.27	0.21	6.32	1.45		
Number of samples	2				17					
<b>MIXOGRAM (Quadromat Junior)</b>										
Peak time, min	3.1	2.9	3.2	0.21	3.1	2.1	4.0	0.41		
Tail height (6 min), mm	50	50	50	0.00	51	46	57	3.14		
Number of samples	2				17					
<b>COMPOSITE SAMPLES</b>										
CLASS AND GRADE	Super	B1	B2	B3	COW	Super	B1	B2	B3	COW
	Bühler Extraction, %									
	75.5	-	-	-	-	74.7	74.3	76.8	-	-
<b>FLOUR</b>										
Protein (12% mb), %	12.5	-	-	-	-	12.2	10.9	10.2	-	-
Moisture, %	13.8	-	-	-	-	13.7	13.7	13.3	-	-
Ash (db), %	0.62	-	-	-	-	0.59	0.58	0.57	-	-
Colour, KJ (wet)	-5.0	-	-	-	-	-5.0	-5.0	-5.0	-	-
Colour, Konica Minolta CM5 (dry)										
L*	93.60	-	-	-	-	93.43	93.79	93.78	-	-
a*	0.57	-	-	-	-	0.49	0.48	0.44	-	-
b*	9.83	-	-	-	-	9.98	10.35	10.21	-	-
<b>RVA</b>										
Peak Viscosity, cP	1985	-	-	-	-	2182	2392	2469	-	-
Minimum viscosity (Trough), cP	1698	-	-	-	-	1770	2116	1961	-	-
Final Viscosity, cP	2111	-	-	-	-	2328	2713	2731	-	-
Peak Time, min	6.87	-	-	-	-	6.87	6.93	7.00	-	-
<b>GLUTEN</b>										
Wet gluten (14% mb), %	36.1	-	-	-	-	33.9	27.8	25.6	-	-
Dry gluten (14% mb), %	11.8	-	-	-	-	11.3	9.8	9.2	-	-
Gluten Index	88	-	-	-	-	94	99	97	-	-
<b>FARINOGRAM</b>										
Water absorption (14% mb), %	60.3	-	-	-	-	59.8	59.1	58.0	-	-
Development time, min	5.3	-	-	-	-	5.5	5.3	4.5	-	-
Stability, min	9.1	-	-	-	-	11.2	9.4	7.2	-	-
Mixing tolerance index, BU	42	-	-	-	-	34	39	53	-	-
<b>EXTENSOGRAM (45 min pull)</b>										
Area, cm <sup>2</sup>	124	-	-	-	-	114	98	98	-	-
Maximum height, BU	398	-	-	-	-	395	377	351	-	-
Extensibility, mm	231	-	-	-	-	212	191	207	-	-
<b>ALVEOGRAM</b>										
Strength (S), cm <sup>2</sup>	42.0	-	-	-	-	40.4	37.5	33.0	-	-
Stability (P), mm	64	-	-	-	-	67	72	58	-	-
Distensibility (L), mm	180	-	-	-	-	158	126	161	-	-
Configuration ratio (P/L)	0.36	-	-	-	-	0.42	0.57	0.36	-	-
<b>MIXOGRAM</b>										
Peak time, min	2.7	-	-	-	-	2.5	3.0	2.9	-	-
<b>100 g BAKING TEST</b>										
Loaf volume, cm <sup>3</sup>	1141	-	-	-	-	793	948	986	-	-
Evaluation (see page 67)	0	-	-	-	-	4	0	0	-	-



## *Rheological Graphs Per Production Region*

MIXOGRAM

14



15



FARINOGRAM

14

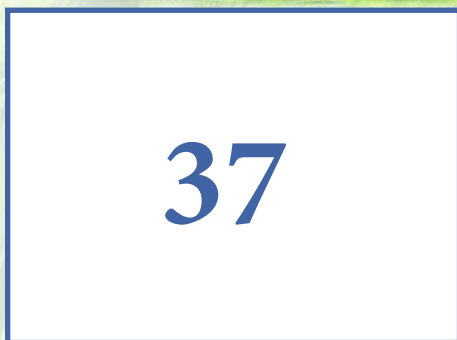


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EXTENSOGRAM

14

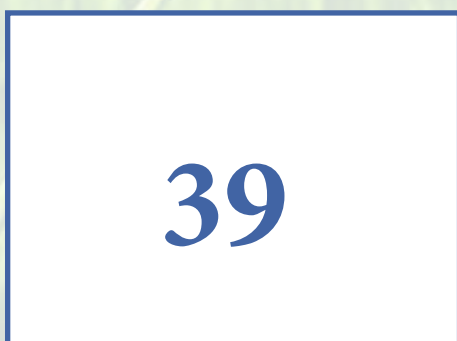


15



ALVEOGRAM

14



15



# South African quality data per production region

## IRRIGATION WHEAT

PRODUCTION REGION	(16)				(18)						
	North West Central Eastern Region				North West Central Region (Ventersdorp)						
<b>WHEAT</b>											
	ave	min	max	stdev	ave	min	max	stdev			
Protein (12% mb), %	13.2	12.4	14.0	1.13	12.3	11.9	12.6	0.49			
Falling number, sec	319	273	364	64.35	306	304	308	2.83			
Moisture, %	11.4	11.4	11.4	0.00	11.4	11.3	11.4	0.07			
1000 Kernel mass (13% mb), g	37.8	37.6	37.9	0.21	38.2	35.7	40.7	3.54			
Hectolitre mass (dirty), kg/hl	78.7	78.5	78.9	0.28	80.1	80.0	80.1	0.07			
Screenings (<1.8 mm sieve), %	0.83	0.40	1.25	0.60	1.15	0.96	1.33	0.26			
Total damaged kernels, %	0.16	0.16	0.16	0.00	0.39	0.36	0.42	0.04			
Combined deviations, %	1.37	0.74	1.99	0.88	1.97	1.54	2.39	0.60			
Number of samples	2				2						
<b>MIXOGRAM (Quadromat Junior)</b>											
	ave	min	max	stdev	ave	min	max	stdev			
Peak time, min	3.9	3.5	4.3	0.57	3.3	3.2	3.3	0.07			
Tail height (6 min), mm	56	55	56	0.71	53	51	55	2.83			
Number of samples	2				2						
<b>COMPOSITE SAMPLES</b>											
CLASS AND GRADE	Super	B1	B2	B3	COW	Super	B1	B2	B3	COW	
	Bühler Extraction, %	74.9	75.4	-	-	-	-	-	-	-	
<b>FLOUR</b>											
Protein (12% mb), %	12.8	11.3	-	-	-	-	-	-	-	-	
Moisture, %	13.7	13.0	-	-	-	-	-	-	-	-	
Ash (db), %	0.58	0.59	-	-	-	-	-	-	-	-	
Colour, KJ (wet)	-5.0	-5.0	-	-	-	-	-	-	-	-	
Colour, Konica Minolta CM5 (dry)											
L*	93.34	93.35	-	-	-	-	-	-	-	-	
a*	0.57	0.45	-	-	-	-	-	-	-	-	
b*	10.62	10.48	-	-	-	-	-	-	-	-	
<b>RVA</b>											
Peak Viscosity, cP	1874	2241	-	-	-	-	-	-	-	-	
Minimum viscosity (Trough), cP	1614	1978	-	-	-	-	-	-	-	-	
Final Viscosity, cP	2093	2544	-	-	-	-	-	-	-	-	
Peak Time, min	6.53	6.80	-	-	-	-	-	-	-	-	
<b>GLUTEN</b>											
Wet gluten (14% mb), %	32.3	28.0	-	-	-	-	-	-	-	-	
Dry gluten (14% mb), %	11.5	10.0	-	-	-	-	-	-	-	-	
Gluten Index	98	99	-	-	-	-	-	-	-	-	
<b>FARINOGRAM</b>											
Water absorption (14% mb), %	60.7	58.7	-	-	-	-	-	-	-	-	
Development time, min	8.2	14.4	-	-	-	-	-	-	-	-	
Stability, min	20.0	20.0	-	-	-	-	-	-	-	-	
Mixing tolerance index, BU	21	14	-	-	-	-	-	-	-	-	
<b>EXTENSOGRAM (45 min pull)</b>											
Area, cm <sup>2</sup>	147	168	-	-	-	-	-	-	-	-	
Maximum height, BU	483	585	-	-	-	-	-	-	-	-	
Extensibility, mm	225	216	-	-	-	-	-	-	-	-	
<b>ALVEOGRAM</b>											
Strength (S), cm <sup>2</sup>	59.8	57.0	-	-	-	-	-	-	-	-	
Stability (P), mm	89	95	-	-	-	-	-	-	-	-	
Distensibility (L), mm	155	124	-	-	-	-	-	-	-	-	
Configuration ratio (P/L)	0.57	0.77	-	-	-	-	-	-	-	-	
<b>MIXOGRAM</b>											
Peak time, min	3.1	4.3	-	-	-	-	-	-	-	-	
<b>100 g BAKING TEST</b>											
Loaf volume, cm <sup>3</sup>	1048	947	-	-	-	-	-	-	-	-	
Evaluation (see page 67)	0	0	-	-	-	-	-	-	-	-	



## *Rheological Graphs Per Production Region*

MIXOGRAM

16



18



FARINOGRAM

16

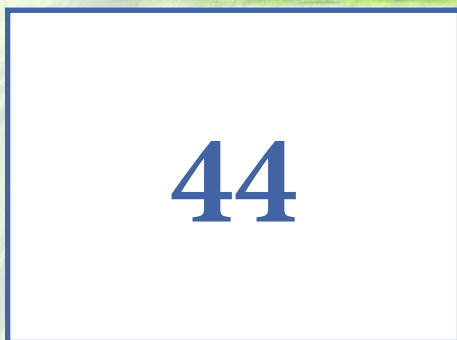


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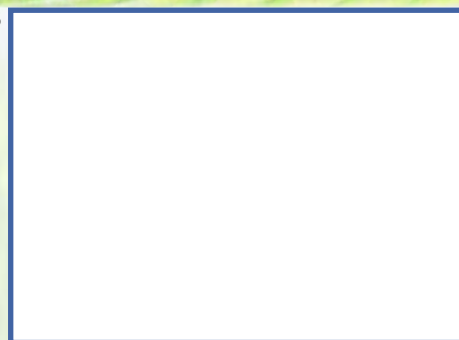


EXTENSOGRAM

16

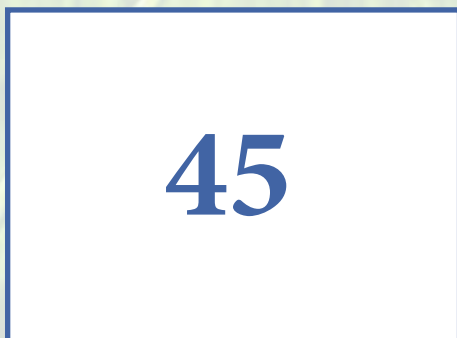


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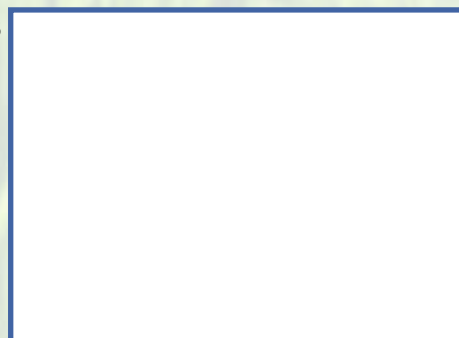


ALVEOGRAM

16



18



# South African quality data per production region

SUMMER RAINFALL AND IRRIGATION

PRODUCTION REGION	(21) Free State North-Western Region (Viljoenskroon)				(22) Free State North-Western Region (Bothaville)					
	ave	min	max	stdev	ave	min	max	stdev		
<b>WHEAT</b>										
Protein (12% mb), %	11.9	10.4	13.4	2.12	13.1	11.7	15.6	1.27		
Falling number, sec	319	311	327	11.31	291	187	339	49.13		
Moisture, %	11.9	11.7	12.0	0.21	11.6	11.4	12.0	0.21		
1000 Kernel mass (13% mb), g	36.5	35.3	37.6	1.63	37.0	29.3	41.5	4.25		
Hectolitre mass (dirty), kg/hl	80.4	78.6	82.1	2.47	79.0	73.6	81.7	3.01		
Screenings (<1.8 mm sieve), %	1.51	1.47	1.55	0.06	2.34	0.77	10.46	2.96		
Total damaged kernels, %	0.78	0.40	1.16	0.54	0.59	0.16	2.20	0.64		
Combined deviations, %	2.35	1.95	2.75	0.57	3.90	1.03	14.46	4.09		
Number of samples	2				10					
<b>MIXOGRAM (Quadromat Junior)</b>										
Peak time, min	3.4	3.1	3.6	0.35	3.6	3.0	5.5	0.75		
Tail height (6 min), mm	47	44	49	3.54	52	49	56	2.45		
Number of samples	2				10					
<b>COMPOSITE SAMPLES</b>										
CLASS AND GRADE	Super	B1	B2	B3	COW	Super	B1	B2	B3	COW
Bühler Extraction, %	75.5	-	-	75.1	-	75.3	75.0	-	-	-
<b>FLOUR</b>										
Protein (12% mb), %	12.3	-	-	9.5	-	12.2	11.0	-	-	-
Moisture, %	13.4	-	-	13.6	-	13.7	13.6	-	-	-
Ash (db), %	0.62	-	-	0.65	-	0.60	0.61	-	-	-
Colour, KJ (wet)	-5.0	-	-	-5.0	-	-5.0	-5.0	-	-	-
Colour, Konica Minolta CM5 (dry)										
L*	93.35	-	-	93.90	-	93.48	93.58	-	-	-
a*	0.52	-	-	0.44	-	0.57	0.51	-	-	-
b*	10.20	-	-	9.45	-	10.02	10.17	-	-	-
<b>RVA</b>										
Peak Viscosity, cP	2008	-	-	2579	-	1973	2099	-	-	-
Minimum viscosity (Trough), cP	1702	-	-	2218	-	1686	1840	-	-	-
Final Viscosity, cP	2085	-	-	2820	-	2148	2282	-	-	-
Peak Time, min	6.80	-	-	6.87	-	6.53	6.80	-	-	-
<b>GLUTEN</b>										
Wet gluten (14% mb), %	33.4	-	-	27.8	-	33.6	29.1	-	-	-
Dry gluten (14% mb), %	11.0	-	-	7.4	-	11.1	9.5	-	-	-
Gluten Index	98	-	-	99	-	91	98	-	-	-
<b>FARINOGRAM</b>										
Water absorption (14% mb), %	60.4	-	-	58.3	-	60.9	59.0	-	-	-
Development time, min	7.5	-	-	4.5	-	6.3	5.2	-	-	-
Stability, min	11.6	-	-	7.0	-	12.2	11.3	-	-	-
Mixing tolerance index, BU	41	-	-	56	-	33	28	-	-	-
<b>EXTENSOGRAM (45 min pull)</b>										
Area, cm <sup>2</sup>	151	-	-	88	-	127	122	-	-	-
Maximum height, BU	504	-	-	374	-	431	427	-	-	-
Extensibility, mm	221	-	-	175	-	218	214	-	-	-
<b>ALVEOGRAM</b>										
Strength (S), cm <sup>2</sup>	49.1	-	-	33.2	-	48.5	43.4	-	-	-
Stability (P), mm	78	-	-	68	-	84	75	-	-	-
Distensibility (L), mm	155	-	-	128	-	144	149	-	-	-
Configuration ratio (P/L)	0.50	-	-	0.53	-	0.58	0.50	-	-	-
<b>MIXOGRAM</b>										
Peak time, min	3.2	-	-	3.0	-	3.1	3.4	-	-	-
<b>100 g BAKING TEST</b>										
Loaf volume, cm <sup>3</sup>	1138	-	-	942	-	1067	1026	-	-	-
Evaluation (see page 67)	0	-	-	0	-	0	0	-	-	-



## *Rheological Graphs Per Production Region*

MIXOGRAM

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22



FARINOGRAM

21

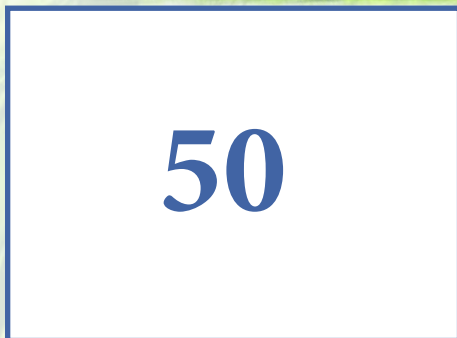


22



EXTENSOGRAM

21



22



ALVEOGRAM

21



22



# South African quality data per production region

SUMMER RAINFALL AND IRRIGATION WHEAT

PRODUCTION REGION	(23) Free State North-Western Region (Bultfontein)				(24) Free State Central Region					
	ave	min	max	stdev	ave	min	max	stdev		
<b>WHEAT</b>										
Protein (12% mb), %	11.5	8.1	13.9	1.56	11.4	9.1	13.1	1.43		
Falling number, sec	317	242	423	40.80	314	116	406	75.37		
Moisture, %	11.6	9.8	12.6	0.64	11.6	11.0	12.8	0.53		
1000 Kernel mass (13% mb), g	36.1	23.0	45.7	4.52	37.1	30.1	44.0	4.21		
Hectolitre mass (dirty), kg/hl	78.6	70.6	82.2	2.43	79.7	74.5	82.2	2.29		
Screenings (<1.8 mm sieve), %	3.19	0.40	17.76	4.15	2.63	0.20	19.09	5.24		
Total damaged kernels, %	0.45	0.00	1.72	0.49	0.58	0.00	2.64	0.74		
Combined deviations, %	4.15	0.96	20.80	4.53	3.54	0.74	20.61	5.46		
Number of samples	24				12					
<b>MIXOGRAM (Quadromat Junior)</b>										
Peak time, min	3.9	2.9	5.5	0.75	3.4	3.0	4.7	0.46		
Tail height (6 min), mm	47	34	55	5.75	47	33	52	5.10		
Number of samples	24				12					
<b>COMPOSITE SAMPLES</b>										
CLASS AND GRADE	Super	B1	B2	B3	COW	Super	B1	B2	B3	COW
	Bühler Extraction, %									
	74.3	74.9	73.6	73.5	-	74.1	74.5	-	72.6	-
<b>FLOUR</b>										
Protein (12% mb), %	11.9	11.3	9.8	9.5	-	11.7	9.9	-	8.9	-
Moisture, %	13.3	13.4	13.5	13.9	-	13.7	13.4	-	13.5	-
Ash (db), %	0.60	0.52	0.56	0.55	-	0.60	0.54	-	0.53	-
Colour, KJ (wet)	-5.0	-5.0	-5.0	-5.0	-	-5.0	-5.0	-	-5.0	-
Colour, Konica Minolta CM5 (dry)										
L*	93.37	93.51	93.82	93.86	-	93.67	93.99	-	93.92	-
a*	0.48	0.44	0.39	0.37	-	0.51	0.42	-	0.38	-
b*	10.11	10.47	9.90	9.87	-	10.18	10.33	-	9.90	-
<b>RVA</b>										
Peak Viscosity, cP	2285	2243	2022	1921	-	2318	2517	-	2212	-
Minimum viscosity (Trough), cP	1967	1944	1784	1707	-	1859	2058	-	1975	-
Final Viscosity, cP	2561	2493	2256	2160	-	2533	2902	-	2516	-
Peak Time, min	6.67	6.80	6.80	6.67	-	7.00	7.00	-	6.87	-
<b>GLUTEN</b>										
Wet gluten (14% mb), %	32.3	31.5	26.3	25.2	-	31.9	25.0	-	23.4	-
Dry gluten (14% mb), %	10.8	10.6	8.6	8.1	-	10.7	8.3	-	7.5	-
Gluten Index	98	97	98	96	-	96	97	-	96	-
<b>FARINOGRAM</b>										
Water absorption (14% mb), %	60.1	59.8	57.5	56.0	-	59.9	56.2	-	56.8	-
Development time, min	6.2	6.3	6.1	6.1	-	7.1	5.3	-	4.2	-
Stability, min	16.4	17.2	10.2	12.3	-	14.4	13.2	-	9.5	-
Mixing tolerance index, BU	22	24	38	29	-	30	25	-	36	-
<b>EXTENSOGRAM (45 min pull)</b>										
Area, cm <sup>2</sup>	131	121	92	99	-	124	116	-	79	-
Maximum height, BU	476	467	447	500	-	436	473	-	375	-
Extensibility, mm	205	193	152	147	-	210	181	-	153	-
<b>ALVEOGRAM</b>										
Strength (S), cm <sup>2</sup>	50.5	49.2	39.1	39.0	-	45.3	38.7	-	33.2	-
Stability (P), mm	85	87	84	82	-	74	75	-	82	-
Distensibility (L), mm	141	133	105	103	-	150	116	-	91	-
Configuration ratio (P/L)	0.60	0.65	0.80	0.80	-	0.49	0.65	-	0.90	-
<b>MIXOGRAM</b>										
Peak time, min	3.5	3.1	3.2	4.1	-	3.2	3.3	-	3.7	-
<b>100 g BAKING TEST</b>										
Loaf volume, cm <sup>3</sup>	936	1053	879	860	-	1055	996	-	837	-
Evaluation (see page 67)	0	0	0	0	-	0	0	-	0	-



## *Rheological Graphs Per Production Region*

MIXOGRAM

23



24



FARINOGRAM

23



24



EXTENSOGRAM

23

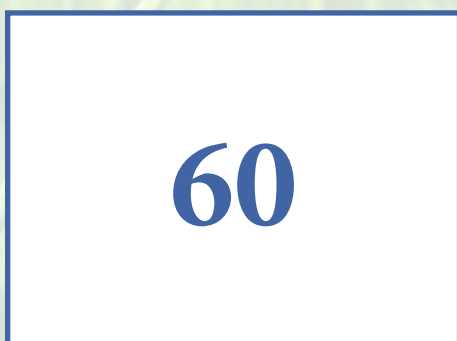


24



ALVEOGRAM

23



24



# South African quality data per production region

SUMMER RAINFALL AND IRRIGATION WHEAT

PRODUCTION REGION	(25) Free State South-Western Region				(26) Free State South-Eastern Region					
	<b>WHEAT</b>									
	ave	min	max	stdev	ave	min	max	stdev		
Protein (12% mb), %	10.6	8.9	12.3	2.40	12.1	10.1	14.1	1.37		
Falling number, sec	301	286	316	21.21	313	190	433	77.46		
Moisture, %	11.4	10.7	12.0	0.92	11.7	10.8	12.5	0.68		
1000 Kernel mass (13% mb), g	33.6	29.7	37.5	5.52	35.4	30.9	42.3	3.54		
Hectolitre mass (dirty), kg/hl	76.9	74.8	79.0	2.97	80.2	77.7	81.5	1.25		
Screenings (<1.8 mm sieve), %	1.45	0.54	2.35	1.28	0.83	0.16	2.00	0.75		
Total damaged kernels, %	0.38	0.08	0.68	0.42	0.31	0.12	0.80	0.23		
Combined deviations, %	2.39	1.02	3.75	1.93	1.33	0.28	2.60	0.90		
Number of samples	2				7					
<b>MIXOGRAM (Quadromat Junior)</b>										
	ave	min	max	stdev	ave	min	max	stdev		
Peak time, min	3.2	3.1	3.2	0.07	3.7	2.9	5.1	0.77		
Tail height (6 min), mm	46	42	50	5.66	52	43	60	5.45		
Number of samples	2				7					
<b>COMPOSITE SAMPLES</b>										
CLASS AND GRADE	Super	B1	B2	B3	COW	Super	B1	B2	B3	COW
	Bühler Extraction, %									
-										
<b>FLOUR</b>										
Protein (12% mb), %	-	-	-	10.9	-	12.8	11.0	10.1	9.6	-
Moisture, %	-	-	-	13.1	-	13.6	13.4	13.4	13.7	-
Ash (db), %	-	-	-	0.56	-	0.51	0.54	0.58	0.51	-
Colour, KJ (wet)	-	-	-	-4.7	-	-4.8	-5.0	-4.5	-5.0	-
Colour, Konica Minolta CM5 (dry)										
L*	-	-	-	93.37	-	92.95	93.57	92.80	93.77	-
a*	-	-	-	0.43	-	0.50	0.46	0.53	0.45	-
b*	-	-	-	11.08	-	9.29	10.33	10.72	9.77	-
<b>RVA</b>										
Peak Viscosity, cP	-	-	-	1961	-	2220	2127	1179	2912	-
Minimum viscosity (Trough), cP	-	-	-	1550	-	1919	1661	877	2095	-
Final Viscosity, cP	-	-	-	2201	-	2431	2387	1294	3400	-
Peak Time, min	-	-	-	7.00	-	6.73	7.00	5.93	7.00	-
<b>GLUTEN</b>										
Wet gluten (14% mb), %	-	-	-	30.0	-	33.1	29.1	26.7	25.3	-
Dry gluten (14% mb), %	-	-	-	10.0	-	11.4	9.7	8.7	8.4	-
Gluten Index	-	-	-	97	-	99	98	96	96	-
<b>FARINOGRAM</b>										
Water absorption (14% mb), %	-	-	-	61.8	-	59.9	60.3	59.5	58.9	-
Development time, min	-	-	-	4.5	-	8.3	6.5	4.0	4.0	-
Stability, min	-	-	-	10.0	-	20.0	13.3	6.2	9.6	-
Mixing tolerance index, BU	-	-	-	39	-	14	35	56	39	-
<b>EXTENSOGRAM (45 min pull)</b>										
Area, cm <sup>2</sup>	-	-	-	63	-	156	100	60	84	-
Maximum height, BU	-	-	-	266	-	519	412	300	371	-
Extensibility, mm	-	-	-	166	-	224	176	139	160	-
<b>ALVEOGRAM</b>										
Strength (S), cm <sup>2</sup>	-	-	-	33.8	-	53.4	42.7	24.9	33.8	-
Stability (P), mm	-	-	-	90	-	80	90	83	88	-
Distensibility (L), mm	-	-	-	86	-	152	110	67	91	-
Configuration ratio (P/L)	-	-	-	1.05	-	0.53	0.82	1.24	0.97	-
<b>MIXOGRAM</b>										
Peak time, min	-	-	-	2.9	-	3.7	3.8	2.7	3.2	-
<b>100 g BAKING TEST</b>										
Loaf volume, cm <sup>3</sup>	-	-	-	933	-	1102	867	819	819	-
Evaluation (see page 67)	-	-	-	0	-	0	0	0	0	-



## *Rheological Graphs Per Production Region*

MIXOGRAM

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FARINOGRAM

25

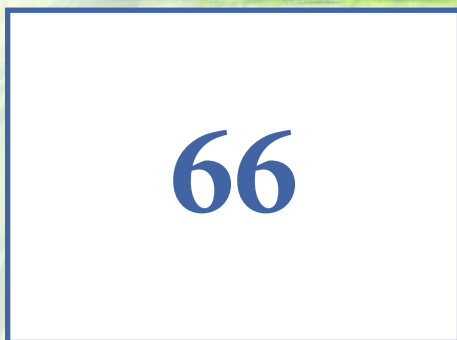


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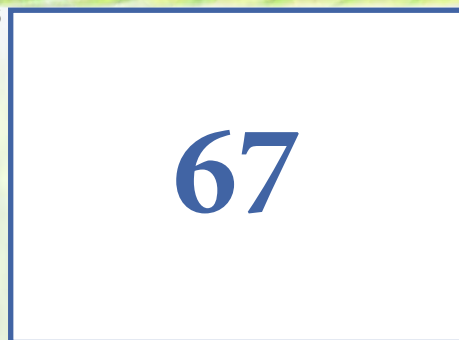


EXTENSOGRAM

25

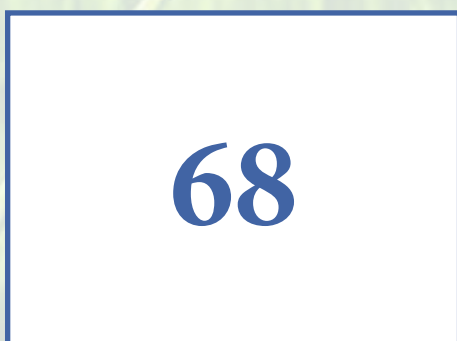


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ALVEOGRAM

25



26



# South African quality data per production region

## IRRIGATION WHEAT

PRODUCTION REGION	(28) Free State Eastern Region				(33) Mpumalanga Northern Region					
	ave	min	max	stdev	ave	min	max	stdev		
<b>WHEAT</b>										
Protein (12% mb), %	12.5	11.3	13.2	0.64	12.1	10.7	13.2	0.80		
Falling number, sec	288	164	361	68.65	416	289	504	53.10		
Moisture, %	11.9	11.4	12.4	0.29	11.5	10.6	11.9	0.38		
1000 Kernel mass (13% mb), g	33.9	29.1	38.1	3.17	38.1	33.4	41.2	2.79		
Hectolitre mass (dirty), kg/hl	78.6	75.1	81.3	1.79	81.4	77.1	85.7	3.06		
Screenings (<1.8 mm sieve), %	1.60	0.77	3.76	0.93	0.80	0.24	2.26	0.62		
Total damaged kernels, %	1.24	0.00	5.76	1.79	0.94	0.08	3.18	0.85		
Combined deviations, %	3.31	1.33	10.16	2.60	2.15	0.40	3.96	1.15		
Number of samples	10				11					
<b>MIXOGRAM (Quadromat Junior)</b>										
Peak time, min	3.6	2.9	4.3	0.46	3.8	3.2	4.7	0.42		
Tail height (6 min), mm	51	45	59	5.55	53	50	61	3.82		
Number of samples	10				11					
<b>COMPOSITE SAMPLES</b>										
CLASS AND GRADE	Super	B1	B2	B3	COW	Super	B1	B2	B3	COW
	Bühler Extraction, %									
	72.5	70.4	70.3	71.2	-	75.2	75.5	74.1	-	-
<b>FLOUR</b>										
Protein (12% mb), %	11.7	10.7	9.9	10.4	-	11.4	10.9	10.1	-	-
Moisture, %	14.3	13.2	13.6	13.3	-	13.6	13.6	13.7	-	-
Ash (db), %	0.61	0.54	0.60	0.60	-	0.61	0.66	0.64	-	-
Colour, KJ (wet)	-5.0	-4.4	-4.9	-4.7	-	-5.0	-5.0	-5.0	-	-
Colour, Konica Minolta CM5 (dry)										
L*	93.50	92.99	93.18	93.18	-	93.38	93.51	93.39	-	-
a*	0.48	0.39	0.41	0.52	-	0.53	0.51	0.57	-	-
b*	10.09	11.24	11.46	11.81	-	9.89	10.21	10.56	-	-
<b>RVA</b>										
Peak Viscosity, cP	2002	1785	1908	2071	-	2257	2452	2276	-	-
Minimum viscosity (Trough), cP	1635	1414	1551	1599	-	1657	1780	1680	-	-
Final Viscosity, cP	2138	1968	2132	2260	-	2482	2756	2547	-	-
Peak Time, min	7.00	7.00	6.93	7.00	-	7.00	7.00	7.00	-	-
<b>GLUTEN</b>										
Wet gluten (14% mb), %	32.0	30.6	29.0	27.1	-	30.1	28.0	27.1	-	-
Dry gluten (14% mb), %	10.5	10.4	9.1	9.0	-	9.9	8.8	9.0	-	-
Gluten Index	96	95	96	97	-	98	97	97	-	-
<b>FARINOGRAM</b>										
Water absorption (14% mb), %	60.3	61.9	60.4	60.1	-	59.6	58.4	59.8	-	-
Development time, min	6.1	4.3	4.1	5.4	-	8.5	8.1	5.6	-	-
Stability, min	13.3	7.3	6.1	9.2	-	20.0	13.6	9.1	-	-
Mixing tolerance index, BU	34	42	48	40	-	24	32	39	-	-
<b>EXTENSOGRAM (45 min pull)</b>										
Area, cm <sup>2</sup>	130	52	52	64	-	141	134	104	-	-
Maximum height, BU	465	228	241	303	-	495	516	457	-	-
Extensibility, mm	209	154	147	151	-	215	195	168	-	-
<b>ALVEOGRAM</b>										
Strength (S), cm <sup>2</sup>	47.1	26.1	28.1	34.7	-	46.3	44.2	38.8	-	-
Stability (P), mm	89	82	86	92	-	79	77	87	-	-
Distensibility (L), mm	127	77	76	86	-	131	130	110	-	-
Configuration ratio (P/L)	0.70	1.06	1.13	1.07	-	0.60	0.59	0.79	-	-
<b>MIXOGRAM</b>										
Peak time, min	3.3	2.4	2.3	3.5	-	3.6	3.4	3.5	-	-
<b>100 g BAKING TEST</b>										
Loaf volume, cm <sup>3</sup>	911	893	907	976	-	987	1013	873	-	-
Evaluation (see page 67)	0	0	0	0	-	0	0	0	-	-



## *Rheological Graphs Per Production Region*

MIXOGRAM

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33

**70**

**71**

FARINOGRAM

28

33

**72**

**73**

EXTENSOGRAM

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33

**74**

**75**

ALVEOGRAM

28

33

**76**

**77**

# South African quality data per production region

## IRRIGATION WHEAT

PRODUCTION REGION	(35) Limpopo Region				(36) KwaZulu-Natal					
	<b>WHEAT</b>									
	<b>ave</b>	<b>min</b>	<b>max</b>	<b>stdev</b>	<b>ave</b>	<b>min</b>	<b>max</b>	<b>stdev</b>		
Protein (12% mb), %	11.7	9.0	13.4	1.21	13.3	11.4	15.7	1.08		
Falling number, sec	376	323	451	44.79	251	119	561	94.44		
Moisture, %	11.5	11.1	12.1	0.34	11.4	10.6	12.3	0.46		
1000 Kernel mass (13% mb), g	39.5	31.1	49.7	5.47	37.2	30.1	43.5	3.47		
Hectolitre mass (dirty), kg/hl	77.7	73.9	82.4	2.90	80.8	77.3	84.5	1.97		
Screenings (<1.8 mm sieve), %	0.73	0.14	1.77	0.60	1.56	0.25	5.06	1.17		
Total damaged kernels, %	1.08	0.24	2.48	0.93	1.56	0.16	5.62	1.31		
Combined deviations, %	2.24	0.91	3.90	0.89	3.44	1.15	7.06	1.77		
<b>Number of samples</b>	<b>10</b>				<b>22</b>					
<b>MIXOGRAM (Quadromat Junior)</b>										
	<b>ave</b>	<b>min</b>	<b>max</b>	<b>stdev</b>	<b>ave</b>	<b>min</b>	<b>max</b>	<b>stdev</b>		
Peak time, min	4.0	2.8	5.6	0.96	4.0	2.8	5.5	0.80		
Tail height (6 min), mm	55	46	60	4.17	54	44	63	4.66		
<b>Number of samples</b>	<b>10</b>				<b>22</b>					
<b>COMPOSITE SAMPLES</b>										
<b>CLASS AND GRADE</b>	<b>Super</b>	<b>B1</b>	<b>B2</b>	<b>B3</b>	<b>COW</b>	<b>Super</b>	<b>B1</b>	<b>B2</b>	<b>B3</b>	<b>COW</b>
Bühler Extraction, %	76.2	-	-	76.0	73.8	76.4	75.5	76.1	-	-
<b>FLOUR</b>										
Protein (12% mb), %	11.7	-	-	10.6	10.5	12.8	11.0	10.3	-	-
Moisture, %	13.8	-	-	13.4	13.3	13.8	13.6	13.9	-	-
Ash (db), %	0.63	-	-	0.63	0.58	0.56	0.57	0.62	-	-
Colour, KJ (wet)	-4.9	-	-	-4.9	-5.0	-5.0	-5.0	-5.0	-	-
Colour, Konica Minolta CM5 (dry)										
L*	93.19	-	-	93.65	93.31	93.67	93.65	93.48	-	-
a*	0.41	-	-	0.29	0.45	0.46	0.49	0.48	-	-
b*	10.12	-	-	9.10	10.65	9.06	9.86	10.63	-	-
<b>RVA</b>										
Peak Viscosity, cP	1873	-	-	2515	2041	1908	1998	1966	-	-
Minimum viscosity (Trough), cP	1580	-	-	2004	1683	1614	1677	1705	-	-
Final Viscosity, cP	1991	-	-	2701	2216	2043	2102	2115	-	-
Peak Time, min	7.00	-	-	7.00	7.00	6.53	6.60	6.67	-	-
<b>GLUTEN</b>										
Wet gluten (14% mb), %	30.7	-	-	25.3	27.8	31.5	31.1	27.3	-	-
Dry gluten (14% mb), %	10.2	-	-	8.6	9.1	11.3	10.3	9.3	-	-
Gluten Index	97	-	-	99	96	99	95	99	-	-
<b>FARINOGRAM</b>										
Water absorption (14% mb), %	60.1	-	-	55.7	59.9	59.8	60.5	56.9	-	-
Development time, min	6.2	-	-	2.2	6.3	7.5	5.2	2.4	-	-
Stability, min	13.2	-	-	20.0	9.3	16.4	7.5	11.1	-	-
Mixing tolerance index, BU	24	-	-	3	39	18	52	11	-	-
<b>EXTENSOGRAM (45 min pull)</b>										
Area, cm <sup>2</sup>	149	-	-	137	126	172	97	108	-	-
Maximum height, BU	473	-	-	546	456	500	369	427	-	-
Extensibility, mm	234	-	-	188	208	256	193	187	-	-
<b>ALVEOGRAM</b>										
Strength (S), cm <sup>2</sup>	49.7	-	-	44.0	42.2	54.0	44.2	40.1	-	-
Stability (P), mm	74	-	-	68	84	73	84	71	-	-
Distensibility (L), mm	169	-	-	146	123	166	135	134	-	-
Configuration ratio (P/L)	0.44	-	-	0.47	0.68	0.44	0.62	0.53	-	-
<b>MIXOGRAM</b>										
Peak time, min	3.1	-	-	5.2	3.4	3.7	3.1	3.5	-	-
<b>100 g BAKING TEST</b>										
Loaf volume, cm <sup>3</sup>	1014	-	-	1058	949	1196	1044	927	-	-
Evaluation (see page 67)	0	-	-	0	0	0	0	0	-	-



## *Rheological Graphs Per Production Region*

MIXOGRAM

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FARINOGRAM

35



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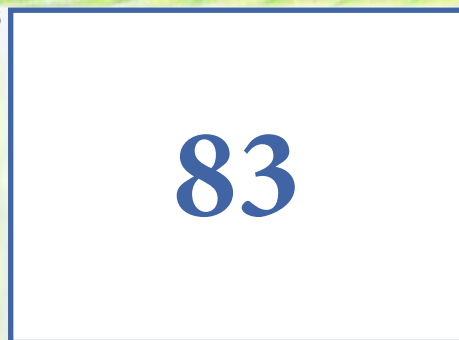


EXTENSOGRAM

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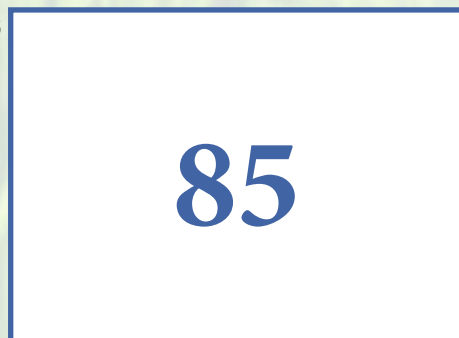


ALVEOGRAM

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## *Mycotoxins*

The accredited multi-mycotoxin assessments included in the annual wheat crop quality survey for the past eleven seasons, provide the most comprehensive overview of the multi-mycotoxin risk in commercial wheat produced and delivered to commercial grain storage companies in South Africa. Approximately 10 - 20% of the wheat crop samples were selected every season to proportionally represent all the production regions.

Constant monitoring of mycotoxin occurrence is crucial as it is well documented that mycotoxin risk can vary significantly between production seasons and also different production regions. Application of good agricultural practices and storage conditions as well as effective mycotoxin risk management programs are essential elements in preventing the negative effects of mycotoxins. Continued research on the prevention and mitigation of mycotoxin contamination is also necessary.

The only proven way to determine whether grain, cereals, feed or food are contaminated, is to obtain reliable testing data through analytical testing.

The absence of Aflatoxin B<sub>1</sub>, B<sub>2</sub>, G<sub>1</sub>, G<sub>2</sub>, Fumonisin B<sub>1</sub>, B<sub>2</sub>, B<sub>3</sub>, Ochratoxin A, T2-toxin and HT-2 toxin in the wheat samples over the past twelve seasons were confirmed in the 2022/23 season. This is the third season that Zearalenone residues were detected on a wheat crop sample, residues were also detected on a sample during the 2019/20 and 2021/2022 seasons.

The Deoxynivalenol prevalence this season is the joint highest of the twelve seasons for which accredited test results are available. 43% of the samples tested positive for Deoxynivalenol residues, compared to the 35% and 43% of the previous two seasons respectively. Four of the positive residue levels measured this season exceeded the national maximum allowable level (2 000 µg/kg) for cereals intended for further processing. The two highest levels, namely 6 124 µg/kg and 6 463 µg/kg, were measured on samples originating from the North West and Free State production regions.

Please refer to the mycotoxin results in Table 6 on pages 58 and 69.

### *National Mycotoxin Regulations*

According to the Foodstuffs, Cosmetics and Disinfectants Act (Act 54 of 1972) and regulations published under Government Notice No. R. 1145, dated 8 October 2004, all foodstuffs, ready for human consumption, may not contain more than 10 µg/kg of aflatoxin, of which Aflatoxin B<sub>1</sub> may not exceed 5 µg/kg.

Amendments to Government Notice No. R. 1145, dated 8 October 2004, published in Government Notice No. 987 of 05 September 2016, specify that: Cereal grains (wheat, maize and barley) intended for further processing, may not contain more than 2 000 µg/kg of Deoxynivalenol.

Flour, meal, semolina and flakes derived from wheat, maize or barley, ready for human consumption, may not contain more than 1 000 µg/kg of Deoxynivalenol.

Further processing means any other treatment or processing method that has been proven to reduce levels of fungus produced toxins in foodstuffs intended for human consumption.



**Table 6: Mycotoxin results for the 2022/23 season**

Region	Aflatoxin (µg/kg)						Fumonisin (µg/kg)			Deoxyvalenol (µg/kg)	15-ADON (µg/kg)	Ochratoxin A (µg/kg)	Zearalenone (µg/kg)	HT-2 Toxin (µg/kg)	T-2 Toxin (µg/kg)
	B <sub>1</sub>	B <sub>2</sub>	G <sub>1</sub>	G <sub>2</sub>	B <sub>1</sub>	B <sub>2</sub>	B <sub>3</sub>								
	5 µg/kg		5 µg/kg		20 µg/kg	20 µg/kg	20 µg/kg	100 µg/kg	100 µg/kg	5 µg/kg	20 µg/kg	20 µg/kg			
	5 µg/kg	5 µg/kg	5 µg/kg	5 µg/kg	20 µg/kg	20 µg/kg	20 µg/kg	100 µg/kg	100 µg/kg	5 µg/kg	20 µg/kg	20 µg/kg			
1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	126	ND	ND	ND	ND
4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	118	ND	ND	ND	ND
4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
6	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
6	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
6	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
10	ND	ND	ND	ND	ND	ND	ND	ND	ND	1 136	ND	ND	ND	ND	ND
10	ND	ND	ND	ND	ND	ND	ND	ND	ND	2 544	157	ND	ND	ND	ND
10	ND	ND	ND	ND	ND	ND	ND	ND	ND	867	143	ND	ND	ND	ND
11	ND	ND	ND	ND	ND	ND	ND	ND	ND	1 885	161	ND	ND	ND	ND
11	ND	ND	ND	ND	ND	ND	ND	ND	ND	1 582	100	ND	ND	ND	ND
11	ND	ND	ND	ND	ND	ND	ND	ND	ND	1 362	189	ND	ND	ND	ND
14	ND	ND	ND	ND	ND	ND	ND	ND	ND	347	ND	ND	ND	ND	ND



**Table 6: Mycotoxin results for the 2022/23 season (continue)**

Region	Aflatoxin (µg/kg)						Fumonisin (µg/kg)			Deoxyvalenol (µg/kg)	15-ADON (µg/kg)	Ochratoxin A (µg/kg)	Zearalenone (µg/kg)	HT-2 Toxin (µg/kg)	T-2 Toxin (µg/kg)
	B <sub>1</sub>		B <sub>2</sub>		G <sub>1</sub> , G <sub>2</sub>		B <sub>1</sub>	B <sub>2</sub>	B <sub>3</sub>						
	5 µg/kg	5 µg/kg	5 µg/kg	5 µg/kg	20 µg/kg	20 µg/kg	20 µg/kg	20 µg/kg	20 µg/kg						
	LOQ														
15	ND	ND	ND	ND	ND	ND	ND	ND	ND	1 279	ND	ND	ND	ND	ND
15	ND	ND	ND	ND	ND	ND	ND	ND	ND	6 124	ND	ND	ND	ND	ND
22	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	123	ND	ND	ND	ND
23	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
23	ND	ND	ND	ND	ND	ND	ND	ND	ND	109	ND	ND	ND	ND	ND
23	ND	ND	ND	ND	ND	ND	ND	ND	ND	346	ND	ND	ND	ND	ND
24	ND	ND	ND	ND	ND	ND	ND	ND	ND	6 463	301	ND	ND	ND	ND
26	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
28	ND	ND	ND	ND	ND	ND	ND	ND	ND	1 024	119	ND	ND	ND	ND
33	ND	ND	ND	ND	ND	ND	ND	ND	ND	976	160	ND	ND	ND	ND
35	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
36	ND	ND	ND	ND	ND	ND	ND	ND	ND	2 209	ND	ND	ND	ND	ND
36	ND	ND	ND	ND	ND	ND	ND	ND	ND	1 696	ND	ND	36	ND	ND
36	ND	ND	ND	ND	ND	ND	ND	ND	ND	315	ND	ND	ND	ND	ND
Total number of samples	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
Average of total number of samples	0	0	0	0	0	0	0	0	0	757	46	0	1	0	0
Number of positive results	0	0	0	0	0	0	0	0	0	17	12	0	1	0	0
Average of positive results	-	-	-	-	-	-	-	-	-	1 780	154	-	36	-	-
Maximum of positive results	-	-	-	-	-	-	-	-	-	6 463	301	-	36	-	-

**Note:**

- Limit of quantitation (LOQ) means the lowest concentration level that can be quantified with acceptable precision and accuracy by the UPLC-MS/MS. A concentration measured below the LOQ is reported as <LOQ.
- Limit of detection (LOD) is the lowest concentration level that can be detected but not quantified and is 50% of the LOQ of each mycotoxin. A concentration measured below the LOD is reported as not detected (ND).
- Mycotoxin levels lower than the LOQ were seen as tested negative for calculation purposes.
- µg/kg = ppb (parts per billion)

# RSA Wheat Crop Quality Summary

RSA Crop Quality 2020/21 and 2022/23 Seasons

Country of origin	RSA Crop Average 2020/21						RSA Crop Average 2022/23					
	Super	B1	B2	B3	COW	Average	Super	B1	B2	B3	COW	Average
<b>Class and Grade bread wheat</b>												
<b>No. of samples</b>	70	34	31	30	85	250	103	55	47	35	95	335
<b>WHEAT</b>												
<b>GRADING</b>												
Protein (12% mb), %	13.2	12.0	11.0	10.0	11.9	12.0	13.2	12.0	11.1	10.3	12.2	12.1
Moisture, %	11.3	11.0	11.1	11.0	11.1	11.1	11.2	11.2	11.3	11.5	11.2	11.3
Falling number, sec	367	389	403	399	348	372	370	372	378	374	331	361
1000 Kernel mass (13% mb), g	37.3	38.7	39.2	39.3	38.0	38.2	36.8	37.4	38.6	39.2	35.4	37.0
Hlm (dirty), kg/hl	80.8	79.8	79.3	78.0	77.0	78.9	80.3	80.4	80.7	79.5	78.7	79.8
Screenings (<1.8 mm sieve), %	1.07	1.04	1.54	1.55	2.38	1.63	1.26	1.21	1.32	1.41	2.72	1.69
Gravel, stones, turf and glass, %	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.03	0.01
Foreign matter, %	0.03	0.05	0.04	0.03	0.13	0.07	0.11	0.11	0.11	0.12	0.21	0.14
Other grain & unthreshed ears, %	0.25	0.24	0.40	0.34	0.87	0.49	0.33	0.36	0.38	0.39	0.78	0.48
Heat damaged kernels, %	0.01	0.02	0.01	0.02	0.20	0.08	0.00	0.00	0.00	0.00	0.00	0.00
Immature kernels, %	0.09	0.04	0.01	0.01	0.06	0.05	0.06	0.03	0.04	0.03	0.03	0.04
Insect damaged kernels, %	0.31	0.43	0.47	0.59	0.98	0.61	0.45	0.48	0.55	0.58	0.66	0.54
Sprouted kernels, %	0.13	0.06	0.03	0.01	0.45	0.20	0.11	0.07	0.04	0.03	0.42	0.17
Total damaged kernels, %	0.54	0.54	0.53	0.64	1.69	0.94	0.62	0.58	0.64	0.63	1.11	0.76
Combined deviations, %	1.89	1.86	2.51	2.56	5.07	3.12	2.32	2.27	2.45	2.55	4.82	3.06
Heavily frost damaged kernels, %	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.01	0.00	0.11	0.03
Field fungi, %	0.57	0.45	0.27	0.25	1.04	0.64	0.33	0.33	0.16	0.14	0.59	0.36
Storage fungi, %	0.01	0.00	0.00	0.00	0.06	0.02	0.00	0.00	0.00	0.00	0.00	0.00
Ergot, %	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Poisonous seeds ( <i>Crotalaria spp.</i> , etc.)	0	0	0	0	0	0	0	0	0	0	0	0
Poisonous seeds ( <i>Argemone mexicana</i> , etc.)	0	0	0	0	0	0	0	0	0	0	0	0
Live insects	No	No	No	No	No	No	No	No	No	No	No	No
Undesirable odour	No	No	No	No	No	No	No	No	No	No	No	No
<b>Summary Statistics</b>												
	Super	B1	B2	B3	COW	Average	Super	B1	B2	B3	COW	Average
<b>No. of samples</b>	21	9	7	5	7	49	19	17	13	11	5	65
Bühler Extraction, %	74.3	74.2	74.3	73.9	73.6	74.1	74.4	73.9	73.7	73.1	73.3	73.8
<b>FLOUR</b>												
Colour, KJ (wet)	-4.7	-4.8	-5.0	-5.0	-4.7	-4.8	-5.0	-5.0	-5.0	-4.9	-5.0	-5.0
Colour, Konica Minolta CM5 (dry)												
L*	93.72	93.91	94.16	94.44	94.03	93.93	93.6	93.69	93.67	93.76	93.8	93.68
a*	0.48	0.46	0.40	0.35	0.39	0.44	0.51	0.48	0.47	0.44	0.48	0.48
b*	9.74	9.89	9.79	9.47	9.87	9.77	10.02	10.26	10.58	9.99	10.23	10.20
Ash (db), %	0.60	0.60	0.60	0.59	0.60	0.60	0.59	0.60	0.60	0.59	0.59	0.59
Protein (12% mb), %	12.3	11.0	10.0	9.6	10.6	11.2	12.2	11.1	10.2	9.6	10.9	11.0
Wet Gluten (14% mb), %	32.8	29.8	26.8	24.1	28.5	29.9	32.9	29.6	27.5	25.6	29.7	29.5
Dry Gluten (14% mb), %	11.4	10.0	8.8	7.9	9.6	10.1	11.1	9.9	9.1	8.2	9.9	9.8
Gluten Index	96	95	95	95	94	95	95	96	96	97	96	96
<b>100 g BAKING TEST</b>												
Baking water absorption, %	62.5	60.9	59.9	59.2	60.5	61.2	62.4	61.0	60.0	59.7	60.9	61.0
Loaf volume, cm <sup>3</sup>	1189	1095	1023	958	1043	1104	1034	972	916	898	963	966
Evaluation (see page 78)	0	0	0	0	0	0	0	0	0	0	0	0
<b>FARINOGRAM</b>												
Water absorption (14% mb), %	60.2	59.2	58.7	57.5	59.0	59.3	60.3	59.7	58.7	58.3	59.2	59.4
Development time, min	6.4	5.2	5.0	4.0	5.0	5.6	6.5	6.0	4.3	4.2	4.8	5.4
Stability, mm	9.2	8.1	7.7	7.8	7.9	8.5	15.8	12.9	9.7	10.3	12.4	12.6
Mixing tolerance index, BU	36	37	39	33	36	36	25	31	37	36	30	31
<b>86</b>						<b>87</b>						



RSA Crop Quality 2020/21 and 2022/23 Seasons

Country of origin	RSA Crop Average 2020/21						RSA Crop Average 2022/23					
Class and Grade bread wheat	Super	B1	B2	B3	COW	Average	Super	B1	B2	B3	COW	Average
<b>No. of samples</b>	21	9	7	5	7	49	19	17	13	11	5	65
<b>ALVEOGRAM</b>												
Strength (S), cm <sup>2</sup>	43.2	37.1	33.4	30.9	35.2	38.3	48.0	42.7	35.6	35.4	40.6	41.4
Stability (P), mm	75	74	77	77	76	75	78	82	78	84	77	80
Distensibility (L), mm	147	126	111	97	119	129	152	130	119	101	137	130
P/L	0.54	0.62	0.72	0.83	0.67	0.63	0.52	0.66	0.72	0.86	0.60	0.66
	<b>88</b>						<b>89</b>					
<b>EXTENSOGRAM</b>												
Strength, cm <sup>2</sup>	115	97	82	74	91	99	134	108	91	85	113	109
Max. height, BU	390	366	324	315	342	362	454	407	371	384	419	411
Extensibility, mm	217	195	182	170	192	200	218	194	178	159	200	192
	<b>90</b>						<b>91</b>					
<b>MIXOGRAM</b>												
Peak time, min	3.0	2.8	2.8	3.2	2.9	2.9	3.1	3.2	3.0	3.4	3.2	3.1
Water absorption (14% mb), %	62.5	60.9	59.9	59.2	60.5	61.2	62.4	61	60	59.5	60.9	60.9
	<b>92</b>						<b>93</b>					
<b>MYCOTOXINS</b>												
Aflatoxin B <sub>1</sub> (µg/kg)	ND						ND					
Aflatoxin B <sub>2</sub> (µg/kg)	ND						ND					
Aflatoxin G <sub>1</sub> (µg/kg)	ND						ND					
Aflatoxin G <sub>2</sub> (µg/kg)	ND						ND					
Fumonisin B <sub>1</sub> (µg/kg)	ND						ND					
Fumonisin B <sub>2</sub> (µg/kg)	ND						ND					
Fumonisin B <sub>3</sub> (µg/kg)	ND						ND					
Deoxynivalenol (µg/kg) [max. value]	386 [3 088]						757 [6 463]					
15-ADON (µg/kg) [max. value]	ND						46 [301]					
Ochratoxin A (µg/kg)	ND						ND					
Zearalenone (µg/kg) [max. value]	ND						1 [36]					
HT-2 (µg/kg)	ND						ND					
T-2 Toxin (µg/kg)	ND						ND					
<b>No. of samples</b>	<b>30</b>						<b>40</b>					

# RSA Wheat Crop Quality Summary

RSA Crop Quality 2021/22 and 2022/23 Seasons

Country of origin	RSA Crop Average 2021/22						RSA Crop Average 2022/23					
Class and Grade bread wheat	Super	B1	B2	B3	COW	Average	Super	B1	B2	B3	COW	Average
No. of samples	73	64	46	47	105	335	103	55	47	35	95	335
<b>WHEAT</b>												
<b>GRADING</b>												
Protein (12% mb), %	13.3	12.0	11.0	10.1	12.0	11.9	13.2	12.0	11.1	10.3	12.2	12.1
Moisture, %	11.3	11.2	11.1	11.2	11.1	11.2	11.2	11.2	11.3	11.5	11.2	11.3
Falling number, sec	344	349	366	367	311	341	370	372	378	374	331	361
1000 Kernel mass (13% mb), g	40.1	41.8	42.1	41.8	38.1	40.3	36.8	37.4	38.6	39.2	35.4	37.0
Hlm (dirty), kg/hl	81.2	81.3	79.9	79.8	78.1	79.9	80.3	80.4	80.7	79.5	78.7	79.8
Screenings (<1.8 mm sieve), %	0.69	0.82	0.92	0.91	2.04	1.20	1.26	1.21	1.32	1.41	2.72	1.69
Gravel, stones, turf and glass, %	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.03	0.01
Foreign matter, %	0.01	0.02	0.04	0.02	0.15	0.06	0.11	0.11	0.11	0.12	0.21	0.14
Other grain & unthreshed ears, %	0.29	0.23	0.42	0.39	1.12	0.57	0.33	0.36	0.38	0.39	0.78	0.48
Heat damaged kernels, %	0.01	0.01	0.00	0.00	0.04	0.01	0.00	0.00	0.00	0.00	0.00	0.00
Immature kernels, %	0.09	0.04	0.02	0.02	0.03	0.04	0.06	0.03	0.04	0.03	0.03	0.04
Insect damaged kernels, %	0.18	0.17	0.28	0.32	0.58	0.34	0.45	0.48	0.55	0.58	0.66	0.54
Sprouted kernels, %	0.09	0.09	0.06	0.04	0.44	0.19	0.11	0.07	0.04	0.03	0.42	0.17
Total damaged kernels, %	0.37	0.31	0.35	0.39	1.08	0.58	0.62	0.58	0.64	0.63	1.11	0.76
Combined deviations, %	1.35	1.39	1.73	1.71	4.39	2.41	2.32	2.27	2.45	2.55	4.82	3.06
Heavily frost damaged kernels, %	0.00	0.02	0.00	0.00	0.03	0.01	0.00	0.00	0.01	0.00	0.11	0.03
Field fungi, %	0.44	0.38	0.23	0.17	0.77	0.47	0.33	0.33	0.16	0.14	0.59	0.36
Storage fungi, %	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ergot, %	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Poisonous seeds ( <i>Crotalaria spp.</i> , etc.)	0	0	0	0	1	0	0	0	0	0	0	0
Poisonous seeds ( <i>Argemone mexicana</i> , etc.)	0	0	0	0	0	0	0	0	0	0	0	0
Live insects	No	No	No	No	No	No	No	No	No	No	No	No
Undesirable odour	No	No	No	No	No	No	No	No	No	No	No	No
	Super	B1	B2	B3	COW	Average	Super	B1	B2	B3	COW	Average
<b>No. of samples</b>	<b>19</b>	<b>16</b>	<b>14</b>	<b>8</b>	<b>8</b>	<b>65</b>	<b>19</b>	<b>17</b>	<b>13</b>	<b>11</b>	<b>5</b>	<b>65</b>
Bühler Extraction, %	74.0	74.1	73.7	73.8	73.3	73.9	74.4	73.9	73.7	73.1	73.3	73.8
<b>FLOUR</b>												
Colour, KJ (wet)	-4.9	-5.0	-5.0	-4.9	-4.8	-4.9	-5.0	-5.0	-5.0	-4.9	-5.0	-5.0
Colour, Konica Minolta CM5 (dry)												
L*	93.6	93.73	93.75	93.96	93.55	93.70	93.6	93.69	93.67	93.76	93.8	93.68
a*	0.51	0.48	0.46	0.47	0.49	0.49	0.51	0.48	0.47	0.44	0.48	0.48
b*	9.83	9.89	9.84	9.77	9.91	9.85	10.02	10.26	10.58	9.99	10.23	10.20
Ash (db), %	0.59	0.60	0.61	0.62	0.60	0.60	0.59	0.60	0.60	0.59	0.59	0.59
Protein (12% mb), %	12.3	10.9	10.0	9.1	11.1	10.9	12.2	11.1	10.2	9.6	10.9	11.0
Wet Gluten (14% mb), %	32.5	28.9	26.6	23.4	29.7	28.9	32.9	29.6	27.5	25.6	29.7	29.5
Dry Gluten (14% mb), %	11.0	9.5	8.8	7.8	9.9	9.6	11.1	9.9	9.1	8.2	9.9	9.8
Gluten Index	96	96	96	96	96	96	95	96	96	97	96	96
<b>100 g BAKING TEST</b>												
Baking water absorption, %	62.4	60.8	60.1	59.0	61.1	61.0	62.4	61.0	60.0	59.7	60.9	61.0
Loaf volume, cm <sup>3</sup>	1150	1064	1018	938	1078	1065	1034	972	916	898	963	966
Evaluation (see page 78)	0	0	0	0	0	0	0	0	0	0	0	0
<b>FARINOGRAM</b>												
Water absorption (14% mb), %	61.5	59.9	59.3	58.0	59.6	60.0	60.3	59.7	58.7	58.3	59.2	59.4
Development time, min	7.9	5.3	4.5	4.0	4.9	5.7	6.5	6.0	4.3	4.2	4.8	5.4
Stability, mm	12.2	9.1	8.1	7.3	10.1	9.7	15.8	12.9	9.7	10.3	12.4	12.6
Mixing tolerance index, BU	33	44	48	52	41	42	25	31	37	36	30	31
<b>94</b>						<b>87</b>						

RSA Crop Quality 2021/22 and 2022/22 Seasons

Country of origin	RSA Crop Average 2021/22						RSA Crop Average 2022/23					
Class and Grade bread wheat	Super	B1	B2	B3	COW	Average	Super	B1	B2	B3	COW	Average
<b>No. of samples</b>	19	16	14	8	8	65	19	17	13	11	5	65
<b>ALVEOGRAM</b>												
Strength (S), cm <sup>2</sup>	51.3	41.1	37.2	33.2	43.2	42.5	48.0	42.7	35.6	35.4	40.6	41.4
Stability (P), mm	89	80	88	85	85	86	78	82	78	84	77	80
Distensibility (L), mm	136	127	108	93	126	121	152	130	119	101	137	130
P/L	0.69	0.66	0.98	0.92	0.69	0.77	0.52	0.66	0.72	0.86	0.60	0.66
<b>95</b>						<b>89</b>						
<b>EXTENSOGRAM</b>												
Strength, cm <sup>2</sup>	123	108	87	72	106	103	134	108	91	85	113	109
Max. height, BU	426	401	360	346	405	393	454	407	371	384	419	411
Extensibility, mm	215	198	177	152	188	191	218	194	178	159	200	192
<b>96</b>						<b>91</b>						
<b>MIXOGRAM</b>												
Peak time, min	3.0	2.9	2.9	2.9	3.0	2.9	3.1	3.2	3.0	3.4	3.2	3.1
Water absorption (14% mb), %	62.6	60.8	59.8	59.0	61.2	60.9	62.4	61	60	59.5	60.9	60.9
<b>97</b>						<b>93</b>						
<b>MYCOTOXINS</b>												
Aflatoxin B <sub>1</sub> (µg/kg)	ND						ND					
Aflatoxin B <sub>2</sub> (µg/kg)	ND						ND					
Aflatoxin G <sub>1</sub> (µg/kg)	ND						ND					
Aflatoxin G <sub>2</sub> (µg/kg)	ND						ND					
Fumonisin B <sub>1</sub> (µg/kg)	ND						ND					
Fumonisin B <sub>2</sub> (µg/kg)	ND						ND					
Fumonisin B <sub>3</sub> (µg/kg)	ND						ND					
Deoxynivalenol (µg/kg) [max. value]	169 [1 085]						757 [6 463]					
15-ADON (µg/kg) [max. value]	16 [183]						46 [301]					
Ochratoxin A (µg/kg)	ND						ND					
Zearalenone (µg/kg) [max. value]	4 [144]						1 [36]					
HT-2 (µg/kg)	ND						ND					
T-2 Toxin (µg/kg)	ND						ND					
<b>No. of samples</b>	<b>40</b>						<b>40</b>					



# Methods

## GRADING:

Full grading was conducted in accordance with the Regulations relating to the grading, packing and marking of bread wheat intended for sale in the Republic of South Africa (No. R. 1547 of 29 November 2019). Please see pages 94 to 106.

Hectolitre mass, screenings, protein and falling number were determined. The determination of deviations relating to wheat kernels comprised foreign matter including gravel, stones, turf and glass; other grain and unthreshed ears; damaged kernels including heat-damaged kernels, immature kernels, insect-damaged kernels and sprouted kernels; heavily frost-damaged kernels; field fungi; storage fungi; ergot; noxious seeds; possible presence of undesirable odours and live insects.

**Hectolitre mass** means the mass in kilogram per hectolitre and was determined according to ISO 7971-3, 2019 by means of the Kern 222 instrument.

Hectolitre mass provides a measure of the bulk density of grain and is also useful as a guide to grain soundness and potential milling extraction (flour yield).

**Screenings** means all material that passes through a standard sieve. For the definition of a standard sieve please refer to the definitions of Regulation No. R. 1547 on page 103 of this report.

**Damaged wheat** means wheat -

- (a) which have been damaged by insects;
- (b) which have been distinctly discoloured (orange-brown, dark brown or black) by external heat or as a result of heating caused by internal fermentation in wheat with an excessive moisture content, excluding wheat kernels in respect of which the discolouration is confined to the germ end;
- (c) which are immature and have a distinctly green colour; and
- (d) in which germination has proceeded to such an extent that the skin covering the embryo has been broken or the developing sprouts and/or rootlets are clearly visible.

**Combined deviations** means the sum of the percentages screenings, other grain and unthreshed ears, foreign matter and damaged kernels.

## THOUSAND KERNEL MASS:

This is the weight in grams of one thousand kernels of grain and provides a measure of grain size and density. This determination does not include kernels that are broken or chipped and is done according to Industry Accepted Method 008. Thousand kernel mass is reported on a 13% moisture basis.

## FALLING NUMBER MILLING:

At least 300 g of wheat is cleaned by using the standard 1.8 mm sieve and by removing coarser impurities by hand. The sample is then milled on a falling number hammer mill fitted with a 0.8 mm sieve.

## NEAR INFRARED SPECTROSCOPY (NIRS):

NIRS is a measurement technique based on the fact that the constituents to be measured, absorb electromagnetic radiation in the near infrared region of the electromagnetic spectrum. The moisture and protein content of the whole wheat flour and Quadromat milled flour samples are measured with a SpectraStar 2400 NIR Analyser RTW.

The calibration on the NIR was developed by the SAGL and is verified by analysing every fifth sample by means of the primary methods, described on the next page under Moisture and Protein.

## FALLING NUMBER:

This method is based upon the rapid gelatinisation of an aqueous suspension of meal or flour in a boiling water bath and subsequent measurement of the liquefaction of the starch paste by the alpha-amylase in the sample. The method measures the enzyme activity, mainly the  $\alpha$ -amylase activity.

ICC Standard No. 107/1, latest edition is used to determine the falling number. The altitude-



corrected value is reported on a 14% moisture basis.

### QUADROMAT JUNIOR MILLING:

Cleaned wheat samples are conditioned by adding 3 mL water per 100 g wheat, 18 hours prior to milling. The samples are then milled on the Quadromat Junior laboratory mill.

### BÜHLER MILLING:

Cleaned wheat samples are conditioned to between 15.0% and 16.0% moisture according to the wheat moisture and kernel hardness and allowed to stand for a minimum of 18 hours (18 - 24 hours). Samples are then milled on a Bühler MLU 202 mill and passed through a bran finisher.

### BÜHLER EXTRACTION:

The extraction represents the flour yield after milling plus flour obtained from bran that passed through a bran finisher. Flour extraction is calculated from the mass of the total products. The Bühler MLU 202 mill is set for South African wheat, mill settings and sieve sizes deviate from AACCI method 26-21.02, latest edition.

### MOISTURE:

ICC Standard No. 110/1, latest edition is used to determine the moisture content of wheat flour. This method determines moisture content as a loss in weight of a sample when dried in an oven at 130 °C for 90 minutes for flour or 2 hours for whole wheat flour.

### PROTEIN:

The Dumas combustion analysis technique is used, according to AACCI method 46-30.01, latest edition.

This method prescribes a generic combustion method for the determination of crude protein. Combustion of the sample at high temperature (1 100 °C) in pure oxygen sets nitrogen free, which is measured by thermal conductivity detection. The total nitrogen content of the whole wheat flour and flour samples are determined and converted to equivalent protein by multiplication with a factor of 5.7 to obtain the protein content.

### COLOUR:

Colour is one of the important properties of milled grains and the colour of wheat flour

often affects the colour of the finished product. In general, a bright white colour flour is more desirable for most products.

The Kent Jones colour (so called wet colour) is determined by following FTP Method No. 0007/3, 7/1991. This method determines the influence of bran and/or extraneous material present in flour by measuring the reflectance of a flour-water slurry at a wavelength of 540 nm. The lower the Kent Jones colour, the lighter/brighter the flour and vice versa.

The dry colour of wheat flour can be measured accurately and precisely with the Konica Minolta CM-5 spectrophotometer. CIE L\*a\*b\* (CIELAB) is a colour model using lightness (L\*) and two colour values (a\* and b\*). The colour coordinates define where a specific colour lies in a Cartesian graph. L\* represents lightness (100 being white and 0 being black), a\* represents green to red variation and b\* represents variation from blue to yellow. The results reported are for the 10° observer and D65 illuminant.

### ASH:

Ash is defined as the quantity of mineral matter that remains as incombustible residue, after incineration of a sample in a muffle furnace by application of the described working method. The ash constituents of wheat are taken from the minerals of the soil. The total mineral content as well as the relative proportions of individual elements depend largely upon the soil, rainfall and other climatic conditions during growth.

Since the level of minerals present in flour is related to the rate of extraction, the ash content also indicates milling performance by indirectly revealing the amount of bran contamination. In-house method No. 011, based on the AACCI method 08-02.01 Rapid (Magnesium Acetate) method, is used for the determination.

### RAPID VISCO ANALYSER:

AACCI method 76-21.02, latest edition, is followed to prepare a complete pasting curve by means of the Rapid Visco Analyser (RVA). The RVA is a rotational viscometer, able to continuously record the viscosity of a sample (under controlled temperature conditions) as the starch granules hydrate, swell and disintegrate (gelatinisation and pasting), followed by possible realignment of the starch



molecules during cooling (retrogradation).

Maximum viscosity before the onset of cooling (peak viscosity), time to peak viscosity, minimum viscosity after peak (trough) and final viscosity are measured and provide indications of the pasting properties of the samples and therefore its processing value for baking and other applications.

The results are reported in centipoise (cP) on a 14% moisture basis. Results can also be converted to RVU (rapid visco unit), 1 RVU = 12 cP.

### GLUTEN:

Wheat gluten is the water-insoluble complex protein fraction present in wheat flours. The ability of wheat flour to produce dough with good gas retaining properties is attributed to gluten. Gluten is a plastic elastic substance composed principally of two functional protein components. Glutenin, the high molecular weight fraction, contributes elasticity (is less extensible) and Gliadin, the low molecular weight fraction, provides the viscous component (is highly extensible and less elastic).

The gluten content of wheat flour is determined by means of AACCI Method 38-12.02, latest edition. Wet gluten is washed from meal or flour by an automatic washing apparatus (Glutomatic).

The wet gluten is dried under standardised conditions in a Glutork to obtain the dry gluten. The total wet and total dry gluten contents are expressed as percentages of the sample on a 14% moisture basis.

Wet gluten content correlates to loaf volume and dry gluten content to the crude protein content. The difference between the wet and dry gluten contents is an indication of the water-holding capacity of the gluten proteins, which is in turn, related to flour water absorption.

The gluten index is the ratio of the wet gluten remaining on the sieve (after centrifugation) to the total wet gluten. The gluten index provides an indication of the gluten strength and is not influenced by the protein content.

### FARINOGRAPH:

AACCI method 54-21.02, latest edition constant

flour weight procedure is followed, using 300 g of flour on a 14% moisture basis.

The farinograph measures and records the resistance of a dough to mixing, as it is formed from flour and water, developed and broken down. This resistance is called consistency. The dough is subjected to a prolonged, relatively gentle mixing action.

The water absorption is the amount of water required for a dough to reach a definite consistency (500 Brabender units). The amount of water added to the flour is expressed as a percentage of the flour mass and reported on a 14% moisture basis.

The development time, measured in minutes, is the time from the beginning of water addition until the dough reaches its optimum consistency and the point immediately before the first indication of weakening. A long mixing time can be associated with flours with a high percentage of gluten-forming proteins.

The stability, measured in minutes, is the time during which the top of the curve intercepts a horizontal line through the centre of the curve. This gives an indication of the dough's tolerance to mixing: the longer the stability, the longer the mixing time that the dough can withstand. A dough with a longer stability can also withstand a longer fermentation period.

The mixing tolerance index (MTI) value is the difference, in Brabender units (BU), between the top of the curve at the peak and the top of the curve measured 5 minutes after the peak is reached. The value gives an indication of the extent to which breakdown of the dough occurs. The higher the value, the more and the quicker the breakdown of the dough occurs. This value is similar to the mixogram tail height.

### EXTENSOGRAPH:

The extensograph measures the resistance and extensibility of a fully mixed, relaxed flour-water dough, by measuring the force required to stretch the dough with a hook until it breaks. ICC Standard No. 114/1, latest edition is followed.

The strength, measured in  $\text{cm}^2$ , gives an indication of the total force (work) needed to stretch the dough and is represented by the area under the curve.



The maximum height/resistance, measure in BU, gives an indication of the dough's resistance to stretching and is measured as the mean of the maximum heights of the curves of the two test pieces.

The extensibility, measured in millimeters, is the mean length at the base of the two curves and indicates the stretch ability of the dough.

### ALVEOGRAPH:

The alveograph measures the resistance of the dough to stretching and also how extensible the dough is. The alveograph stretches the dough in more than one direction (as is happening during proofing), whereas the extensograph stretches the dough in only one direction. ICC Standard No. 121, latest edition is followed.

Strength (S): The area under the curve gives an indication of the dough strength and is measured in cm<sup>2</sup>.

Stability (P): Obtained by multiplying the maximum height of the curve with a constant factor of 1.1. This value is an indication of the resistance of the dough to extension (force required to blow the bubble of dough) and is measured in millimetres.

Distensibility (L): The length of the curve, measured along the base line in millimetres, corresponds to the maximum volume of air that the bubble can withhold. Provides an indication of the extensibility of the dough.

P/L-value: This ratio is obtained by dividing the P-value by the L-value, thus providing an approximate indication of the shape of the curve that combines stability and extensibility (viscoelastic properties).

### MIXOGRAPH:

A 35 g mixograph is used. The amount of flour weighed is adjusted according to the flour moisture content and the amount of water added to the flour is adjusted according to the flour protein content. Industry Accepted Method 020 based on AACCI method 54-40.02, latest edition is followed.

Mixogram peak time is the time measured in minutes that dough takes to reach its maximum consistency or first indication of

dough weakening. The peak time is a measure of optimum dough development and thus a measure of protein quality.

Mixogram tail height at 6 minutes is the distance in millimetres measured from the base line of the paper at 6 minutes to the graph centre point at 6 minutes. This figure is an indication of the weakening effect of the dough. Higher values indicate flours that are more tolerant to mixing.

### 100 g BAKING TEST:

This procedure, according to Industry Accepted Method 022 based on AACCI Method 10-10.03, latest edition, provides an optimised bread-making method for evaluating bread wheat flour quality and a variety of dough ingredients by a straight-dough method in which all ingredients are incorporated in the initial mixing step.

Keys for the evaluation of the 100 g Baking test:

- 0 - Excellent
- 1 - Very Good
- 2 - Good
- 3 - Questionable
- 4 - Poor
- 5 - Very Poor
- 6 - Extremely Poor

Please note: This 100 g Baking test evaluation does not give an indication of the baking quality of the flour, but refers to the relationship between the protein content and the bread volume.

### MYCOTOXIN ANALYSES:

Mycotoxins are secondary metabolites produced by fungi on agricultural commodities intended for human and animal consumption. These mycotoxins are potentially dangerous to humans and animals since they are, amongst other also carcinogens. Aside from health risks, mycotoxin contamination can also reduce the value of the crops. Environmental factors such as temperature, humidity, soil and storage conditions influence toxin production.

SAGL implements a validated SAGL In-house multi-mycotoxin method using UPLC - MS/MS. 40 of the 335 wheat crop samples were tested for Aflatoxin B<sub>1</sub>, B<sub>2</sub>, G<sub>1</sub>, G<sub>2</sub>, Fumonisin B<sub>1</sub>, B<sub>2</sub>, B<sub>3</sub>, Deoxynivalenol, 15-ADON, HT2 Toxin, T-2 Toxin, Zearalenone and Ochratoxin A.

# *Wheat Exports and Imports*





## WHEAT EXPORTS/IMPORTS PER COUNTRY

2021/22 Season (25 Sep 2021 - 30 Sep 2022)

RSA EXPORTS		IMPORTS FOR RSA		IMPORTS FOR OTHER COUNTRIES		EXPORTS OF IMPORTED WHEAT		IMPORTS PER HARBOUR*	
To Country	Tons	From Country	Tons	From Country	Tons	To Country	Tons	Harbour	Tons
Botswana	64 736	Argentina	298 543	Argentina	63 522	Botswana	52 583	Cape Town	161 980
Eswatini (Swaziland)	666	Australia	382 604	Australia	18 616	Eswatini (Swaziland)	46 956	Durban	1 430 278
Lesotho	38 554	Brazil	242 639	Brazil	3 983	Lesotho	21 973	East London	27 830
Namibia	56 653	Germany	2 732	Latvia	5 010	Mozambique	11 060	Port Elizabeth	21 631
Zambia	38 396	Latvia	47 391	Lithuania	28 033	Zimbabwe	7 100	Richards Bay	93 357
Zimbabwe	72 187	Lithuania	312 795	Poland	14 613				
		Poland	282 262						
		United States	32 333						
		Ukraine	7 341						
		United States	34 874						
<b>Total</b>	<b>271 192</b>	<b>Total</b>	<b>1 601 299</b>	<b>Total</b>	<b>133 777</b>	<b>Total</b>	<b>139 672</b>	<b>Total</b>	<b>1 735 076</b>

\*Includes: Imports for RSA and Other Countries

**WHEAT EXPORTS/IMPORTS PER COUNTRY**

2022/23 Season (1 Oct 2022 - 29 Sep 2023)

RSA EXPORTS		IMPORTS FOR RSA		IMPORTS FOR OTHER COUNTRIES		EXPORTS OF IMPORTED WHEAT		IMPORTS PER HARBOUR*	
To Country	Tons	From Country	Tons	From Country	Tons	To country	Tons	Harbour	Tons
Botswana	79 690	Argentina	33 719	Argentina	4 725	Botswana	45 590	Cape Town	132 353
Eswatini (Swaziland)	3 276	Australia	262 111	Australia	23 162	Eswatini (Swaziland)	42 139	Durban	1 627 736
Lesotho	14 212	Brazil	135 833	Canada	11 928	Lesotho	51 443	East London	21 911
Namibia	26 055	Czech Republic	26 056	Czech Republic	10 000	Zambia	9 017	Port Elizabeth	48 362
Zambia	45 438	Germany	117 449	Germany	21 301	Zimbabwe	48 759	Richards Bay	73 822
Zimbabwe	85 385	Latvia	76 832	Latvia	22 113				
		Lithuania	232 901	Lithuania	46 507				
		Poland	516 240	Poland	44 990				
		Russian Federation	264 681	Russian Federation	35 089				
		United States	18 547						
<b>Total</b>	<b>254 056</b>	<b>Total</b>	<b>1 684 369</b>	<b>Total</b>	<b>219 815</b>	<b>Total</b>	<b>196 948</b>	<b>Total</b>	<b>1 904 184</b>

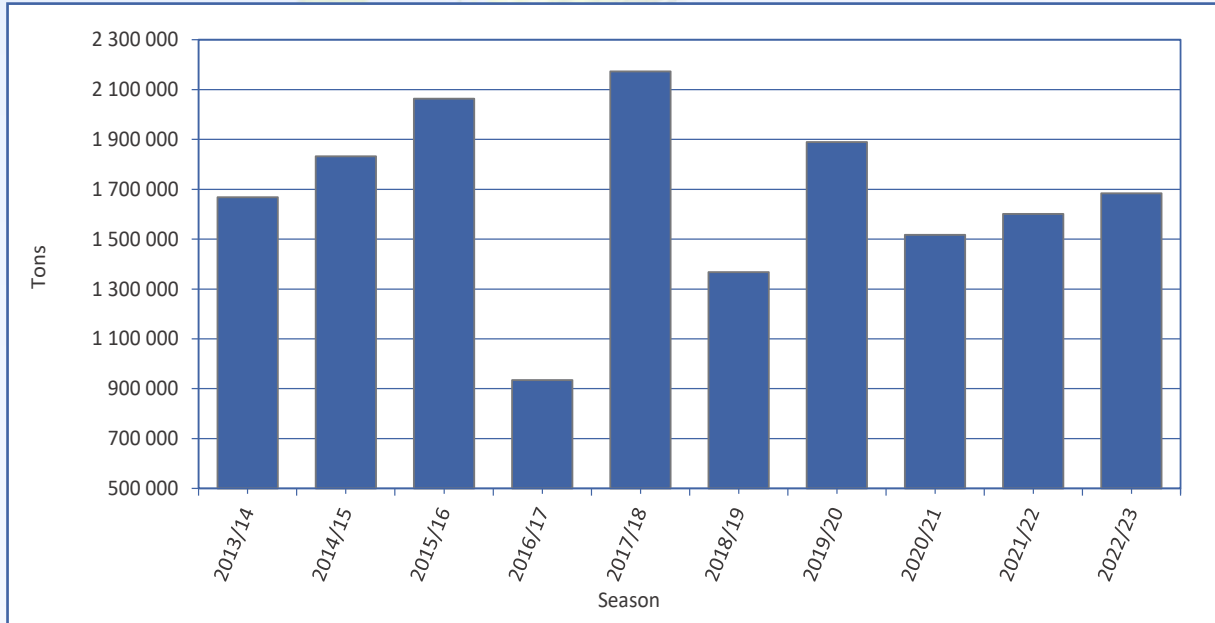
\*Includes: Imports for RSA and Other Countries



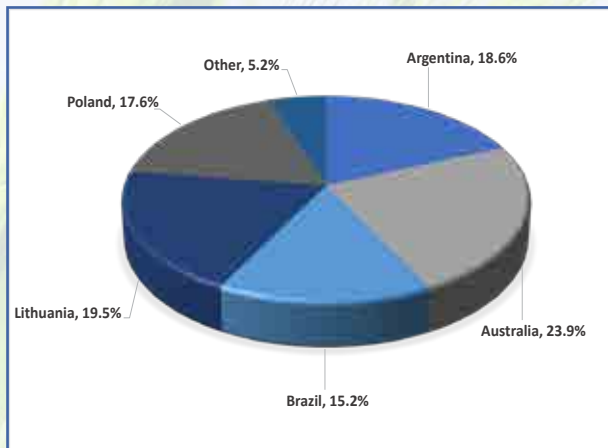
## Quantity of wheat imported to the RSA

The graphs and table given below and on the next page, are based on progressive import figures per country provided by SAGIS.

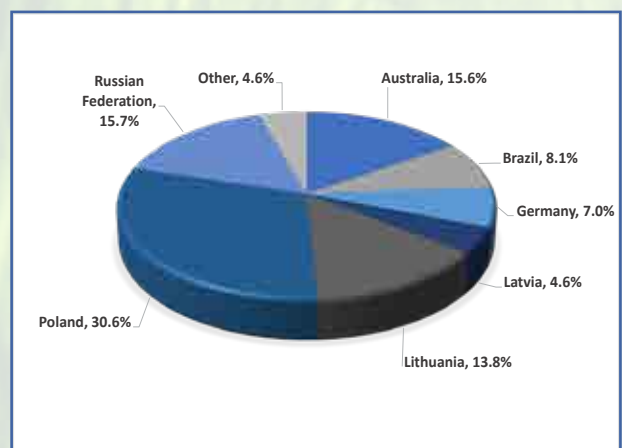
Graph 28: Total wheat imports for domestic use from the 2013/14 season



Graph 29: Wheat imports per origin for domestic use 2021/22 season



Graph 30: Wheat imports per origin for domestic use 2022/23 season



**Table 7: Total wheat imports per country per season for use in the RSA**

	Season										Total (Tons)
	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	
Argentina	-	59 607	49 516	35 613	132 433	35 519	-	-	298 543	33 719	644 950
Australia	49 780	95 254	38 457	24 816	-	-	-	455 717	382 604	262 111	1 308 739
Brazil	-	-	-	-	-	-	-	-	242 639	135 833	378 472
Canada	111 289	105 457	102 816	27 841	90 944	85 428	51 001	136 481	-	-	711 257
Czech Republic	-	-	-	144 402	47 904	110 636	52 365	8 965	-	26 056	390 328
Finland	25 430	-	-	-	-	-	21 860	-	-	-	47 290
Germany	179 436	348 385	283 451	237 508	282 312	358 343	274 283	51 461	2 732	117 449	2 135 360
Latvia	22 013	61 005	-	17 098	140 007	39 290	54 803	115 250	47 391	76 832	573 689
Lithuania	40 532	43 791	151 047	-	182 241	124 161	202 656	275 903	312 795	232 901	1 566 027
Poland	-	91 483	185 036	76 912	17 514	24 998	543 325	220 604	282 262	516 240	1 958 374
Romania	-	-	-	112 334	101 449	-	-	-	-	-	213 783
Russian Federation	800 964	719 784	956 705	182 993	955 697	401 385	536 757	210 399	-	264 681	5 029 365
Ukraine	372 500	279 364	109 350	13 568	135 669	48 210	94 726	7 341	-	-	1 060 728
USA	66 468	28 311	186 387	61 680	87 064	140 127	58 092	34 874	32 333	18 547	713 883
<b>Total</b>	<b>1 668 412</b>	<b>1 832 441</b>	<b>2 062 765</b>	<b>934 765</b>	<b>2 173 234</b>	<b>1 368 097</b>	<b>1 889 868</b>	<b>1 516 995</b>	<b>1 601 299</b>	<b>1 684 369</b>	<b>16 732 245</b>

## *Quality summary of imported wheat*

**(Wheat imported from 25 September 2021 to 30 September 2022) (Previous season)**

The quality of all wheat imported into South Africa is monitored by the SAGL. A subsample of all samples drawn by inspectors of the South African Agricultural Food, Quarantine and Inspection Services (SAAFQIS) of the Department of Agriculture, Land Reform and Rural Development (DALRRD) is forwarded to the SAGL for analysis. To assist with quality comparisons between local and imported wheat, the same scope of analysis is used for both sets of samples. The import quality results are published at the end of each production and marketing season. The results of samples of wheat imported during the current season are updated quarterly and available on the SAGL website.

For grading as well as dough and baking quality results of the imported wheat per country, please refer to pages 77 to 88. This imported wheat quality is compared to a summary of the local crop quality of the corresponding (2021/22) season. To simplify the comparison between the quality of the different countries of import, the average quality per country was summarised in Table 8 on pages 75 and 76. The minimum, maximum and standard deviation per country was also calculated. Please take note of the number of samples analysed when comparing results, the higher the number of samples, the more reliable the average result will be.

A total number of 130 samples of wheat imported from the following six countries were received (number of samples received in brackets): Argentina (32), Australia (35), Brazil (13), Lithuania (19), Poland (23) and the USA (8). Wheat imported for purposes other than bread baking (e.g. soft types for biscuit making) is included in this data set.



Most of the wheat imported to South Africa is blended with local wheat to obtain a certain milling and baking quality as per individual company specifications. Milling companies will blend higher and lower quality wheat to obtain the most cost-effective grist formulation that conforms to a specific quality. The main objective is to supply the most consistent quality of flour to their customers (bakers) as possible, as in the end, consistency is one of the most important quality parameters.

Towards the end of the production season, it may however become necessary for milling companies to mill wheat blends consisting only of imported wheat. Transportation cost is also an important factor for consideration. The grist formulation of mills situated at the coast will as a result consist mainly of imported wheat whereas inland mills will mill a combination of local and imported wheat.

The imported wheat samples as well as the 2021/22 wheat crop samples, were graded according to the national wheat grading regulations published in the Government Notice NO. R. 1547 of 29 November 2019. Hectolitre mass is an important grading factor that also provides an indication of flour extraction potential. Only three of the samples had hectolitre mass values below 76 kg/hl (minimum requirement for South African Super Grade to Grade 2 wheat). One of the samples originated in Lithuania and the other two in Poland.

Screenings represent all material that passes through a standard sieve (1.8 mm), with 3% the maximum allowed for Super Grade to Grade 3 according to RSA grading regulations. When comparing screening results originating from different countries, it is important to keep in mind that sieve aperture size and shape as well as sample preparation procedures vary between countries. Samples from Lithuania and Poland reported the highest levels of screenings.

Five samples from Australia reported falling number results below 220 seconds. However, all of the countries' averages, including that of Australia, were well above 300 seconds. The RSA national average for the same season was 341 seconds.

The protein content of the wheat imported from the USA were low, resulting in flour samples with protein contents below 8%. The resultant rheological quality of the samples was weak and the wheat therefor most probably intended for biscuit making purposes.

The ability of wheat flour to produce dough with good gas-holding capability is attributable to gluten as gluten imparts the elasticity and extensibility characteristics to the dough. Good quality gluten is capable of producing a loaf of bread with a high volume and good crumb texture. When evaluating gluten results, it is important to take the protein content into account. The ratio of wet gluten to total protein content is normally between 2.5 – 2.8 to 1. The wet gluten content of good quality white bread flour normally ranges between 27 – 33% (14% mb). The difference between wet and dry gluten is an indication of the water-holding capacity of the gluten proteins which is in turn related to protein quality. This water-holding capacity is also one of the factors determining flour water absorption.

Flour with higher water absorption is preferred by bakers as this results in increased dough yields. The acceptable range for white bread flour is normally between 60.0 – 64.0%, averaging 61.0 – 62.0%. In general, longer farinogram development times of 3.5 to 6.0 minutes and stabilities of 8.0 to 12.0 minutes will be an indication of good baking quality, which is associated with good protein quality.



Acceptable ranges for the alveogram parameters generally are as follows: Strength 30 – 45 cm<sup>2</sup>, stability (P) 65 – 120 mm, distensibility (L) 80 – 120 mm and P/L 0.70 – 1.50. A good correlation exists between alveogram strength and protein quality. Low/short distensibility values, indicated by high P/L values can result in lower loaf volumes. High/long distensibility values, are indicative of soft doughs with excess stretching properties, which can also result in low loaf volumes due to poor gas retention properties. In general, extensogram strength values ranging between 80 – 150 cm<sup>2</sup>, maximum heights of 300 – 550 BU and extensibility values of 170 – 220 mm, indicate good baking quality.

The imported wheat samples, except for the Australian wheat, again showed a tendency towards longer mixogram mixing times. Some of these long mixing times can be explained by low protein levels in the samples. Mixing time provides an indication of the amount of time required to mix a dough to optimum development, 2.5 to 3.5 minutes are considered acceptable in South Africa. The longer the mixing time, the larger the risk that the dough will not be mixed to optimum development, which will negatively influence the bread quality and cause lower loaf volumes. Long mixing times can also result in increased dough temperatures. Warmer doughs will proof faster and generally carry less water.

Composite samples of holds per shipment per country were tested for the presence of mycotoxin residues by means of a multi-mycotoxin analysis. The mycotoxin residue levels detected on the composite samples did not raise any major concerns. All samples tested negative for Aflatoxin B<sub>1</sub>, B<sub>2</sub>, G<sub>1</sub>, G<sub>2</sub>, Fumonisin B<sub>1</sub>, B<sub>2</sub>, B<sub>3</sub>, Ochratoxin A, HT-2 Toxin, T-2 Toxin and Zearalenone. Deoxynivalenol (DON) was the most prevalent mycotoxin present in these samples, 15-ADON residues were detected on a few samples. All the positive DON results were well below the national maximum allowable level of 2 000 µg/kg for cereal grains intended for further processing.



**Table 8: Summary of the quality results of imported wheat during the 2021/22 season**

Quality parameter	Argentina				Australia				Brazil				Lithuania			
	Ave	Min	Max	Stdev	Ave	Min	Max	Stdev	Ave	Min	Max	Stdev	Ave	Min	Max	Stdev
Hectolitre mass, kg/hl	79.7	78.0	80.9	0.76	83.5	81.7	85.2	1.08	79.6	77.9	80.9	0.83	77.2	75.9	77.9	0.53
Screenings (<1.8mm), %	1.94	1.04	4.15	0.78	0.98	0.42	1.41	0.27	2.13	1.44	3.56	0.72	3.12	2.17	3.84	0.44
1000 Kernel mass, g (13 % mb)	33.3	29.4	36.0	2.02	42.4	38.8	48.2	3.10	32.4	30.2	35.9	2.28	36.2	35.1	38.0	0.66
WWF Protein (12% mb), %	11.7	10.1	12.8	0.79	11.9	10.7	13.3	0.59	12.1	11.4	12.6	0.40	12.5	12.2	12.8	0.17
WWF Falling number, sec	346	275	416	35.17	360	162	495	101.28	361	272	415	33.43	372	311	437	27.98
<i>Number of samples</i>	<b>32</b>				<b>35</b>				<b>13</b>				<b>19</b>			
Flour moisture, %	13.7	13.1	14.1	0.22	13.6	13.0	14.3	0.31	13.9	13.5	14.5	0.26	13.6	12.9	14.0	0.31
Flour Protein, % (12 % mb)	10.6	9.0	11.6	0.73	10.9	9.8	11.5	0.55	10.9	10.2	11.3	0.35	11.2	10.9	11.5	0.20
Ash, % (db)	0.60	0.53	0.67	0.04	0.54	0.49	0.59	0.02	0.62	0.60	0.68	0.03	0.54	0.51	0.57	0.02
Colour, KJ (wet)	-4.6	-5.0	-4.1	0.27	-5.0	-5.0	-5.0	0.00	-4.8	-5.0	-4.6	0.14	-4.5	-4.8	-4.4	0.12
Konica Minolta CM-5 colour, L*	93.15	92.38	93.79	0.44	93.85	93.40	94.29	0.21	93.00	92.66	93.43	0.23	93.50	93.15	93.66	0.14
Konica Minolta CM-5 colour, b*	11.07	10.35	13.73	0.69	9.26	8.86	9.80	0.25	11.09	10.46	11.52	0.39	11.06	10.83	11.43	0.20
Wet gluten, % (14 % mb)	26.8	23.1	30.5	2.84	29.1	25.0	32.6	1.88	27.7	23.0	31.8	2.66	28.9	28.4	29.9	0.45
Dry gluten, % (14 % mb)	9.0	7.6	10.0	0.78	9.6	8.3	10.7	0.62	9.2	8.0	10.3	0.70	10.0	9.6	11.0	0.33
Gluten Index	97	88	100	2.54	96	88	99	2.57	97	94	100	1.88	98	96	99	1.07
<b>Farinogram</b>																
Water absorption, % (14% mb)	56.9	55.1	59.6	1.49	60.2	58.5	62.7	1.05	57.6	55.9	58.5	0.91	54.8	53.7	55.5	0.52
Development time, min	4.1	1.5	9.3	3.12	4.9	2.5	6.7	1.15	5.8	1.8	9.2	3.18	2.4	1.9	3.5	0.41
Stability, mm	9.7	2.0	18.2	5.35	9.0	6.2	12.2	1.80	13.2	3.9	18.7	3.77	10.2	7.2	12.5	1.35
<b>Alveogram</b>																
Strength, cm <sup>2</sup>	43.7	33.0	53.2	4.68	47.6	36.1	62.1	7.05	47.0	42.8	52.9	2.81	38.5	32.9	45.9	3.10
Stability, mm	97	90	104	3.48	97	85	116	9.67	97	89	105	5.81	67	53	75	7.03
Distensibility, mm	84	63	105	12.65	107	68	137	15.33	93	70	105	9.93	120	100	150	12.19
P/L	1.17	0.89	1.47	0.18	0.94	0.68	1.62	0.24	1.07	0.86	1.49	0.18	0.57	0.35	0.74	0.10
<b>Extensogram</b>																
Strength, cm <sup>2</sup>	108	97	126	7.89	114	74	148	23.61	113	94	130	11.01	121	104	134	7.87
Max. height, BU	537	440	639	57.10	447	306	568	85.41	525	428	608	55.92	525	484	569	25.73
Extensibility, mm	152	128	171	11.29	188	146	209	16.30	163	149	178	8.38	172	153	185	8.32
<b>Mixogram</b>																
Water absorption, % (14% mb)	60.5	58.9	61.7	0.79	60.8	59.6	61.5	0.62	60.9	60.0	61.3	0.41	61.2	60.8	61.5	0.25
Peak time, min	4.7	3.7	5.7	0.67	3.0	2.3	3.5	0.33	4.4	3.5	5.3	0.62	4.6	4.1	5.3	0.35
<b>100 g Baking Test</b>																
Loaf volume, cm <sup>3</sup>	955	862	1080	63.27	1030	846	1163	76.40	1028	976	1085	30.93	1091	1007	1152	30.91
Evaluation	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
<i>Number of samples</i>	<b>32</b>				<b>35</b>				<b>13</b>				<b>19</b>			

**Table 8: Summary of the quality results of imported wheat during the 2021/22 season**

Quality parameter	Poland				USA				RSA crop average 2021/22			
	Ave	Min	Max	Stdev	Ave	Min	Max	Stdev	Ave	Min	Max	Stdev
Hectolitre mass, kg/hl	77.0	75.1	77.9	0.72	79.9	79.0	81.1	0.89	79.9	57.9	85.5	2.76
Screenings (<1.8mm), %	2.87	2.17	4.18	0.52	2.21	1.68	3.12	0.48	1.20	0.01	23.97	1.64
1000 Kernel mass, g (13 % mb)	36.0	31.8	40.7	1.86	34.3	32.8	35.9	1.12	40.3	27.6	48.0	3.65
WWF Protein (12% mb), %	12.3	11.5	13.2	0.44	9.3	9.0	9.7	0.26	11.9	9.0	14.7	1.29
WWF Falling number, sec	360	266	429	45.22	335	290	376	29.31	341	56	495	76.94
<i>Number of samples</i>	<b>23</b>				<b>8</b>				<b>65</b>			
Flour moisture, %	13.8	13.2	14.5	0.35	13.4	13.1	13.8	0.24	13.7	13.1	14.4	0.29
Flour Protein, % (12 % mb)	11.0	10.0	11.7	0.44	7.6	7.3	7.9	0.22	10.9	8.6	14.0	1.20
Ash, % (db)	0.55	0.51	0.58	0.02	0.50	0.46	0.53	0.03	0.60	0.50	0.69	0.04
Colour, KJ (wet)	-4.3	-4.6	-4.0	0.20	-4.8	-5.0	-4.5	0.24	-4.9	-5.0	-4.3	0.15
Konica Minolta CM-5 colour, L*	93.27	92.85	93.64	0.20	94.76	94.37	95.18	0.36	93.70	92.66	94.25	0.36
Konica Minolta CM-5 colour, b*	10.49	9.79	11.77	0.41	8.82	8.26	9.09	0.26	9.85	8.57	11.59	0.62
Wet gluten, % (14 % mb)	29.2	25.4	33.1	1.95	18.9	16.6	21.1	1.63	28.9	22.5	35.6	3.45
Dry gluten, % (14 % mb)	9.7	8.8	10.7	0.53	6.2	5.6	6.6	0.38	9.6	7.4	11.9	1.22
Gluten Index	95	82	99	4.13	93	89	99	4.02	96	89	99	1.76
<b>Farinogram</b>												
Water absorption, % (14% mb)	55.6	54.2	57.4	0.96	48.9	48.4	49.5	0.44	60.0	55.7	65.5	1.85
Development time, min	2.7	1.9	3.9	0.49	1.2	1.0	1.4	0.14	5.7	3.1	21.0	2.67
Stability, mm	9.4	5.4	13.0	2.00	2.1	1.6	2.5	0.28	9.7	5.5	20.0	3.19
<b>Alveogram</b>												
Strength, cm <sup>2</sup>	39.8	32.4	46.3	4.08	13.3	11.6	15.3	1.46	42.5	28.9	78.4	8.96
Stability, mm	104	52	747	140.57	40	37	45	3.29	86	63	187	17.78
Distensibility, mm	122	84	194	27.41	70	58	77	6.40	121	45	159	23.81
P/L	0.65	0.27	0.97	0.20	0.58	0.48	0.69	0.08	0.77	0.43	4.16	0.48
<b>Extensogram</b>												
Strength, cm <sup>2</sup>	99	80	111	8.24	58	50	69	6.16	103	66	169	24.43
Max. height, BU	431	319	521	50.11	341	277	391	38.48	393	291	619	66.86
Extensibility, mm	182	157	450	59.30	117	103	127	8.02	191	125	246	27.36
<b>Mixogram</b>												
Water absorption, % (14% mb)	60.9	59.8	61.8	0.52	57.9	57.6	58.0	0.14	60.9	58.5	65.0	1.43
Peak time, min	3.7	3.0	4.4	0.41	4.9	4.3	5.5	0.47	2.9	2.3	5.1	0.42
<b>100 g Baking Test</b>												
Loaf volume, cm <sup>3</sup>	1058	958	1163	43.83	827	701	913	77.49	1065	806	1268	101.28
Evaluation	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
<i>Number of samples</i>	<b>23</b>				<b>8</b>				<b>65</b>			





## 2021/22 Imported Wheat Quality Versus 2021/22 RSA Wheat Quality

Country of origin	Argentina Average						RSA Crop Average					
Class and Grade bread wheat	Super	B1	B2	B3	COW	Average	Super	B1	B2	B3	COW	Average
<b>No. of samples</b>	2	14	9	2	5	32	19	16	14	8	8	65
<b>ALVEOGRAM</b>												
Strength (S), cm <sup>2</sup>	47.9	46.3	40.2	33.7	45.0	43.7	51.3	41.1	37.2	33.2	43.2	42.5
Stability (P), mm	97	98	96	91	97	97	89	80	88	85	85	86
Distensibility (L), mm	101	89	74	66	94	84	136	127	108	93	126	121
P/L	0.97	1.13	1.31	1.39	1.04	1.17	0.69	0.66	0.98	0.92	0.69	0.77
	<b>99</b>						<b>95</b>					
<b>EXTENSOGRAM</b>												
Strength, cm <sup>2</sup>	107	112	108	98	100	108	123	108	87	72	106	103
Max. height, BU	479	559	559	528	461	537	426	401	360	346	405	393
Extensibility, mm	171	152	145	135	162	152	215	198	177	152	188	191
	<b>100</b>						<b>96</b>					
<b>MIXOGRAM</b>												
Peak time, min	4.0	4.6	5.4	5.5	3.8	4.7	3.0	2.9	2.9	2.9	3.0	2.9
Water absorption (14% mb), %	61.6	60.7	59.7	59.0	61.4	60.5	62.6	60.8	59.8	59.0	61.2	60.9
	<b>101</b>						<b>97</b>					
<b>MYCOTOXINS</b>												
Aflatoxin B <sub>1</sub> (µg/kg)	ND						ND					
Aflatoxin B <sub>2</sub> (µg/kg)	ND						ND					
Aflatoxin G <sub>1</sub> (µg/kg)	ND						ND					
Aflatoxin G <sub>2</sub> (µg/kg)	ND						ND					
Fumonisin B <sub>1</sub> (µg/kg)	ND						ND					
Fumonisin B <sub>2</sub> (µg/kg)	ND						ND					
Fumonisin B <sub>3</sub> (µg/kg)	ND						ND					
Deoxynivalenol (µg/kg) [max. value]	340 [1 320]						169 [1 085]					
15-ADON (µg/kg)	0 [<100]						16 [183]					
Ochratoxin A (µg/kg)	ND						ND					
Zearalenone (µg/kg)	ND						4 [144]					
HT-2 (µg/kg)	ND						ND					
T-2 Toxin (µg/kg)	ND						ND					
<b>No. of samples</b>	<b>9</b>						<b>40</b>					



# 2021/22 Imported Wheat Quality - Australia (25 Sep 2021 to 30 Sep 2022)

## 2021/22 Imported Wheat Quality Versus 2021/22 RSA Wheat Quality

Country of origin	Australia Average						RSA Crop Average					
Class and Grade bread wheat	Super	B1	B2	B3	COW	Average	Super	B1	B2	B3	COW	Average
No. of samples	1	24	5	-	5	35	73	64	46	47	105	335
<b>WHEAT GRADING</b>												
Protein (12% mb), %	13.3	12.1	10.9	-	11.5	11.9	13.3	12.0	11.0	10.1	12.0	11.9
Moisture, %	10.9	11.0	10.7	-	10.5	10.9	11.3	11.2	11.1	11.2	11.1	11.2
Falling number, sec	481	389	370	-	190	360	344	349	366	367	311	341
1000 Kernel mass (13% mb), g	40.5	41.1	47.5	-	43.7	42.4	40.1	41.8	42.1	41.8	38.1	40.3
Hlm (dirty), kg/hl	85.2	83.3	83.3	-	84.4	83.5	81.2	81.3	79.9	79.8	78.1	79.9
Screenings (<1.8 mm sieve), %	0.94	1.09	0.55	-	0.84	0.98	0.69	0.82	0.92	0.91	2.04	1.20
Gravel, stones, turf and glass, %	0.00	0.00	0.00	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Foreign matter, %	0.14	0.20	0.34	-	0.11	0.21	0.01	0.02	0.04	0.02	0.15	0.06
Other grain & unthreshed ears, %	0.20	0.31	0.52	-	0.22	0.32	0.29	0.23	0.42	0.39	1.12	0.57
Heat damaged kernels, %	0.00	0.00	0.17	-	0.02	0.03	0.01	0.01	0.00	0.00	0.04	0.01
Immature kernels, %	0.00	0.02	0.00	-	0.00	0.01	0.09	0.04	0.02	0.02	0.03	0.04
Insect damaged kernels, %	0.00	0.05	0.03	-	0.04	0.04	0.18	0.17	0.28	0.32	0.58	0.34
Sprouted kernels, %	0.00	0.46	0.03	-	0.72	0.43	0.09	0.09	0.06	0.04	0.44	0.19
Total damaged kernels, %	0.00	0.53	0.23	-	0.78	0.51	0.37	0.31	0.35	0.39	1.08	0.58
Combined deviations, %	1.28	2.13	1.65	-	1.95	2.01	1.35	1.39	1.73	1.71	4.39	2.41
Heavily frost damaged kernels, %	0.00	0.00	0.07	-	0.00	0.01	0.00	0.02	0.00	0.00	0.03	0.01
Field fungi, %	0.16	0.21	0.25	-	0.48	0.25	0.44	0.38	0.23	0.17	0.77	0.47
Storage fungi, %	0.00	0.00	0.00	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ergot, %	0.00	0.00	0.00	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Poisonous seeds ( <i>Crotalaria spp.</i> , etc.)	0	0	0	-	0	0	0	0	0	0	1	0
Poisonous seeds ( <i>Argemone mexicana</i> , etc.)	0	0	0	-	0	0	0	0	0	0	0	0
Live insects	No	No	No	-	No	No	No	No	No	No	No	No
Undesirable odour	No	No	No	-	No	No	No	No	No	No	No	No
	Super	B1	B2	B3	COW	Average	Super	B1	B2	B3	COW	Average
No. of samples	1	24	5	-	5	35	19	16	14	8	8	65
Bühler Extraction, %	73.1	74.7	74.4	-	74.3	74.5	74.0	74.1	73.7	73.8	73.3	73.9
<b>FLOUR</b>												
Colour, KJ	-5.0	-5.0	-5.0	-	-5.0	-5.0	-4.9	-5.0	-5.0	-4.9	-4.8	-4.9
Colour, Konica Minolta CM5 (dry)												
L*	93.91	93.82	93.97	-	93.86	93.85	93.60	93.73	93.75	93.96	93.55	93.70
a*	0.42	0.47	0.45	-	0.43	0.46	0.51	0.48	0.46	0.47	0.49	0.49
b*	9.31	9.31	9.18	-	9.11	9.26	9.83	9.89	9.84	9.77	9.91	9.85
Ash (db), %	0.56	0.54	0.55	-	0.54	0.54	0.59	0.60	0.61	0.62	0.60	0.60
Protein (12% mb), %	11.5	11.2	9.9	-	10.4	10.9	12.3	10.9	10.0	9.1	11.1	10.9
Wet Gluten (14% mb), %	30.1	29.9	26.0	-	27.9	29.1	32.5	28.9	26.6	23.4	29.7	28.9
Dry Gluten (14% mb), %	10.1	9.9	8.6	-	9.1	9.6	11.0	9.5	8.8	7.8	9.9	9.6
Gluten Index	96	96	96	-	96	96	96	96	96	96	96	96
<b>100 g BAKING TEST</b>												
Baking water absorption, %	61.5	61.1	59.7	-	60.3	60.8	62.4	60.8	60.1	59.0	61.1	61.0
Loaf volume, cm <sup>3</sup>	1163	1056	911	-	999	1030	1150	1064	1018	938	1078	1065
Evaluation	0	0	0	-	0	0	0	0	0	0	0	0
<b>FARINOGRAM</b>												
Water absorption (14% mb), %	60.9	60.5	60.2	-	59.0	60.2	61.5	59.9	59.3	58.0	59.6	60.0
Development time, min	5.2	5.2	4.6	-	3.7	4.9	7.9	5.3	4.5	4.0	4.9	5.7
Stability, mm	11.1	9.5	7.8	-	7.5	9.0	12.2	9.1	8.1	7.3	10.1	9.7
Mixing tolerance index, BU	25	29	36	-	36	31	33	44	48	52	41	42
	<b>102</b>						<b>94</b>					

## 2021/22 Imported Wheat Quality Versus 2021/22 RSA Wheat Quality

Country of origin	Australia Average						RSA Crop Average					
Class and Grade bread wheat	Super	B1	B2	B3	COW	Average	Super	B1	B2	B3	COW	Average
No. of samples	1	24	5	-	5	35	19	16	14	8	8	65
<b>ALVEOGRAM</b>												
Strength (S), cm <sup>2</sup>	59.9	49.6	38.8	-	44.2	47.6	51.3	41.1	37.2	33.2	43.2	42.5
Stability (P), mm	113	97	105	-	88	97	89	80	88	85	85	86
Distensibility (L), mm	106	113	79	-	109	107	136	127	108	93	126	121
P/L	1.07	0.86	1.40	-	0.82	0.94	0.69	0.66	0.98	0.92	0.69	0.77
	<b>103</b>						<b>95</b>					
<b>EXTENSOGRAM</b>												
Strength, cm <sup>2</sup>	141	118	82	-	121	114	123	108	87	72	106	103
Max. height, BU	531	452	374	-	481	447	426	401	360	346	405	393
Extensibility, mm	205	194	157	-	185	188	215	198	177	152	188	191
	<b>104</b>						<b>96</b>					
<b>MIXOGRAM</b>												
Peak time, min	3.2	3.0	2.7	-	3.0	3.0	3.0	2.9	2.9	2.9	3.0	2.9
Water absorption (14% mb), %	61.5	61.1	59.7	-	60.3	60.8	62.6	60.8	59.8	59.0	61.2	60.9
	<b>105</b>						<b>97</b>					
<b>MYCOTOXINS</b>												
Aflatoxin B <sub>1</sub> (µg/kg)				ND								ND
Aflatoxin B <sub>2</sub> (µg/kg)				ND								ND
Aflatoxin G <sub>1</sub> (µg/kg)				ND								ND
Aflatoxin G <sub>2</sub> (µg/kg)				ND								ND
Fumonisin B <sub>1</sub> (µg/kg)				ND								ND
Fumonisin B <sub>2</sub> (µg/kg)				ND								ND
Fumonisin B <sub>3</sub> (µg/kg)				ND								ND
Deoxynivalenol (µg/kg) [max. value]				ND						169 [1 085]		
15-ADON (µg/kg)				ND						16 [183]		
Ochratoxin A (µg/kg)				ND								ND
Zearalenone (µg/kg)				ND						4 [144]		
HT-2 (µg/kg)				ND								ND
T-2 Toxin (µg/kg)				ND								ND
<b>No. of samples</b>	<b>9</b>						<b>40</b>					



# 2021/22 Imported Wheat Quality - Brazil (25 Sep 2021 to 30 Sep 2022)

## 2021/22 Imported Wheat Quality Versus 2021/22 RSA Wheat Quality

Country of origin	Brazil Average						RSA Crop Average					
Class and Grade bread wheat	Super	B1	B2	B3	COW	Average	Super	B1	B2	B3	COW	Average
No. of samples	1	8	1	-	3	13	73	64	46	47	105	335
<b>WHEAT</b>												
<b>GRADING</b>												
Protein (12% mb), %	12.6	12.1	11.4	-	12.3	12.1	13.3	12.0	11.0	10.1	12.0	11.9
Moisture, %	12.0	12.1	11.6	-	12.3	12.1	11.3	11.2	11.1	11.2	11.1	11.2
Falling number, sec	350	358	370	-	370	361	344	349	366	367	311	341
1000 Kernel mass (13% mb), g	31.2	32.8	35.9	-	30.7	32.4	40.1	41.8	42.1	41.8	38.1	40.3
Hlm (dirty), kg/hl	80.5	79.9	79.5	-	78.7	79.6	81.2	81.3	79.9	79.8	78.1	79.9
Screenings (<1.8 mm sieve), %	1.84	1.85	1.53	-	3.20	2.13	0.69	0.82	0.92	0.91	2.04	1.20
Gravel, stones, turf and glass, %	0.00	0.00	0.00	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Foreign matter, %	0.20	0.18	0.12	-	0.16	0.17	0.01	0.02	0.04	0.02	0.15	0.06
Other grain & unthreshed ears, %	0.10	0.25	0.28	-	0.61	0.32	0.29	0.23	0.42	0.39	1.12	0.57
Heat damaged kernels, %	0.00	0.01	0.00	-	0.00	0.00	0.01	0.01	0.00	0.00	0.04	0.01
Immature kernels, %	0.00	0.08	0.00	-	0.11	0.07	0.09	0.04	0.02	0.02	0.03	0.04
Insect damaged kernels, %	0.16	0.26	0.36	-	0.12	0.22	0.18	0.17	0.28	0.32	0.58	0.34
Sprouted kernels, %	0.00	0.18	0.00	-	0.00	0.11	0.09	0.09	0.06	0.04	0.44	0.19
Total damaged kernels, %	0.16	0.52	0.36	-	0.23	0.41	0.37	0.31	0.35	0.39	1.08	0.58
Combined deviations, %	2.30	2.79	2.29	-	4.20	3.04	1.35	1.39	1.73	1.71	4.39	2.41
Heavily frost damaged kernels, %	0.00	0.00	0.00	-	0.00	0.00	0.00	0.02	0.00	0.00	0.03	0.01
Field fungi, %	0.94	0.55	0.26	-	0.85	0.63	0.44	0.38	0.23	0.17	0.77	0.47
Storage fungi, %	0.00	0.00	0.00	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ergot, %	0.00	0.00	0.00	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Poisonous seeds ( <i>Crotalaria spp.</i> , etc.)	0	0	0	-	0	0	0	0	0	0	1	0
Poisonous seeds ( <i>Argemone mexicana</i> , etc.)	0	0	0	-	0	0	0	0	0	0	0	0
Live insects	No	No	No	-	No	No	No	No	No	No	No	No
Undesirable odour	No	No	No	-	No	No	No	No	No	No	No	No
	Super	B1	B2	B3	COW	Average	Super	B1	B2	B3	COW	Average
No. of samples	1	8	1	-	3	13	19	16	14	8	8	65
Bühler Extraction, %	71.8	73.0	74.5	-	72.8	73.0	74.0	74.1	73.7	73.8	73.3	73.9
<b>FLOUR</b>												
Colour, KJ	-4.7	-4.9	-5.0	-	-4.7	-4.8	-4.9	-5.0	-5.0	-4.9	-4.8	-4.9
Colour, Konica Minolta CM5 (dry)												
L*	93.09	93.03	93.43	-	92.76	93.00	93.60	93.73	93.75	93.96	93.55	93.70
a*	0.62	0.58	0.51	-	0.68	0.60	0.51	0.48	0.46	0.47	0.49	0.49
b*	11.43	11.03	10.46	-	11.33	11.09	9.83	9.89	9.84	9.77	9.91	9.85
Ash (db), %	0.63	0.61	0.61	-	0.67	0.62	0.59	0.60	0.61	0.62	0.60	0.60
Protein (12% mb), %	11.3	10.9	10.2	-	11.1	10.9	12.3	10.9	10.0	9.1	11.1	10.9
Wet Gluten (14% mb), %	29.8	27.6	23.0	-	28.9	27.7	32.5	28.9	26.6	23.4	29.7	28.9
Dry Gluten (14% mb), %	9.7	9.2	8.0	-	9.6	9.2	11.0	9.5	8.8	7.8	9.9	9.6
Gluten Index	96	97	100	-	96	97	96	96	96	96	96	96
<b>100 g BAKING TEST</b>												
Baking water absorption, %	61.3	60.9	60.0	-	61.1	60.9	62.4	60.8	60.1	59.0	61.1	61.0
Loaf volume, cm <sup>3</sup>	1085	1024	976	-	1036	1028	1150	1064	1018	938	1078	1065
Evaluation	0	0	0	-	0	0	0	0	0	0	0	0
<b>FARINOGRAM</b>												
Water absorption (14% mb), %	58.5	57.4	56.4	-	58.2	57.6	61.5	59.9	59.3	58.0	59.6	60.0
Development time, min	7.5	5.0	2.0	-	8.7	5.8	7.9	5.3	4.5	4.0	4.9	5.7
Stability, mm	11.4	12.9	18.7	-	12.7	13.2	12.2	9.1	8.1	7.3	10.1	9.7
Mixing tolerance index, BU	30	34	32	-	27	32	33	44	48	52	41	42
<h1>106</h1>						<h1>94</h1>						

## 2021/22 Imported Wheat Quality Versus 2021/22 RSA Wheat Quality

Country of origin	Brazil Average						RSA Crop Average					
Class and Grade bread wheat	Super	B1	B2	B3	COW	Average	Super	B1	B2	B3	COW	Average
No. of samples	1	8	1	-	3	13	19	16	14	8	8	65
<b>ALVEOGRAM</b>												
Strength (S), cm <sup>2</sup>	44.7	47.6	42.8	-	47.8	47.0	51.3	41.1	37.2	33.2	43.2	42.5
Stability (P), mm	89	97	104	-	100	97	89	80	88	85	85	86
Distensibility (L), mm	104	94	70	-	95	93	136	127	108	93	126	121
P/L	0.86	1.05	1.49	-	1.05	1.07	0.69	0.66	0.98	0.92	0.69	0.77
<b>107</b>						<b>95</b>						
<b>EXTENSOGRAM</b>												
Strength, cm <sup>2</sup>	110	112	125	-	114	113	123	108	87	72	106	103
Max. height, BU	487	524	603	-	514	525	426	401	360	346	405	393
Extensibility, mm	170	162	154	-	167	163	215	198	177	152	188	191
<b>108</b>						<b>96</b>						
<b>MIXOGRAM</b>												
Peak time, min	3.8	4.4	5.3	-	4.1	4.4	3.0	2.9	2.9	2.9	3.0	2.9
Water absorption (14% mb), %	61.3	60.9	60.0	-	61.1	60.9	62.6	60.8	59.8	59.0	61.2	60.9
<b>109</b>						<b>97</b>						
<b>MYCOTOXINS</b>												
Aflatoxin B <sub>1</sub> (µg/kg)	ND						ND					
Aflatoxin B <sub>2</sub> (µg/kg)	ND						ND					
Aflatoxin G <sub>1</sub> (µg/kg)	ND						ND					
Aflatoxin G <sub>2</sub> (µg/kg)	ND						ND					
Fumonisin B <sub>1</sub> (µg/kg)	ND						ND					
Fumonisin B <sub>2</sub> (µg/kg)	ND						ND					
Fumonisin B <sub>3</sub> (µg/kg)	ND						ND					
Deoxynivalenol (µg/kg) [max. value]	741 [1 160]						169 [1 085]					
15-ADON (µg/kg) [max. value]	ND						16 [183]					
Ochratoxin A (µg/kg)	ND						ND					
Zearalenone (µg/kg)	ND						4 [144]					
HT-2 (µg/kg)	ND						ND					
T-2 Toxin (µg/kg)	ND						ND					
<b>No. of samples</b>	<b>3</b>						<b>40</b>					



# 2021/22 Imported Wheat Quality - Lithuania (25 Sep 2021 to 30 Sep 2022)

## 2021/22 Imported Wheat Quality Versus 2021/22 RSA Wheat Quality

Country of origin	Lithuania Average						RSA Crop Average					
	Super	B1	B2	B3	COW	Average	Super	B1	B2	B3	COW	Average
Class and Grade bread wheat												
No. of samples	1	4	-	1	13	19	73	64	46	47	105	335
<b>WHEAT</b>												
<b>GRADING</b>												
Protein (12% mb), %	12.5	12.4	-	12.4	12.5	12.5	13.3	12.0	11.0	10.1	12.0	11.9
Moisture, %	12.5	12.7	-	12.5	12.4	12.5	11.3	11.2	11.1	11.2	11.1	11.2
Falling number, sec	379	380	-	354	370	372	344	349	366	367	311	341
1000 Kernel mass (13% mb), g	36.2	36.1	-	36.1	36.3	36.2	40.1	41.8	42.1	41.8	38.1	40.3
Hlm (dirty), kg/hl	77.8	76.9	-	75.9	77.3	77.2	81.2	81.3	79.9	79.8	78.1	79.9
Screenings (<1.8 mm sieve), %	2.96	2.52	-	2.52	3.36	3.12	0.69	0.82	0.92	0.91	2.04	1.20
Gravel, stones, turf and glass, %	0.00	0.00	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Foreign matter, %	0.16	0.09	-	0.06	0.13	0.12	0.01	0.02	0.04	0.02	0.15	0.06
Other grain & unthreshed ears, %	0.76	0.52	-	0.88	0.80	0.74	0.29	0.23	0.42	0.39	1.12	0.57
Heat damaged kernels, %	0.00	0.00	-	0.00	0.01	0.00	0.01	0.01	0.00	0.00	0.04	0.01
Immature kernels, %	0.00	0.00	-	0.00	0.02	0.01	0.09	0.04	0.02	0.02	0.03	0.04
Insect damaged kernels, %	0.16	0.03	-	0.00	0.03	0.03	0.18	0.17	0.28	0.32	0.58	0.34
Sprouted kernels, %	0.00	0.04	-	0.24	0.04	0.05	0.09	0.09	0.06	0.04	0.44	0.19
Total damaged kernels, %	0.16	0.07	-	0.24	0.09	0.10	0.37	0.31	0.35	0.39	1.08	0.58
Combined deviations, %	4.04	3.19	-	3.70	4.37	4.07	1.35	1.39	1.73	1.71	4.39	2.41
Heavily frost damaged kernels, %	0.00	0.00	-	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.03	0.01
Field fungi, %	0.34	0.18	-	0.08	0.11	0.14	0.44	0.38	0.23	0.17	0.77	0.47
Storage fungi, %	0.00	0.04	-	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00
Ergot, %	0.00	0.00	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Poisonous seeds ( <i>Crotalaria spp.</i> , etc.)	0	0	-	0	0	0	0	0	0	0	1	0
Poisonous seeds ( <i>Argemone mexicana</i> , etc.)	0	0	-	0	0	0	0	0	0	0	0	0
Live insects	No	No	-	No	No	No	No	No	No	No	No	No
Undesirable odour	No	No	-	No	No	No	No	No	No	No	No	No
	Super	B1	B2	B3	COW	Average	Super	B1	B2	B3	COW	Average
No. of samples	1	4	-	1	13	19	19	16	14	8	8	65
Bühler Extraction, %	75.3	74.7	-	74.2	73.8	74.1	74.0	74.1	73.7	73.8	73.3	73.9
<b>FLOUR</b>												
Colour, KJ	-4.4	-4.5	-	-4.6	-4.6	-4.5	-4.9	-5.0	-5.0	-4.9	-4.8	-4.9
Colour, Konica Minolta CM5 (dry)												
L*	93.21	93.47	-	93.54	93.53	93.50	93.60	93.73	93.75	93.96	93.55	93.70
a*	0.61	0.59	-	0.57	0.60	0.60	0.51	0.48	0.46	0.47	0.49	0.49
b*	10.88	11.09	-	11.14	11.06	11.06	9.83	9.89	9.84	9.77	9.91	9.85
Ash (db), %	0.57	0.55	-	0.54	0.54	0.54	0.59	0.60	0.61	0.62	0.60	0.60
Protein (12% mb), %	11.3	11.2	-	11.2	11.2	11.2	12.3	10.9	10.0	9.1	11.1	10.9
Wet Gluten (14% mb), %	28.7	28.8	-	28.6	29.0	28.9	32.5	28.9	26.6	23.4	29.7	28.9
Dry Gluten (14% mb), %	9.6	9.8	-	10.0	10.1	10.0	11.0	9.5	8.8	7.8	9.9	9.6
Gluten Index	98	97	-	99	98	98	96	96	96	96	96	96
<b>100 g BAKING TEST</b>												
Baking water absorption, %	61.3	61.1	-	61.2	61.2	61.2	62.4	60.8	60.1	59.0	61.1	61.0
Loaf volume, cm <sup>3</sup>	1059	1088	-	1152	1089	1091	1150	1064	1018	938	1078	1065
Evaluation	0	0	-	0	0	0	0	0	0	0	0	0
<b>FARINOGRAM</b>												
Water absorption (14% mb), %	54.8	54.3	-	54.0	55.1	54.8	61.5	59.9	59.3	58.0	59.6	60.0
Development time, min	3.5	2.4	-	2.5	2.4	2.4	7.9	5.3	4.5	4.0	4.9	5.7
Stability, mm	11.5	10.1	-	10.6	10.1	10.2	12.2	9.1	8.1	7.3	10.1	9.7
Mixing tolerance index, BU	22	24	-	20	26	25	33	44	48	52	41	42
	110						94					

2021/22 Imported Wheat Quality Versus 2021/22 RSA Wheat Quality

Country of origin	Lithuania Average						RSA Crop Average					
Class and Grade bread wheat	Super	B1	B2	B3	COW	Average	Super	B1	B2	B3	COW	Average
<b>No. of samples</b>	<b>1</b>	<b>4</b>	<b>-</b>	<b>1</b>	<b>13</b>	<b>19</b>	<b>19</b>	<b>16</b>	<b>14</b>	<b>8</b>	<b>8</b>	<b>65</b>
<b>ALVEOGRAM</b>												
Strength (S), cm <sup>2</sup>	45.9	38.2	-	39.1	38.0	38.5	51.3	41.1	37.2	33.2	43.2	42.5
Stability (P), mm	73	68	-	67	67	67	89	80	88	85	85	86
Distensibility (L), mm	130	117	-	124	119	120	136	127	108	93	126	121
P/L	0.56	0.59	-	0.54	0.57	0.57	0.69	0.66	0.98	0.92	0.69	0.77
	<b>111</b>						<b>95</b>					
<b>EXTENSOGRAM</b>												
Strength, cm <sup>2</sup>	119	110	-	125	124	121	123	108	87	72	106	103
Max. height, BU	506	503	-	567	530	525	426	401	360	346	405	393
Extensibility, mm	174	165	-	169	175	172	215	198	177	152	188	191
	<b>112</b>						<b>96</b>					
<b>MIXOGRAM</b>												
Peak time, min	4.7	4.4	-	4.6	4.7	4.6	3.0	2.9	2.9	2.9	3.0	2.9
Water absorption (14% mb), %	61.3	61.1	-	61.2	61.2	61.2	62.6	60.8	59.8	59.0	61.2	60.9
	<b>113</b>						<b>97</b>					
<b>MYCOTOXINS</b>												
Aflatoxin B <sub>1</sub> (µg/kg)	ND						ND					
Aflatoxin B <sub>2</sub> (µg/kg)	ND						ND					
Aflatoxin G <sub>1</sub> (µg/kg)	ND						ND					
Aflatoxin G <sub>2</sub> (µg/kg)	ND						ND					
Fumonisin B <sub>1</sub> (µg/kg)	ND						ND					
Fumonisin B <sub>2</sub> (µg/kg)	ND						ND					
Fumonisin B <sub>3</sub> (µg/kg)	ND						ND					
Deoxynivalenol (µg/kg) [max. value]	ND						169 [1 085]					
15-ADON (µg/kg)	22 [109]						16 [183]					
Ochratoxin A (µg/kg)	ND						ND					
Zearalenone (µg/kg)	ND						4 [144]					
HT-2 (µg/kg)	ND						ND					
T-2 Toxin (µg/kg)	ND						ND					
<b>No. of samples</b>	<b>5</b>						<b>40</b>					

# 2021/22 Imported Wheat Quality - Poland (25 Sep 2021 to 30 Sep 2022)

## 2021/22 Imported Wheat Quality Versus 2021/22 RSA Wheat Quality

Country of origin	Poland Average						RSA Crop Average					
Class and Grade bread wheat	Super	B1	B2	B3	COW	Average	Super	B1	B2	B3	COW	Average
No. of samples	2	10	1	-	10	23	73	64	46	47	105	335
<b>WHEAT</b>												
<b>GRADING</b>												
Protein (12% mb), %	12.6	12.2	11.5	-	12.5	12.3	13.3	12.0	11.0	10.1	12.0	11.9
Moisture, %	12.4	12.3	12.5	-	12.5	12.4	11.3	11.2	11.1	11.2	11.1	11.2
Falling number, sec	383	342	316	-	378	360	344	349	366	367	311	341
1000 Kernel mass (13% mb), g	36.2	36.7	39.1	-	35.0	36.0	40.1	41.8	42.1	41.8	38.1	40.3
Hlm (dirty), kg/hl	77.5	77.4	76.8	-	76.5	77.0	81.2	81.3	79.9	79.8	78.1	79.9
Screenings (<1.8 mm sieve), %	2.81	2.71	2.19	-	3.12	2.87	0.69	0.82	0.92	0.91	2.04	1.20
Gravel, stones, turf and glass, %	0.00	0.00	0.00	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Foreign matter, %	0.05	0.07	0.08	-	0.08	0.07	0.01	0.02	0.04	0.02	0.15	0.06
Other grain & unthreshed ears, %	0.92	0.80	0.66	-	0.89	0.84	0.29	0.23	0.42	0.39	1.12	0.57
Heat damaged kernels, %	0.00	0.03	0.00	-	0.01	0.02	0.01	0.01	0.00	0.00	0.04	0.01
Immature kernels, %	0.00	0.01	0.00	-	0.00	0.01	0.09	0.04	0.02	0.02	0.03	0.04
Insect damaged kernels, %	0.12	0.03	0.08	-	0.08	0.06	0.18	0.17	0.28	0.32	0.58	0.34
Sprouted kernels, %	0.00	0.03	0.16	-	0.06	0.04	0.09	0.09	0.06	0.04	0.44	0.19
Total damaged kernels, %	0.12	0.10	0.24	-	0.15	0.13	0.37	0.31	0.35	0.39	1.08	0.58
Combined deviations, %	3.90	3.67	3.14	-	4.55	4.05	1.35	1.39	1.73	1.71	4.39	2.41
Heavily frost damaged kernels, %	0.00	0.00	0.00	-	0.00	0.00	0.00	0.02	0.00	0.00	0.03	0.01
Field fungi, %	0.15	0.24	0.16	-	0.32	0.26	0.44	0.38	0.23	0.17	0.77	0.47
Storage fungi, %	0.00	0.01	0.00	-	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.00
Ergot, %	0.00	0.00	0.00	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Poisonous seeds ( <i>Crotalaria spp.</i> , etc.)	0	0	0	-	0	0	0	0	0	0	1	0
Poisonous seeds ( <i>Argemone mexicana</i> , etc.)	0	0	0	-	0	0	0	0	0	0	0	0
Live insects	No	No	No	-	No	No	No	No	No	No	No	No
Undesirable odour	No	No	No	-	No	No	No	No	No	No	No	No
<b>Super B1 B2 B3 COW Average Super B1 B2 B3 COW Average</b>												
<b>No. of samples</b>	<b>2</b>	<b>10</b>	<b>1</b>	<b>-</b>	<b>10</b>	<b>23</b>	<b>19</b>	<b>16</b>	<b>14</b>	<b>8</b>	<b>8</b>	<b>65</b>
Bühler Extraction, %	74.6	73.7	72.7	-	74.1	73.9	74.0	74.1	73.7	73.8	73.3	73.9
<b>FLOUR</b>												
Colour, KJ	-4.5	-4.3	-4.3	-	-4.3	-4.3	-4.9	-5.0	-5.0	-4.9	-4.8	-4.9
Colour, Konica Minolta CM5 (dry)												
L*	92.97	93.28	93.64	-	93.27	93.27	93.60	93.73	93.75	93.96	93.55	93.70
a*	0.66	0.58	0.48	-	0.57	0.58	0.51	0.48	0.46	0.47	0.49	0.49
b*	10.48	10.50	10.05	-	10.53	10.49	9.83	9.89	9.84	9.77	9.91	9.85
Ash (db), %	0.57	0.56	0.51	-	0.56	0.55	0.59	0.60	0.61	0.62	0.60	0.60
Protein (12% mb), %	11.4	10.9	10.0	-	11.1	11.0	12.3	10.9	10.0	9.1	11.1	10.9
Wet Gluten (14% mb), %	30.4	28.8	25.4	-	29.7	29.2	32.5	28.9	26.6	23.4	29.7	28.9
Dry Gluten (14% mb), %	10.3	9.6	8.8	-	9.8	9.7	11.0	9.5	8.8	7.8	9.9	9.6
Gluten Index	98	97	98	-	93	95	96	96	96	96	96	96
<b>100 g BAKING TEST</b>												
Baking water absorption, %	61.4	60.9	59.8	-	61.1	60.9	62.4	60.8	60.1	59.0	61.1	61.0
Loaf volume, cm <sup>3</sup>	1019	1062	1020	-	1065	1058	1150	1064	1018	938	1078	1065
Evaluation	0	0	0	-	0	0	0	0	0	0	0	0
<b>FARINOGRAM</b>												
Water absorption (14% mb), %	57.2	55.8	54.5	-	55.3	55.6	61.5	59.9	59.3	58.0	59.6	60.0
Development time, min	3.0	2.5	2.2	-	2.9	2.7	7.9	5.3	4.5	4.0	4.9	5.7
Stability, mm	12.1	8.9	5.7	-	9.8	9.4	12.2	9.1	8.1	7.3	10.1	9.7
Mixing tolerance index, BU	19	29	44	-	26	27	33	44	48	52	41	42
<b>114</b>						<b>94</b>						



2021/22 Imported Wheat Quality Versus 2021/22 RSA Wheat Quality

Country of origin	Poland Average						RSA Crop Average					
Class and Grade bread wheat	Super	B1	B2	B3	COW	Average	Super	B1	B2	B3	COW	Average
<b>No. of samples</b>	2	10	1	-	10	23	19	16	14	8	8	65
<b>ALVEOGRAM</b>												
Strength (S), cm <sup>2</sup>	45.2	40.8	36.4	-	38.0	39.8	51.3	41.1	37.2	33.2	43.2	42.5
Stability (P), mm	87	78	83	-	136	104	89	80	88	85	85	86
Distensibility (L), mm	113	115	86	-	134	122	136	127	108	93	126	121
P/L	0.77	0.70	0.97	-	0.55	0.65	0.69	0.66	0.98	0.92	0.69	0.77
	<b>115</b>						<b>95</b>					
<b>EXTENSOGRAM</b>												
Strength, cm <sup>2</sup>	102	102	107	-	95	99	123	108	87	72	106	103
Max. height, BU	419	447	490	-	413	431	426	401	360	346	405	393
Extensibility, mm	177	199	162	-	168	182	215	198	177	152	188	191
	<b>116</b>						<b>96</b>					
<b>MIXOGRAM</b>												
Peak time, min	3.4	3.9	4.2	-	3.6	3.7	3.0	2.9	2.9	2.9	3.0	2.9
Water absorption (14% mb), %	61.4	60.9	59.8	-	61.0	60.9	62.6	60.8	59.8	59.0	61.2	60.9
	<b>117</b>						<b>97</b>					
<b>MYCOTOXINS</b>												
Aflatoxin B <sub>1</sub> (µg/kg)					ND							ND
Aflatoxin B <sub>2</sub> (µg/kg)					ND							ND
Aflatoxin G <sub>1</sub> (µg/kg)					ND							ND
Aflatoxin G <sub>2</sub> (µg/kg)					ND							ND
Fumonisin B <sub>1</sub> (µg/kg)					ND							ND
Fumonisin B <sub>2</sub> (µg/kg)					ND							ND
Fumonisin B <sub>3</sub> (µg/kg)					ND							ND
Deoxynivalenol (µg/kg) [max. value]					32 [190]						169 [1 085]	
15-ADON (µg/kg)					58 [143]						16 [183]	
Ochratoxin A (µg/kg)					ND							ND
Zearalenone (µg/kg)					ND						4 [144]	
HT-2 (µg/kg)					ND							ND
T-2 Toxin (µg/kg)					ND							ND
<b>No. of samples</b>	<b>6</b>						<b>40</b>					

# 2021/22 Imported Wheat Quality - USA (25 Sep 2021 to 30 Sep 2022)

## 2021/22 Imported Wheat Quality Versus 2021/22 RSA Wheat Quality

Country of origin	USA Average						RSA Crop Average					
Class and Grade bread wheat	Super	B1	B2	B3	COW	Average	Super	B1	B2	B3	COW	Average
No. of samples	-	-	-	3	5	8	73	64	46	47	105	335
<b>WHEAT GRADING</b>												
Protein (12% mb), %	-	-	-	9.6	9.1	9.3	13.3	12.0	11.0	10.1	12.0	11.9
Moisture, %	-	-	-	12.4	12.5	12.4	11.3	11.2	11.1	11.2	11.1	11.2
Falling number, sec	-	-	-	365	317	335	344	349	366	367	311	341
1000 Kernel mass (13% mb), g	-	-	-	33.1	35.0	34.3	40.1	41.8	42.1	41.8	38.1	40.3
Hlm (dirty), kg/hl	-	-	-	80.9	79.3	79.9	81.2	81.3	79.9	79.8	78.1	79.9
Screenings (<1.8 mm sieve), %	-	-	-	1.88	2.41	2.21	0.69	0.82	0.92	0.91	2.04	1.20
Gravel, stones, turf and glass, %	-	-	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Foreign matter, %	-	-	-	0.23	0.11	0.16	0.01	0.02	0.04	0.02	0.15	0.06
Other grain & unthreshed ears, %	-	-	-	0.30	0.24	0.27	0.29	0.23	0.42	0.39	1.12	0.57
Heat damaged kernels, %	-	-	-	0.16	0.40	0.31	0.01	0.01	0.00	0.00	0.04	0.01
Immature kernels, %	-	-	-	0.00	0.03	0.02	0.09	0.04	0.02	0.02	0.03	0.04
Insect damaged kernels, %	-	-	-	0.11	0.04	0.06	0.18	0.17	0.28	0.32	0.58	0.34
Sprouted kernels, %	-	-	-	0.11	0.07	0.08	0.09	0.09	0.06	0.04	0.44	0.19
Total damaged kernels, %	-	-	-	0.37	0.54	0.48	0.37	0.31	0.35	0.39	1.08	0.58
Combined deviations, %	-	-	-	2.79	3.30	3.11	1.35	1.39	1.73	1.71	4.39	2.41
Heavily frost damaged kernels, %	-	-	-	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.03	0.01
Field fungi, %	-	-	-	0.13	0.38	0.29	0.44	0.38	0.23	0.17	0.77	0.47
Storage fungi, %	-	-	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ergot, %	-	-	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Poisonous seeds ( <i>Crotalaria spp.</i> , etc.)	-	-	-	0	0	0	0	0	0	0	1	0
Poisonous seeds ( <i>Argemone mexicana</i> , etc.)	-	-	-	0	0	0	0	0	0	0	0	0
Live insects	-	-	-	No	No	No	No	No	No	No	No	No
Undesirable odour	-	-	-	No	No	No	No	No	No	No	No	No
	Super	B1	B2	B3	COW	Average	Super	B1	B2	B3	COW	Average
No. of samples	-	-	-	3	5	8	19	16	14	8	8	65
Bühler Extraction, %	-	-	-	72.6	74.3	73.7	74.0	74.1	73.7	73.8	73.3	73.9
<b>FLOUR</b>												
Colour, KJ	-	-	-	-5.0	-4.7	-4.8	-4.9	-5.0	-5.0	-4.9	-4.8	-4.9
Colour, Konica Minolta CM5 (dry)												
L*	-	-	-	95.11	94.55	94.76	93.60	93.73	93.75	93.96	93.55	93.70
a*	-	-	-	0.28	0.35	0.33	0.51	0.48	0.46	0.47	0.49	0.49
b*	-	-	-	9.04	8.70	8.82	9.83	9.89	9.84	9.77	9.91	9.85
Ash (db), %	-	-	-	0.49	0.51	0.50	0.59	0.60	0.61	0.62	0.60	0.60
Protein (12% mb), %	-	-	-	7.9	7.5	7.6	12.3	10.9	10.0	9.1	11.1	10.9
Wet Gluten (14% mb), %	-	-	-	19.8	17.5	18.9	32.5	28.9	26.6	23.4	29.7	28.9
Dry Gluten (14% mb), %	-	-	-	6.3	6.0	6.2	11.0	9.5	8.8	7.8	9.9	9.6
Gluten Index	-	-	-	94	92	93	96	96	96	96	96	96
<b>100 g BAKING TEST</b>												
Baking water absorption, %	-	-	-	58.0	55.7	56.6	62.4	60.8	60.1	59.0	61.1	61.0
Loaf volume, cm <sup>3</sup>	-	-	-	903	781	827	1150	1064	1018	938	1078	1065
Evaluation	-	-	-	0	0	0	0	0	0	0	0	0
<b>FARINOGRAM</b>												
Water absorption (14% mb), %	-	-	-	49.4	48.6	48.9	61.5	59.9	59.3	58.0	59.6	60.0
Development time, min	-	-	-	1.2	1.1	1.2	7.9	5.3	4.5	4.0	4.9	5.7
Stability, mm	-	-	-	2.3	2.0	2.1	12.2	9.1	8.1	7.3	10.1	9.7
Mixing tolerance index, BU	-	-	-	61	75	70	33	44	48	52	41	42
	<h1>118</h1>						<h1>94</h1>					

2021/22 Imported Wheat Quality Versus 2021/22 RSA Wheat Quality

Country of origin	USA Average						RSA Crop Average					
Class and Grade bread wheat	Super	B1	B2	B3	COW	Average	Super	B1	B2	B3	COW	Average
<b>No. of samples</b>	-	-	-	3	5	8	19	16	14	8	8	65
<b>ALVEOGRAM</b>												
Strength (S), cm <sup>2</sup>	-	-	-	14.9	12.3	13.3	51.3	41.1	37.2	33.2	43.2	42.5
Stability (P), mm	-	-	-	44	38	40	89	80	88	85	85	86
Distensibility (L), mm	-	-	-	71	69	70	136	127	108	93	126	121
P/L	-	-	-	0.62	0.56	0.58	0.69	0.66	0.98	0.92	0.69	0.77
	<b>119</b>						<b>95</b>					
<b>EXTENSOGRAM</b>												
Strength, cm <sup>2</sup>	-	-	-	64	54	58	123	108	87	72	106	103
Max. height, BU	-	-	-	368	325	341	426	401	360	346	405	393
Extensibility, mm	-	-	-	123	114	117	215	198	177	152	188	191
	<b>120</b>						<b>96</b>					
<b>MIXOGRAM</b>												
Peak time, min	-	-	-	5.4	4.6	4.9	3.0	2.9	2.9	2.9	3.0	2.9
Water absorption (14% mb), %	-	-	-	58.0	57.8	57.9	62.6	60.8	59.8	59.0	61.2	60.9
	<b>121</b>						<b>97</b>					
<b>MYCOTOXINS</b>												
Aflatoxin B <sub>1</sub> (µg/kg)	ND						ND					
Aflatoxin B <sub>2</sub> (µg/kg)	ND						ND					
Aflatoxin G <sub>1</sub> (µg/kg)	ND						ND					
Aflatoxin G <sub>2</sub> (µg/kg)	ND						ND					
Fumonisin B <sub>1</sub> (µg/kg)	ND						ND					
Fumonisin B <sub>2</sub> (µg/kg)	ND						ND					
Fumonisin B <sub>3</sub> (µg/kg)	ND						ND					
Deoxynivalenol (µg/kg) [max. value]	657 [710]						169 [1 085]					
15-ADON (µg/kg)	0 [<100]						16 [183]					
Ochratoxin A (µg/kg)	ND						ND					
Zearalenone (µg/kg)	ND						4 [144]					
HT-2 (µg/kg)	ND						ND					
T-2 Toxin (µg/kg)	ND						ND					
<b>No. of samples</b>	<b>3</b>						<b>40</b>					





*ISO/IEC 17025:2017*  
*Accreditation*



## CERTIFICATE OF ACCREDITATION

*In terms of section 22(2) (b) of the Accreditation for Conformity Assessment, Calibration and Good Laboratory Practice Act, 2006 (Act 19 of 2006), read with sections 23(1), (2) and (3) of the said Act, I hereby certify that:-*

### SOUTHERN AFRICAN GRAIN LABORATORY NPC

Co. Reg. No.: 1997/018518/08

Facility Accreditation Number: **T0116**

is a South African National Accreditation System accredited facility provided that all conditions and requirements are complied with

This certificate is valid as per the scope as stated in the accompanying schedule of accreditation, Annexure "A", bearing the above accreditation number for


### CHEMICAL AND PHYSICAL ANALYSIS

The facility is accredited in accordance with the recognised International Standard

**ISO/IEC 17025:2017**

The accreditation demonstrates technical competency for a defined scope and the operation of a quality management system

While this certificate remains valid, the Accredited Facility named above is authorised to use the relevant accreditation symbol to issue facility reports and/or certificates

  
Mr R Josias  
Chief Executive Officer

Effective Date: 01 November 2019  
Certificate Expires: 31 October 2024



Facility Number: T0116

**ANNEXURE A**  
**SCHEDULE OF ACCREDITATION**

Facility Number: **T0116**

**Permanent Address of Laboratory:**

Southern African Grain Laboratories NPC  
Agri-Hub Office Park - Grain Building  
477 Witherite Road  
The Willows  
Pretoria  
0040

**Technical Signatories:**

Ms J Nortje (All Methods excl. In-house method 029)  
Ms M Bothma (All Chemical Methods)  
Ms A de Jager (Nutrients & Contaminants Methods)  
Ms W Louw (In-house Methods 001, 002, 003, 010 & 026)  
Ms D Moleke (Rheological Methods)  
Mrs H Meyer (All Chemical, Nutrients and Contaminants & Grading Methods)  
Ms J Kruger (All Chemical Methods)  
Ms M Motlanthe (In-house Methods 001, 003 & 026)  
Mr B van Der Linde (Grading)  
Ms M Ramare (All Chemical Methods Excl. In-House Method 012 and SOP MC23)  
Ms T de Beer (Rheological Methods)

**Postal Address:**

Postnet Suite # 391  
Private Bag X1  
The Willows  
0041

**Nominated Representative:**

Mrs H Meyer

**Tel:** (012) 807-4019

**Fax:** N/A

**E-mail:** hannelien.meyer@sagl.co.za

**Issue No.:** 32

**Date of Issue:** 19 November 2021

**Expiry Date:** 31 October 2024

<b>Material or Products Tested</b>	<b>Type of Tests / Properties Measured, Range of Measurement</b>	<b>Standard Specifications, Techniques / Equipment Used</b>
<b>CHEMICAL</b>		
Ground Barley	Moisture (Oven Method)	Analytical EBC Method 3.2, latest Edition (2 hour; 130 <sup>0</sup> C)
Cereal and cereal products specifically-wheat, rice, (hulled paddy), barley, millet, rye, and oats as grain, semolina and flour	Moisture (Oven Method)	ICC Std No.110/1, Latest Edition (90 min; 130 <sup>0</sup> C) (2 hour; 130 <sup>0</sup> C)
Flour, semolina, bread, all kind of grains and cereal products and food products (except those that are sugar coated)	Moisture (Oven Method)	AACCI 44-15.02, Latest Edition (1 hour; 130 <sup>0</sup> C) (72 hour; 103 <sup>0</sup> C)



Facility Number: T0116

Maize Grits	Moisture (Oven Method)	Analytical EBC Method 6.2.2, latest edition (4 hours, 130 <sup>0</sup> C)
Animal feed, Plant tissue and Sunflower (Milled)	Moisture (Oven Method)	AgriLASA 2.1, Latest Edition (5 hours, 105 <sup>0</sup> C)
All flours, cereal grains, oilseeds and animal feeds	Nitrogen and protein (Combustion method - Dumas)	AACCI 46-30.01, Latest Edition
Cereal based food stuff	Dietary fibres (Total)	In-house method 012
Food stuff and feeds	Carbohydrates (by difference) (calculation) Energy value (calculation) Total digestible nutritional value (calculation)	SOP MC 23
Food Stuff and feeds	Determination of Ash	In-house method 011
Wheat Kernels	Moisture (Oven Method)	Government Gazette Wheat Regulation, Latest Edition (72 hour, 103 <sup>0</sup> C)
Flours of grains e.g. barley, oats, triticale, maize, rye, sorghum and wheat; oilseeds like soybeans and sunflower, feeds and mixed feeds and foodstuffs	Crude fat (Ether extraction by Soxhlet)	In-house method 024
Meal and flour of wheat, rye, barley, other grains, starch containing and malted products	Falling number	ICC Std 107/1, Latest Edition
<b>NUTRIENTS AND CONTAMINANTS</b>		
Vitamin fortified food and feed products and fortification mixes grain based	Vitamin A as all trans Retinol (Saponification) (HPLC)	In-house method 001
	Thiamine Mononitrate (HPLC) Riboflavin (HPLC) Nicotinamide (HPLC) Pyridoxine Hydrochloride (HPLC)	In-house method 002
	Folic Acid (HPLC)	In-house method 003
	Total Sodium (Na) Total Iron (Fe) Total Zinc (Zn)	In-house method 010

Facility Number: T0116

Yeast and Bread                      Vitamin D<sub>2</sub> (HPLC)                      In-House method 029

Food and feed                      Multi-Mycotoxin:  
-Aflatoxin G<sub>1</sub>, B<sub>1</sub>, G<sub>2</sub>, B<sub>2</sub> and total  
-Deoxynivalenol (DON), 15-ADON  
-Fumonisin B<sub>1</sub>, B<sub>2</sub>, B<sub>3</sub>  
-Ochratoxin A  
-T2, HT-2  
- Zearalenone

In-house method 026

**GRADING**

Maize                      Defective kernels (White maize/  
yellow maize)                      Government Gazette Maize  
Regulation, Latest Edition

Cereal as grains (Wheat, barley,  
rye and oats)                      Hectolitre mass (Kern222)                      ISO 7971-3, Latest edition

Wheat                      Screenings                      Government Gazette Wheat  
Grading Regulation, Latest  
Edition

**RHEOLOGICAL**

Wheat flour                      Alveograph (Rheological properties)                      ICC Std.121, Latest Edition

Flours                      Farinograph (Rheological properties)                      AACCI 54.02, Latest Edition  
(Rheological behaviour of flour  
Farinograph: Constant Flour  
Weight procedure)

Hard, soft and durum wheat (flour  
and whole wheat flour)                      Mixograph (Rheological properties)                      Industry accepted method 020  
(Based on AACCI 54-40.02,  
Latest Edition Mixograph  
Method)

Original Date of Accreditation: 01 November 1999

ISSUED BY THE SOUTH AFRICAN NATIONAL ACCREDITATION SYSTEM

  
\_\_\_\_\_  
Accreditation Manager



*Government Gazette,  
No. 42862  
29 November 2019*



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**GOVERNMENT NOTICES • GOEWERMENTSKENNISGEWINGS**

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**DEPARTMENT OF AGRICULTURE, FORESTRY AND FISHERIES****NO. R. 1547****29 NOVEMBER 2019**

AGRICULTURAL PRODUCT STANDARDS ACT NO. 119 OF 1990

**REGULATIONS RELATING TO THE GRADING, PACKING AND MARKING OF  
BREAD WHEAT INTENDED FOR SALE IN THE REPUBLIC OF SOUTH AFRICA**

The Minister of Agriculture, Forestry and Fisheries, acting under section 15 of the Agricultural Product Standards Act 119 of 1990, has --

- (a) made the regulations in the Schedule;
- (b) determined that the said regulations shall come into operations on the date of publication; and
- (c) read together with section 3(1) of the said Act, repealed the regulations published by Government Notice Nos. R. 905 of 10 July 1998, R. 1421 of 6 November 1998, R.876 of 14 September 2001, R.979 of July 2002, R.1210 of 29 August 2003, R.1186 of December 2010, R.64 of 29 January 2016 and R. 1218 of 7 October 2016.

**SCHEDULE****Definitions**

1. Unless the context otherwise indicates, any word or expression in these regulations to which a meaning has been assigned in the Act shall have that meaning, and --

“**animal filth**” means dead rodents, dead birds and dung;

“**bag**” means a bag manufactured from --

- (a) jute or phormium or a mixture of jute and phormium; or
- (b) polypropylene that complies with SANS specification CKS632 1246:2012;

“**bulk container**” means any vehicle or container in which bulk wheat is stored or transported;

“**consignment**” means --

- (a) a quantity of wheat of the same class, which belongs to the same owner, delivered at any one time under cover of the same consignment note, delivery note or receipt note, or delivered by the same vehicle or bulk container, or loaded from the same bin of a grain elevator or from a ship's hold; or
- (b) in the case where a quantity referred to in paragraph (a), is subdivided into different grades, each such quantity of each of the different grades.

“**container**” means a bag or bulk container;

“**damaged wheat**” means wheat --

- (a) which have been damaged by insects;

- (b) which have been distinctly discoloured (orange-brown, dark brown or black) by external heat or as a result of heating caused by internal fermentation in wheat with an excessive moisture content, excluding wheat kernels in respect of which the discolouration is confined to the germ end;
- (c) which are immature and have a distinctly green colour; and
- (d) in which germination has proceeded to such an extent that the skin covering the embryo has been broken or the developing sprouts and/or rootlets are clearly visible.

**"ergot sclerotia"** means the sclerotia of the fungus *Claviceps purpurea*; and "ergot" has a corresponding meaning;

**"falling number"** means the time in seconds according to Hagberg-Perten as a measure of the degree of Alpha-Amylase activity in grain and flour;

**"field fungi-infected wheat"** means wheat of which the kernels are visibly infected with fungi, and that--

- (a) clearly have greyish brush-ends that are discoloured as a whole; or where field fungi growth is present from the brush-ends into the crease; and
- (b) have a dull, lifeless, chalky or pinkish and shrunken appearance as a result of *Fusarium* infection.

**"foreign matter"** means all matter excluding wheat, other grain and unthreshed ears. Coal, dung, glass and metal shall not be present in the consignment concerned;

**"heavily frost-damaged wheat"** means --

- (a) wheat which have been damaged by severe frost during the milk to soft dough stage and which is characterised by the kernels being fairly plump, but covered entirely with small blisters extending into the crease, excluding --
  - (i) kernels in which blistering is confined to the back of the kernel; and
  - (ii) immature wrinkled kernels in which wrinkling has been caused by frost while the kernels were still immature; and
- (b) kernels which have a slightly flaked-off bran coat due to frost: Provided that evidence of frost damage is present and that the bran coat had not been rubbed off due to handling.

**"hectolitre mass"** means the mass in kilogram per hectolitre;

**"insect"** means any live grain insect that is injurious to stored grain irrespective of the stage of development of that insect;

**"other grain"** means the kernels or pieces of kernels of barley, oats, triticale, maize, rye and sorghum;

**"poisonous seeds"** means the seeds or bits of seeds of plant species that may in terms of the Foodstuffs, Cosmetics and Disinfectants Act 54 of 1972 represent a hazard to human or animal health when consumed, including seeds of *Argemone mexicana*, *Convolvulus spp.*, *Crotalaria spp.*, *Datura spp.*, *Ipomoea purpurea*, *Lolium temulentum*, *Ricinus communis* or *Xanthium spp.*;

**"protein content"** means the percentage protein in wheat on a 12 percent moisture basis;

“**screenings**” means all material that passes through the standard sieve;

“**standard sieve**” means a slotted sieve --

- (a) with a flat bottom of metal sheet of 1.0 mm thickness with apertures 12.7mm long and 1.8 mm wide with rounded ends. The spacing between the slots in the same row must be 2.43 mm wide and the spacing between the rows of slots must be 2.0 mm wide. The slots must be alternately orientated with a slot always opposite the solid inter segment of the next row of slots;
- (b) of which the upper surface of the sieve is smooth;
- (c) with a round frame of suitable material with an inner diameter of between 300 mm and 310 mm maximum and at least 50 mm high; and
- (d) that fits onto a tray with a solid bottom and must be at least 20 mm above the bottom of the tray.

“**stinking smut infection**” means wheat that is infected with *Tilletia spp.* with the exception of wheat infected with *Tilletia indica* (karnal bunt). Wheat is considered to be infected by stinking smut if one or more of the following characteristics are present--

- (a) an unmistakable stinking smut odour; or
- (b) wheat kernels that are smeared with stinking smut; or
- (c) more than four stinking smut balls (or pieces of balls equal to four stinking smut balls) per 100 g of wheat.

“**storage fungi infected wheat**” means wheat that are visibly infected with fungi, and that show--

- (a) blue, green, blackish or yellow fungal growth anywhere on the kernel; or
- (b) visible mould beneath the bran.

“**the Act**” means the Agricultural Product Standards Act No. 119 of 1990;

“**unthreshed ears**” means ears and bits of ears of wheat, barley, triticale and rye that still contain seeds that are completely covered with glumes; and

“**wheat**” means the kernels and pieces of kernels of the species *Triticum aestivum*.

**Restrictions on sale of wheat**

2. (1) No person shall sell a consignment of wheat in the Republic of South Africa --
  - (a) unless the wheat is sold according to the classes set out in regulation 3;
  - (b) unless the wheat complies with the standards for the classes set out in regulation 4;
  - (c) unless the wheat, where applicable, complies with the grades of wheat and the standards for grades set out in regulations 5 and 6 respectively;
  - (d) unless the wheat is packed in accordance with the packing requirements set out in regulation 7;



- (e) unless the containers or sale documents, as the case may be, are marked in accordance with the marking requirements set out in regulation 8; and
- (f) if such wheat contains a substance that renders it unfit for human consumption or for processing into or utilisation thereof as food or feed.

(2) The Executive Officer may grant written exemption, entirely or partially, to any person on such conditions as he or she may deem necessary, from the provisions of sub-regulation (1).

## PART I

### QUALITY STANDARDS

#### *Classes of wheat*

3. The classes of wheat are --

- (a) Bread Wheat; and
- (b) Other Wheat.

#### *Standards for classes*

4. (1) Notwithstanding the provisions of sub-regulations (2) and (3), a consignment of wheat shall --

- (a) be free from any toxin, chemical or any other substance that renders it unsuitable for human consumption or for processing into or utilisation thereof as food or feed and may not exceed the permissible deviations regarding aflatoxin in terms of the Foodstuffs, Cosmetics and Disinfectants Act 54 of 1972;
- (b) not contain more poisonous seeds or ergot sclerotia than permitted in terms of the Foodstuffs, Cosmetics and Disinfectants Act 54 of 1972;
- (c) be free from organisms of phytosanitary importance as determined in terms of the Agricultural Pest Act 36 of 1983;
- (d) be free from mould infected, sour and rancid other grain and foreign matter;
- (e) be free from any undesired odour, taste or colour not typical of undamaged and sound wheat;
- (f) be free from animal filth;
- (g) be free from glass, metal, coal or dung;
- (h) with the exception of Class Other Wheat, be free from grain insects;
- (i) with the exception of Class Other Wheat, be free from stinking smut infection; and
- (j) with the exception of Class Other Wheat, have a moisture content not exceeding 13 percent.

(2) A consignment shall be classified as Bread Wheat if --

- (a) the wheat in the consignment consists of at least 95 percent (m/m) of one or more of the bread wheat seeds; and

- (b) it complies with the standards for Super Grade, Grade 1, Grade 2 or Grade 3 set out in regulation 6.

(3) A consignment of wheat shall be classified as Class Other Wheat if it does not comply with the standards for Bread Wheat.

**Grades of wheat**

5. (1) The grades for Bread Wheat shall be as follows:

- (a) Super Grade;
- (b) Grade 1;
- (c) Grade 2; and
- (d) Grade 3.

(2) No grades are determined for Class Other Wheat.

**Standards for grades of wheat**

6. (1) Subject to the provisions of subregulations (2), (3) and (4), a consignment of wheat shall be graded as --

- (a) Super Grade if the nature of deviation, specified in column 1 of Table 1 of the Annexure, in that consignment does not exceed the percentage specified in column 2 of the said table opposite the deviation concerned;
- (b) Grade 1 if the nature of deviation, specified in column 1 of Table 1 of the Annexure, in that consignment does not exceed the percentage specified in column 3 of the said table opposite the deviation concerned;
- (c) Grade 2 if the nature of deviation, specified in column 1 of Table 1 of the Annexure, in that consignment does not exceed the percentage specified in column 4 of the said table opposite the deviation concerned; and
- (d) Grade 3 if the nature of deviation, specified in column 1 of Table 1 of the Annexure, in that consignment does not exceed the percentage specified in column 5 of the said table opposite the deviation concerned."

(2) The minimum hectolitre masses for the different grades are as follows:

- (a) Super Grade – 76 kg;
- (b) Grade 1 – 76 kg;
- (c) Grade 2 – 76 kg; and
- (d) Grade 3 – 74 kg.

- (3) (a) Super Grade, Grade 1, Grade 2 and Grade 3 shall have a minimum falling number value of not less than 250 seconds.
- (b) Notwithstanding the provision of paragraph (a), wheat shall be deemed to comply with the requirements of the paragraph concerned if it deviates with not more than 30 seconds lower than the minimum prescribed for Super Grade, Grade 1, Grade 2 and Grade 3.
- (4) The minimum protein content (on a 12 percent moisture basis) for the different grades shall be as follows:
- (a) Super Grade – 12.5 percent;
- (b) Grade 1 – 11.5 percent;
- (c) Grade 2 – 10.5 percent; and
- (d) Grade 3 – 9.5 percent.

## PART II

### PACKING AND MARKING REQUIREMENTS

#### *Packing requirements*

7. Wheat of different grades shall be packed in different containers, or stored separately.

#### *Marking requirements*

8. (1) Every container or the accompanying sale documents of a consignment of wheat shall be marked or endorsed by means of appropriate symbols specified in sub-regulation (2), with --
- (a) the class of the wheat; and
- (b) the grade.
- (2) The symbols referred to in sub-regulation (1) shall appear in the order of class and grade.
- (3) The symbols used to indicate the different-
- (a) classes shall be --
- (i) B in the case of Bread Wheat; and
- (ii) O in the case of Other Wheat.
- (b) grades shall be --
- (i) SG in the case of Super Grade
- (ii) 1 in the case of Grade 1;
- (iii) 2 in the case of Grade 2; and
- (iv) 3 in the case of Grade 3.



**PART III****SAMPLING*****Obtaining a sample from the consignment***

9. (1) An inspection sample of a consignment of wheat shall --
- (a) in the case of wheat delivered in bags and subject to regulation 10, be obtained by sampling at least ten percent of the bags, chosen from that consignment at random, with a bag probe: Provided that at least 25 bags in a consignment shall be sampled and where a consignment consists of less than 25 bags, all the bags in that consignment shall be sampled; and
  - (b) in the case of wheat delivered in bulk and subject to regulation 10, be obtained by sampling that consignment throughout the whole depth of the layer, in at least six different places, chosen at random in that bulk quantity, with a bulk sampling apparatus.
- (2) The collective sample obtained in sub-regulation (1) (a) or (b) shall --
- (a) have a total mass of at least 10 kg; and
  - (b) be thoroughly mixed by means of dividing before further examination.
- (3) If it is suspected that the sample referred to in sub-regulation (1) (a) is not representative of that consignment, an additional five percent of the remaining bags, chosen from that consignment at random, shall be emptied into a suitable bulk container and sampled in the manner contemplated in sub-regulation (1) (b).
- (4) If it is suspected that the sample referred to in sub-regulation (1) (b) is not representative of that consignment, an additional representative sample shall be obtained by using an alternative sampling pattern, apparatus or method.
- (5) A sample taken in terms of these regulations shall be deemed representative of the consignment from which it was taken.

***Sampling if contents differ***

10. (1) If, after an examination of the wheat taken from different bags in a consignment in terms of regulation 9(1) (a), it appears that the contents of those bags differ substantially --
- (a) the bags concerned shall be placed separately;
  - (b) all the bags in the consignment concerned shall be sampled with a bag probe in order to do such separation; and
  - (c) each group of bags with similar contents in that consignment shall for the purposes of these regulations be deemed to be a separate consignment.
- (2) If, after the discharge of a consignment of wheat in bulk has commenced, it is suspected that the consignment could be of a class or grade other than that determined by means of the initial sampling, the discharge shall immediately be stopped and the part of the consignment remaining in the bulk container as well as the wheat already in the hopper shall be sampled anew with a bulk sampling apparatus or by catching at least 20 samples, by means of a suitable container, at regular intervals throughout the whole offloading period from the stream of wheat flowing in bulk.

**Working sample**

11. A working sample is obtained by dividing the representative sample of the consignment according to the latest revision of the ICC (International Association for Cereal Science and Technology) 101/1 method.

**PART IV****DETERMINATION OF OTHER SUBSTANCES*****Determination of undesirable odours and harmful substances***

12. A consignment of wheat or a sample of a consignment of wheat shall be sensorially assessed or chemically analysed in order to determine whether--

- (a) it contains a substance that renders the wheat unfit for human consumption or for processing into or for utilisation as food or feed such as poisonous seeds, stones, glass, metal, coal or dung; and
- (b) it has a musty, sour, rancid or other undesirable odour: Provided that a working sample of unscreened wheat that is ground in a grain mill to a fine meal may be used for the determination concerned.

**PART V****DETERMINATION OF CLASS, HECTOLITRE MASS,  
MOISTURE CONTENT, PROTEIN CONTENT AND FALLING NUMBER*****Determination of class***

13. The class of a consignment of wheat shall be determined as follows:

- (a) Obtain a working sample of at least 500 g and screen the working sample in the manner prescribed in regulation 18.
- (b) Take at least 100 g of the screened wheat and remove all other grain, unthreshed ears and foreign matter by hand.
- (c) Obtain a working sample of at least 25 g each after all other grain, unthreshed ears and foreign matter have been removed and separate the different cultivars.
- (d) Determine the combined mass of all of the cultivars that belong to the same class and express the mass thus determined as a percentage of the mass of the working sample.
- (e) Such percentage represents the percentage of all the cultivars that belong to the same class in the consignment.

***Determination of the hectolitre mass***

14. The hectolitre mass of a consignment of unscreened wheat may be determined by any suitable instrument: Provided that the instrument complies with and has been calibrated to the specifications detailed in ISO (International Organization for Standardization) 7971-3.

***Determination of moisture content***

15. The moisture content of a consignment wheat may be determined by any suitable method: Provided that the results thus obtained is in accordance with the maximum permissible deviation for a class 1 moisture meter as detailed in ISO (International Organization for Standardization) 7700/1 based

on the results of the 72 hour, 103°C oven dried method [the latest revision of the AACCI (American Association of Cereal Chemists International) Method 44-15A].

***Determination of protein content***

16. The percentage of protein of a consignment of wheat may be determined according to any suitable method: Provided that --

- (a) the determination shall be conducted on a sample which had been sifted using a screen with the same apertures as the standard sieve and from which other grain, un threshed ears and foreign matter had been removed by hand; and
- (b) the results thus obtained are in accordance ( $\pm 0.3$  percent ) with the results obtained by the Dumas Combustion Analysis Method [the latest revision of the AACCI (American Association of Cereal Chemists International) Method 46-30].

***Determination of falling number in wheat***

17. (1) The falling number of a consignment of wheat may be determined according to any suitable method: Provided that --

- (a) the determination shall be conducted on a sample which had been sifted using a screen with the same apertures as the standard sieve and from which other grain, unthreshed ears and foreign matter had been removed by hand; and
- (b) the results thus obtained are in accordance ( $\pm 5$  percent) with the results obtained by the latest revision of the ICC (International Association for Cereal Science and Technology) 107/1 method.

(2) If the falling number of a consignment of wheat is determined according to the latest revision of the ICC (International Association for Cereal Science and Technology) 107/1 method --

- (a) the sampling in the mentioned method shall be replaced with the manner prescribed in regulation 9; and
- (b) only the altitude corrected value shall be used.

**PART VI**

**DETERMINATION OF PERCENTAGE DEVIATIONS**

***Determination of percentage screenings***

18. (1) The percentage screenings in a consignment of wheat shall be determined as follows:

- (a) Obtain a working sample of at least 500 g.
- (b) Place the sample on the standard sieve and screen the sample by moving the sieve 50 strokes to and fro, alternately away from and towards the operator of the sieve, in the same direction as the long axes of the slots of the sieve. Move the sieve, which rests on a table or other suitable smooth surface, 250 mm to 460 mm away from and towards the operator with each stroke. The prescribed 50 strokes must be completed within 50 to 60 seconds: Provided that the screening process may also be performed with the standard sieve in some or other container or an automatic sieving apparatus.
- (c) Determine the mass of the material that has passed through the sieve and express it as a percentage of the mass of the working sample.



- (d) Such percentage represents the percentage screenings in the consignment.

***Determination of the percentage heavily frost-damaged wheat***

19. The percentage heavily frost-damaged wheat in a consignment of wheat shall be determined as follows:

- (a) Obtain a working sample of at least 25 g of a screened sample.
- (b) Remove all heavily frost-damaged kernels by hand and determine the mass thereof.
- (c) Express the mass thus determined as a percentage of the mass of the working sample.
- (d) Such percentage represents the percentage heavily frost-damaged wheat in the consignment concerned.

***Determination of the percentages other grain and unthreshed ears***

20. The percentage other grain and unthreshed ears in a consignment of wheat shall be determined as follows:

- (a) Obtain a working sample of at least 50 g from a screened sample.
- (b) Remove all other grain and unthreshed ears by hand and determine the mass thereof.
- (c) Express the mass thus determined as a percentage of the mass of the working sample.
- (d) Such percentage represents the percentage other grain and unthreshed ears in the consignment concerned.

***Determination of the percentage foreign matter***

21. The percentage foreign matter in a consignment of wheat is determined as follows:

- (a) Obtain a working sample of at least 100 g from a screened sample.
- (b) Remove all foreign matter by hand and determine the mass thereof.
- (c) Express the mass thus determined as a percentage of the mass of the working sample.
- (d) Such percentage represents the percentage foreign matter in the consignment concerned.

***Determination of the percentage damaged wheat***

22. The percentage of damaged wheat in a consignment of wheat shall be determined as follows:

- (a) Obtain a working sample of at least 25 g of a screened sample.
- (b) Remove all damaged kernels by hand and determines the mass thereof.
- (c) Express the mass thus determined as a percentage of the mass of the working sample.
- (d) Such percentage represents the percentage damaged wheat in the consignment concerned.

***Determination of the percentage heat-damaged wheat***

23. The percentage heat-damaged wheat in a consignment of wheat shall be determined as follows:
- (a) Obtain a working sample of at least 100 g from a screened sample.
  - (b) Remove all heat-damaged kernels by hand and determine the mass thereof. Kernels from an additional working sample may also be sensorially assessed (by smelling and tasting the kernels) to confirm suspicion of heat damage.
  - (c) Express the mass thus determined as a percentage of the mass of the working sample.
  - (d) Such percentage represents the percentage heat-damaged wheat in the consignment concerned.

***Determination of percentage field fungi infected wheat***

24. The percentage field fungi infected wheat in a consignment of wheat shall be determined as follows:
- (a) Obtain a working sample of at least 25 g from a screened sample.
  - (b) Remove all field fungi infected kernels by hand and determine the mass thereof.
  - (c) Express the mass thus determined as a percentage of the mass of the working sample.
  - (d) Such percentage represents the percentage of field fungi infected wheat in the consignment concerned.

***Determination of percentage storage fungi infected wheat***

25. The percentage storage fungi infected wheat in a consignment of wheat shall be determined as follows:
- (a) Obtain a working sample of at least 100 g from a screened sample.
  - (b) Remove all storage fungi infected kernels by hand and determine the mass thereof.
  - (c) Express the mass thus obtained as a percentage of the mass of the working sample.
  - (d) Such percentage represents the percentage storage fungi infected wheat in the consignment concerned.

**PART VII*****Offence and penalties***

26. Any person who contravenes or fails to comply with any provision of these regulations shall be guilty of an offence and upon conviction be liable to a fine or to imprisonment in accordance with section 11 of the Act.

## ANNEXURE

**TABLE 1**  
**STANDARDS FOR GRADES OF BREAD WHEAT**

Nature of deviation	Maximum percentage permissible deviation (m/m)			
	Super Grade	Grade 1	Grade 2	Grade 3
Column 1	Column 2	Column 3	Column 4	Column 5
(a) Heavily frost-damaged kernel	5	5	5	5
(b) Field fungi infected kernels	2	2	2	2
(c) Storage fungi infected kernels	0.5	0.5	0.5	0.5
(d) Screenings	3	3	3	3
(e) Other grain and unthreshed ears	1	1	1	1
(f) Gravel, stones and turf	0.5	0.5	0.5	0.5
(g) Foreign matter including gravel, stones and turf: Provided that such deviations are individually within the limits specified in item (f)	1	1	1	1
(h) Heat-damaged kernels	0.5	0.5	0.5	0.5
(i) Damaged kernels, including heat-damaged kernels: Provided that such deviations are individually within the limit specified in item (h) and provided further that the minimum falling number value prescribed in regulation 6(3) for the grade concerned is at least complied with	2	2	2	2
(j) Deviations in items (d), (e), (g) and (i) collectively: Provided that such deviations are individually within the limits of the said items	5	5	5	5



