



South African Wheat Crop

Quality Report
2023/2024 Season



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South African

Commercial Wheat Quality of the 2023/2024 Season

Acknowledgements

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- **Agbiz Grain and its members for providing the samples to make this survey possible.**
- **The Crop Estimates Committee (CEC) of the Department of Agriculture (DOA) 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 2023/24 season's commercial wheat crop was set at 2 050 000 tons, almost 3% lower than the previous season. A total area of 537 950 hectares was utilised for wheat production during this season and the average yield was 3.81 tons per hectare (Figures obtained from the CEC).

The whole wheat protein average of 11.8% decreased by 0.3% 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 28% (44% and 37% during the previous two seasons respectively). The hectoliter mass averaged 80.7 kg/hl, 0.9 kg/hl higher than 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 80.3 kg/hl.

The average falling number this season was 375 seconds. Only 1% (4) of the samples analysed gave falling number values below 250 seconds and of these only one sample was below 220 seconds. The average mixogram peak time was 3.1 minutes compared to the 3.3 minutes of the previous season. The ten-year average is 3.0 minutes.

Introduction

This report provides the results of the twenty-sixth 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 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) 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 2022/23 (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.

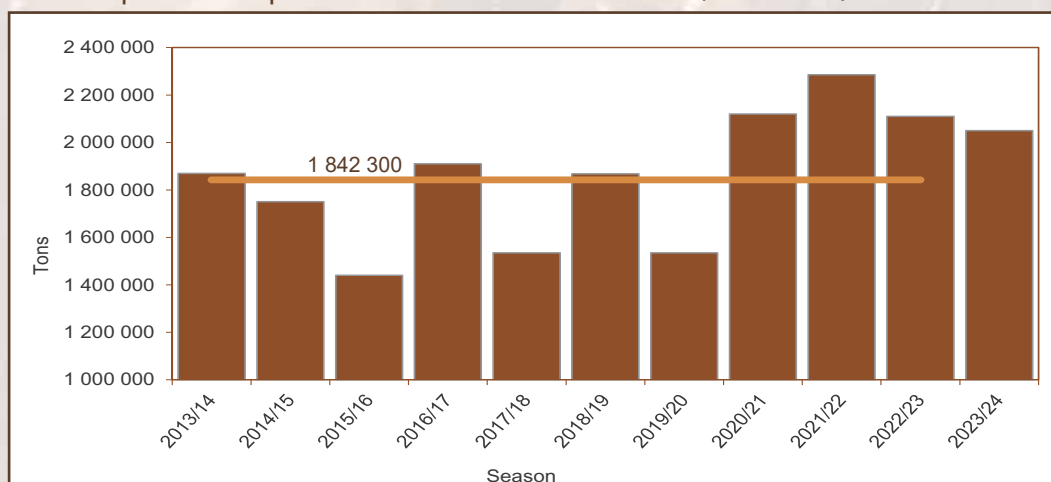
Production

Wheat contributed 76% to the total winter cereal crop production in South Africa this season. Other winter crops produced are malting barley, canola and oats.

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 28 and 30.

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 the DOA, were added to the SAGIS delivery figures to calculate the final crop production figures.

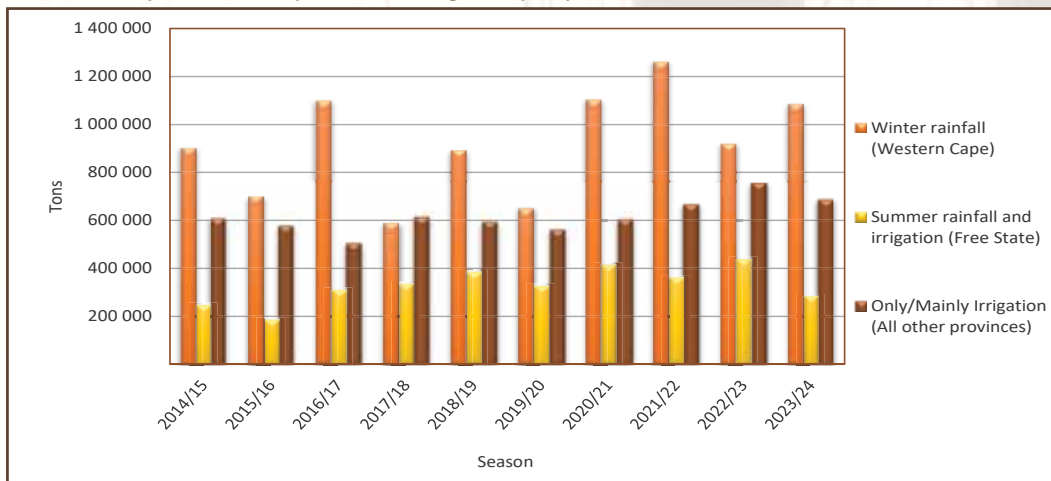
Graph 1: Wheat production in the RSA from the 2013/14 to 2023/24 seasons



Figures provided by the CEC.

The final production figure of 2 050 000 tons is 11% higher than the ten-year production average of 1 842 300 tons (2013/14 to 2022/23 seasons). The Western Cape produced 1 084 000 tons of wheat this season, representing a year-on-year increase of 18% and a 53% contribution to the total crop. The irrigation areas of the Northern Cape, the second largest wheat producing area this season, produced 292 000 tons, 14% less than last season. The Free State's wheat production (280 800 tons) decreased by 36% year-on-year. The remainder of wheat was produced mainly in Limpopo with 195 000 tons, representing a 4% increase compared to the 2022/23 season and North West, where production decreased by 28% to 67 650 tons. Please see Graphs 1 and 2 for national wheat production figures and wheat production figures per production area over ten seasons.

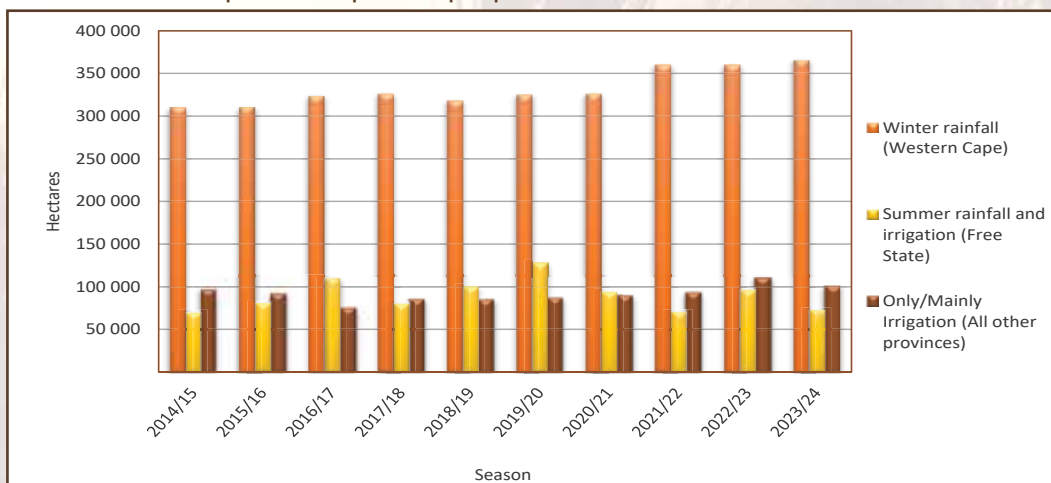
Graph 2: Wheat production figures per production area over ten seasons



Figures provided by the CEC.

The area utilised for wheat production decreased by 5% to 537 950 hectares compared to the 2022/23 season. There was a slight increase (1%) in the hectares cultivated under wheat in the Western Cape, while the wheat production area in the Free State decreased by 25% year-on-year. Nationally, dry land and irrigation areas decreased by 2% and 14% respectively year on year. Please see Graph 3.

Graph 3: Area planted per production area over ten seasons

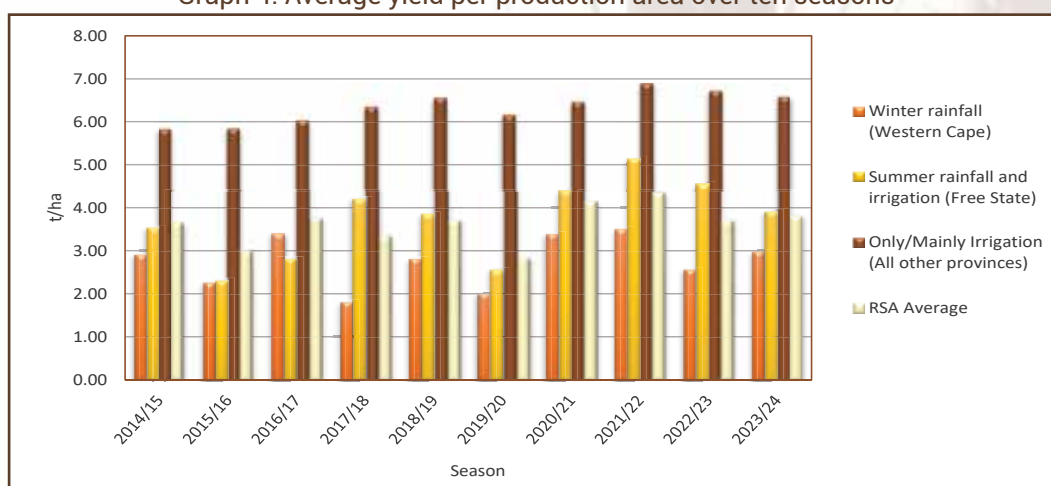


Figures provided by the CEC.

The yield in the main production areas ranged from 2.97 tons per hectare (t/ha) in the winter rainfall area of the Western Cape to 7.30 t/ha for irrigation wheat produced in the Northern Cape. The Free State (summer rainfall and irrigation areas) averaged 3.90 t/ha. The national yield average increased by 2.4% from 3.72 t/ha in the previous season to 3.81 t/ha this season. Please see Graph 4 for the average yield per production area over ten seasons.

The figures illustrated in Graphs 2 to 4 are based on the production figures 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	2023/2024			2022/2023		
		Hectares planted, ha	Production, tons	Yield, t/ha	Hectares planted, ha	Production, tons	Yield, t/ha
Western Cape	Dryland	361 000	1 064 000	2.95	354 100	873 750	2.47
	Irrigation	4 000	20 000	5.00	5 900	44 250	7.50
	Total	365 000	1 084 000	2.97	360 000	918 000	2.55
Northern Cape	Dryland	-	-	-	-	-	-
	Irrigation	40 000	292 000	7.30	47 000	338 500	7.20
	Total	40 000	292 000	7.30	47 000	338 500	7.20
Free State	Dryland	36 500	73 000	2.00	49 000	134 800	2.75
	Irrigation	35 500	207 800	6.60	47 000	302 000	6.43
	Total	72 000	280 800	3.90	96 000	436 800	4.55
Eastern Cape	Dryland	1 100	4 400	4.00	1 500	6 600	4.40
	Irrigation	5 200	36 155	6.95	4 500	33 600	7.47
	Total	6 300	40 555	6.44	6 000	40 200	6.70
KwaZulu-Natal	Dryland	250	850	3.40	250	750	3.00
	Irrigation	8 250	55 250	6.70	8 950	59 980	6.70
	Total	8 500	56 100	6.60	9 200	60 730	6.60
Mpumalanga	Dryland	-	-	-	-	-	-
	Irrigation	4 200	27 720	6.60	4 000	27 600	6.90
	Total	4 200	27 720	6.60	4 000	27 600	6.90
Limpopo	Dryland	5 000	18 000	3.60	5 000	16 500	3.30
	Irrigation	25 000	177 000	7.08	24 000	170 500	7.10
	Total	30 000	195 000	6.50	29 000	187 000	6.45
Gauteng	Dryland	150	600	4.00	250	1 170	4.68
	Irrigation	800	5 575	6.97	850	6 200	7.30
	Total	950	6 175	6.50	1 100	7 370	6.70
North West	Dryland	1 000	4 000	4.00	2 000	7 500	3.75
	Irrigation	10 000	63 650	6.37	12 500	86 300	6.90
	Total	11 000	67 650	6.15	14 500	93 800	6.47
RSA	Dryland	405 000	1 164 850	2.88	412 100	1 041 070	2.53
	Irrigation	132 950	885 150	6.66	154 700	1 068 930	6.91
	Total	537 950	2 050 000	3.81	566 800	2 110 000	3.72

Figures provided by the CEC.

Supply and Demand

World wheat production for the 2023/24 season is estimated at 790.42 million metric tons according to the *World Agricultural Supply and Demand Estimates (WASDE) report 654 of 8 November 2024*, world production for 2024/25 is projected to be 794.73 million metric tons.

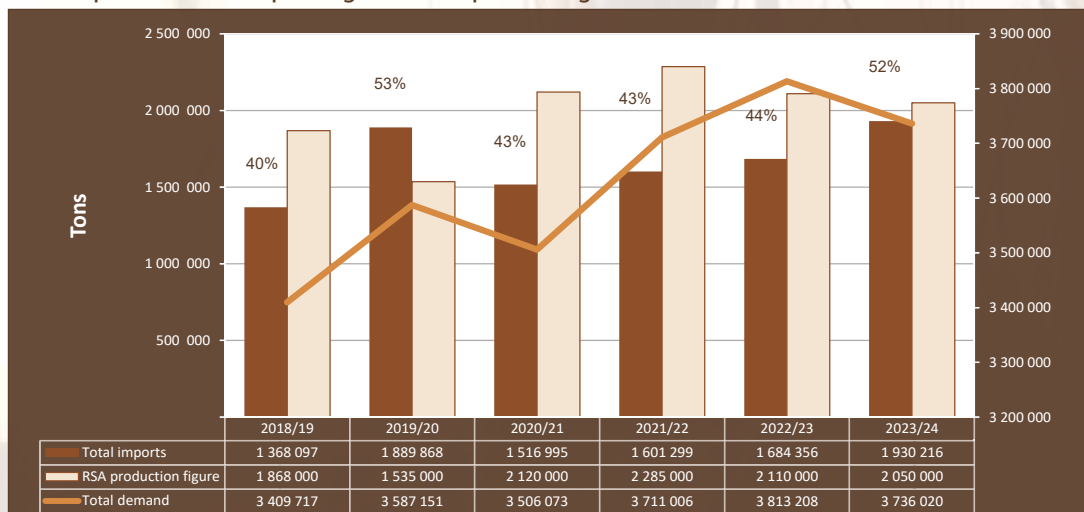
South Africa is a net importer of wheat and relies on imports to supply local demand. According to SAGIS figures (Table S1), wheat processing demand (human, animal and gristing) during the 2022/23 (3 491 898 tons) and 2023/24 (3 439 633 tons) seasons were the highest and second highest respectively of the last 26 seasons. The ten-year average is 3 275 066 tons.

During the 2023/24 season, 1 930 216 tons of wheat were imported. This figure is almost 15% higher than the amount of wheat imported during 2022/23. The ten-year import average is 1 673 276 tons. According to Table 8 on page 74, 30% of the wheat imported during the 2022/23 season for local consumption, originated in Poland, followed by the Russian Federation (16%), Australia (15%) and Lithuania (20%). See pages 83 to 101 for the quality of the wheat imported during 2022/23.

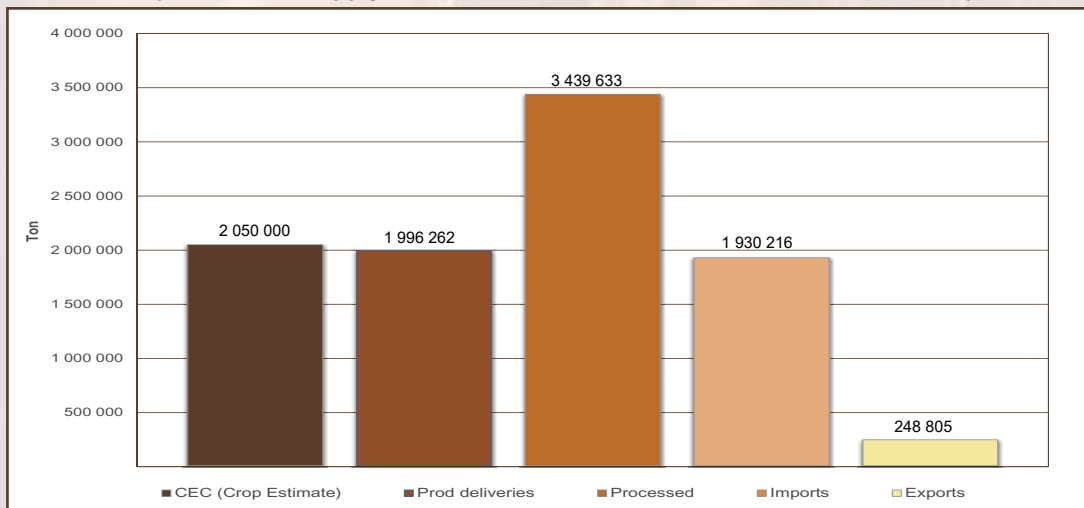
In 2023/24 the largest amount of wheat was imported from the Russian Federation (28%), followed by Lithuania (21%), Australia (20%) and Poland (19%). 214 796 tons of local wheat were exported to countries such as Zambia, Botswana and Lesotho during the corresponding period. See Table S9.

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 2023/24 season (Oct - Sep)



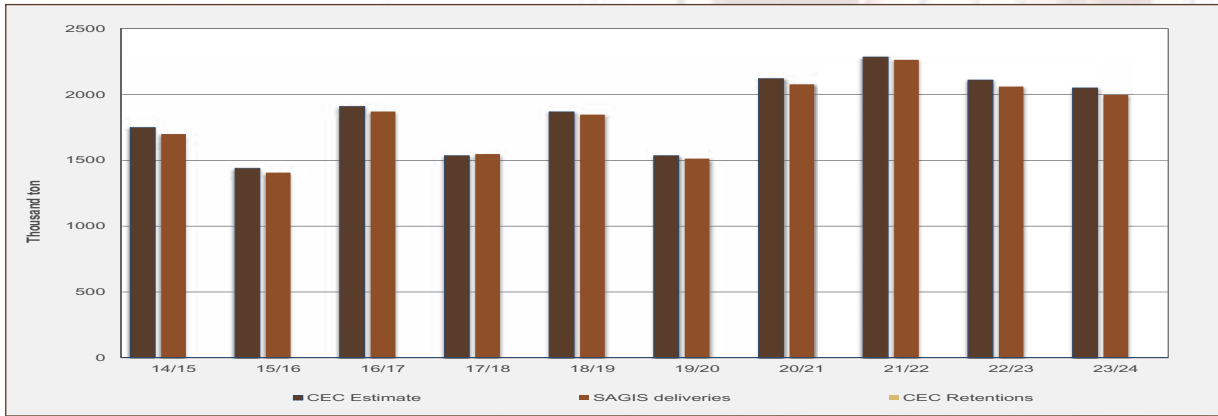
Figures provided by SAGIS, (Publication date: 2024-10-25)

Table S1: WHEAT: SUPPLY AND DEMAND TABLE BASED ON SAGIS' INFO Publication date: 2024-10-25

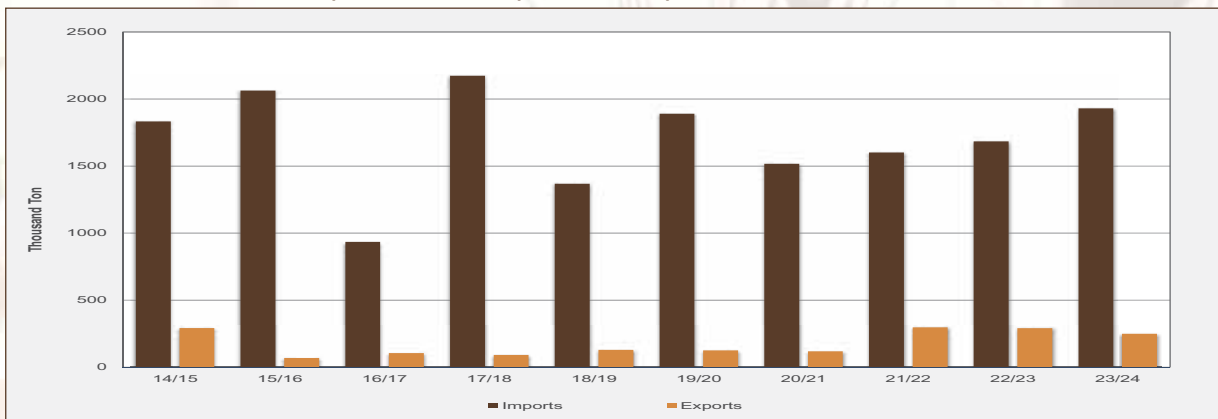
	Season (Oct - Sep)												Current Season		10 Year average 2013/14-2022/23		
													Oct - Sep	23/24***			
	07/08	08/09	09/10	10/11	11/12	12/13	13/14	14/15	15/16	16/17	17/18	18/19	19/20	20/21		21/22	22/23
CEC (Crop Estimate)	1 905 000	2 130 000	1 958 000	1 430 000	2 005 000	1 870 000	1 750 000	1 440 000	1 910 000	1 535 000	1 868 000	1 535 000	2 120 000	2 285 000	2 110 000	2 050 000	1 842 300
CEC (Retention)	42 000	43 000	29 000	27 000	26 500	30 000	0	0	0	0	0	0	0	0	0	0	3 000
SUPPLY																	
Opening stock (1 Oct)	376 000	509 000	694 000	579 000	478 000	651 180	488 526	596 823	827 232	341 424	721 534	539 079	364 908	467 404	625 083	563 259	546 127
Prod deliveries	1 876 000	2 130 000	1 910 000	1 389 000	1 973 000	1 837 137	1 699 546	1 406 752	1 870 525	1 547 486	1 847 171	1 513 300	2 077 136	2 262 938	2 059 649	1 996 262	1 810 148
Imports	1 396 000	1 192 000	1 285 000	1 649 000	1 724 000	1 393 215	1 668 412	2 062 765	934 765	2 173 757	1 368 097	1 889 868	1 516 995	1 601 299	1 684 356	1 930 216	1 673 276
Surplus	0	13 000	0	23 000	14 000	0	15 151	8 807	9 249	5 611	11 994	9 812	14 438	4 448	7 379	0	8 689
Total supply	3 648 000	3 844 000	3 889 000	3 640 000	4 189 000	3 881 532	4 035 664	4 075 147	3 641 771	4 068 278	3 948 796	3 952 059	3 973 477	4 336 089	4 376 467	4 489 737	4 038 239
DEMAND																	
Processed	2 845 000	2 857 000	3 017 000	2 945 000	3 202 000	3 040 086	3 175 834	3 144 414	3 163 196	3 229 861	3 254 656	3 437 768	3 355 869	3 384 445	3 491 898	3 439 633	3 275 066
-human	2 844 000	2 849 000	2 991 000	2 944 000	3 066 000	3 008 378	3 122 134	3 142 077	3 160 660	3 226 649	3 251 410	3 414 602	3 347 677	3 364 789	3 452 070	3 433 875	3 289 109
-animal	1 000	8 000	26 000	1 000	136 000	31 694	53 695	2 337	2 536	3 212	3 246	23 166	8 192	19 656	39 828	5 756	15 956
-gristing	0	0	0	0	0	14	5	0	0	0	0	0	0	0	0	0	1
-bio-fuel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Withdrawn by producers	12 000	12 000	14 000	6 000	4 000	3 934	3 127	1 834	1 880	884	941	1 767	4 049	7 033	6 206	3 535	2 904
Released to end-consumers	2 000	5 000	3 000	6 000	7 000	7 322	3 095	1 907	1 256	1 990	2 186	1 269	1 453	1 426	1 411	1 095	1 880
Seed for planting purposes	22 000	26 000	17 000	13 000	18 000	15 998	18 198	18 800	24 067	18 237	19 222	16 595	20 561	19 377	18 612	19 741	19 637
Net receipts(-)/disp(+)	26 000	19 000	15 000	13 000	19 000	19 990	16 172	7 468	5 101	4 992	3 523	4 410	5 653	1 615	3 901	7 233	6 527
Deficit	9 000	0	4 000	0	0	713	1 243	0	0	0	0	0	0	0	0	15 978	124
Exports	223 000	231 000	240 000	179 000	288 000	304 236	268 451	68 525	104 847	90 780	129 189	125 342	118 488	297 110	291 180	248 805	178 574
Total Demand	3 139 000	3 150 000	3 310 000	3 162 000	3 538 000	3 332 279	3 486 120	3 247 915	3 300 347	3 346 744	3 409 717	3 587 151	3 506 073	3 711 006	3 813 208	3 738 020	3 484 712
Ending Stock (30 Sep)	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	563 259	553 527
- processed p/month	237 100	238 100	251 400	245 400	266 800	253 341	264 653	262 035	263 600	269 155	271 221	286 481	279 656	282 037	290 992	286 636	272 922
- months' stock	2.1	2.9	2.3	1.9	2.4	1.9	1.8	3.2	1.3	2.7	2.0	1.3	1.7	2.2	1.9	2.6	2

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

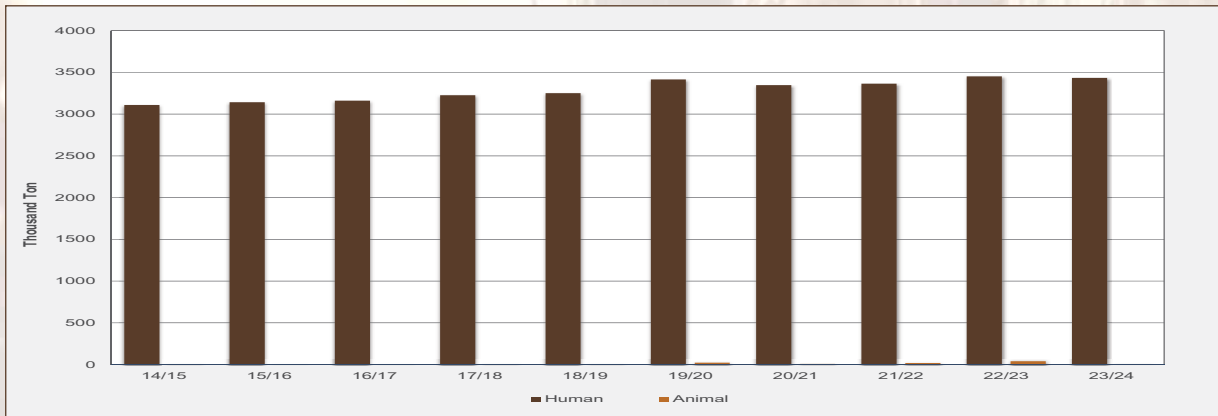
Graph 7: Wheat: CEC Estimate, Retentions and SAGIS deliveries over ten seasons



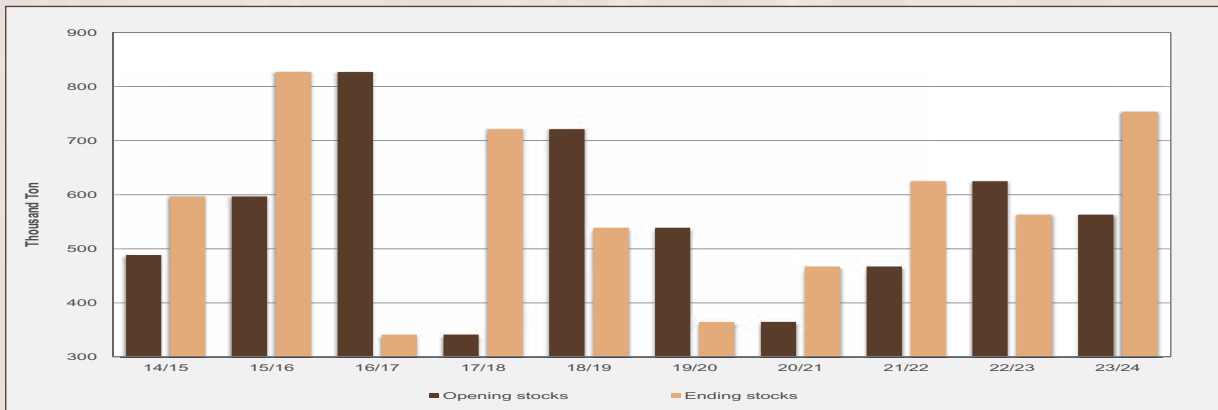
Graph 8: Wheat: Imports and exports over ten seasons



Graph 9: Wheat: RSA consumption over ten seasons



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



Figures provided by SAGIS, 23/24 figures (Oct - Sep)

Table S2: WHOLE WHEAT PROCESSED PER PROVINCE

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	3 478 803

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	3 382 925

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	3 410 363

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	286 581	659 846	714 913	420	608 844	1 260 153	3 530 757

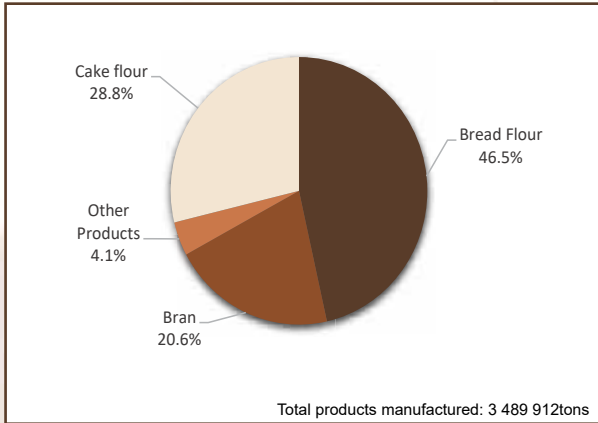
PROGRESSIVE: October 2023 to September 2024 (2023/24 Marketing Year)							
	Northern Cape Eastern Cape	Western Cape	KwaZulu-Natal Mpumalanga	Limpopo North West	Free State	Gauteng	Total
Processed	288 924	687 333	654 610	277	622 293	1 220 205	3 473 642

* Please note that included are the products destined for exports

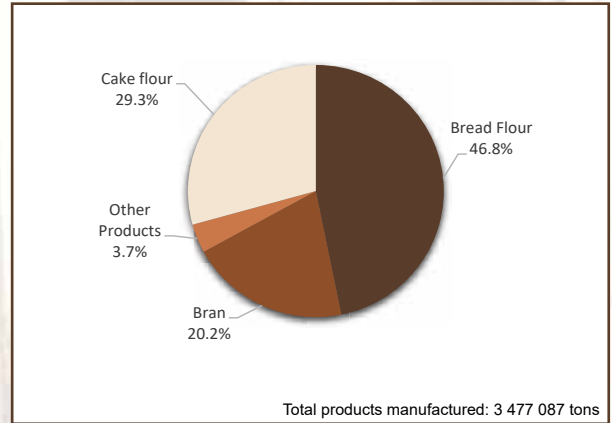
SAGIS Wheat Product Information

Please see graphs 11 to 16 below as well as Tables S3 to S6 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 in Table S7 on pages 12 and 13.

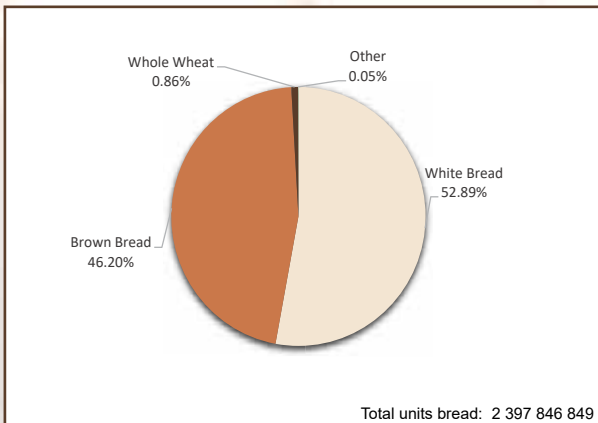
Graph 11: Wheat products manufactured from Oct 2022 - Sept 2023



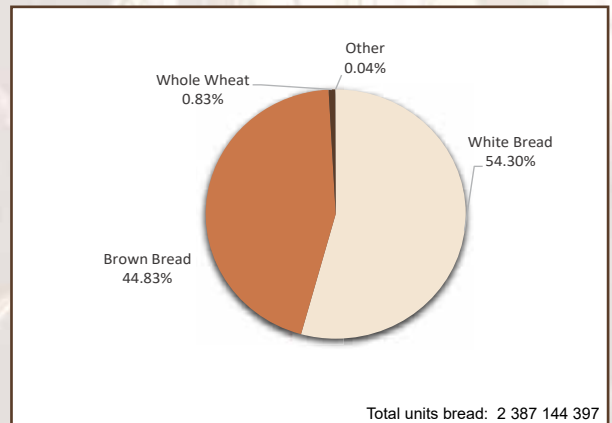
Graph 12: Wheat products manufactured from Oct 2023 - Sept 2024



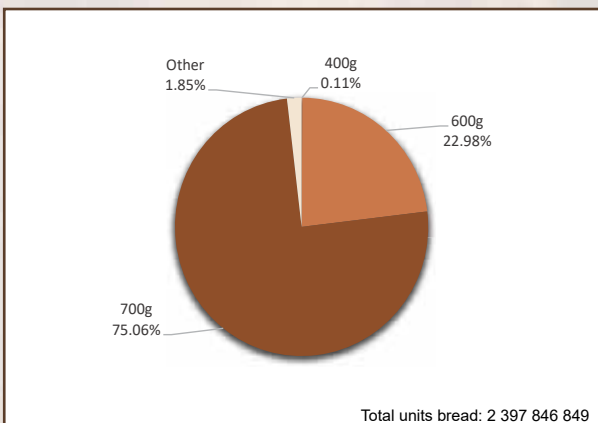
Graph 13: Pan baked bread per type from Oct 2022 - Sept 2023



Graph 14: Pan baked bread per type from Oct 2023 - Sept 2024



Graph 15: Pan baked bread per mass Oct 2022 - Sept 2023



Graph 16: Pan baked bread per mass Oct 2023 - Sept 2024

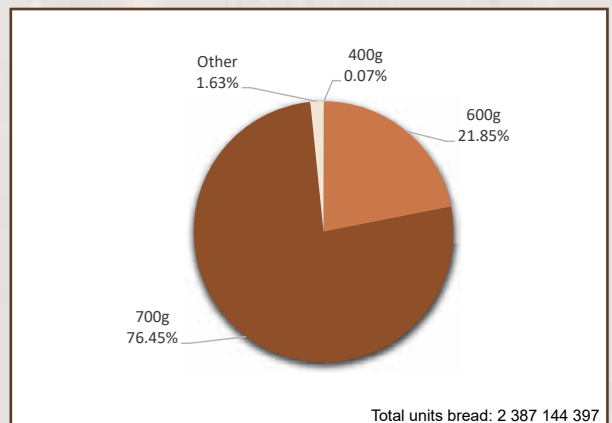


Table S3: WHEATEN PRODUCTS MANUFACTURED PER MARKETING YEAR

	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: 12 Months	Marketing year: Oct 2023 - Sep 2024 Manufactured Tons Progressive: 12 Months
Cake Flour	1 016 500	996 325	993 216	1 004 173	1 019 026
Self-Raising Flour	19 179	18 302	16 228	16 583	15 871
White Bread Flour	1 174 102	1 248 539	1 289 487	1 335 956	1 349 184
Brown Bread Flour	396 342	310 161	279 856	280 328	273 007
Other Flour (Industrial)	124 713	116 786	117 568	122 324	108 627
Whole Wheat Meal	8 072	6 706	6 106	6 217	6 082
Bran	703 550	680 402	684 976	719 707	701 139
Semolina	4 138	4 537	4 663	4 624	4 151
Total	3 446 596	3 381 758	3 392 100	3 489 912	3 477 087

Table S4: WHEATEN PRODUCTS IMPORTED PER MARKETING YEAR

	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: 12 Months	Marketing year: Oct 2023 - Sep 2024 Manufactured Tons Progressive: 12 Months
Cake Flour	5 254	3 985	4 205	5 151	4 993
Self-Raising Flour	35	25	24	4	13
White Bread Flour	12 383	10 116	13 947	13 125	12 775
Brown Bread Flour	8 088	7 120	6 888	5 766	5 082
Other Flour (Industrial)	0	0	0	0	106
Whole Wheat Meal	0	0	0	0	0
Bran	7 329	7 086	7 574	8 438	4 162
Semolina	0	0	0	0	0
Total	33 089	28 332	32 638	32 484	27 131

Table S5: WHEATEN PRODUCTS EXPORTED PER MARKETING YEAR

	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: 12 Months	Marketing year: Oct 2023 - Sep 2024 Manufactured Tons Progressive: 12 Months
Cake Flour	4 719	1 310	1 869	2 417	1 146
Self-Raising Flour	2 201	3 685	3 808	3 198	3 408
White Bread Flour	5 612	4 407	5 363	10 408	9 891
Brown Bread Flour	17 019	11 097	9 177	13 884	11 424
Other Flour (Industrial)	70	21	0	0	0
Whole Wheat Meal	21	14	11	12	11
Bran	1 022	0	0	2 029	1 821
Semolina	17	7	13	12	13
Total	30 681	20 541	20 241	31 960	27 714

Table S6: PAN BAKED PRODUCTS MANUFACTURED PER YEAR

	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: 12 Months	Marketing year: Oct 2023 - Sep 2024 Manufactured Units Progressive: 12 Months
WHITE BREAD					
400g (Units)	1 503 633	1 916 490	1 694 463	1 070 102	926 871
600g (Units)	247 511 992	242 926 271	255 130 078	258 864 432	255 626 643
700g (Units)	880 836 097	906 178 166	968 154 742	998 024 829	1 031 689 318
Other (Units)	10 640 346	9 185 895	11 825 665	10 363 681	7 919 236
White Bread (Total Units)	1 140 492 068	1 160 206 822	1 236 804 948	1 268 323 044	1 296 162 068
BROWN BREAD					
400g (Units)	659 354	366 727	360 750	1 514 923	709 132
600g (Units)	359 714 338	362 220 781	337 902 579	291 630 705	265 557 504
700g (Units)	840 722 226	805 850 607	797 206 075	799 183 797	790 933 824
Other (Units)	15 706 019	14 445 645	14 670 901	15 479 227	12 894 283
Brown Bread (Total Units)	1 216 801 937	1 182 883 760	1 150 140 305	1 107 808 652	1 070 094 743
WHOLE WHEAT					
400g (Units)	12 305	11 678	11 010	12 088	13 361
600g (Units)	564 692	502 886	481 868	498 848	367 558
700g (Units)	5 847 337	5 397 378	4 369 143	2 554 403	2 292 729
Other (Units)	20 240 473	19 734 109	19 686 320	17 446 150	17 173 595
Whole Wheat (Total Units)	26 664 807	25 646 051	24 548 341	20 511 489	19 847 243
OTHER					
400g (Units)	21 651	24 759	14 070	16 344	9 899
600g (Units)	216 720	128 498	109 541	100 425	36 037
700g (Units)	110 366	70 805	62 119	26 895	13 677
Other (Units)	1 730 533	1 057 879	1 073 105	1 060 000	980 730
Other (Total Units)	2 079 270	1 281 941	1 258 835	1 203 664	1 040 343
Total	2 386 038 082	2 370 018 574	2 412 752 429	2 397 846 849	2 387 144 397

Table S7:

PAN BAKED PRODUCTS MANUFACTURED PER BAKERY GROUP PER MARKETING YEAR				
SUPERMARKET GROUPS	Oct 2020 - Sept 2021	Oct 2021 - Sept 2022	Oct 2022 - Sept 2023	Oct 2023 - Sept 2024
WHITE BREAD				
400g (Units)	220 462	222 924	308 991	225 963
600g (Units)	96 281 265	104 353 834	105 654 212	93 386 747
700g (Units)	5 733 674	7 370 730	9 308 614	7 086 555
Other (Units)	1 292 005	1 814 900	2 213 433	2 105 439
White Bread (Total Units)	103 527 406	113 762 388	117 485 250	102 804 704
BROWN BREAD				
400g (Units)	108 295	119 173	114 940	113 299
600g (Units)	163 353 889	155 206 196	108 858 713	101 296 962
700g (Units)	4 648 966	5 204 174	5 728 792	4 912 025
Other (Units)	647 030	865 212	1 108 391	1 405 561
Brown Bread (Total Units)	168 758 180	161 394 755	115 810 836	107 727 847
WHOLE WHEAT				
400g (Units)	0	0	0	0
600g (Units)	443 080	426 799	422 227	326 524
700g (Units)	1 933 139	2 102 161	620 058	137 323
Other (Units)	0	0	0	0
Whole Wheat (Total Units)	2 376 219	2 528 960	1 042 285	463 847
OTHER				
400g (Units)	0	0	0	0
600g (Units)	0	0	0	0
700g (Units)	0	0	0	0
Other (Units)	910 678	850 306	873 748	823 341
Other (Total Units)	910 678	850 306	873 748	823 341
Total	275 572 483	278 536 409	235 212 119	211 819 739

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

BAKERY GROUPS	Oct 2020 - Sept 2021	Oct 2021 - Sept 2022	Oct 2022 - Sept 2023	Oct 2023 - Sept 2024
WHITE BREAD				
400g (Units)	0	0	0	0
600g (Units)	87 869 366	96 555 426	102 275 869	100 485 098
700g (Units)	843 809 594	888 591 779	921 791 317	957 905 682
Other (Units)	1 791 049	2 462 060	2 148 300	1 965 780
White Bread (Total Units)	933 470 009	987 609 265	1 026 215 486	1 060 356 560
BROWN BREAD				
400g (Units)	0	0	1 159 063	385 326
600g (Units)	127 335 203	115 746 595	120 734 158	106 587 774
700g (Units)	759 962 904	733 826 197	738 562 362	732 931 185
Other (Units)	11 418 698	11 415 983	10 091 368	9 480 795
Brown Bread (Total Units)	898 716 805	860 988 775	870 546 951	849 385 080
WHOLE WHEAT				
400g (Units)	0	0	0	0
600g (Units)	0	0	0	0
700g (Units)	3 206 902	2 008 170	1 642 658	1 876 735
Other (Units)	19 716 636	19 676 075	17 439 822	17 166 991
Whole Wheat (Total Units)	22 923 538	21 684 245	19 082 480	19 043 726
OTHER				
400g (Units)	0	0	0	0
600g (Units)	0	0	0	0
700g (Units)	0	0	0	0
Other (Units)	0	66 809	0	0
Other (Total Units)	0	66 809	0	0
Total	1 855 110 352	1 870 349 094	1 915 844 917	1 928 785 366

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

Table S7 (continue):

PAN BAKED PRODUCTS MANUFACTURED PER BAKERY GROUP PER MARKETING YEAR				
INDEPENDENT BAKERIES	Oct 2020 - Sept 2021	Oct 2021 - Sept 2022	Oct 2022 - Sept 2023	Oct 2023 - Sept 2024
WHITE BREAD				
400g (Units)	1 059 148	803 922	0	0
600g (Units)	29 800 163	23 614 453	20 164 066	33 309 135
700g (Units)	41 524 028	55 358 272	48 511 492	49 050 001
Other (Units)	4 287 887	5 826 804	4 484 964	2 199 609
White Bread (Total Units)	76 671 226	85 603 451	73 160 522	84 558 745
BROWN BREAD				
400g (Units)	2 696	795	0	0
600g (Units)	38 133 521	33 209 283	30 098 047	26 492 523
700g (Units)	31 072 223	47 313 482	43 115 393	42 628 416
Other (Units)	647 331	763 902	3 025 354	525 182
Brown Bread (Total Units)	69 855 771	81 287 462	76 238 794	69 646 121
WHOLE WHEAT				
400g (Units)	0	0	0	0
600g (Units)	2 601	2 504	1 129	6 085
700g (Units)	92 436	118 795	114 201	105 883
Other (Units)	4 685	4 583	1 385	956
Whole Wheat (Total Units)	99 722	125 882	116 715	112 924
OTHER				
400g (Units)	0	0	0	0
600g (Units)	0	0	0	0
700g (Units)	0	0	0	0
Other (Units)	6 573	10 832	59 968	128 315
Other (Total Units)	6 573	10 832	59 968	128 315
Total	146 633 292	167 027 627	149 575 999	154 446 105

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

INDEPENDENT SUPERMARKETS	Oct 2020 - Sept 2021	Oct 2021 - Sept 2022	Oct 2022 - Sept 2023	Oct 2023 - Sept 2024
WHITE BREAD				
400g (Units)	636 880	658 750	760 354	700 908
600g (Units)	28 975 477	30 630 511	29 980 618	28 445 663
700g (Units)	15 110 870	16 610 799	18 322 492	17 647 080
Other (Units)	1 814 954	1 698 820	1 506 283	1 648 408
White Bread (Total Units)	46 538 181	49 598 880	50 569 747	48 442 059
BROWN BREAD				
400g (Units)	255 736	229 694	240 698	210 507
600g (Units)	33 398 168	33 694 966	31 130 434	31 180 245
700g (Units)	10 166 514	10 820 150	11 714 046	10 462 198
Other (Units)	1 732 586	1 597 971	1 238 973	1 482 745
Brown Bread (Total Units)	45 553 004	46 342 781	44 324 151	43 335 695
WHOLE WHEAT				
400g (Units)	11 678	11 010	12 053	13 361
600g (Units)	57 205	52 565	64 663	34 949
700g (Units)	164 901	140 017	172 889	172 788
Other (Units)	12 788	5 662	4 943	5 648
Whole Wheat (Total Units)	246 572	209 254	254 548	226 746
OTHER				
400g (Units)	24 759	14 070	16 344	9 899
600g (Units)	128 498	109 541	100 425	36 037
700g (Units)	70 805	62 119	26 895	13 677
Other (Units)	140 628	145 158	135 941	29 074
Other (Total Units)	364 690	330 888	279 605	88 687
Total	92 702 447	96 481 803	95 428 051	92 093 187

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 2023/24 season received were graded as follows: 19% was graded Super Grade, 25% was graded Grade 1, 21% was graded Grade 2, 10% was graded Grade 3 and 25% 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 85 samples received that were downgraded to COW, 8 samples (9%) had protein content values below 9.5% (14% mb), 4 samples (5%) had hectolitre mass values below 74 kg/hl, 1 sample had a falling number value below 220 seconds and 28 samples (33%) had screening levels higher than 3%.

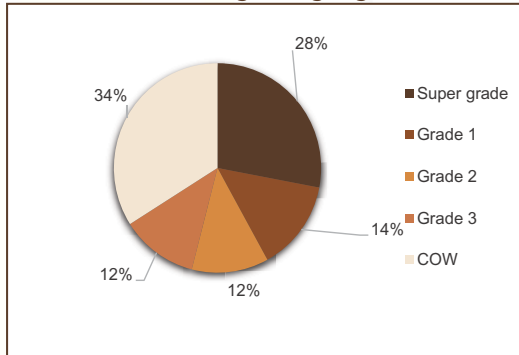
The deviations that caused the highest percentages of samples to be downgraded to COW was other grain and unthreshed ears with 52% (44 samples) and combined deviations with 28% (24 samples).

49% of the downgraded samples originated from the Western Cape, 17% from the Free State and 34% from the irrigation areas.

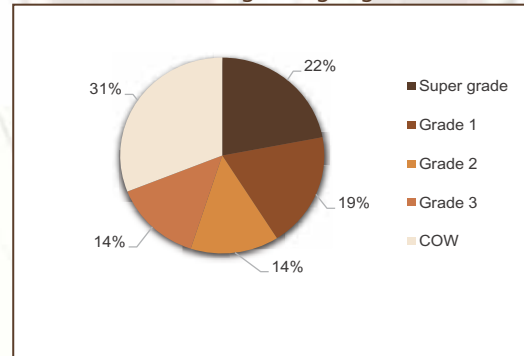
22% of wheat crop quality survey samples originating in the Free State were graded Super Grade. 41% of the wheat crop samples from the irrigation areas and 4% of wheat crop samples from the Western Cape Province graded Super Grade.



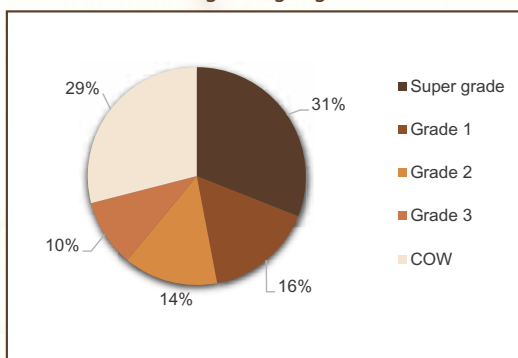
Graph 17: Percentage of samples per Class and grade in the 2020/21 season according to the current grading regulations



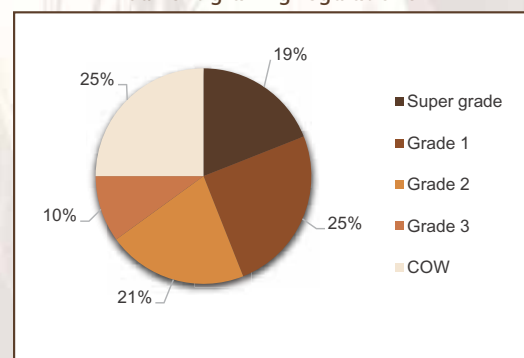
Graph 18: Percentage of samples per Class and grade in the 2021/22 season according to the current grading regulations



Graph 19: Percentage of samples per Class and grade in the 2022/23 season according to the current grading regulations



Graph 20: Percentage of samples per Class and grade in the 2023/24 season according to the current grading regulations



Wheat seed sold by commercial grain storage companies to wheat producers for the 2023 planting season

Cultivar	%	Cultivar	%
SST 0166	40.70	SST 374	0.26
SST 0187	26.57	PAN 3584	0.24
SST 0117	4.78	Ancia	0.18
PAN 3497	3.20	PAN 3681	0.177
SST 0147	3.13	PAN 3471	0.161
SST 056	2.90	PAN 3111	0.152
SST 884	2.52	Duzi	0.139
SST 015	2.11	SST 8177	0.129
SST 8205	1.95	SST 806	0.109
SST 88	1.80	PAN 3541	0.069
SST 843	1.47	SST 347	0.063
PAN 3161	1.25	SST 835	0.059
PAN 3373	1.14	SST 3197	0.055
SST 8154	1.11	Renoster	0.051
SST 0127	0.80	SST 8175	0.041
SST 356	0.63	IS TORDO	0.028
SST 8156	0.60	SST 398	0.025
SST 8135	0.57	PAN 3644	0.019
PAN 3400	0.42	Afficion	0.005
Matlabas	0.37	SST 087	0.001
			<hr/>
			100

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

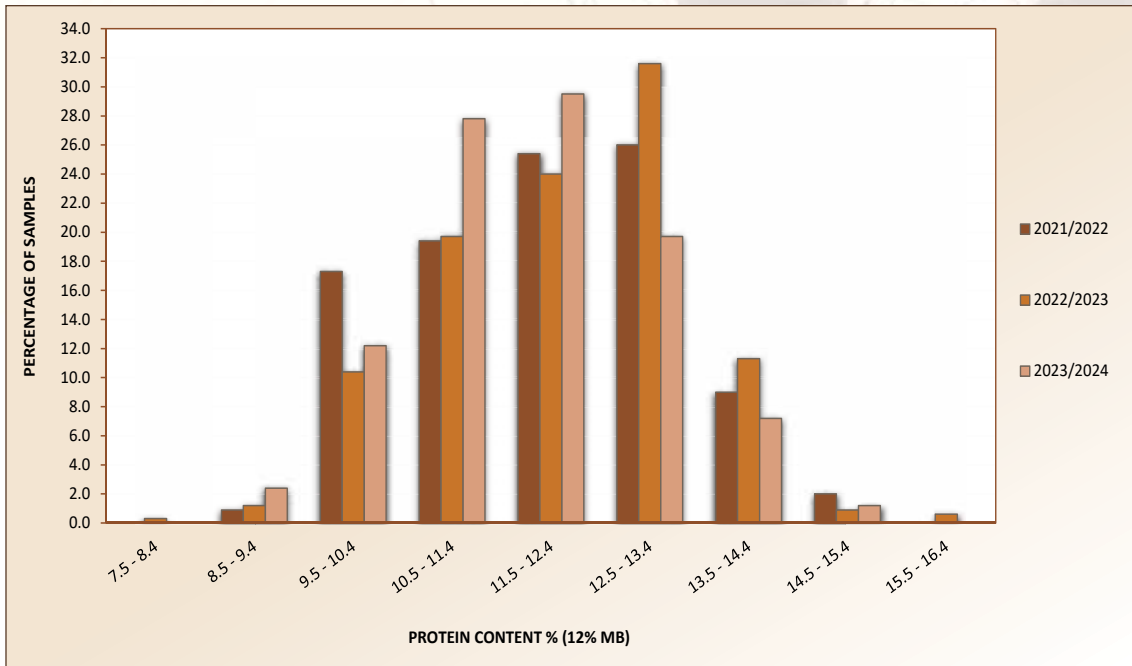
Grade	Minimum			Maximum percentage permissible deviation (m/m)										
	Hectolitre mass, kg/hl	Falling number, seconds	Protein content, %	A	B	C	D	E	F	G	H	I	J	
Super Grade	76	220	12.5	5	2	0.5	3	1	0.5	1	0.5	2	5	
Grade 1	76	220	11.5	5	2	0.5	3	1	0.5	1	0.5	2	5	
Grade 2	76	220	10.5	5	2	0.5	3	1	0.5	1	0.5	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 2023/24 season

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

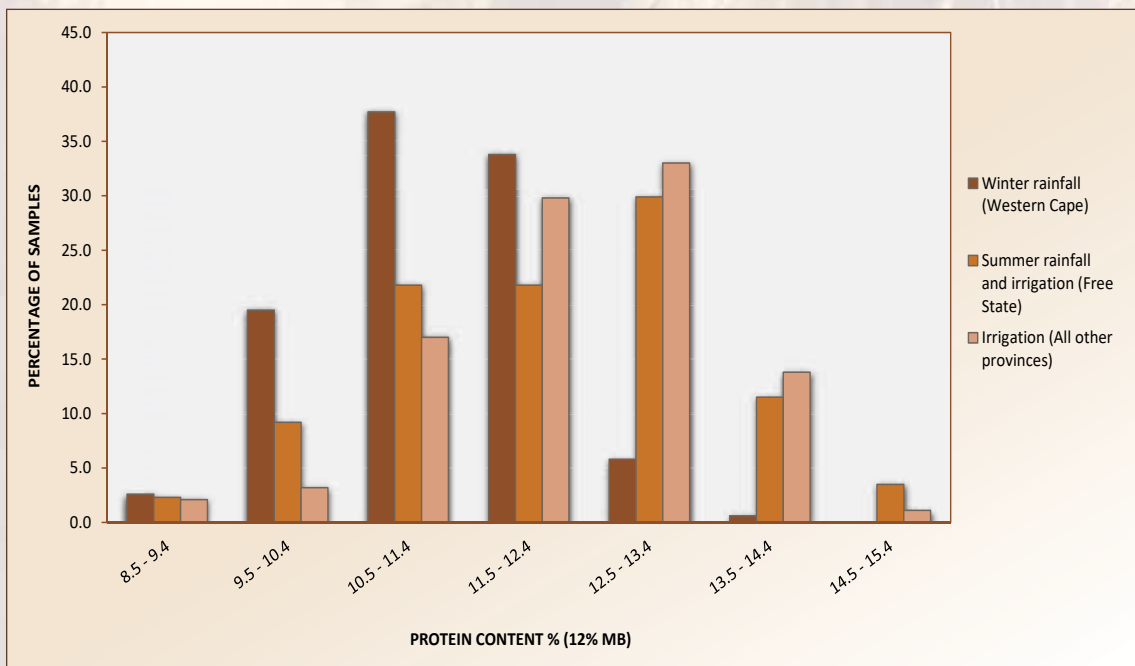
The national whole wheat protein average decreased from 12.1% in the previous season to 11.8%. The ten-year national average is 12.2%. Protein content is generally a function of the growing environment (soil and climatic conditions) as well as fertiliser application. Please see Graphs 21 and 22 for the protein content distribution over the last three seasons and between the three major production areas during 2023/24.

Graph 21: Protein content distribution over the last three seasons



The Irrigation areas reported the highest whole wheat protein average, namely 12.4%. The production regions in the Winter rainfall area of the Western Cape averaged 11.2% and the Summer rainfall and irrigation areas of the Free State 12.2%. See the Regional quality weighted averages summarized in Table 5 on pages 26 and 27.

Graph 22: Protein content distribution between the three production areas during the 2023/24 season



Flour protein content is on average 0.5 to 1.2% lower than that of whole wheat and averaged 10.8% this season, slightly (0.2%) percent lower 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 80.7 kg/hl is 0.9 kg/hl higher than the previous season and also 0.4 kg/hl higher than the ten-year national average of 80.3 kg/hl. Thirteen samples (4%) reported values below the 76 kg/hl minimum level for Super grade, Grade 1 and Grade 2 wheat. Eleven of these samples originated in the Free State and one each in Limpopo and the Western Cape. Regional averages ranged from 79.7 kg/hl in the Free State, 80.2 kg/hl in the Western Cape and 82.4 kg/hl in the Irrigation areas.

The average 1000 kernel mass, reported on a 13% moisture basis, increased from 37.0 g last season to 39.1 g this season. The 2021/22 season's average was 40.3 g. Averages over production areas varied from 36.2 g in the Summer rainfall and irrigation areas of the Free State to 38.6 g in the Irrigation areas and 41.1 g in the Winter rainfall areas. The weighted average percentage screenings obtained with a 1.8 mm slotted sieve was 1.45%, compared to the 1.69% and 1.20% of the previous two seasons respectively. The Summer rainfall and irrigation areas reported the highest average percentage, namely 1.72% and the Irrigation areas the lowest of 1.21%. 28 (8%) of the 335 samples exceeded the 3% maximum permissible screenings level for Super grade to Grade 3. 43% of these samples originated in the Free State, 32% in the Western Cape, with single samples in Limpopo, North West, Mpumalanga and Gauteng.

The national weighted average falling number value was 375 seconds, compared to last season's average of 361 seconds. The ten-year weighted average value is 368 seconds. Only four (1%) of the samples analysed for this survey reported falling number values below 250 seconds and only one of these was below 220 seconds and were downgraded to COW as a result. This sample originated in Gauteng. Last season 5% 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 197 and 551 seconds. All falling number values reported, are corrected for the altitude at which the test is performed.

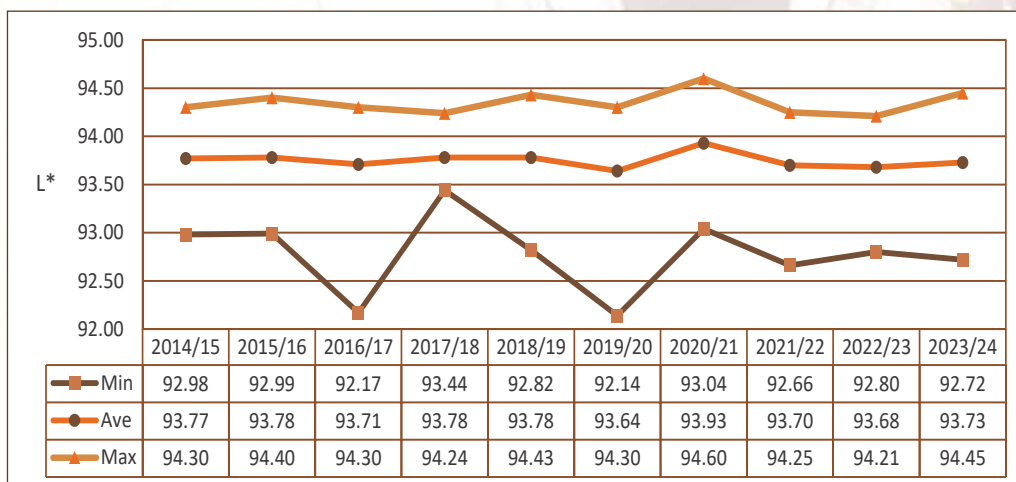
The mixogram peak time on flour milled on the Quadromat Junior mill averaged 3.1 minutes compared to the 3.3 minutes of the 2022/23 season. The ten-year average is 3.0 minutes. The weighted mixogram peak time of the flour from the Bühler mill was 3.0 minutes and on par with the 3.1 minutes of the previous 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 72.8% compared to the 73.8% of the previous season.

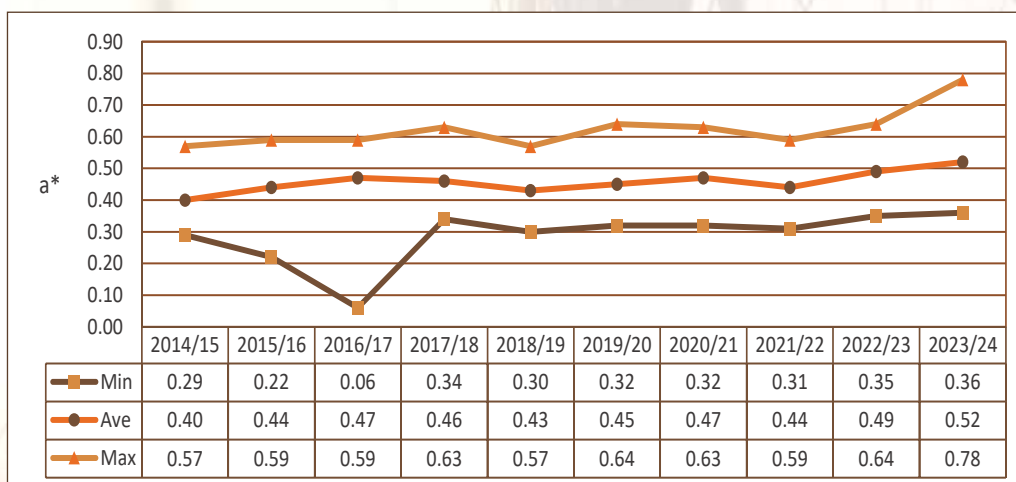
Colour is an important parameter of milled wheat since the colour of wheat flour affects the colour of the finished product, like the crumb colour of a loaf of bread. In general, a bright white colour flour is more desirable for most products. The CIE L*a*b* (CIELAB) colour model uses lightness (L*) 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.

The average ash content was 0.59 % on a dry basis (moisture free basis), equal to the previous season's average. 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%.

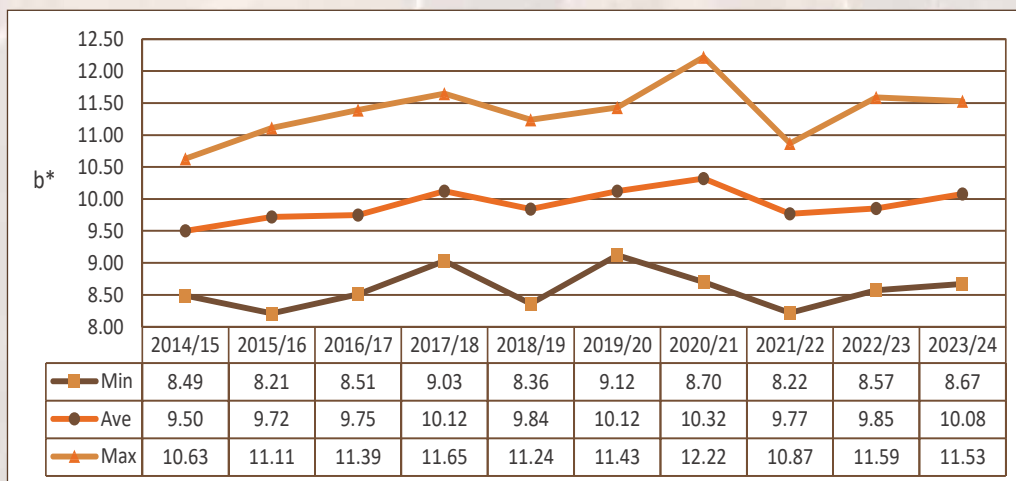
Graph 23: Range of L* values over ten seasons



Graph 24: Range of a* values over ten seasons



Graph 25: Range of b* values over ten seasons



The Rapid Visco Analyser (RVA) average peak viscosity of the samples analysed was 2291 cP (centipoise) (1548 – 2703 cP), the minimum viscosity 1773 cP (1266 – 2154 cP) and the final viscosity 2576 cP (1654 – 3071 cP). The range of the values are provided in brackets. The previous season the average peak viscosity was 2297 cP (1179 – 2912 cP), the minimum viscosity 1799 cP (877 – 2218 cP) and the final viscosity 2593 cP (1294 – 3400 cP). The RVA test parameters were kept constant during all the analyses. Results are reported on a 14% moisture basis.

Both the wet and dry gluten content averaged slightly lower than in the 2022/23 season. The wet gluten content (14% mb) averaged 29.1% and the dry gluten, also on a 14% moisture basis, 9.6%. The previous values, averaged 29.5% and 9.8% respectively. The average gluten index value was 96 (equal to last season) and ranged between 92 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 60.0% (59.4% the previous season) and an average development time of 5.4 minutes that equaled the previous season. The stability value of 11.2 minutes was 1.4 minutes shorter than the previous average (12.6 minutes). The mixing tolerance index compared well, 35 BU this season, 31 BU previously.

The average alveogram strength was 39.3 cm² and the average P/L value 0.71 (41.4 cm² and 0.66 the previous season). The distensibility of the dough (122 mm) decreased lightly on average compared to the previous season (130 mm). The average stability value of 80 mm equals the previous season's value.

The average extensogram strength of 110 cm² compared very well with the 109 cm² in the previous season. The maximum height in Brabender Units was slightly lower than last season, 403 BU in 2023/24 versus 411 BU in 2022/23. The average extensibility value this season (198 mm) was slightly longer than the previous season's 192 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 58.

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 B₁, B₂, G₁, G₂, Fumonisin B₁, B₂, B₃, Deoxynivalenol, 15-ADON, HT-2 Toxin, T-2 Toxin, Zearalenone and Ochratoxin A are possible in one run.

11 samples (28%) tested positive for deoxynivalenol (DON) residues, none 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 11 positive results was 239 µg/kg (ppb) and the highest value measured 478 µg/kg. Last season, 17 samples (43%) tested positive for DON residues with an average value of 1 780 µg/kg (ppb), the highest value obtained was 6 463 µg/kg. No residues were found for any of the other mycotoxins tested.

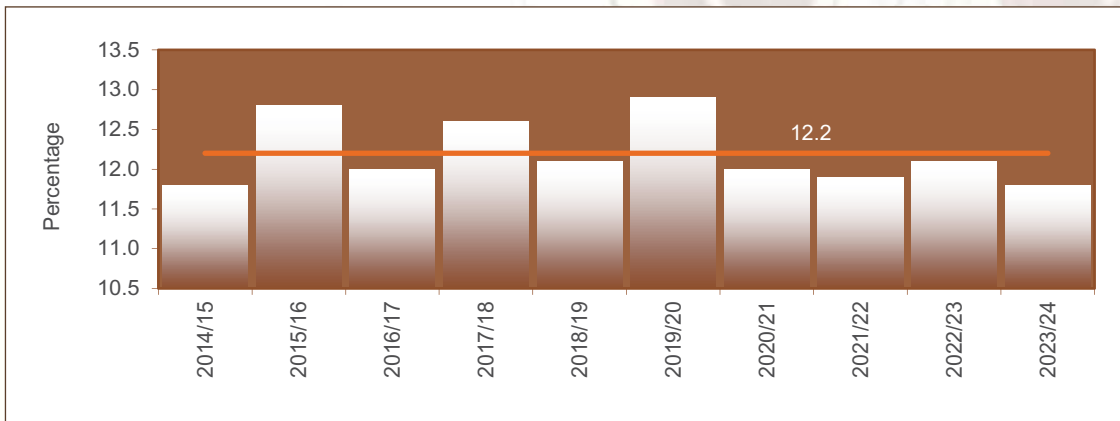
Please see the mycotoxin results in Table 6 on pages 60 and 61.



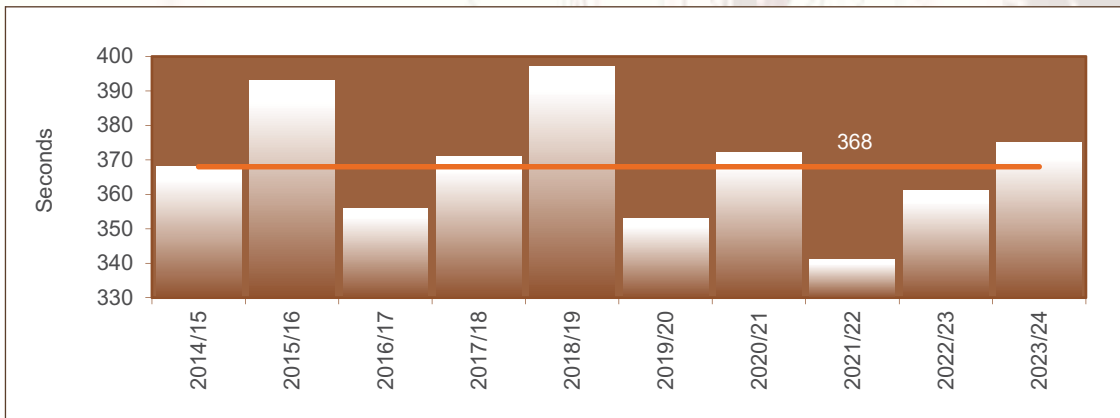
Table 3: Weighted average results for the last three seasons

Region	2023/24					2022/23					2021/22				
	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	11.7	369	80.4	3.0	4	12.1	403	80.4	2.8	4	12.2	405	79.0	3.1	4
2	10.9	404	79.0	2.8	12	12.0	378	78.5	3.3	13	10.6	366	77.1	3.4	4
3	11.0	387	80.9	2.8	66	12.4	400	79.1	3.2	63	11.2	397	78.7	3.2	57
4	11.0	392	81.3	2.7	19	11.5	397	80.5	3.2	23	10.7	369	78.7	3.0	15
5	11.4	378	79.3	3.1	27	11.1	388	80.6	3.1	32	11.1	391	80.6	2.9	26
6	11.6	339	79.0	3.4	26	11.6	398	80.8	3.0	23	10.8	368	79.5	3.0	26
7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10	13.1	380	83.8	2.7	17	13.0	361	81.5	2.7	21	12.6	357	82.4	2.8	39
11	12.2	408	83.6	3.1	11	12.3	358	80.0	3.2	23	12.1	335	80.4	2.9	16
12	-	-	-	-	-	-	-	-	-	-	11.3	293	80.7	3.1	1
13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
14	13.4	364	81.2	3.2	3	13.2	316	80.1	3.1	2	14.1	348	81.4	3.7	6
15	11.9	404	81.8	3.2	9	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	12.0	383	81.7	2.8	4	-	-	-	-	-	13.5	360	78.7	2.9	2
18	12.5	374	82.2	3.5	6	12.3	306	80.1	3.3	2	11.8	299	79.6	3.3	2
19	-	-	-	-	-	-	-	-	-	-	13.3	340	80.4	4.2	10
20	12.0	389	82.5	3.6	3	-	-	-	-	-	12.0	311	80.2	3.5	11
21	13.1	285	77.4	4.0	2	11.9	319	80.4	3.4	2	13.7	360	67.0	3.0	3
22	-	-	-	-	-	13.1	291	79.0	3.6	10	11.9	251	78.1	3.0	1
23	11.6	386	81.3	3.3	13	11.5	317	78.6	3.9	24	12.0	288	77.9	3.3	17
24	12.0	363	79.3	3.2	20	11.4	314	79.7	3.4	12	11.8	336	78.5	3.1	14
25	12.5	360	77.7	3.8	21	10.6	301	76.9	3.2	2	11.8	241	82.3	4.0	7
26	11.4	384	81.0	3.5	13	12.1	313	80.2	3.7	7	12.1	302	79.3	3.5	19
27	13.5	354	78.7	3.1	2	-	-	-	-	-	13.6	273	78.9	3.0	3
28	12.8	360	81.0	3.3	16	12.5	288	78.6	3.6	10	12.7	244	80.0	3.8	17
29	-	-	-	-	-	-	-	-	-	-	10.0	372	79.9	2.9	1
30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
32	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
33	11.7	403	81.2	3.5	8	12.1	416	81.4	3.8	11	12.0	366	82.8	3.5	10
34	12.0	348	84.4	3.3	8	-	-	-	-	-	12.9	235	78.7	3.1	5
35	12.2	362	80.2	3.5	17	11.7	376	77.7	4.0	10	12.1	345	83.6	3.1	2
36	13.1	353	83.5	3.3	8	13.3	251	80.8	4.0	22	12.9	216	81.9	3.1	13
Ave.	11.8	375	80.7	3.1	335	12.1	361	79.8	3.3	335	11.9	341	79.9	3.2	335

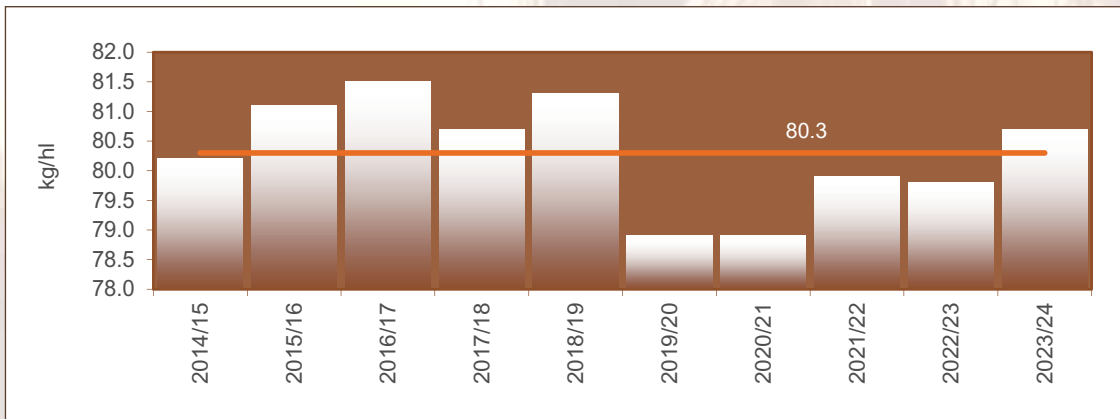
Graph 26a: Weighted average whole wheat protein (12% mb) over ten seasons



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

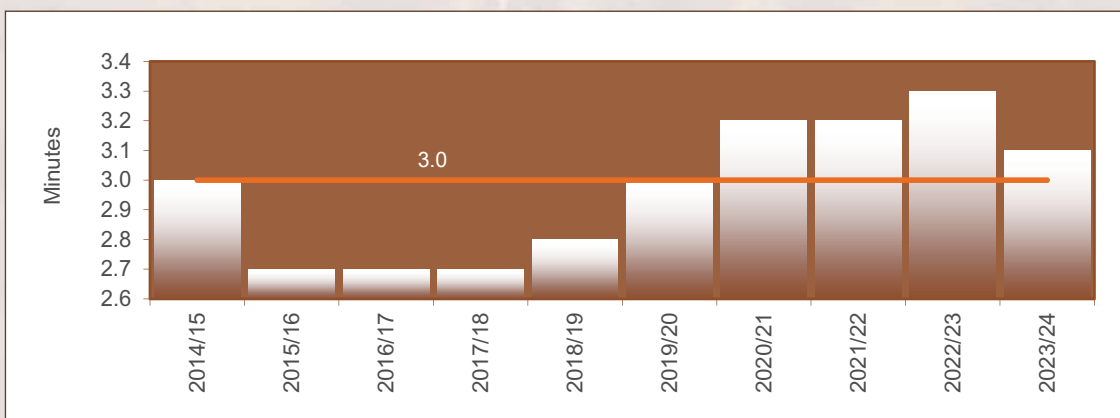


Table 4: Comparison of Flour Quality over the last four seasons

Flour Quality 2023/24 season			
Flour protein (12% mb) (%)	10.8	Farinogram abs. (14% mb) (%)	60.0
Bread volume 100 g (cm ³)	1038	Farinogram dev. time (min)	5.4
Mixogram (Bühler) peak time (min)	3.0	Alveogram strength (cm ²)	39.3
Wet gluten (14% mb) (%)	29.1	Alveogram P/L	0.71
Dry gluten (14% mb) (%)	9.6	Extensogram strength (cm ²)	110

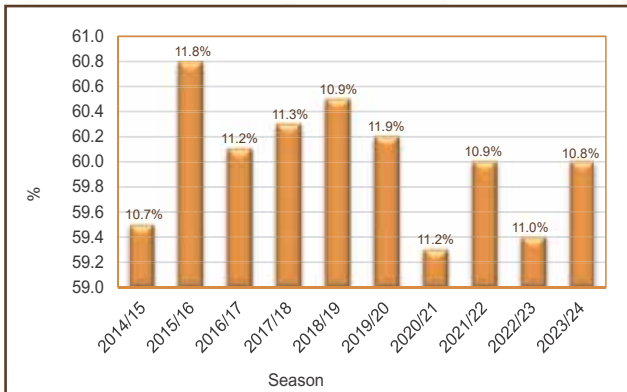
Flour Quality 2022/23 season			
Flour protein (12% mb) (%)	11.0	Farinogram abs. (14% mb) (%)	59.4
Bread volume 100 g (cm ³)	966	Farinogram dev. time (min)	5.4
Mixogram (Bühler) peak time (min)	3.1	Alveogram strength (cm ²)	41.4
Wet gluten (14% mb) (%)	29.5	Alveogram P/L	0.66
Dry gluten (14% mb) (%)	9.8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

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

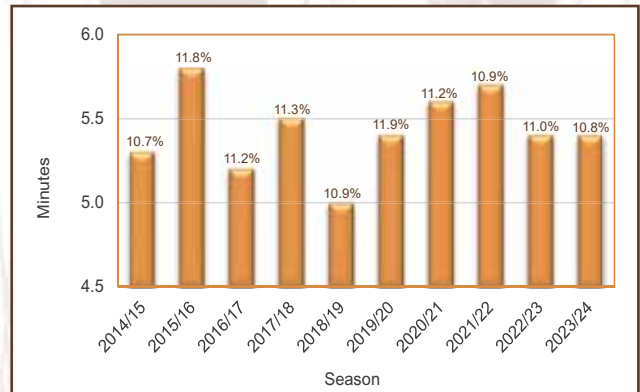
Flour Quality 2020/21 season			
Flour protein (12% mb) (%)	11.2	Farinogram abs. (14% mb) (%)	59.3
Bread volume 100 g (cm ³)	1104	Farinogram dev. time (min)	5.6
Mixogram (Bühler) peak time (min)	2.9	Alveogram strength (cm ²)	38.3
Wet gluten (14% mb) (%)	29.9	Alveogram P/L	0.63
Dry gluten (14% mb) (%)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

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

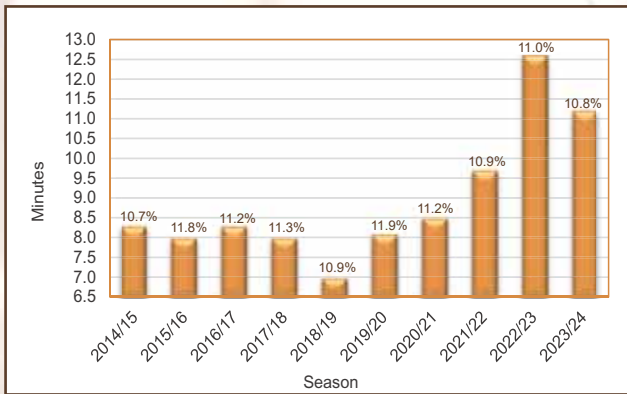
Graph 27a: Farinogram absorption (14%mb)



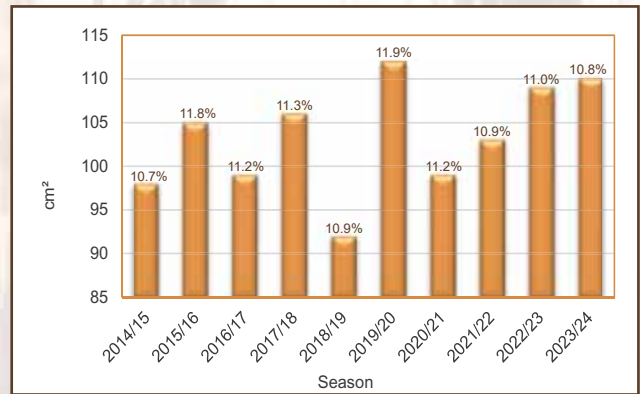
Graph 27b: Farinogram development time



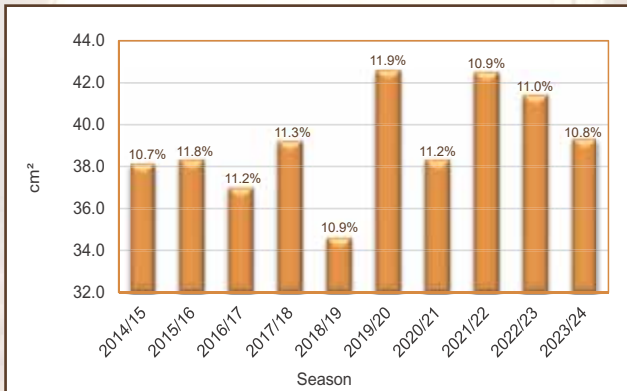
Graph 27c: Farinogram stability



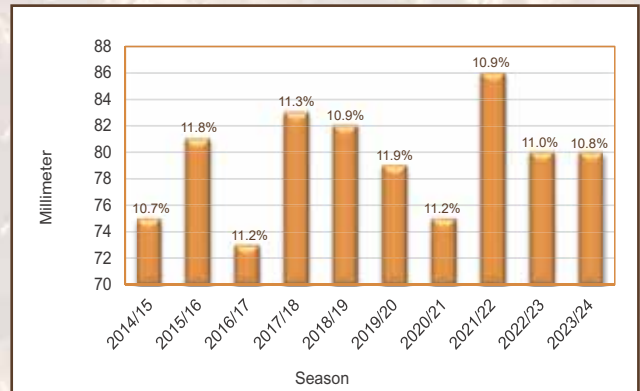
Graph 27d: Extensogram strength



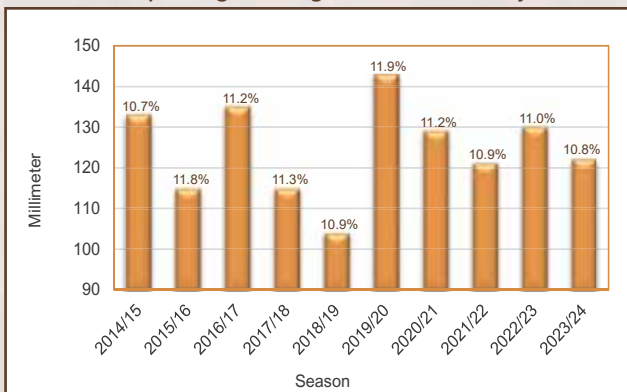
Graph 27e: Alveogram strength



Graph 27f: Alveogram stability



Graph 27g: Alveogram distensibility



Graph 27h: Alveogram P/L

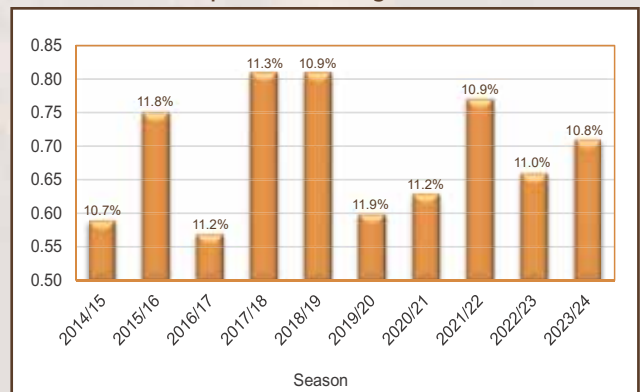


Table 5: Regional quality weighted averages

	Winter rainfall area (Western Cape)			Summer rainfall and Irrigation area (Free State)			Irrigation areas (All other provinces)			RSA Average		
Number of samples per area	154			87			94			335		
Regions	1 - 6			21 - 28			10 - 11, 12 - 20, 29 - 36			All		
Hectolitre mass dirty, kg/hl	80.2			79.7			82.4			80.7		
1000 kernel mass (13% mb), g	41.1			36.2			38.6			39.1		
Falling number, sec	379			366			379			375		
Screenings (1.8 mm sieve), %	1.43			1.72			1.21			1.45		
Protein (12% mb), % (WWF)	11.2			12.2			12.4			11.8		
Mixogram peak time, min (Quadromat Junior)	2.9			3.4			3.2			3.1		
Composite samples per class and grade	<i>Super</i>	<i>Gr1</i>	<i>Gr2</i>	<i>Super</i>	<i>Gr1</i>	<i>Gr2</i>	<i>Super</i>	<i>Gr1</i>	<i>Gr2</i>	<i>Super</i>	<i>Gr1</i>	<i>Gr2</i>
	<i>Gr3</i>	<i>COW</i>		<i>Gr3</i>	<i>COW</i>		<i>Gr3</i>	<i>COW</i>		<i>Gr3</i>	<i>COW</i>	
Composite samples, n = 69	2	5	5	5	5	5	9	10	5	16	20	15
	5	3		4	1		1	-		10	4	
Bühler extraction, %	72.5	72.3	72.2	72.5	72.5	72.7	73.7	74.0	73.1	73.2	73.2	72.6
	71.9	71.2		71.9	73.0		73.4	-		72.1	71.7	
Flour colour, Konica Minolta CM-5 (dry)												
L*	93.86	93.84	92.01	93.69	93.55	93.97	93.53	93.64	93.69	93.62	93.67	93.89
	94.03	94.06		93.67	92.72		93.33	-		93.82	93.73	
a*	0.58	0.56	0.52	0.49	0.51	0.46	0.57	0.54	0.51	0.54	0.54	0.50
	0.48	0.50		0.46	0.78		0.43	-		0.47	0.57	
b*	8.95	9.12	9.18	10.51	10.38	10.52	10.36	10.26	10.65	10.23	10.01	10.12
	9.38	9.31		10.67	10.71		11.53	-		10.11	9.66	
Ash (db), %	0.63	0.62	0.59	0.57	0.61	0.58	0.59	0.60	0.57	0.59	0.61	0.58
	0.60	0.61		0.60	0.61		0.60	-		0.60	0.61	

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 (All other provinces)			RSA Average		
	1 - 6			21 - 28			10 - 11, 12 - 20, 29 - 36			All		
Composite samples per class and grade	Super	Gr1	Gr2	Super	Gr1	Gr2	Super	Gr1	Gr2	Super	Gr1	Gr2
	Gr3	COW		Gr3	COW		Gr3	COW		Gr3	COW	
Composite samples, n = 69	2	5	5	5	5	5	9	10	5	16	20	15
	5	3		4	1		1	-		10	4	
Flour protein (12% mb), %	12.1	10.9	10.0	12.0	11.1	9.8	12.2	11.1	9.8	12.1	11.1	9.9
	9.0	10.4		10.9	10.4		8.9	-		9.7	10.4	
Wet gluten (14% mb), %	32.5	30.1	27.7	31.7	30.6	25.8	32.8	30.1	26.2	32.4	30.2	26.6
	24.4	28.3		27.3	29.3		24.7	-		25.6	28.6	
Dry gluten (14% mb), %	11.0	10.0	9.0	10.8	10.0	8.2	11.1	9.9	8.3	11.0	9.9	8.5
	7.9	9.4		8.9	9.5		7.9	-		8.3	9.4	
Gluten Index	95	94	94	95	96	97	96	96	95	96	96	95
	96	96		96	96		94	-		96	96	
Farinogram: Water absorption (14% mb), %	61.3	59.3	59.7	61.7	60.4	58.6	61.1	60.7	59.3	61.3	60.3	59.2
	58.9	59.8		59.5	58.8		57.1	-		58.9	59.5	
Farinogram: Development time, min	5.2	4.9	3.9	7.3	4.8	6.6	6.8	5.6	5.1	6.7	5.2	5.2
	2.2	3.4		7.5	6.2		3.5	-		4.5	4.1	
Farinogram: Stability, min	15.6	9.8	8.7	15.7	10.2	10.9	13.2	11.0	11.1	14.3	10.5	10.2
	7.2	8.6		12.7	12.2		8.0	-		9.5	9.5	
Alveogram: Strength (S), cm ²	41.5	37.0	33.8	45.2	39.2	35.5	45.2	43.3	38.8	44.8	40.7	36.0
	28.6	36.6		38.8	39.3		38.1	-		33.6	37.3	
Alveogram: P/L	0.66	0.60	0.76	0.64	0.67	0.99	0.47	0.61	0.90	0.55	0.62	0.88
	0.93	0.68		0.85	0.66		0.68	-		0.87	0.68	
Extensogram: Strength, cm ²	90	101	85	128	110	98	141	125	108	131	115	97
	76	94		101	134		81	-		87	104	
Mixogram peak time, min	2.6	2.8	2.8	2.9	3.0	3.5	3.0	3.0	3.4	2.9	3.0	3.2
	2.9	2.9		3.1	4.1		3.3	-		3.0	3.2	
Relationship between protein and bread volume	EX	EX	EX	EX	EX	EX	EX	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 page 30.

The production regions from which wheat samples were received for the crop quality survey of the 2023/24 production season, are named and described on pages 31 to 34. All the silo/intake stands as well as the type of storage structure, situated in a particular region, are provided.

The wheat production regions in South Africa is divided into three major production regions:

Winter Rainfall Region (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 more than half of the wheat produced in South Africa. The Swartland (on the West Coast) and the Rûens (Southern Cape) are the main 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 mainly during November.

Summer Rainfall Region (Free State)

The summer rainfall area (predominantly the Free State Province) is a major dryland wheat production region of South Africa. Significant variation in precipitation, soil types and average temperature occurs from east to west. The Free State is therefore typically 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.

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

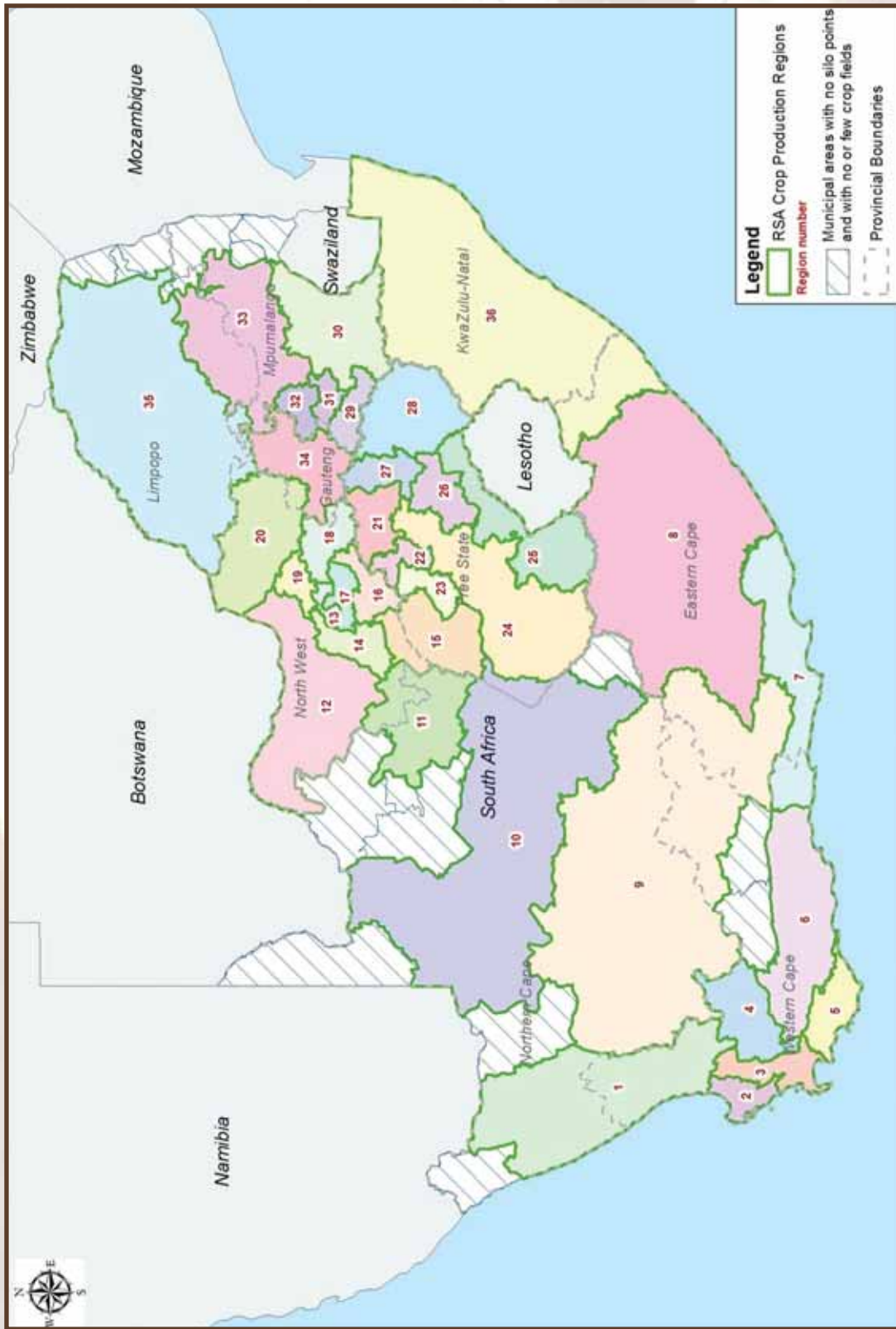
The irrigation wheat production area of South Africa can be broadly categorized into four main geographic regions: the Cooler Central irrigation region in the Northern Cape, the Warmer Northern irrigation region in the North West, Limpopo and Gauteng provinces, the Highveld region in Mpumalanga and the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

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

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



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 Protem (*Bags/Bins*)
Overberg Agri Krige (*Bags/Bins/Bunkers*) Overberg Agri Rietpoel (*Bags/Bins/Bunkers*)
Overberg Agri Lemoenskap (*Bunkers*)

Region 6: Rûens Eastern Region

SSK Albertinia (*Bins*) SSK Krombeks (*Bins*)
SSK Ashton (*Bags/Bins*) SSK Protem (*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 17: North West Central-Northern Region (Ottosdal)

NWK	Boschpoort (<i>Bags/Bins/Bulk</i>)	NWK	Makokskraal (<i>Bins</i>)
NWK	Kleinharts (<i>Bins</i>)	Senwes	Potchefstroom (<i>Bins</i>)
NWK	Ottosdal (<i>Bins</i>)	Senwes	Ventersdorp Silo A (<i>Bins</i>)
NWK	Rostrataville (<i>Bins</i>)	Senwes	Ventersdorp Silo B (<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 20: North West Eastern Region

Afgri	Battery (<i>Bins</i>)	NWK	Derby (<i>Bins</i>)
Afgri	Beestekraal (<i>Bunker</i>)	NWK	Koster (<i>Bins</i>)
Afgri	Brits (<i>Bins</i>)	NWK	Swartruggens (<i>Bins</i>)
NWK	Boons (<i>Bins</i>)	NWK	Syferbult (<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>)		

Grain Production Regions

Silo/Intake stands per region indicating type of storage structure

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>)

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 27: Free State Northern Region

Senwes	Gottenburg (<i>Bins</i>)	Senwes	Wolwehoek (<i>Bins</i>)
Senwes	Heilbron (<i>Bins</i>)	VKB	Petrus Steyn (<i>Bins</i>)
Senwes	Hoogte Grainlink (<i>Bins</i>)	VKB	Reinette (<i>Bunkers</i>)
Senwes	Mooigeleë (<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	Arnôt (<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>)

Grain Production Regions

Silo/Intake stands per region indicating type of storage structure

Region 34: Gauteng Region

Afgri	Bloekomspruit (<i>Bins</i>)	Afgri	Nigel (<i>Bins</i>)
Afgri	Bronkhorstspuit (<i>Bins</i>)	Afgri	Pretoria Wes(<i>Bins</i>)
Afgri	Glenroy (<i>Bins</i>)	Afgri	Vogelvallei (<i>Bunkers</i>)
Afgri	Goeiehoek (<i>Bins</i>)	Senwes	Middelvlei (<i>Bins</i>)
Afgri	Kaalfontein (<i>Bins</i>)	Senwes	Oberholzer (<i>Bins</i>)
Afgri	Kliprivier (<i>Bunkers</i>)	Senwes	Raathsvlei (<i>Bins</i>)
Afgri	Meyerton (<i>Bunkers</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

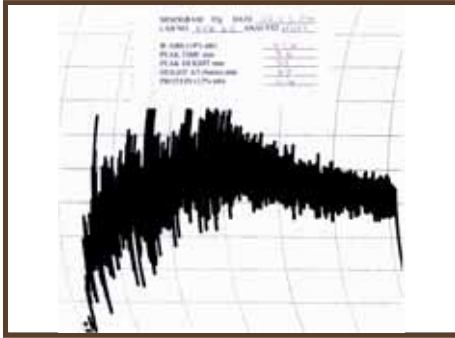
WINTER RAINFALL WHEAT

PRODUCTION REGION	(1) Namakwaland Region				(2) Swartland Western Region						
	WHEAT										
	ave	min	max	stdev	ave	min	max	stdev			
Protein (12% mb), %	11.7	10.1	13.6	1.46	10.9	9.4	12.7	0.98			
Falling number, sec	369	317	407	37.93	404	329	488	42.09			
Moisture, %	10.7	10.5	11.0	0.22	11.5	10.8	11.9	0.34			
1000 Kernel mass (13% mb), g	37.7	36.0	39.6	1.47	38.8	33.7	43.8	2.90			
Hectolitre mass (dirty), kg/hl	80.4	79.3	81.6	1.14	79.0	74.8	82.3	2.15			
Screenings (<1.8 mm sieve), %	3.62	3.34	4.20	0.39	2.36	0.58	4.89	1.40			
Total damaged kernels, %	1.72	1.36	1.92	0.25	0.34	0.00	0.70	0.26			
Combined deviations, %	5.87	5.18	6.76	0.66	3.52	0.84	6.99	2.05			
Number of samples	4				12						
MIXOGRAM (Quadromat Junior)											
	ave	min	max	stdev	ave	min	max	stdev			
Peak time, min	3.0	2.8	3.3	0.24	2.8	2.0	3.6	0.42			
Tail height (6 min), mm	45	43	47	2.31	47	42	51	2.91			
Number of samples	4				12						
COMPOSITE SAMPLES											
CLASS AND GRADE	Super	Grade 1	Grade 2	Grade 3	COW	Super	Grade 1	Grade 2	Grade 3	COW	
Bühler Extraction, %	-	-	-	-	70.9	-	73.4	71.6	71.7	-	
FLOUR											
Protein (12% mb), %	-	-	-	-	10.78	-	10.77	9.99	8.93	-	
Moisture, %	-	-	-	-	13.9	-	13.7	13.4	13.3	-	
Ash (db), %	-	-	-	-	0.62	-	0.74	0.60	0.62	-	
Colour, KJ (wet)	-	-	-	-	-4.9	-	-3.8	-4.7	-4.9	-	
Colour, Konica Minolta CM5 (dry)											
L*	-	-	-	-	94.17	-	93.56	94.12	94.22	-	
a*	-	-	-	-	0.47	-	0.78	0.56	0.44	-	
b*	-	-	-	-	9.64	-	8.99	9.11	9.02	-	
RVA											
Peak Viscosity, cP	-	-	-	-	2203	-	2622	2491	2495	-	
Minimum viscosity (Trough), cP	-	-	-	-	1664	-	1813	1758	1830	-	
Final Viscosity, cP	-	-	-	-	2485	-	3071	2921	2915	-	
Peak Time, min	-	-	-	-	7.00	-	7.00	7.00	7.00	-	
GLUTEN											
Wet gluten (14% mb), %	-	-	-	-	29.5	-	29.7	28.3	25.6	-	
Dry gluten (14% mb), %	-	-	-	-	9.7	-	10.0	9.1	8.0	-	
Gluten Index	-	-	-	-	96	-	94	97	98	-	
FARINOGRAM											
Water absorption (14% mb), %	-	-	-	-	59.5	-	57.8	60.3	60.0	-	
Development time, min	-	-	-	-	4.3	-	4.3	4.1	2.3	-	
Stability, min	-	-	-	-	9.1	-	9	9.4	9.1	-	
Mixing tolerance index, BU	-	-	-	-	41	-	39	35	26	-	
EXTENSOGRAM (45 min pull)											
Area, cm ²	-	-	-	-	93	-	92	81	110	-	
Maximum height, BU	-	-	-	-	365	-	371	350	413	-	
Extensibility, mm	-	-	-	-	186	-	180	164	198	-	
ALVEOGRAM											
Strength (S), cm ²	-	-	-	-	35.9	-	32.9	34.7	29.7	-	
Stability (P), mm	-	-	-	-	75	-	64	87	91	-	
Distensibility (L), mm	-	-	-	-	122	-	137	96	76	-	
Configuration ratio (P/L)	-	-	-	-	0.61	-	0.47	0.91	1.20	-	
MIXOGRAM											
Peak time, min	-	-	-	-	2.9	-	2.7	2.8	3.3	-	
100 g BAKING TEST											
Loaf volume, cm ³	-	-	-	-	951	-	992	890	826	-	
Evaluation (see page 72)	-	-	-	-	0	-	0	0	0	-	

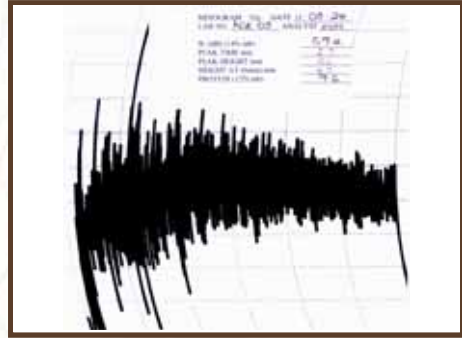
Rheological Graphs Per Production Region

MIXOGRAM

1

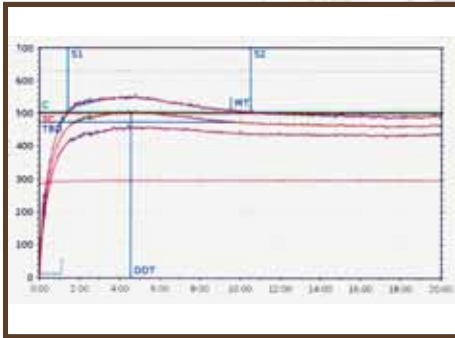


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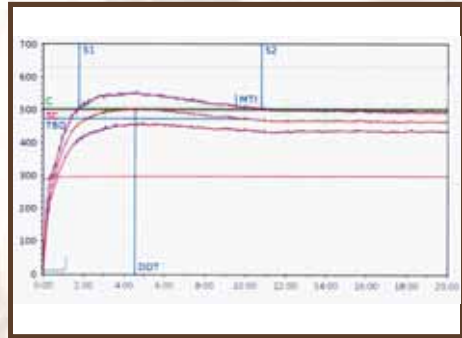


FARINOGRAM

1

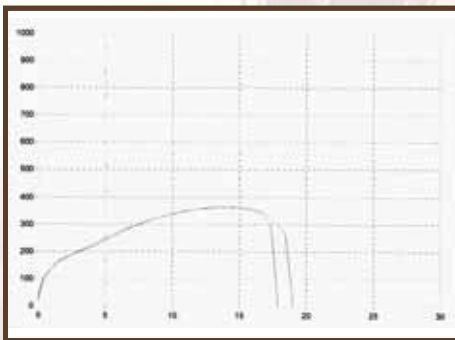


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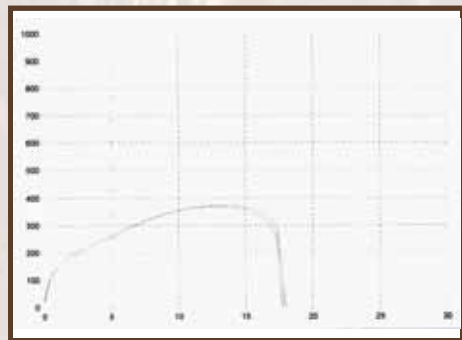


EXTENSOGRAM

1

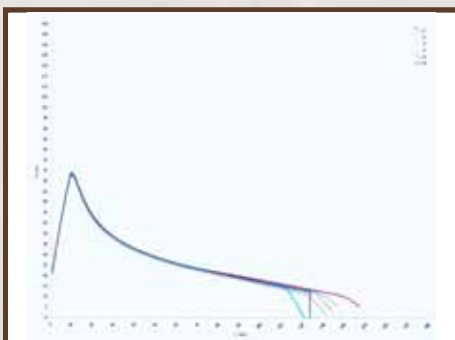


2

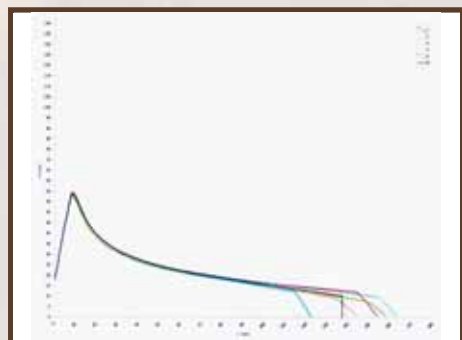


ALVEOGRAM

1



2



South African quality data per production region

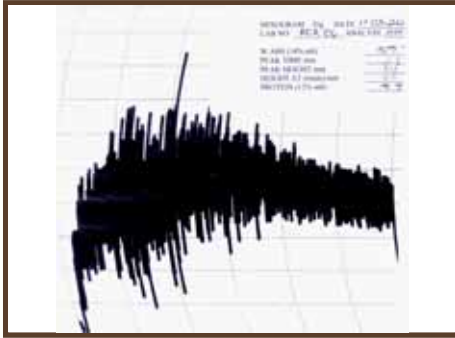
WINTER RAINFALL WHEAT

PRODUCTION REGION	(3)				(4)						
	Swartland Central Region				Swartland Eastern Region						
WHEAT											
	ave	min	max	stdev	ave	min	max	stdev			
Protein (12% mb), %	11.0	8.9	13.2	0.90	11.0	9.7	12.3	0.86			
Falling number, sec	387	333	473	34.61	392	325	472	32.19			
Moisture, %	10.9	10.2	12.0	0.38	10.5	10.0	10.9	0.30			
1000 Kernel mass (13% mb), g	41.4	37.2	47.3	2.06	40.5	36.2	44.0	2.09			
Hectolitre mass (dirty), kg/hl	80.9	77.2	84.0	1.56	81.3	76.1	83.9	1.82			
Screenings (<1.8 mm sieve), %	1.34	0.04	5.25	0.79	1.26	0.06	2.76	0.84			
Total damaged kernels, %	0.44	0.00	1.44	0.31	0.67	0.00	1.60	0.48			
Combined deviations, %	2.72	0.12	6.35	1.17	2.68	0.20	4.61	1.21			
Number of samples	66				19						
MIXOGRAM (Quadromat Junior)											
	ave	min	max	stdev	ave	min	max	stdev			
Peak time, min	2.8	2.4	3.5	0.25	2.7	2.3	3.8	0.36			
Tail height (6 min), mm	46	39	56	3.17	45	39	53	3.81			
Number of samples	66				19						
COMPOSITE SAMPLES											
CLASS AND GRADE	Super	Grade 1	Grade 2	Grade 3	COW	Super	Grade 1	Grade 2	Grade 3	COW	
Bühler Extraction, %	71.7	71.8	71.6	71.3	71.6	-	72.1	72.5	72.1		
FLOUR											
Protein (12% mb), %	11.87	10.75	10.06	9.01	10.09	-	11.08	9.82	8.97	-	
Moisture, %	13.5	13.8	13.4	13.2	13.5	-	14.0	13.6	13.5	-	
Ash (db), %	0.61	0.58	0.55	0.57	0.60	-	0.57	0.56	0.57	-	
Colour, KJ (wet)	-4.8	-4.9	-5.0	-5.0	-5.0	-	-5.0	-5.0	-5.0	-	
Colour, Konica Minolta CM5 (dry)											
L*	93.87	93.99	93.84	93.91	94.04	-	93.81	94.05	94.13	-	
a*	0.63	0.53	0.54	0.49	0.52	-	0.54	0.49	0.49	-	
b*	9.23	8.99	9.27	9.27	9.35	-	9.83	9.61	9.43	-	
RVA											
Peak Viscosity, cP	2505	2267	2387	2491	2343	-	2288	2276	2350	-	
Minimum viscosity (Trough), cP	1727	1711	1734	1817	1808	-	1668	1683	1813	-	
Final Viscosity, cP	2887	2558	2775	2955	2610	-	2618	2686	2757	-	
Peak Time, min	7.00	7.00	7.00	7.00	7.00	-	7.00	7.00	7.00	-	
GLUTEN											
Wet gluten (14% mb), %	32.5	31.1	28.0	24.7	27.1	-	31.1	27.0	24.1	-	
Dry gluten (14% mb), %	10.9	10.1	9.1	8.0	9.2	-	10.3	8.8	7.9	-	
Gluten Index	93	92	93	93	96	-	92	92	96	-	
FARINOGRAM											
Water absorption (14% mb), %	62.1	60.4	60.7	59.0	60.0	-	59.3	59.3	59.5	-	
Development time, min	5.1	4.5	3.4	3.4	2.2	-	4.3	4.1	2.5	-	
Stability, min	20.0	9.1	8.1	7.1	7.0	-	9.3	6.5	5.6	-	
Mixing tolerance index, BU	20	42	41	49	46	-	37	51	53	-	
EXTENSOGRAM (45 min pull)											
Area, cm ²	115	101	86	70	89	-	100	77	65	-	
Maximum height, BU	402	410	347	310	361	-	371	308	274	-	
Extensibility, mm	212	178	177	161	177	-	196	177	166	-	
ALVEOGRAM											
Strength (S), cm ²	43.6	37.9	35.3	28.9	35.0	-	35.5	30.0	27.8	-	
Stability (P), mm	86	85	85	84	80	-	70	71	77	-	
Distensibility (L), mm	133	111	107	81	111	-	136	114	93	-	
Configuration ratio (P/L)	0.65	0.77	0.79	1.04	0.72	-	0.51	0.62	0.83	-	
MIXOGRAM											
Peak time, min	2.4	2.8	2.8	2.7	2.8	-	2.4	2.6	2.7	-	
100 g BAKING TEST											
Loaf volume, cm ³	1119	1004	996	936	984	-	1048	959	842	-	
Evaluation (see page 72)	0	0	0	0	0	-	0	0	0	-	

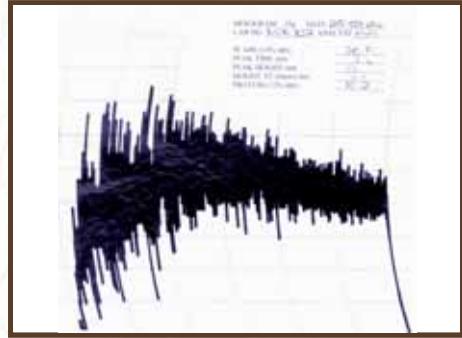
Rheological Graphs Per Production Region

MIXOGRAM

3

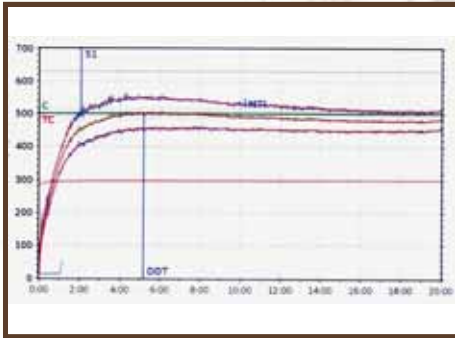


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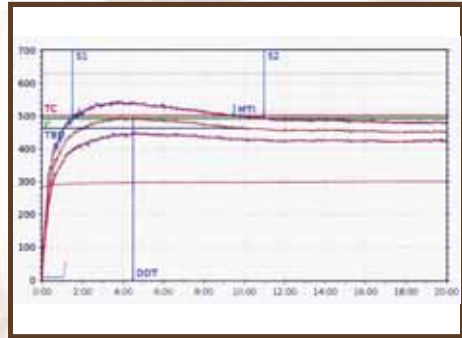


FARINOGRAM

3

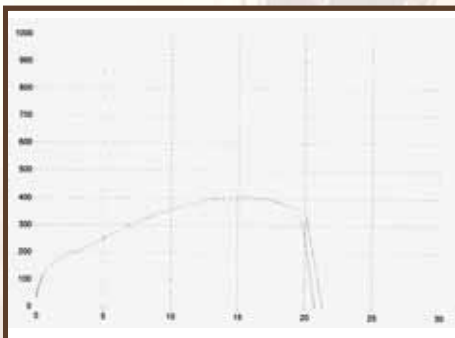


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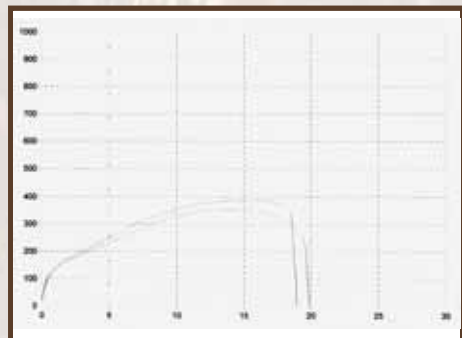


EXTENSOGRAM

3

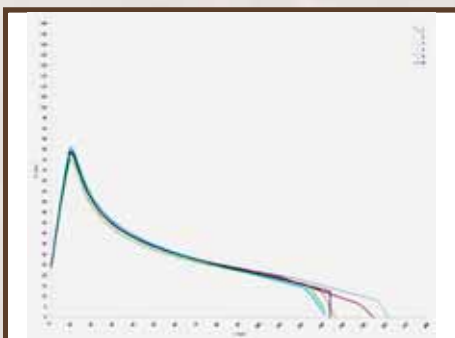


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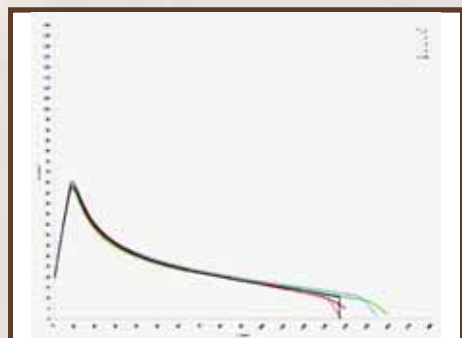


ALVEOGRAM

3



4



South African quality data per production region

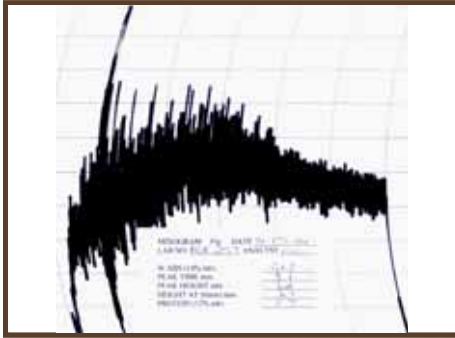
WINTER RAINFALL WHEAT

PRODUCTION REGION	(5) Rüens Western Region				(6) Rüens Eastern Region					
	WHEAT	ave	min	max	stdev	ave	min	max	stdev	
Protein (12% mb), %	11.4	9.8	13.1	0.89	11.6	10.0	12.6	0.60		
Falling number, sec	378	307	433	34.94	339	278	390	31.33		
Moisture, %	11.6	11.0	12.1	0.27	11.7	11.2	12.4	0.38		
1000 Kernel mass (13% mb), g	41.3	37.7	44.0	1.59	42.3	36.9	44.5	1.84		
Hectolitre mass (dirty), kg/hl	79.3	76.6	81.6	1.40	79.0	77.3	81.6	1.14		
Screenings (<1.8 mm sieve), %	1.21	0.13	2.77	0.59	1.26	0.22	2.49	0.72		
Total damaged kernels, %	0.46	0.00	1.28	0.37	0.03	0.00	0.36	0.09		
Combined deviations, %	2.28	0.19	7.85	1.39	0.58	0.06	1.48	0.43		
Number of samples	27				26					
MIXOGRAM (Quadromat Junior)										
	ave	min	max	stdev	ave	min	max	stdev		
Peak time, min	3.1	2.7	3.7	0.26	3.4	2.8	4.2	0.38		
Tail height (6 min), mm	48	44	53	1.96	49	44	54	2.55		
Number of samples	27				26					
COMPOSITE SAMPLES										
CLASS AND GRADE	Super	Grade 1	Grade 2	Grade 3	COW	Super	Grade 1	Grade 2	Grade 3	COW
Bühler Extraction, %	73.3	72.4	72.8	72.9	-	-	71.9	72.3	71.7	71.2
FLOUR										
Protein (12% mb), %	12.19	10.96	10.08	9.18	-	-	10.67	10.02	8.89	10.44
Moisture, %	13.3	13.8	13.6	13.6	-	-	13.5	13.4	13.3	13.5
Ash (db), %	0.65	0.63	0.62	0.58	-	-	0.59	0.60	0.65	0.62
Colour, KJ (wet)	-4.3	-4.5	-4.8	-4.9	-	-	-4.7	-4.7	-4.8	-4.7
Colour, Konica Minolta CM5 (dry)										
L*	93.84	93.92	94.14	94.20	-	-	93.90	93.88	93.71	93.96
a*	0.53	0.50	0.53	0.48	-	-	0.47	0.49	0.50	0.51
b*	8.67	8.88	8.70	9.14	-	-	8.91	9.21	10.02	8.93
RVA										
Peak Viscosity, cP	2204	2184	2367	2445	-	-	2158	2084	2437	2474
Minimum viscosity (Trough), cP	1712	1686	1744	1775	-	-	1720	1701	1900	1787
Final Viscosity, cP	2427	2436	2691	2792	-	-	2397	2317	2794	2860
Peak Time, min	7.00	7.00	7.00	7.00	-	-	7.00	6.93	7.00	7.00
GLUTEN										
Wet gluten (14% mb), %	32.5	29.5	28.1	24.1	-	-	29.2	27.3	23.6	28.4
Dry gluten (14% mb), %	11.1	9.6	9.0	7.9	-	-	10.0	9.1	7.6	9.2
Gluten Index	96	96	94	96	-	-	96	96	98	95
FARINOGRAM										
Water absorption (14% mb), %	60.4	59.6	59.4	58.3	-	-	59.2	58.7	57.7	59.8
Development time, min	5.2	5.4	3.4	1.6	-	-	6.1	4.4	1.4	3.6
Stability, min	11.1	9.5	9.0	8.1	-	-	12.0	10.5	6.2	9.6
Mixing tolerance index, BU	35	43	40	32	-	-	38	27	40	31
EXTENSOGRAM (45 min pull)										
Area, cm ²	64	102	84	75	-	-	110	96	60	100
Maximum height, BU	290	366	336	344	-	-	413	403	262	393
Extensibility, mm	153	200	181	158	-	-	192	174	160	182
ALVEOGRAM										
Strength (S), cm ²	39.4	42.4	35.2	33.8	-	-	36.1	33.6	22.8	38.8
Stability (P), mm	79	78	82	82	-	-	78	76	67	84
Distensibility (L), mm	119	148	106	101	-	-	107	109	87	117
Configuration ratio (P/L)	0.66	0.53	0.77	0.81	-	-	0.73	0.70	0.77	0.72
MIXOGRAM										
Peak time, min	2.8	2.6	2.8	3.3	-	-	3.3	2.9	2.3	2.9
100 g BAKING TEST										
Loaf volume, cm ³	1026	968	982	904	-	-	973	958	934	1005
Evaluation (see page 72)	0	0	0	0	-	-	0	0	0	0

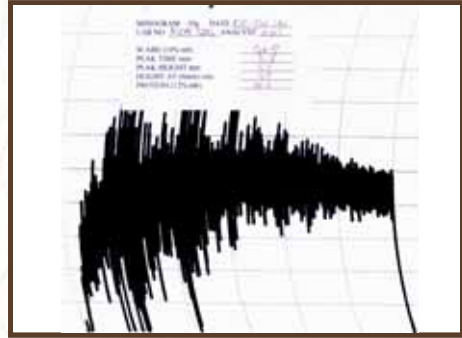
Rheological Graphs Per Production Region

MIXOGRAM

5

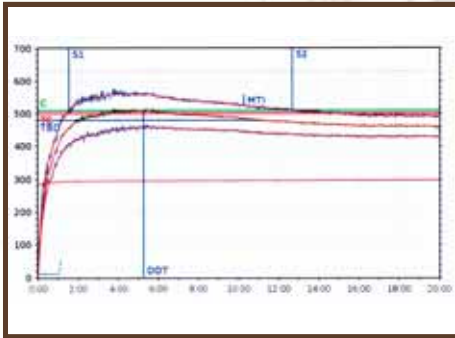


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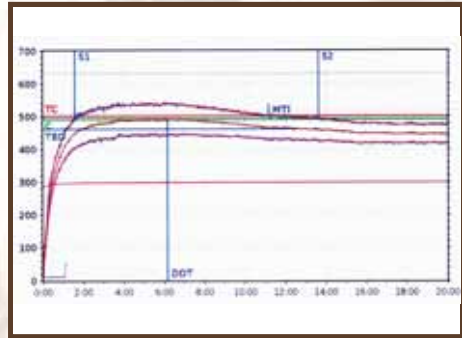


FARINOGRAM

5

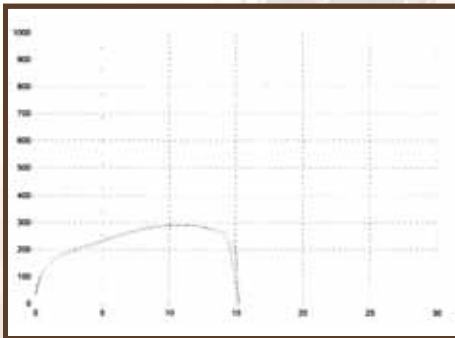


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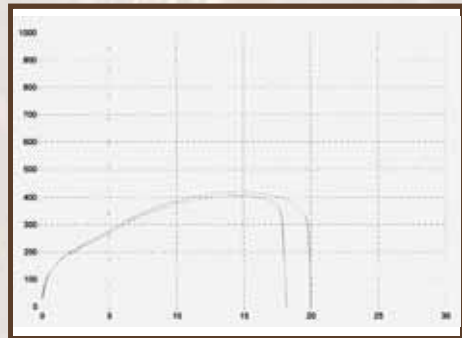


EXTENSOGRAM

5

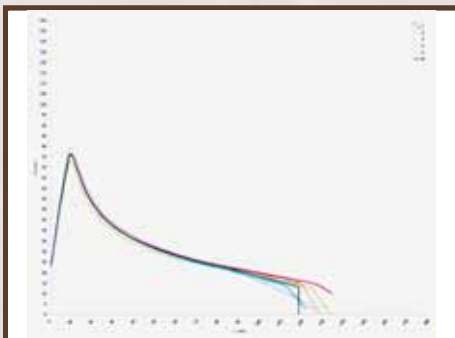


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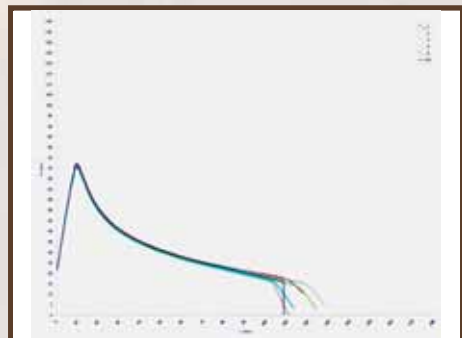


ALVEOGRAM

5



6



South African quality data per production region

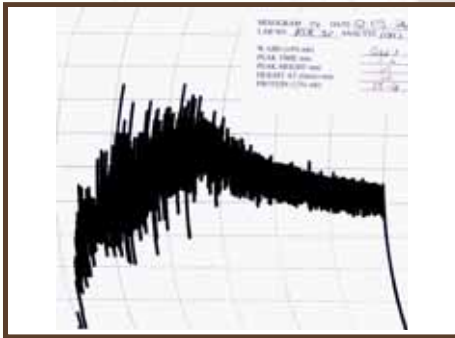
IRRIGATION WHEAT

PRODUCTION REGION	(10) Griqualand West Region				(11) Vaalharts Region					
	WHEAT									
	ave	min	max	stdev	ave	min	max	stdev		
Protein (12% mb), %	13.1	10.9	14.2	0.88	12.2	11.2	13.6	0.63		
Falling number, sec	380	335	433	34.93	408	344	510	47.60		
Moisture, %	9.4	8.4	10.5	0.72	10.2	9.5	11.1	0.49		
1000 Kernel mass (13% mb), g	37.4	34.2	39.3	1.35	40.1	37.8	42.2	1.30		
Hectolitre mass (dirty), kg/hl	83.8	81.1	85.5	1.13	83.6	82.5	84.8	0.89		
Screenings (<1.8 mm sieve), %	0.98	0.49	2.18	0.54	0.91	0.29	2.38	0.65		
Total damaged kernels, %	0.59	0.20	1.16	0.26	0.48	0.10	1.00	0.29		
Combined deviations, %	1.74	0.84	2.90	0.61	1.75	0.78	2.88	0.60		
Number of samples	17				11					
MIXOGRAM (Quadromat Junior)										
	ave	min	max	stdev	ave	min	max	stdev		
Peak time, min	2.7	2.4	3.4	0.30	3.1	2.9	3.4	0.18		
Tail height (6 min), mm	46	41	53	3.37	52	47	58	3.49		
Number of samples	17				11					
COMPOSITE SAMPLES										
CLASS AND GRADE	Super	Grade 1	Grade 2	Grade 3	COW	Super	Grade 1	Grade 2	Grade 3	COW
Bühler Extraction, %	73.9	75.7	-	-	-	73.8	74.6	-	-	-
FLOUR										
Protein (12% mb), %	12.05	10.77	-	-	-	12.23	11.08	-	-	-
Moisture, %	13.8	13.4	-	-	-	12.9	13.3	-	-	-
Ash (db), %	0.60	0.60	-	-	-	0.61	0.60	-	-	-
Colour, KJ (wet)	-5.0	-5.0	-	-	-	-4.8	-5.0	-	-	-
Colour, Konica Minolta CM5 (dry)										
L*	93.58	94.01	-	-	-	93.31	93.73	-	-	-
a*	0.64	0.57	-	-	-	0.68	0.56	-	-	-
b*	11.20	9.87	-	-	-	11.26	10.95	-	-	-
RVA										
Peak Viscosity, cP	2158	2527	-	-	-	2219	2283	-	-	-
Minimum viscosity (Trough), cP	1666	2039	-	-	-	1742	1783	-	-	-
Final Viscosity, cP	2438	2935	-	-	-	2488	2538	-	-	-
Peak Time, min	7.00	7.00	-	-	-	7.00	7.00	-	-	-
GLUTEN										
Wet gluten (14% mb), %	33.1	29.6	-	-	-	32.7	30.1	-	-	-
Dry gluten (14% mb), %	11.2	9.6	-	-	-	11.2	9.9	-	-	-
Gluten Index	93	96	-	-	-	95	99	-	-	-
FARINOGRAM										
Water absorption (14% mb), %	61.5	61.6	-	-	-	60.9	60.6	-	-	-
Development time, min	6.2	5.1	-	-	-	7.0	5.2	-	-	-
Stability, min	15.4	12.2	-	-	-	12.3	9.1	-	-	-
Mixing tolerance index, BU	30	34	-	-	-	31	42	-	-	-
EXTENSOGRAM (45 min pull)										
Area, cm ²	118	106	-	-	-	125	108	-	-	-
Maximum height, BU	387	386	-	-	-	372	388	-	-	-
Extensibility, mm	225	198	-	-	-	244	204	-	-	-
ALVEOGRAM										
Strength (S), cm ²	37.0	42.7	-	-	-	43.0	41.9	-	-	-
Stability (P), mm	71	88	-	-	-	65	80	-	-	-
Distensibility (L), mm	119	123	-	-	-	177	124	-	-	-
Configuration ratio (P/L)	0.60	0.72	-	-	-	0.37	0.65	-	-	-
MIXOGRAM										
Peak time, min	3.0	2.5	-	-	-	2.8	2.9	-	-	-
100 g BAKING TEST										
Loaf volume, cm ³	1161	1086	-	-	-	1205	984	-	-	-
Evaluation (see page 72)	0	0	-	-	-	0	0	-	-	-

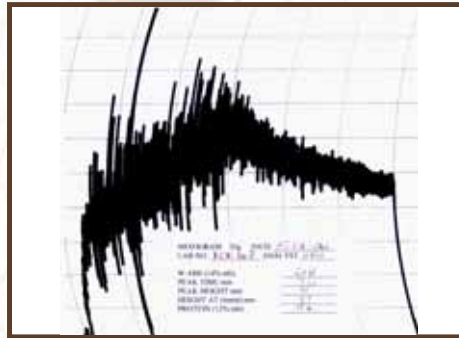
Rheological Graphs Per Production Region

MIXOGRAM

10

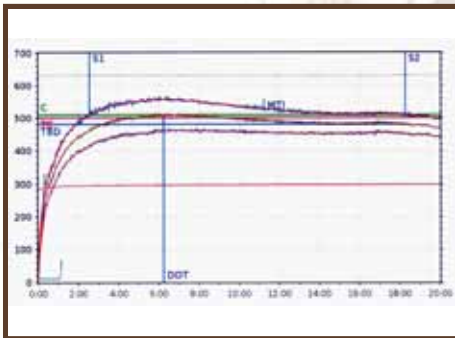


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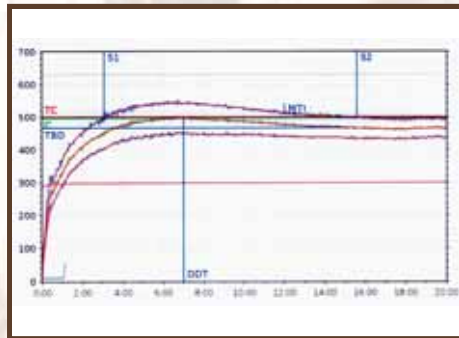


FARINOGRAM

10

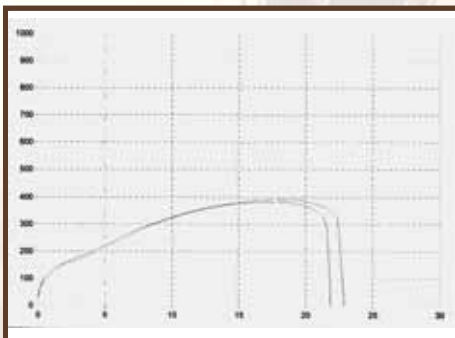


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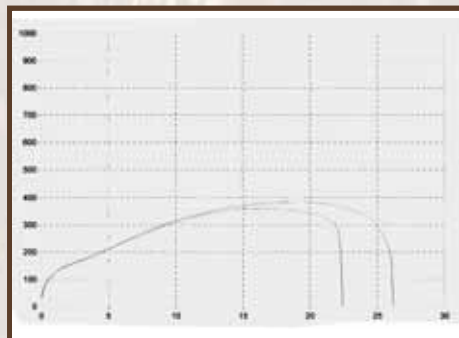


EXTENSOGRAM

10

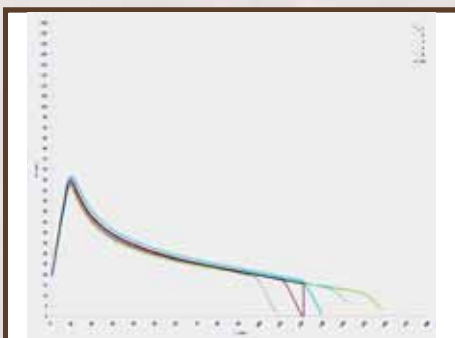


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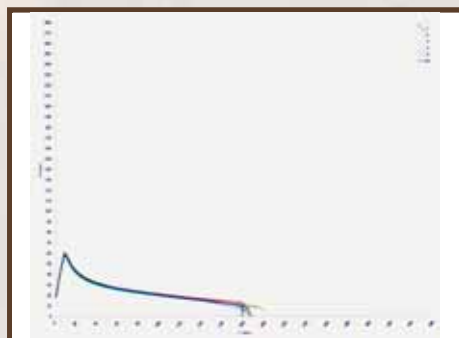


ALVEOGRAM

10



11



South African quality data per production region

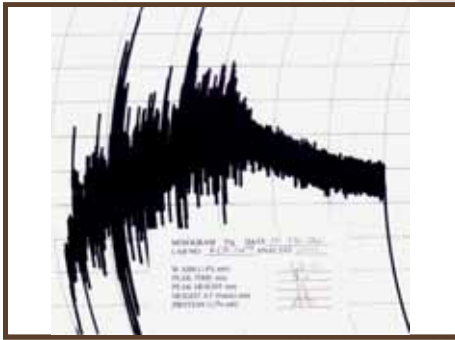
IRRIGATION WHEAT

PRODUCTION REGION	(14)				(15)					
	North West Southern Region				North West South-Eastern Region					
WHEAT										
	ave	min	max	stdev	ave	min	max	stdev		
Protein (12% mb), %	13.4	13.3	13.5	0.12	11.9	9.4	13.5	1.44		
Falling number, sec	364	341	396	28.43	404	370	470	28.51		
Moisture, %	10.9	10.6	11.1	0.26	10.7	10.4	11.0	0.22		
1000 Kernel mass (13% mb), g	36.8	36.7	36.9	0.12	37.7	33.3	41.1	2.37		
Hectolitre mass (dirty), kg/hl	81.2	80.3	82.6	1.23	81.8	79.7	83.6	1.42		
Screenings (<1.8 mm sieve), %	1.34	0.67	2.00	0.67	1.59	0.70	3.76	1.03		
Total damaged kernels, %	0.77	0.30	1.34	0.53	0.30	0.00	0.58	0.22		
Combined deviations, %	2.71	1.67	4.08	1.24	2.41	0.70	4.48	1.21		
Number of samples	3				9					
MIXOGRAM (Quadromat Junior)										
	ave	min	max	stdev	ave	min	max	stdev		
Peak time, min	3.2	3.1	3.3	0.10	3.2	2.4	3.9	0.45		
Tail height (6 min), mm	51	50	53	1.53	48	38	55	5.64		
Number of samples	3				9					
COMPOSITE SAMPLES										
CLASS AND GRADE	Super	Grade 1	Grade 2	Grade 3	COW	Super	Grade 1	Grade 2	Grade 3	COW
Bühler Extraction, %	74.3	-	-	-	-	73.4	74.2	69.6	-	-
FLOUR										
Protein (12% mb), %	12.57	-	-	-	-	12.08	11.87	8.73	-	-
Moisture, %	13.6	-	-	-	-	13.6	13.6	13.4	-	-
Ash (db), %	0.60	-	-	-	-	0.61	0.59	0.54	-	-
Colour, KJ (wet)	-5.0	-	-	-	-	-5.0	-5.0	-5.0	-	-
Colour, Konica Minolta CM5 (dry)										
L*	93.78	-	-	-	-	93.66	93.79	93.53	-	-
a*	0.56	-	-	-	-	0.57	0.55	0.53	-	-
b*	10.77	-	-	-	-	10.98	10.48	11.35	-	-
RVA										
Peak Viscosity, cP	2274	-	-	-	-	2233	2131	2395	-	-
Minimum viscosity (Trough), cP	1766	-	-	-	-	1718	1741	1830	-	-
Final Viscosity, cP	2508	-	-	-	-	2498	2659	2699	-	-
Peak Time, min	7.00	-	-	-	-	7.00	7.00	7.00	-	-
GLUTEN										
Wet gluten (14% mb), %	33.6	-	-	-	-	32.7	32.6	24.9	-	-
Dry gluten (14% mb), %	11.1	-	-	-	-	11.0	11.0	7.6	-	-
Gluten Index	98	-	-	-	-	99	94	93	-	-
FARINOGRAM										
Water absorption (14% mb), %	60.9	-	-	-	-	61.7	61.8	58.6	-	-
Development time, min	6.3	-	-	-	-	7.5	6.2	1.4	-	-
Stability, min	14.3	-	-	-	-	13.5	11.1	7.3	-	-
Mixing tolerance index, BU	25	-	-	-	-	29	34	25	-	-
EXTENSOGRAM (45 min pull)										
Area, cm ²	163	-	-	-	-	147	123	72	-	-
Maximum height, BU	454	-	-	-	-	483	409	376	-	-
Extensibility, mm	266	-	-	-	-	229	226	139	-	-
ALVEOGRAM										
Strength (S), cm ²	46.9	-	-	-	-	49.2	42.0	28.1	-	-
Stability (P), mm	67	-	-	-	-	78	72	91	-	-
Distensibility (L), mm	187	-	-	-	-	154	148	65	-	-
Configuration ratio (P/L)	0.36	-	-	-	-	0.51	0.49	1.40	-	-
MIXOGRAM										
Peak time, min	3.1	-	-	-	-	3.0	2.8	2.9	-	-
100 g BAKING TEST										
Loaf volume, cm ³	1227	-	-	-	-	1222	1260	905	-	-
Evaluation (see page 72)	0	-	-	-	-	0	0	0	-	-

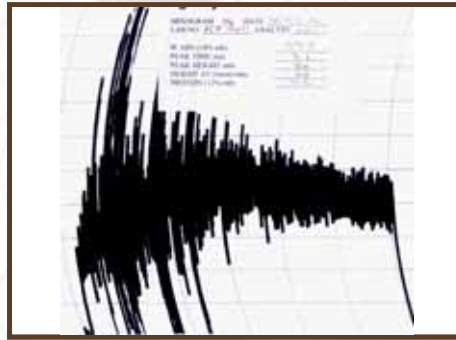
Rheological Graphs Per Production Region

MIXOGRAM

14

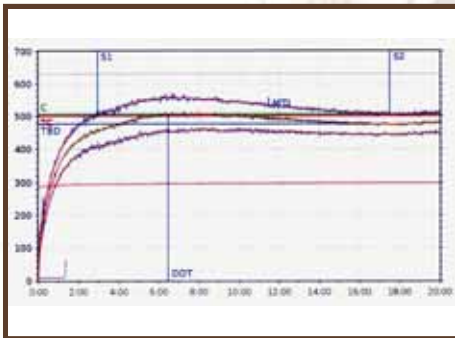


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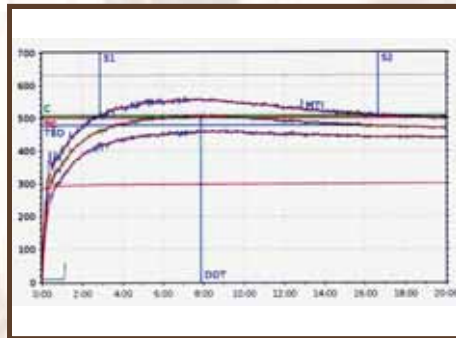


FARINOGRAM

14

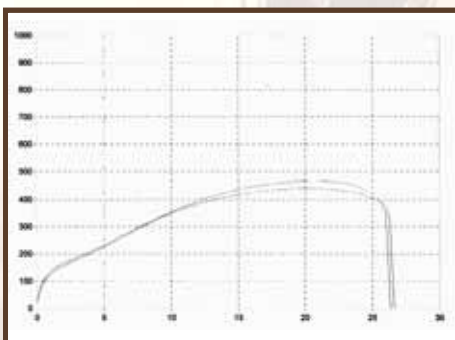


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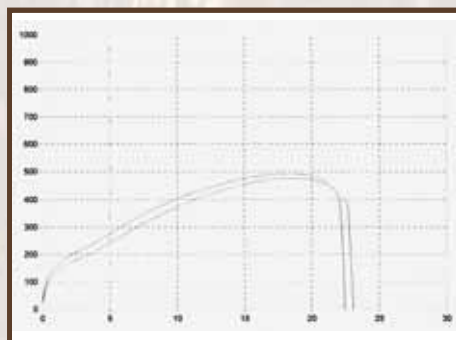


EXTENSOGRAM

14

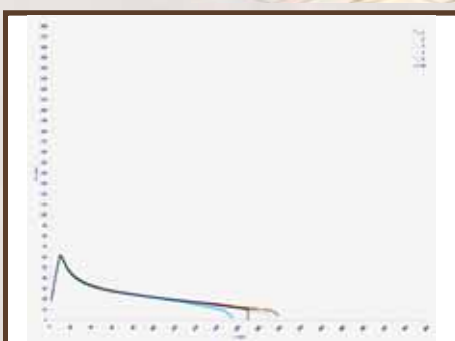


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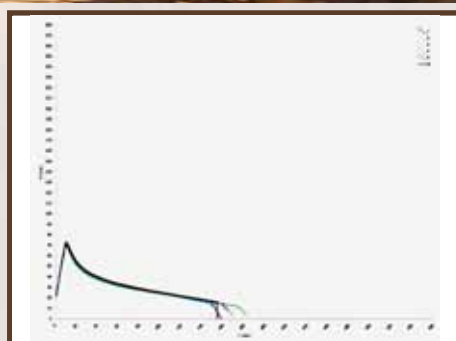


ALVEOGRAM

14



15



South African quality data per production region

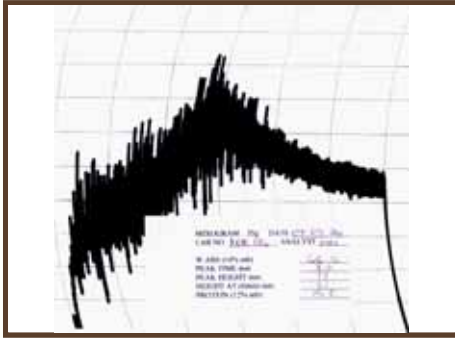
IRRIGATION WHEAT

PRODUCTION REGION	(17) North West Central Northern Region (Ottosdal)				(18) North West Central Region (Ventersdorp)					
	ave	min	max	stdev	ave	min	max	stdev		
WHEAT										
Protein (12% mb), %	12.0	10.1	15.1	2.19	12.5	11.0	13.7	0.99		
Falling number, sec	383	333	403	33.33	374	236	455	73.59		
Moisture, %	11.2	11.1	11.4	0.15	10.9	10.5	11.3	0.31		
1000 Kernel mass (13% mb), g	42.7	39.4	45.9	2.72	36.6	33.5	39.2	2.00		
Hectolitre mass (dirty), kg/hl	81.7	80.6	83.5	1.29	82.2	80.3	84.2	1.41		
Screenings (<1.8 mm sieve), %	0.04	0.00	0.12	0.06	1.80	1.01	4.28	1.25		
Total damaged kernels, %	1.97	0.22	3.66	1.43	0.61	0.26	0.88	0.27		
Combined deviations, %	2.20	0.24	4.18	1.62	2.54	1.80	4.60	1.04		
Number of samples	4				6					
MIXOGRAM (Quadromat Junior)										
Peak time, min	2.8	2.4	3.2	0.39	3.5	2.8	3.9	0.41		
Tail height (6 min), mm	46	38	51	6.56	52	41	62	6.80		
Number of samples	4				6					
COMPOSITE SAMPLES										
CLASS AND GRADE	Super	Grade 1	Grade 2	Grade 3	COW	Super	Grade 1	Grade 2	Grade 3	COW
Bühler Extraction, %	-	73.7	-	-	-	71.7	73.7	-	-	-
FLOUR										
Protein (12% mb), %	-	11.14	-	-	-	11.60	11.03	-	-	-
Moisture, %	-	13.9	-	-	-	13.7	13.6	-	-	-
Ash (db), %	-	0.63	-	-	-	0.57	0.60	-	-	-
Colour, KJ (wet)	-	-4.7	-	-	-	-4.5	-5.0	-	-	-
Colour, Konica Minolta CM5 (dry)										
L*	-	93.06	-	-	-	93.70	93.96	-	-	-
a*	-	0.53	-	-	-	0.52	0.53	-	-	-
b*	-	11.38	-	-	-	9.36	9.52	-	-	-
RVA										
Peak Viscosity, cP	-	2411	-	-	-	1548	2397	-	-	-
Minimum viscosity (Trough), cP	-	1879	-	-	-	1266	1804	-	-	-
Final Viscosity, cP	-	2653	-	-	-	1654	2656	-	-	-
Peak Time, min	-	7.00	-	-	-	6.27	7.00	-	-	-
GLUTEN										
Wet gluten (14% mb), %	-	31.6	-	-	-	31.6	29.2	-	-	-
Dry gluten (14% mb), %	-	10.5	-	-	-	10.6	9.5	-	-	-
Gluten Index	-	95	-	-	-	96	95	-	-	-
FARINOGRAM										
Water absorption (14% mb), %	-	62.1	-	-	-	60.3	60.2	-	-	-
Development time, min	-	4.1	-	-	-	7.1	6.1	-	-	-
Stability, min	-	7.2	-	-	-	13.4	14.3	-	-	-
Mixing tolerance index, BU	-	45	-	-	-	26	20	-	-	-
EXTENSOGRAM (45 min pull)										
Area, cm ²	-	106	-	-	-	150	145	-	-	-
Maximum height, BU	-	357	-	-	-	504	519	-	-	-
Extensibility, mm	-	215	-	-	-	224	210	-	-	-
ALVEOGRAM										
Strength (S), cm ²	-	33.9	-	-	-	40.4	46.6	-	-	-
Stability (P), mm	-	70	-	-	-	73	89	-	-	-
Distensibility (L), mm	-	134	-	-	-	123	113	-	-	-
Configuration ratio (P/L)	-	0.52	-	-	-	0.59	0.79	-	-	-
MIXOGRAM										
Peak time, min	-	2.4	-	-	-	3.2	3.3	-	-	-
100 g BAKING TEST										
Loaf volume, cm ³	-	1067	-	-	-	1090	1037	-	-	-
Evaluation (see page 72)	-	0	-	-	-	0	0	-	-	-

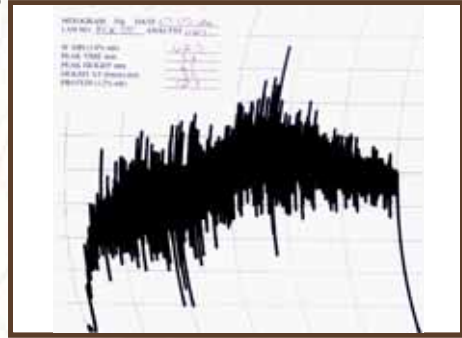
Rheological Graphs Per Production Region

MIXOGRAM

17

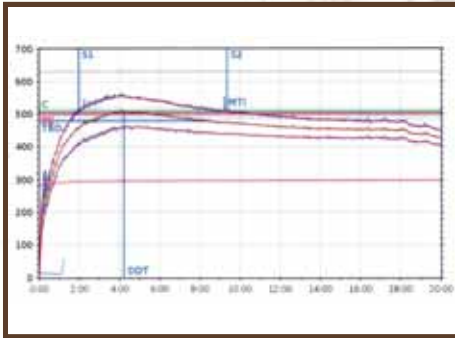


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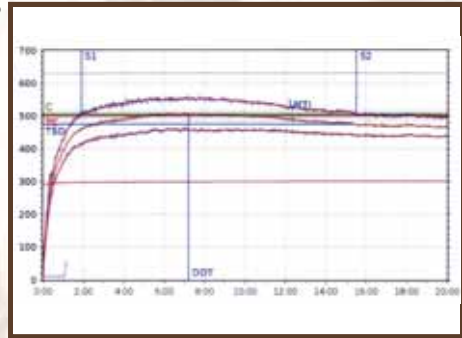


FARINOGRAM

17

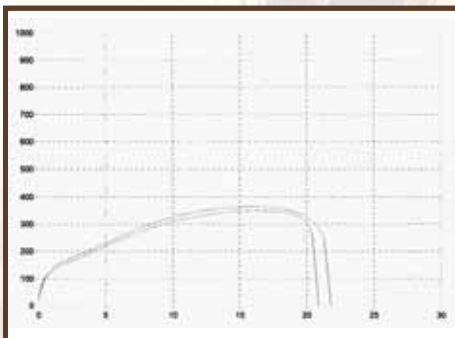


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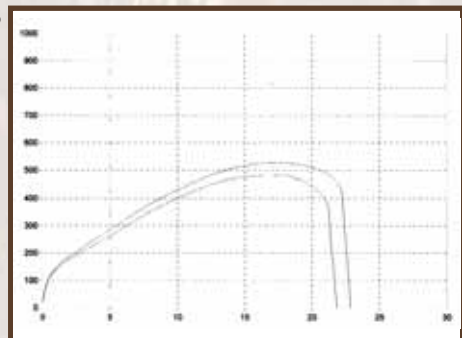


EXTENSOGRAM

17

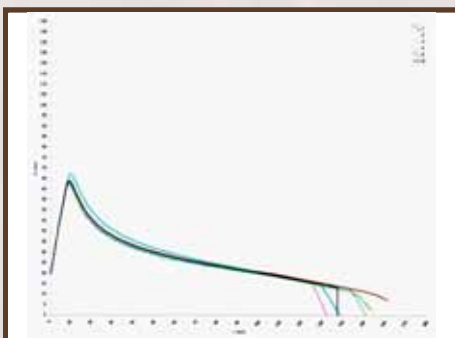


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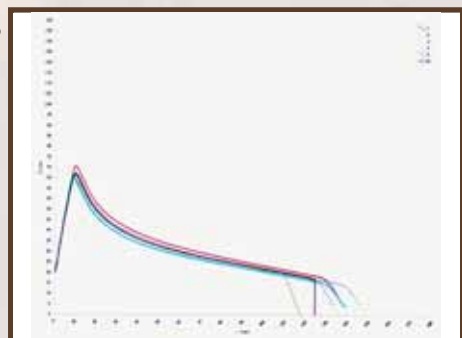


ALVEOGRAM

17



18



South African quality data per production region

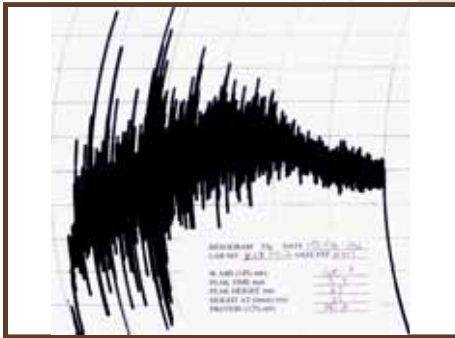
SUMMER RAINFALL AND IRRIGATION

PRODUCTION REGION	(20)				(21)					
	North West Eastern Region				Free State North-Western Region (Viljoenskroon)					
WHEAT										
	ave	min	max	stdev	ave	min	max	stdev		
Protein (12% mb), %	12.0	11.3	12.9	0.83	13.1	12.7	13.4	0.49		
Falling number, sec	389	358	414	28.48	285	258	311	37.48		
Moisture, %	10.8	10.5	11.0	0.25	11.3	11.2	11.3	0.07		
1000 Kernel mass (13% mb), g	37.4	32.8	41.3	4.29	35.2	34.7	35.6	0.64		
Hectolitre mass (dirty), kg/hl	82.5	81.2	83.3	1.16	77.4	75.9	78.9	2.12		
Screenings (<1.8 mm sieve), %	0.76	0.22	1.47	0.64	5.81	3.21	8.40	3.67		
Total damaged kernels, %	0.23	0.10	0.40	0.15	1.23	0.52	1.94	1.00		
Combined deviations, %	1.15	0.66	2.09	0.81	8.05	4.77	11.32	4.63		
Number of samples	3				2					
MIXOGRAM (Quadromat Junior)										
	ave	min	max	stdev	ave	min	max	stdev		
Peak time, min	3.6	3.5	3.7	0.10	4.0	3.5	4.5	0.71		
Tail height (6 min), mm	52	47	55	4.16	49	48	49	0.71		
Number of samples	3				2					
COMPOSITE SAMPLES										
CLASS AND GRADE	Super	Grade 1	Grade 2	Grade 3	COW	Super	Grade 1	Grade 2	Grade 3	COW
Bühler Extraction, %	-	71.9	-	-	-	-	-	-	-	73.0
FLOUR										
Protein (12% mb), %	-	10.79	-	-	-	-	-	-	-	10.38
Moisture, %	-	13.5	-	-	-	-	-	-	-	13.9
Ash (db), %	-	0.61	-	-	-	-	-	-	-	0.61
Colour, KJ (wet)	-	-4.9	-	-	-	-	-	-	-	-3.2
Colour, Konica Minolta CM5 (dry)										
L*	-	93.66	-	-	-	-	-	-	-	92.72
a*	-	0.52	-	-	-	-	-	-	-	0.78
b*	-	9.63	-	-	-	-	-	-	-	10.71
RVA										
Peak Viscosity, cP	-	2326	-	-	-	-	-	-	-	1799
Minimum viscosity (Trough), cP	-	1732	-	-	-	-	-	-	-	1407
Final Viscosity, cP	-	2588	-	-	-	-	-	-	-	1924
Peak Time, min	-	7.00	-	-	-	-	-	-	-	6.33
GLUTEN										
Wet gluten (14% mb), %	-	30.2	-	-	-	-	-	-	-	29.3
Dry gluten (14% mb), %	-	9.7	-	-	-	-	-	-	-	9.5
Gluten Index	-	95	-	-	-	-	-	-	-	96
FARINOGRAM										
Water absorption (14% mb), %	-	61.2	-	-	-	-	-	-	-	58.8
Development time, min	-	5.5	-	-	-	-	-	-	-	6.2
Stability, min	-	9.4	-	-	-	-	-	-	-	12.2
Mixing tolerance index, BU	-	43	-	-	-	-	-	-	-	19
EXTENSOGRAM (45 min pull)										
Area, cm ²	-	124	-	-	-	-	-	-	-	134
Maximum height, BU	-	472	-	-	-	-	-	-	-	466
Extensibility, mm	-	200	-	-	-	-	-	-	-	212
ALVEOGRAM										
Strength (S), cm ²	-	46.5	-	-	-	-	-	-	-	39.3
Stability (P), mm	-	92	-	-	-	-	-	-	-	75
Distensibility (L), mm	-	124	-	-	-	-	-	-	-	114
Configuration ratio (P/L)	-	0.74	-	-	-	-	-	-	-	0.66
MIXOGRAM										
Peak time, min	-	2.9	-	-	-	-	-	-	-	4.1
100 g BAKING TEST										
Loaf volume, cm ³	-	987	-	-	-	-	-	-	-	940
Evaluation (see page 72)	-	0	-	-	-	-	-	-	-	0

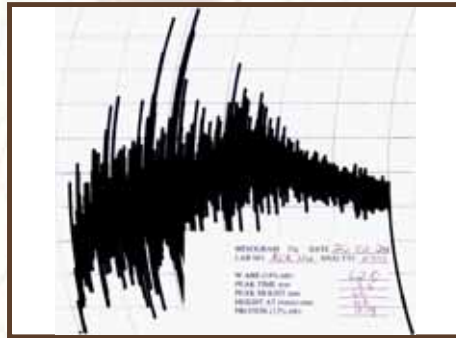
Rheological Graphs Per Production Region

MIXOGRAM

20

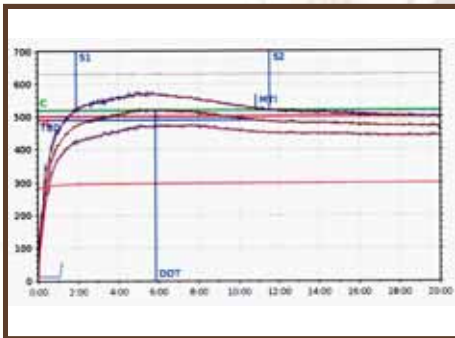


21



FARINOGRAM

20

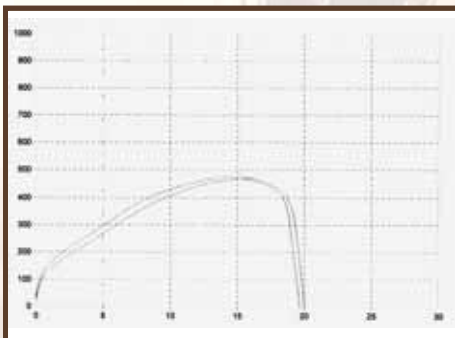


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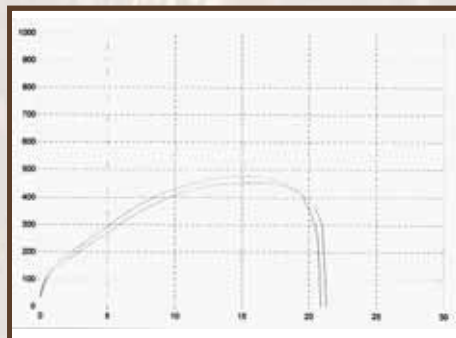


EXTENSOGRAM

20

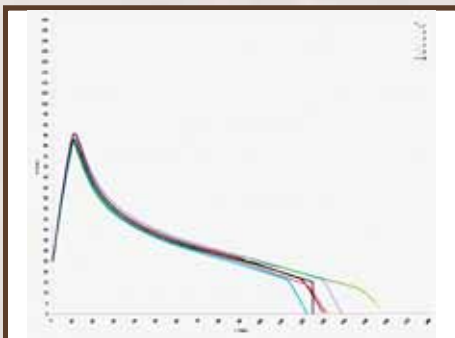


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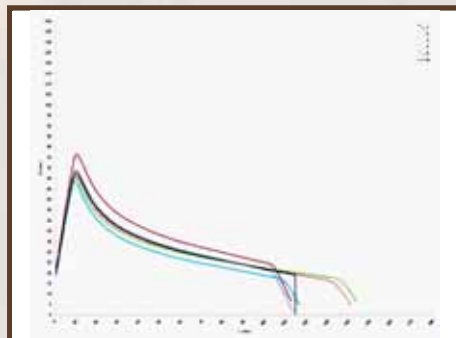


ALVEOGRAM

20



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South African quality data per production region

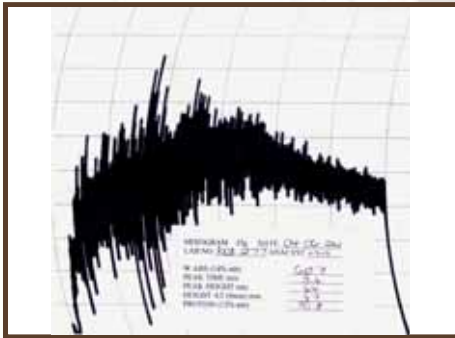
SUMMER RAINFALL AND IRRIGATION WHEAT

PRODUCTION REGION	(23)				(24)						
	Free State North-Western Region (Bultfontein)				Free State Central Region						
WHEAT											
	ave	min	max	stdev	ave	min	max	stdev			
Protein (12% mb), %	11.6	10.1	13.7	1.20	12.0	9.8	14.2	1.24			
Falling number, sec	386	245	551	80.18	363	277	431	44.82			
Moisture, %	11.1	10.5	11.8	0.42	11.0	9.6	12.6	0.64			
1000 Kernel mass (13% mb), g	34.9	28.0	41.0	4.02	35.4	28.5	41.4	3.93			
Hectolitre mass (dirty), kg/hl	81.3	77.4	83.3	1.77	79.3	69.6	83.8	3.71			
Screenings (<1.8 mm sieve), %	1.95	0.33	7.01	1.84	2.65	0.54	9.18	1.98			
Total damaged kernels, %	0.30	0.00	1.00	0.28	0.62	0.00	5.50	1.17			
Combined deviations, %	2.93	0.87	8.73	2.25	3.87	1.42	10.14	2.43			
Number of samples	13				20						
MIXOGRAM (Quadromat Junior)											
Peak time, min	3.3	2.3	4.7	0.75	3.2	2.8	3.8	0.33			
Tail height (6 min), mm	49	37	58	5.68	48	34	57	5.04			
Number of samples	13				20						
COMPOSITE SAMPLES											
CLASS AND GRADE	Super	Grade 1	Grade 2	Grade 3	COW	Super	Grade 1	Grade 2	Grade 3	COW	
Bühler Extraction, %	72.2	72.0	71.6	70.6	-	72.5	71.3	72.0	74.3	-	
FLOUR											
Protein (12% mb), %	11.89	10.75	9.38	8.59	-	11.40	10.79	10.11	9.15	-	
Moisture, %	13.2	13.0	13.4	13.4	-	13.5	13.5	13.5	13.7	-	
Ash (db), %	0.49	0.53	0.53	0.52	-	0.60	0.61	0.59	0.68	-	
Colour, KJ (wet)	-5.0	-4.9	-5.0	-5.0	-	-4.6	-4.9	-4.9	-5.0	-	
Colour, Konica Minolta CM5 (dry)											
L*	93.52	93.55	93.85	93.89	-	93.75	93.83	93.77	93.87	-	
a*	0.51	0.47	0.44	0.44	-	0.44	0.53	0.45	0.57	-	
b*	11.22	10.77	11.22	11.03	-	10.59	10.45	11.42	11.10	-	
RVA											
Peak Viscosity, cP	2162	1605	2390	1930	-	1879	2233	2357	2286	-	
Minimum viscosity (Trough), cP	1637	1427	1881	1576	-	1644	1764	1897	1796	-	
Final Viscosity, cP	2651	1835	2814	2372	-	2055	2488	2667	2625	-	
Peak Time, min	7.00	6.60	7.00	7.00	-	6.87	7.00	7.00	7.00	-	
GLUTEN											
Wet gluten (14% mb), %	33.8	32.9	23.8	22.9	-	29.7	29.9	26.7	23.9	-	
Dry gluten (14% mb), %	11.7	10.5	7.4	7.3	-	10.0	9.6	8.7	7.6	-	
Gluten Index	93	94	97	97	-	98	95	97	97	-	
FARINOGRAM											
Water absorption (14% mb), %	62.4	60.4	59.7	58.6	-	60	60.2	59.6	57.3	-	
Development time, min	6.2	5.4	12.1	4.2	-	7.2	3.3	5.2	4.5	-	
Stability, min	20.0	8.1	20.0	8.6	-	13.1	8.2	8.4	7.2	-	
Mixing tolerance index, BU	23	43	7	33	-	34	38	43	52	-	
EXTENSOGRAM (45 min pull)											
Area, cm ²	110	95	141	73	-	110	100	82	83	-	
Maximum height, BU	401	379	612	382	-	399	379	315	339	-	
Extensibility, mm	200	179	172	137	-	202	192	188	177	-	
ALVEOGRAM											
Strength (S), cm ²	43.9	39.1	43.9	32.3	-	37.2	37.8	34.1	27.8	-	
Stability (P), mm	94	85	132	108	-	74	77	76	60	-	
Distensibility (L), mm	106	110	59	61	-	117	124	118	132	-	
Configuration ratio (P/L)	0.89	0.77	2.24	1.77	-	0.63	0.62	0.64	0.45	-	
MIXOGRAM											
Peak time, min	2.8	2.5	4.4	2.6	-	3.1	2.8	3.0	3.1	-	
100 g BAKING TEST											
Loaf volume, cm ³	1088	1031	868	845	-	1045	1042	1017	949	-	
Evaluation (see page 72)	0	0	0	0	-	0	0	0	0	-	

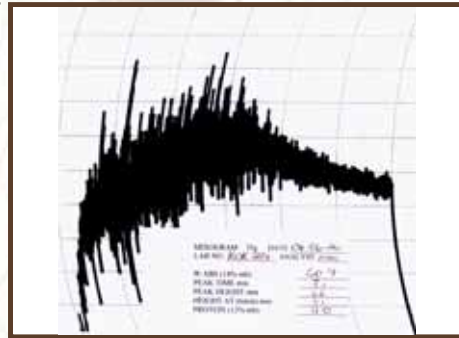
Rheological Graphs Per Production Region

MIXOGRAM

23

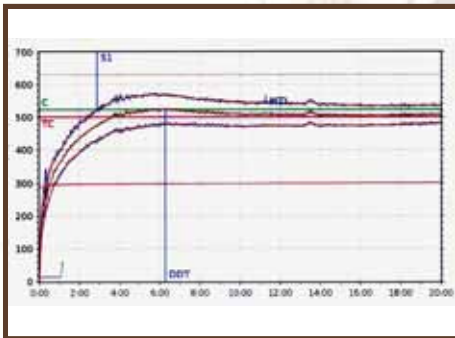


24



FARINOGRAM

23

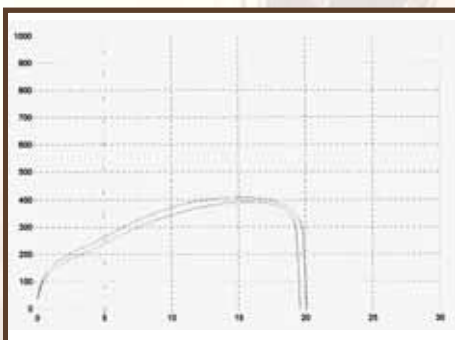


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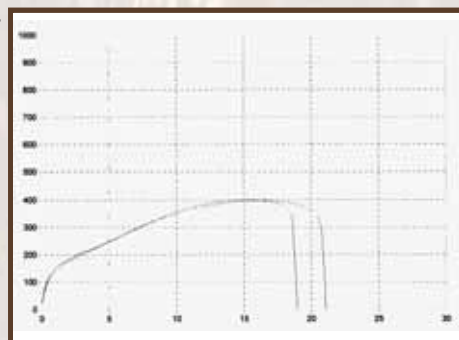


EXTENSOGRAM

23

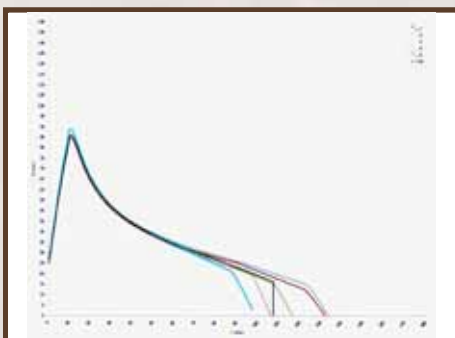


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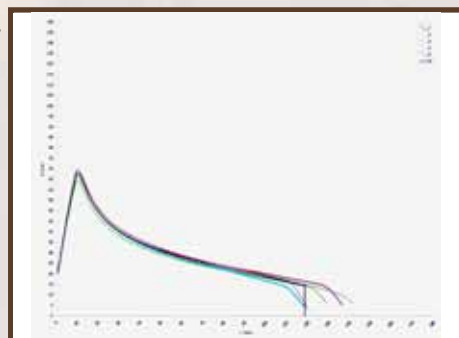


ALVEOGRAM

23



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South African quality data per production region

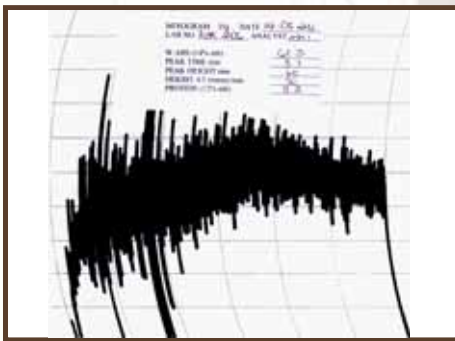
SUMMER RAINFALL AND IRRIGATION WHEAT

PRODUCTION REGION	(25)				(26)						
	Free State South-Western Region				Free State South-Eastern Region						
WHEAT											
	ave	min	max	stdev	ave	min	max	stdev			
Protein (12% mb), %	12.5	10.9	13.9	0.97	11.4	8.9	13.3	1.44			
Falling number, sec	360	295	415	34.83	384	319	495	48.26			
Moisture, %	11.8	9.6	13.1	0.83	11.3	10.7	12.3	0.47			
1000 Kernel mass (13% mb), g	37.6	24.9	45.5	5.57	36.0	31.5	42.5	3.36			
Hectolitre mass (dirty), kg/hl	77.7	73.3	83.7	2.52	81.0	77.7	83.2	1.72			
Screenings (<1.8 mm sieve), %	0.99	0.06	2.51	0.62	1.64	0.23	7.56	2.21			
Total damaged kernels, %	0.27	0.00	0.76	0.21	0.39	0.00	1.30	0.36			
Combined deviations, %	1.63	0.51	3.09	0.83	2.43	0.65	8.62	2.33			
Number of samples	21				13						
MIXOGRAM (Quadromat Junior)											
	ave	min	max	stdev	ave	min	max	stdev			
Peak time, min	3.8	2.8	5.0	0.65	3.5	2.3	5.2	0.79			
Tail height (6 min), mm	49	40	55	3.68	48	37	60	6.62			
Number of samples	21				13						
COMPOSITE SAMPLES											
CLASS AND GRADE	Super	Grade 1	Grade 2	Grade 3	COW	Super	Grade 1	Grade 2	Grade 3	COW	
Bühler Extraction, %	72.8	72.2	73.3	71.3	-	73.2	73.6	73.4	-	-	
FLOUR											
Protein (12% mb), %	12.05	10.88	10.10	11.45	-	12.33	11.44	10.10	-	-	
Moisture, %	13.7	13.6	13.7	13.6	-	13.7	13.5	13.7	-	-	
Ash (db), %	0.59	0.61	0.60	0.63	-	0.61	0.63	0.63	-	-	
Colour, KJ (wet)	-4.6	-4.2	-5.0	-4.3	-	-5.0	-4.5	-5.0	-	-	
Colour, Konica Minolta CM5 (dry)											
L*	93.59	93.53	93.85	93.81	-	93.76	93.47	93.94	-	-	
a*	0.43	0.38	0.49	0.36	-	0.56	0.61	0.57	-	-	
b*	10.71	10.44	10.95	10.23	-	10.06	9.86	9.52	-	-	
RVA											
Peak Viscosity, cP	2298	1737	2256	2274	-	2605	2578	2434	-	-	
Minimum viscosity (Trough), cP	1686	1530	1732	1573	-	1935	1939	1767	-	-	
Final Viscosity, cP	2593	1901	2537	2549	-	2796	2860	2756	-	-	
Peak Time, min	7.00	6.73	7.00	7.00	-	7.00	7.00	7.00	-	-	
GLUTEN											
Wet gluten (14% mb), %	29.9	27.7	26.7	30.6	-	33.2	30.5	28.0	-	-	
Dry gluten (14% mb), %	10.1	9.3	8.8	10.0	-	11.1	10.2	9.3	-	-	
Gluten Index	96	98	99	95	-	93	98	95	-	-	
FARINOGRAM											
Water absorption (14% mb), %	61.2	60.0	59.6	58.5	-	62.6	60.1	59.5	-	-	
Development time, min	8.6	4.6	5.6	7.0	-	7.6	5.6	5.2	-	-	
Stability, min	17.0	12.6	11.4	15.0	-	12.4	11.2	8.2	-	-	
Mixing tolerance index, BU	26	21	33	34	-	36	29	49	-	-	
EXTENSOGRAM (45 min pull)											
Area, cm ²	134	100	107	119	-	160	132	88	-	-	
Maximum height, BU	433	393	456	435	-	432	440	345	-	-	
Extensibility, mm	227	185	177	207	-	275	222	185	-	-	
ALVEOGRAM											
Strength (S), cm ²	49.2	40.8	42.4	39.4	-	48.6	42.8	32.6	-	-	
Stability (P), mm	89.0	91.0	94	70	-	75	75	71	-	-	
Distensibility (L), mm	125	97	99	136	-	177	145	120	-	-	
Configuration ratio (P/L)	0.71	0.94	0.95	0.51	-	0.42	0.52	0.59	-	-	
MIXOGRAM											
Peak time, min	3.3	3.8	3.7	3.3	-	2.6	3.2	2.9	-	-	
100 g BAKING TEST											
Loaf volume, cm ³	1110	1046	945	1119	-	1230	1085	1047	-	-	
Evaluation (see page 72)	0	0	0	0	-	0	0	0	-	-	

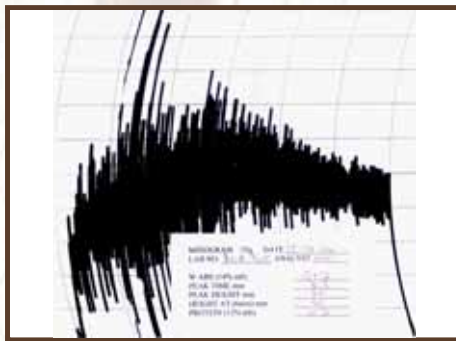
Rheological Graphs Per Production Region

MIXOGRAM

25

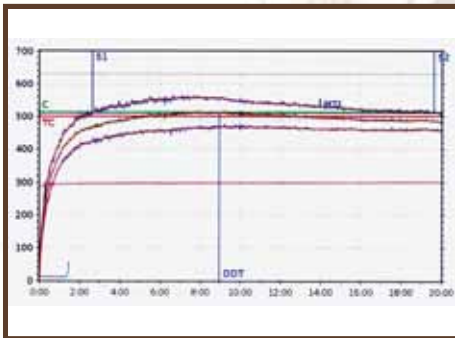


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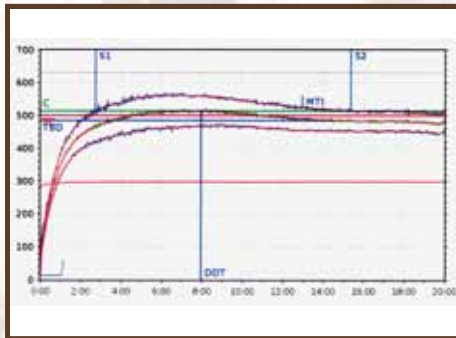


FARINOGRAM

25

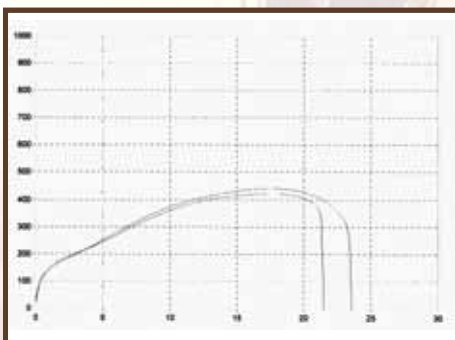


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EXTENSOGRAM

25

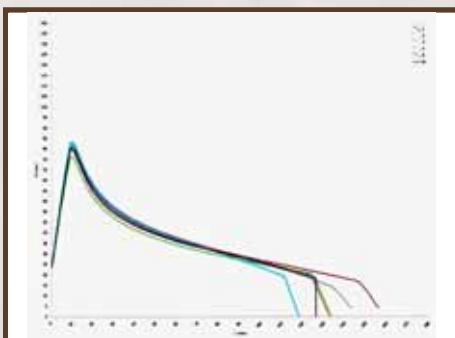


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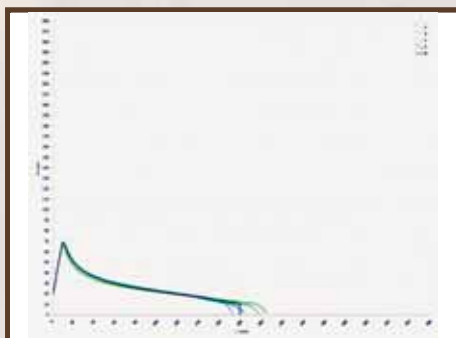


ALVEOGRAM

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South African quality data per production region

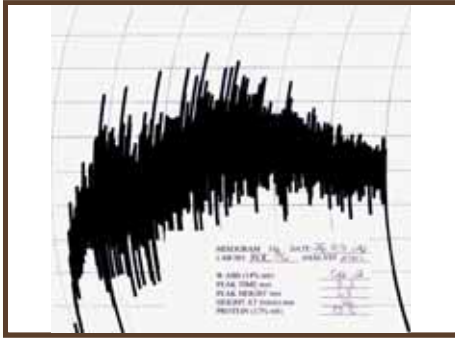
SUMMER RAINFALL AND IRRIGATION WHEAT

PRODUCTION REGION	(27)				(28)					
	Free State		Northern Region		Free State		Eastern Region			
WHEAT										
	ave	min	max	stdev	ave	min	max	stdev		
Protein (12% mb), %	13.5	12.2	14.8	1.84	12.8	10.7	14.9	1.22		
Falling number, sec	354	333	374	28.99	360	291	414	37.03		
Moisture, %	11.5	11.5	11.5	0.00	11.5	10.5	12.3	0.51		
1000 Kernel mass (13% mb), g	33.2	31.1	35.2	2.90	37.2	29.4	42.4	3.56		
Hectolitre mass (dirty), kg/hl	78.7	78.3	79.1	0.57	81.0	75.5	84.3	2.67		
Screenings (<1.8 mm sieve), %	0.47	0.40	0.54	0.10	1.05	0.13	2.89	0.68		
Total damaged kernels, %	2.35	2.00	2.70	0.49	0.52	0.02	1.26	0.30		
Combined deviations, %	3.62	2.50	4.74	1.58	1.92	0.25	4.47	0.98		
Number of samples	2				16					
MIXOGRAM (Quadromat Junior)										
	ave	min	max	stdev	ave	min	max	stdev		
Peak time, min	3.1	2.8	3.3	0.35	3.3	2.3	4.4	0.62		
Tail height (6 min), mm	56	55	56	0.71	49	27	60	7.81		
Number of samples	2				16					
COMPOSITE SAMPLES										
CLASS AND GRADE	Super	Grade 1	Grade 2	Grade 3	COW	Super	Grade 1	Grade 2	Grade 3	COW
Bühler Extraction, %	-	73.2	-	-	-	73.5	-	73.0	71.2	-
FLOUR										
Protein (12% mb), %	-	11.78	-	-	-	12.37	-	9.10	14.06	-
Moisture, %	-	13.8	-	-	-	13.6	-	13.4	13.4	-
Ash (db), %	-	0.66	-	-	-	0.57	-	0.55	0.56	-
Colour, KJ (wet)	-	-4.7	-	-	-	-4.9	-	-4.7	-3.8	-
Colour, Konica Minolta CM5 (dry)										
L*	-	93.37	-	-	-	93.82	-	94.45	93.12	-
a*	-	0.56	-	-	-	0.49	-	0.36	0.48	-
b*	-	10.40	-	-	-	9.96	-	9.48	10.32	-
RVA										
Peak Viscosity, cP	-	2270	-	-	-	2327	-	2304	2403	-
Minimum viscosity (Trough), cP	-	1700	-	-	-	1771	-	1877	1813	-
Final Viscosity, cP	-	2549	-	-	-	2611	-	2513	2663	-
Peak Time, min	-	7.00	-	-	-	7.00	-	7.00	7.00	-
GLUTEN										
Wet gluten (14% mb), %	-	32.1	-	-	-	32.0	-	23.9	31.6	-
Dry gluten (14% mb), %	-	10.4	-	-	-	11.1	-	6.9	10.6	-
Gluten Index	-	93	-	-	-	95	-	96	95	-
FARINOGRAM										
Water absorption (14% mb), %	-	61.4	-	-	-	62.5	-	54.6	63.4	-
Development time, min	-	5.2	-	-	-	7.1	-	5.0	14.4	-
Stability, min	-	11.1	-	-	-	16.1	-	6.5	20.0	-
Mixing tolerance index, BU	-	30	-	-	-	28	-	64	12	-
EXTENSOGRAM (45 min pull)										
Area, cm ²	-	124	-	-	-	125	-	71	130	-
Maximum height, BU	-	376	-	-	-	398	-	354	415	-
Extensibility, mm	-	240	-	-	-	231	-	141	230	-
ALVEOGRAM										
Strength (S), cm ²	-	35.5	-	-	-	47.1	-	24.6	55.7	-
Stability (P), mm	-	70	-	-	-	82	-	56	90	-
Distensibility (L), mm	-	137	-	-	-	145	-	108	139	-
Configuration ratio (P/L)	-	0.51	-	-	-	0.57	-	0.52	0.65	-
MIXOGRAM										
Peak time, min	-	2.7	-	-	-	2.7	-	3.5	3.4	-
100 g BAKING TEST										
Loaf volume, cm ³	-	1202	-	-	-	1122	-	921	1208	-
Evaluation (see page 72)	-	0	-	-	-	0	-	0	0	-

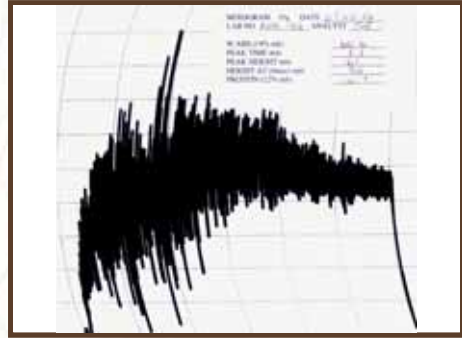
Rheological Graphs Per Production Region

MIXOGRAM

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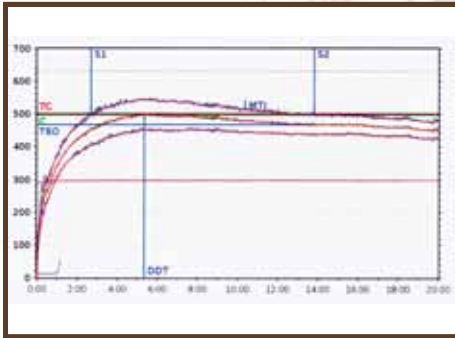


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FARINOGRAM

27

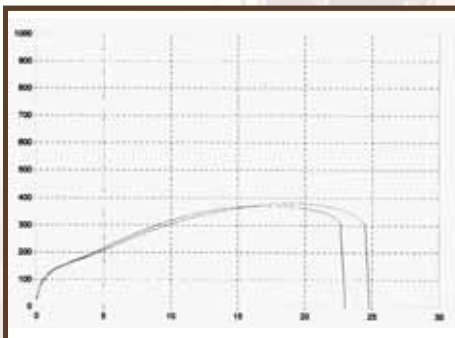


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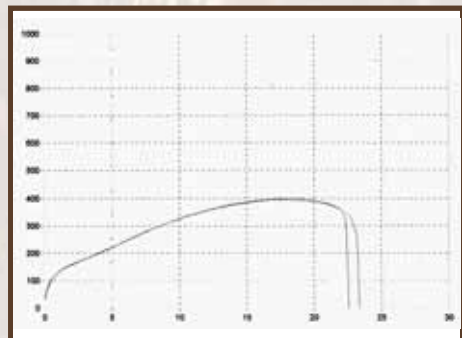


EXTENSOGRAM

27

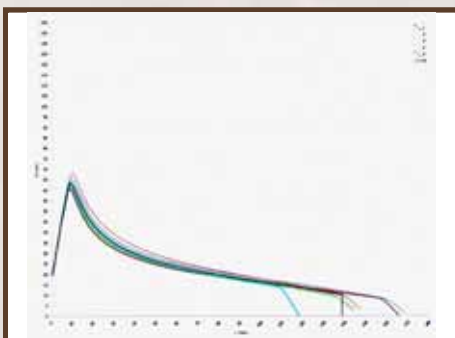


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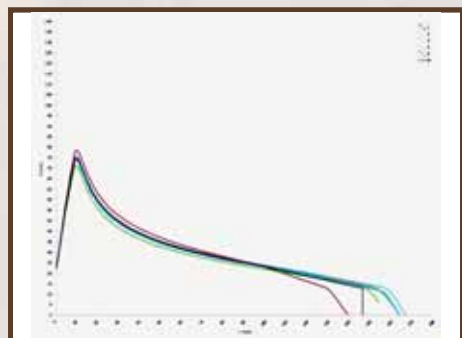


ALVEOGRAM

27



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South African quality data per production region

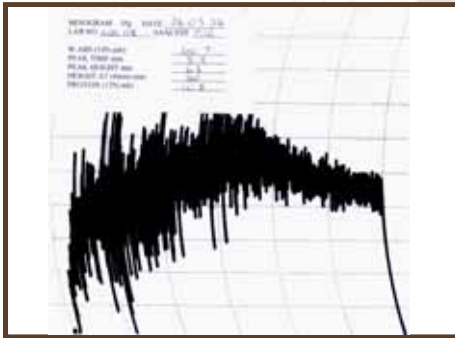
IRRIGATION WHEAT

PRODUCTION REGION	(33) Mpumalanga Northern Region				(34) Gauteng					
	ave	min	max	stdev	ave	min	max	stdev		
WHEAT										
Protein (12% mb), %	11.7	9.3	13.1	1.21	12.0	10.6	13.0	0.77		
Falling number, sec	403	342	540	65.69	348	197	408	66.54		
Moisture, %	11.3	10.9	11.6	0.23	11.0	10.4	11.7	0.49		
1000 Kernel mass (13% mb), g	36.4	32.0	42.0	3.18	38.8	33.4	45.7	3.76		
Hectolitre mass (dirty), kg/hl	81.2	78.7	83.5	1.70	84.4	82.6	86.3	1.36		
Screenings (<1.8 mm sieve), %	1.65	0.23	3.54	1.00	1.44	0.18	3.40	1.01		
Total damaged kernels, %	0.73	0.00	2.52	0.87	0.37	0.06	0.76	0.24		
Combined deviations, %	2.61	0.31	6.54	1.83	2.07	0.32	5.56	1.56		
Number of samples	8				8					
MIXOGRAM (Quadromat Junior)										
Peak time, min	3.5	2.9	3.8	0.31	3.3	2.7	3.8	0.35		
Tail height (6 min), mm	48	41	55	3.91	50	45	52	2.71		
Number of samples	8				8					
COMPOSITE SAMPLES										
CLASS AND GRADE	Super	Grade 1	Grade 2	Grade 3	COW	Super	Grade 1	Grade 2	Grade 3	COW
	Bühler Extraction, %									
	73.6	74.0	74.1	-	-	73.6	74.1	73.7	-	-
FLOUR										
Protein (12% mb), %	11.96	11.17	10.59	-	-	11.70	10.88	10.50	-	-
Moisture, %	13.4	13.3	13.7	-	-	13.7	13.5	13.7	-	-
Ash (db), %	0.59	0.60	0.62	-	-	0.60	0.62	0.58	-	-
Colour, KJ (wet)	-4.5	-4.7	-4.8	-	-	-5.0	-4.9	-5.0	-	-
Colour, Konica Minolta CM5 (dry)										
L*	93.17	93.58	93.58	-	-	93.69	93.44	93.75	-	-
a*	0.54	0.50	0.56	-	-	0.61	0.61	0.57	-	-
b*	9.84	9.89	10.11	-	-	10.51	10.61	10.91	-	-
RVA										
Peak Viscosity, cP	2376	2428	2451	-	-	2295	2392	2445	-	-
Minimum viscosity (Trough), cP	1880	1855	1880	-	-	1798	1897	1927	-	-
Final Viscosity, cP	2519	2627	2680	-	-	2502	2587	2750	-	-
Peak Time, min	7.00	7.00	7.00	-	-	7.00	7.00	7.00	-	-
GLUTEN										
Wet gluten (14% mb), %	32.7	29.2	27.6	-	-	30.4	28.6	27.8	-	-
Dry gluten (14% mb), %	10.7	9.5	9.0	-	-	11.0	9.4	8.8	-	-
Gluten Index	96	95	95	-	-	96	97	96	-	-
FARINOGRAM										
Water absorption (14% mb), %	60.5	59.1	59.7	-	-	62.6	58.9	61.7	-	-
Development time, min	7.0	7.0	6.2	-	-	6.3	5.1	6.5	-	-
Stability, min	15.4	12.3	9.6	-	-	10.0	9.4	14.0	-	-
Mixing tolerance index, BU	26	42	41	-	-	39	37	28	-	-
EXTENSOGRAM (45 min pull)										
Area, cm ²	144	137	115	-	-	129	115	119	-	-
Maximum height, BU	481	478	419	-	-	391	449	405	-	-
Extensibility, mm	221	215	200	-	-	245	192	215	-	-
ALVEOGRAM										
Strength (S), cm ²	46.9	42.5	41.0	-	-	45.3	39.4	42.7	-	-
Stability (P), mm	78	68	78	-	-	79	74	90	-	-
Distensibility (L), mm	144	153	124	-	-	149	127	117	-	-
Configuration ratio (P/L)	0.54	0.44	0.63	-	-	0.53	0.58	0.77	-	-
MIXOGRAM										
Peak time, min	3.1	3.2	3.4	-	-	2.8	3.5	3.1	-	-
100 g BAKING TEST										
Loaf volume, cm ³	1192	1166	1034	-	-	1096	1107	1041	-	-
Evaluation (see page 72)	0	0	0	-	-	0	0	0	-	-

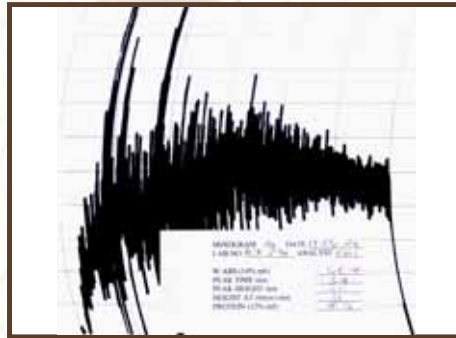
Rheological Graphs Per Production Region

MIXOGRAM

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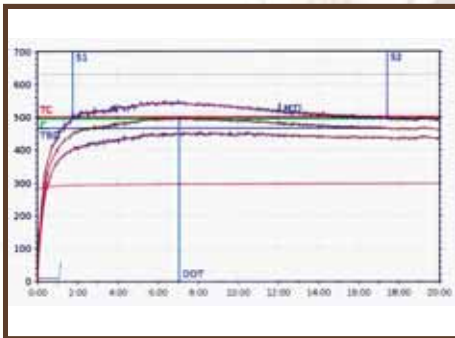


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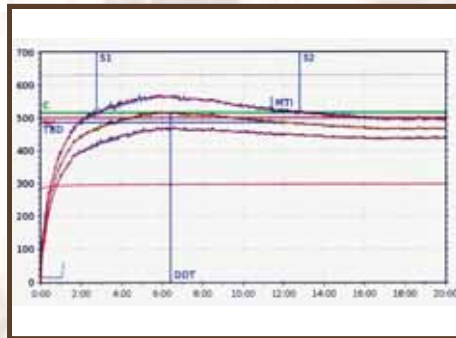


FARINOGRAM

33

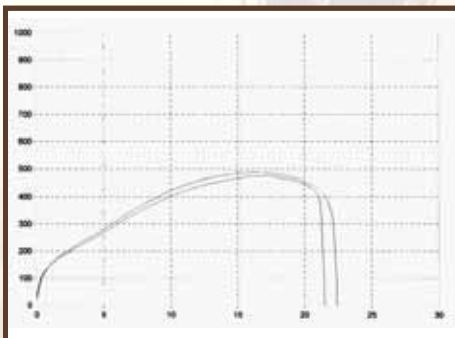


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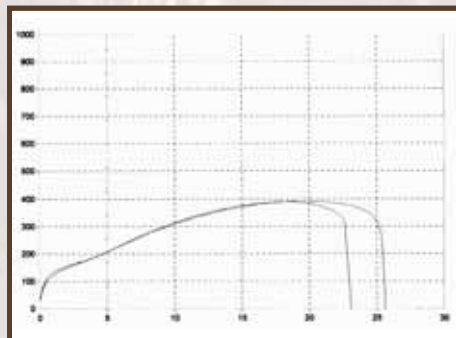


EXTENSOGRAM

33

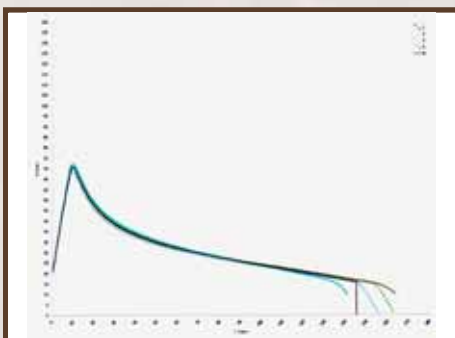


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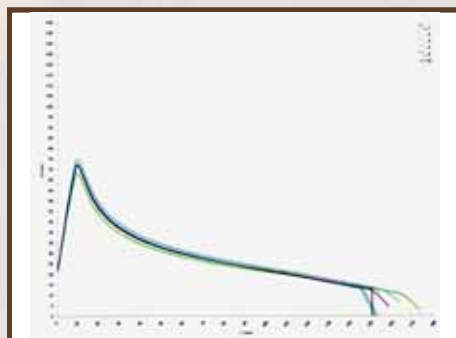


ALVEOGRAM

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South African quality data per production region

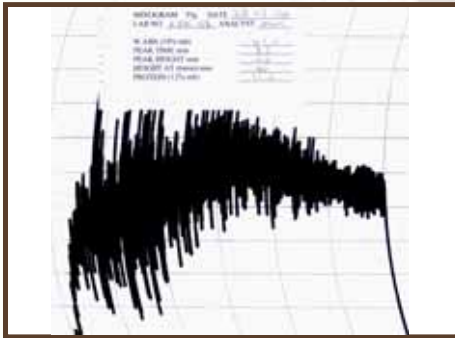
IRRIGATION WHEAT

PRODUCTION REGION	(35)				(36)					
	Limpopo Region				KwaZulu-Natal					
WHEAT										
	ave	min	max	stdev	ave	min	max	stdev		
Protein (12% mb), %	12.2	9.7	14.0	1.15	13.1	11.1	14.1	0.99		
Falling number, sec	362	224	467	69.80	353	290	398	40.88		
Moisture, %	11.0	9.6	11.7	0.62	11.5	11.1	11.9	0.30		
1000 Kernel mass (13% mb), g	39.8	33.1	46.5	3.72	39.9	38.9	41.4	0.98		
Hectolitre mass (dirty), kg/hl	80.2	75.8	83.3	2.31	83.5	82.0	84.5	0.72		
Screenings (<1.8 mm sieve), %	1.52	0.15	5.69	1.60	0.67	0.28	1.51	0.40		
Total damaged kernels, %	0.68	0.00	2.46	0.72	0.21	0.00	0.38	0.15		
Combined deviations, %	2.63	0.59	8.79	1.98	1.08	0.40	1.95	0.47		
Number of samples	17				8					
MIXOGRAM (Quadromat Junior)										
	ave	min	max	stdev	ave	min	max	stdev		
Peak time, min	3.5	2.3	4.6	0.66	3.3	2.8	3.5	0.24		
Tail height (6 min), mm	51	46	60	4.40	54	50	57	2.30		
Number of samples	17				8					
COMPOSITE SAMPLES										
CLASS AND GRADE	Super	Grade 1	Grade 2	Grade 3	COW	Super	Grade 1	Grade 2	Grade 3	COW
Bühler Extraction, %	73.7	73.9	73.1	73.4	-	75.3	74.5	75.1	-	-
FLOUR										
Protein (12% mb), %	12.34	11.36	9.37	8.89	-	12.86	11.20	9.98	-	-
Moisture, %	13.8	13.6	13.8	14.1	-	13.9	13.5	14.0	-	-
Ash (db), %	0.57	0.58	0.54	0.60	-	0.53	0.55	0.56	-	-
Colour, KJ (wet)	-4.7	-4.5	-4.9	-4.8	-	-4.8	-5.0	-5.0	-	-
Colour, Konica Minolta CM5 (dry)										
L*	93.73	93.33	93.87	93.33	-	93.19	93.84	93.72	-	-
a*	0.51	0.50	0.41	0.43	-	0.48	0.48	0.46	-	-
b*	9.21	10.68	10.72	11.53	-	10.12	9.61	10.15	-	-
RVA										
Peak Viscosity, cP	2331	1994	2456	2247	-	2158	2703	2569	-	-
Minimum viscosity (Trough), cP	1896	1728	2052	1834	-	1841	2154	2127	-	-
Final Viscosity, cP	2526	2128	2582	2425	-	2398	2944	2729	-	-
Peak Time, min	7.00	6.80	6.47	7.00	-	6.87	7.00	6.93	-	-
GLUTEN										
Wet gluten (14% mb), %	32.9	31.1	24.7	24.7	-	61.8	61.1	59.8	-	-
Dry gluten (14% mb), %	11.0	10.5	7.6	7.9	-	8.2	6.4	6.0	-	-
Gluten Index	96	99	97	94	-	14.4	14.0	9.4	-	-
FARINOGRAM										
Water absorption (14% mb), %	60.0	60.0	56.8	57.1	-	61.8	61.1	59.8	-	-
Development time, min	5.3	5.4	5.4	3.5	-	8.2	6.4	6.0	-	-
Stability, min	10.3	11.1	15.2	8.0	-	14.4	14.0	9.4	-	-
Mixing tolerance index, BU	39	33	16	46	-	28	32	46	-	-
EXTENSOGRAM (45 min pull)										
Area, cm ²	139	136	119	81	-	157	147	115	-	-
Maximum height, BU	426	454	549	331	-	496	512	441	-	-
Extensibility, mm	242	224	163	179	-	240	215	194	-	-
ALVEOGRAM										
Strength (S), cm ²	43.1	44.6	41.4	38.1	-	55.4	52.6	41.0	-	-
Stability (P), mm	68	74	86	75	-	73	90	89	-	-
Distensibility (L), mm	159	145	100	110	-	184	138	107	-	-
Configuration ratio (P/L)	0.43	0.51	0.86	0.68	-	0.40	0.65	0.83	-	-
MIXOGRAM										
Peak time, min	2.8	3.3	4.5	3.3	-	3.0	3.4	3.3	-	-
100 g BAKING TEST										
Loaf volume, cm ³	1064	1134	917	940	-	1242	1138	1034	-	-
Evaluation (see page 72)	0	0	0	0	-	0	0	0	-	-

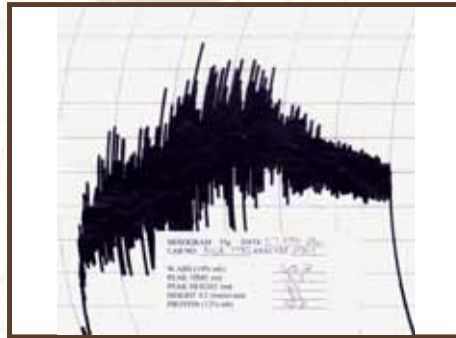
Rheological Graphs Per Production Region

MIXOGRAM

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FARINOGRAM

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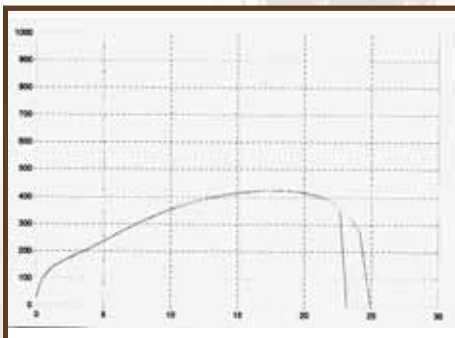


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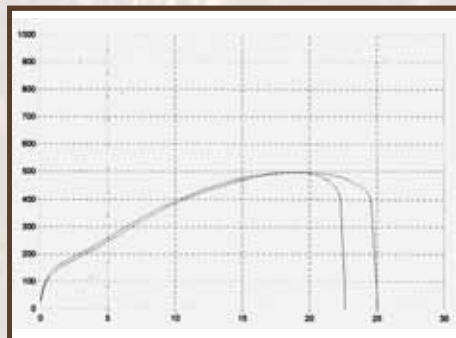


EXTENSOGRAM

35

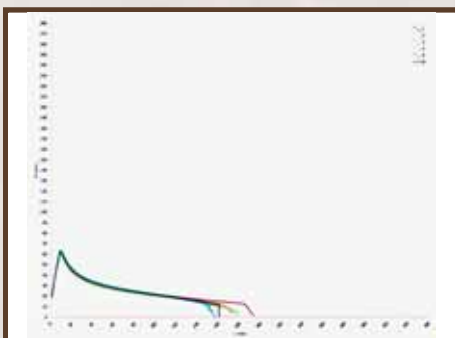


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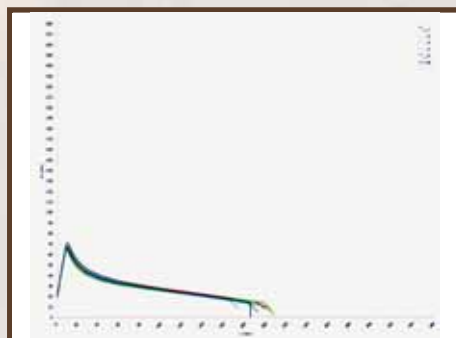


ALVEOGRAM

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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 B₁, B₂, G₁, G₂, Fumonisin B₁, B₂, B₃, Ochratoxin A, T2-toxin and HT-2 toxin in the wheat samples over the past thirteen seasons were confirmed in the 2023/24 season. Zearalenone residues have only been detected in three seasons, namely 2019/20, 2021/2022 and 2022/23.

28% of the samples tested positive for Deoxynivalenol residues, compared to the 43%, 35% and 43% of the previous three seasons respectively. None of the positive residue levels measured this season exceeded the national maximum allowable level (2 000 µg/kg) for cereals intended for further processing.

Please refer to the mycotoxin results in Table 6 on pages 60 and 61.

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 B₁ 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 2023/24 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 ₁	B ₂	G ₁	G ₂	B ₁	B ₂	B ₃								
	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	20 µg/kg	20 µg/kg	
	LOQ														
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
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	187	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	ND	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
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	192	ND	ND	ND	ND	ND
10	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
11	ND	ND	ND	ND	ND	ND	ND	ND	ND	304	ND	ND	ND	ND	ND
15	ND	ND	ND	ND	ND	ND	ND	ND	ND	226	ND	ND	ND	ND	ND
17	ND	ND	ND	ND	ND	ND	ND	ND	ND	291	ND	ND	ND	ND	ND
18	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	ND	ND	ND	ND	ND	ND
23	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Table 6: Mycotoxin results for the 2023/24 season (continue)

Region	Aflatoxin (µg/kg)						Fumonisin (µg/kg)			Deoxynivalenol (µg/kg)	15-ADON (µg/kg)	Ochratoxin A (µg/kg)	Zearalenone (µg/kg)	HT-2 Toxin (µg/kg)	T-2 Toxin (µg/kg)
	B ₁	B ₂	G ₁	G ₂	B ₁	B ₂	B ₁	B ₂	B ₃						
	5 µg/kg	5 µg/kg	5 µg/kg	5 µg/kg	20 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	20 µg/kg	20 µg/kg
24	ND	ND	ND	ND	ND	ND	ND	ND	478	ND	ND	ND	ND	ND	ND
24	ND	ND	ND	ND	ND	ND	ND	ND	273	ND	ND	ND	ND	ND	ND
25	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
25	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
26	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
26	ND	ND	ND	ND	ND	ND	ND	ND	317	ND	ND	ND	ND	ND	ND
28	ND	ND	ND	ND	ND	ND	ND	ND	107	ND	ND	ND	ND	ND	ND
28	ND	ND	ND	ND	ND	ND	ND	ND	136	ND	ND	ND	ND	ND	ND
33	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
34	ND	ND	ND	ND	ND	ND	ND	ND	118	ND	ND	ND	ND	ND	ND
35	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	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	ND	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	66	0	0	0	0	0	0
Number of positive results	0	0	0	0	0	0	0	0	11	0	0	0	0	0	0
Average of positive results	-	-	-	-	-	-	-	-	239	-	-	-	-	-	-
Maximum of positive results	-	-	-	-	-	-	-	-	478	-	-	-	-	-	-

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)

Amino Acid Profile

Amino acid profile or composition is an important feature in determining the nutritional value of wheat for human and animal diets and are considered crucial to good health. Amino acids are the building blocks of proteins and approximately 22 amino acids are commonly distributed among the proteins of all biological materials. Of these, 18 can be found in cereal grain proteins. Amino acids are organic compounds containing basic amine (-NH₂) and acidic carboxyl (-COOH) functional groups, in addition to a side chain (R group) specific to each amino acid.

The classification of amino acids is based on different features, one being whether the amino acid can be acquired through the diet. According to this, three types are identified: essential, conditionally essential and non-essential amino acids. Classification as essential or non-essential, does however not reflect their actual importance, since all of them are necessary for human health. Essential amino acids are considered “essential” as they cannot be synthesised by the body and must be obtained from the diet. The nine essential amino acids are phenylalanine, valine, threonine, tryptophan, methionine, leucine, isoleucine, lysine and histidine. Arginine, cysteine, glycine, glutamine, proline and tyrosine, are considered conditionally essential in the human diet, meaning their synthesis can be limited under special pathophysiological conditions. Alanine, aspartic acid, asparagine, glutamic acid and serine are non-essential amino acids, meaning they can be synthesized by the body.^(1,2)

The results of the 40 samples analysed by SAGL and reported as g amino acid/100 g sample, are provided in Table 7 on pages 63 and 64. The values obtained for all amino acids on these samples, were within the normal range reported for wheat in literature, deficient in certain essential amino acids, such as tryptophan, lysine, threonine, methionine and histidine, but high in glutamic acid and proline, which is not essential. The range per season per individual amino acid compared well over the six seasons for which data is available.

Due to the fact that protein and amino acid composition of wheat vary with crop varieties, application of fertilisers, irrigation practices, soil composition and climatic conditions, the amino acid generally content showed a wide variation between samples. The exception being tryptophan, ranging from 0.14 to 0.19 g/100 g this season. Similar small differences were observed in previous seasons. The World Health Organisation’s (WHO) recommended daily dose for tryptophan is 4 mg/kg/day.⁽³⁾

Lysine values varied between 0.29 and 0.39 g/100 g, comprising \pm 2.3 – 3.1 % of the total amino acid content. The WHO recommended daily dose for lysine is 30 mg/kg/day. Threonine’s WHO recommended daily dose is 15 mg/kg/day⁽³⁾ and ranged from 0.31 to 0.43 g/100 g this season. Methionine values compared well with previous seasons, ranging from 0.13 to 0.24 g/100 g. The WHO daily recommendation is 15 mg/kg/day for the sulphur containing amino acids in total.⁽³⁾

The values for histidine varied between 0.22 and 0.34 g/100 g. The results also showed that the samples were high in the essential amino acid leucine, with values ranging from 0.69 to 1.01 g/100 g. Phenylalanine values varied between 0.44 and 0.73 g/100 g. According to the results, the samples were rich in glutamic acid and proline, together contributing \pm 40% of the total amino acid content.

References:

1. Richard D. Semba, Michelle Shardell, Fayrouz A. Sakr Ashour, Ruin Moaddel, Indi Trehan, Kenneth M. Maleta, M. Isabel Ordiz, Klaus Kraemer, Mohammed A. Khadeer, Luigi Ferrucci, Mark J. Manary. (2016). Child Stunting is Associated with Low Circulating Essential Amino Acids. *EbioMedicine* (6), page 246-252.
2. Williams, P. 2011. *A Practical Introduction to Cereal Chemistry*. First Choice Books, page 4-19.
3. World Health Organization. Protein and amino acids requirements in human nutrition: report of a joint FAO/WHO/UNU expert consultation, Teck. Rep. Series no 935, World Health Organization, Geneva, Switzerland 2007.

Table 7: Amino acid profile of wheat samples originating from different production regions

Region	Grade	Amino Acid g/100g (as is)																	
		Tryptophan	Methionine	Cystine	Histidine	Serine	Arginine	Glycine	Aspartic acid	Glutamic acid	Threonine	Alanine	Proline	Lysine	Tyrosine	Valine	Isoleucine	Leucine	Phenyl-alanine
1	COW	0.15	0.20	0.43	0.26	0.58	0.53	0.50	0.60	3.55	0.36	0.42	1.17	0.33	0.31	0.47	0.38	0.79	0.54
2	COW	0.14	0.20	0.44	0.25	0.54	0.52	0.49	0.59	3.29	0.34	0.41	1.12	0.32	0.31	0.45	0.36	0.75	0.51
3	Grade 1	0.16	0.20	0.41	0.29	0.62	0.59	0.53	0.64	3.91	0.39	0.44	1.27	0.35	0.33	0.52	0.42	0.85	0.60
3	Grade 2	0.17	0.18	0.38	0.28	0.60	0.56	0.50	0.64	3.77	0.37	0.42	1.22	0.33	0.33	0.50	0.41	0.82	0.57
3	COW	0.16	0.18	0.36	0.28	0.60	0.57	0.53	0.63	3.69	0.37	0.43	1.22	0.34	0.35	0.50	0.39	0.81	0.56
3	COW	0.15	0.17	0.36	0.23	0.51	0.47	0.45	0.56	3.06	0.32	0.37	0.99	0.30	0.27	0.42	0.33	0.69	0.46
3	SUPER	0.16	0.24	0.51	0.33	0.75	0.68	0.65	0.74	4.95	0.44	0.51	1.64	0.39	0.44	0.57	0.48	1.02	0.72
3	Grade 3	0.15	0.19	0.42	0.24	0.53	0.51	0.47	0.57	3.14	0.33	0.40	1.05	0.31	0.31	0.44	0.35	0.72	0.48
3	Grade 2	0.16	0.21	0.46	0.26	0.59	0.55	0.51	0.62	3.67	0.36	0.43	1.23	0.33	0.33	0.48	0.39	0.81	0.55
4	COW	0.15	0.21	0.43	0.26	0.57	0.54	0.49	0.61	3.45	0.36	0.41	1.13	0.32	0.32	0.46	0.37	0.77	0.53
4	Grade 3	0.15	0.20	0.40	0.25	0.55	0.52	0.48	0.60	3.31	0.35	0.40	1.09	0.33	0.31	0.46	0.37	0.76	0.52
5	Grade 2	0.15	0.17	0.36	0.25	0.55	0.48	0.48	0.57	3.47	0.33	0.38	1.09	0.30	0.30	0.45	0.35	0.72	0.49
5	Grade 3	0.14	0.15	0.31	0.23	0.49	0.45	0.43	0.55	3.11	0.30	0.36	0.99	0.29	0.27	0.42	0.33	0.67	0.45
5	Grade 1	0.17	0.19	0.39	0.28	0.61	0.52	0.51	0.69	3.98	0.36	0.42	1.25	0.32	0.30	0.50	0.40	0.81	0.55
6	Grade 2	0.15	0.18	0.35	0.25	0.54	0.48	0.49	0.63	3.58	0.33	0.38	1.13	0.32	0.30	0.46	0.36	0.73	0.49
6	Grade 3	0.15	0.17	0.34	0.24	0.52	0.48	0.47	0.57	3.28	0.32	0.37	1.04	0.30	0.29	0.44	0.34	0.69	0.46
6	SUPER	0.17	0.19	0.35	0.30	0.66	0.57	0.55	0.57	3.89	0.39	0.41	1.35	0.30	0.34	0.53	0.42	0.86	0.63
10	SUPER	0.17	0.20	0.40	0.31	0.70	0.60	0.61	0.80	4.89	0.39	0.47	1.51	0.35	0.38	0.53	0.44	0.92	0.65
10	Grade 1	0.16	0.18	0.39	0.29	0.63	0.55	0.54	0.71	4.29	0.37	0.43	1.32	0.33	0.35	0.49	0.40	0.84	0.59
10	Grade 2	0.17	0.18	0.37	0.26	0.57	0.52	0.51	0.62	3.78	0.33	0.40	1.15	0.31	0.29	0.46	0.37	0.76	0.51
10	SUPER	0.18	0.20	0.42	0.30	0.66	0.59	0.58	0.72	4.78	0.38	0.46	1.44	0.35	0.39	0.54	0.44	0.90	0.62
10	Grade 1	0.16	0.19	0.38	0.26	0.56	0.51	0.50	0.62	3.96	0.33	0.38	1.20	0.31	0.34	0.47	0.37	0.76	0.52
11	SUPER	0.17	0.21	0.45	0.30	0.68	0.59	0.59	0.78	4.75	0.39	0.46	1.45	0.35	0.38	0.54	0.44	0.92	0.64
11	Grade 1	0.18	0.21	0.43	0.28	0.60	0.56	0.56	0.73	4.27	0.36	0.43	1.31	0.34	0.36	0.52	0.41	0.84	0.56
14	SUPER	0.19	0.25	0.52	0.35	0.77	0.69	0.65	0.78	5.37	0.45	0.54	1.70	0.39	0.46	0.63	0.53	1.06	0.77
15	Grade 2	0.17	0.17	0.36	0.25	0.54	0.47	0.45	0.60	3.59	0.33	0.39	1.08	0.32	0.29	0.45	0.37	0.74	0.48
19	SUPER	0.17	0.21	0.44	0.30	0.64	0.59	0.56	0.70	4.26	0.39	0.46	1.39	0.34	0.36	0.53	0.44	0.89	0.64

Table 7: Amino acid profile of wheat samples originating from different production regions (continue)

Region	Grade	Amino Acid																	
		Tryptophan	Methionine	Cystine	Histidine	Serine	Arginine	Glycine	Aspartic acid	Glutamic acid	Threonine	Alanine	Proline	Lysine	Tyrosine	Valine	Isoleucine	Leucine	Phenyl-alanine
		g/100g (as is)																	
20	Grade 1	0.19	0.21	0.44	0.29	0.62	0.59	0.54	0.68	4.01	0.38	0.45	1.30	0.35	0.35	0.51	0.40	0.86	0.59
23	COW	0.17	0.20	0.39	0.31	0.67	0.59	0.58	0.77	4.51	0.39	0.46	1.39	0.35	0.34	0.54	0.44	0.88	0.63
23	Grade 3	0.15	0.17	0.32	0.26	0.56	0.52	0.47	0.61	3.48	0.34	0.40	1.07	0.31	0.30	0.46	0.36	0.72	0.51
24	SUPER	0.17	0.17	0.34	0.27	0.57	0.50	0.50	0.64	3.53	0.34	0.40	1.11	0.30	0.29	0.45	0.35	0.73	0.50
25	COW	0.17	0.21	0.21	0.33	0.70	0.62	0.58	0.70	4.76	0.41	0.47	1.47	0.35	0.40	0.57	0.46	0.92	0.67
26	COW	0.18	0.23	0.46	0.35	0.76	0.62	0.63	0.75	5.17	0.43	0.49	1.62	0.36	0.38	0.60	0.49	0.99	0.70
26	Grade 1	0.19	0.08	0.17	0.26	0.57	0.49	0.48	0.62	3.65	0.33	0.40	1.12	0.30	0.28	0.45	0.36	0.74	0.50
28	COW	0.17	0.17	-	0.32	0.69	0.61	0.58	0.67	4.37	0.41	0.47	1.47	0.35	0.37	0.55	0.45	0.92	0.68
28	SUPER	0.16	0.19	0.37	0.31	0.69	0.64	0.58	0.71	4.51	0.41	0.48	1.46	0.36	0.40	0.54	0.45	0.94	0.67
33	Grade 1	0.17	0.20	0.44	0.30	0.64	0.58	0.55	0.66	4.15	0.39	0.45	1.36	0.35	0.36	0.54	0.43	0.87	0.63
34	COW	0.19	0.19	0.36	0.30	0.66	0.58	0.55	0.71	4.36	0.38	0.45	1.33	0.35	0.35	0.52	0.43	0.86	0.59
36	COW	0.18	0.19	0.39	0.29	0.66	0.57	0.55	0.70	4.59	0.38	0.46	1.41	0.36	0.38	0.53	0.44	0.89	0.61
36	SUPER	0.19	0.19	0.40	0.31	0.69	0.60	0.58	0.75	4.81	0.41	0.48	1.45	0.37	0.36	0.56	0.47	0.93	0.63
	2023/24 Minimum	0.12	0.13	0.18	0.22	0.50	0.45	0.44	0.55	2.88	0.31	0.37	0.95	0.29	0.26	0.41	0.32	0.69	0.44
	2023/24 Maximum	0.18	0.24	0.51	0.34	0.75	0.67	0.66	0.81	5.09	0.43	0.53	1.63	0.39	0.42	0.61	0.49	1.01	0.73
	2021/22 Minimum	0.14	0.08	0.17	0.23	0.49	0.45	0.43	0.55	3.06	0.30	0.36	0.99	0.29	0.27	0.42	0.33	0.67	0.45
	2021/22 Maximum	0.19	0.25	0.52	0.35	0.77	0.69	0.65	0.80	5.37	0.45	0.54	1.70	0.39	0.46	0.63	0.53	1.06	0.77
	2019/20 Minimum	0.13	0.14	0.31	0.24	0.51	0.48	0.46	0.58	3.08	0.32	0.38	1.03	0.31	0.25	0.47	0.34	0.71	0.47
	2019/20 Maximum	0.18	0.26	0.49	0.36	0.79	0.69	0.67	0.79	4.91	0.45	0.51	1.72	0.40	0.43	0.68	0.53	1.07	0.77
	2018/19 Minimum	0.12	0.17	0.35	0.23	0.55	0.50	0.48	0.59	3.35	0.33	0.40	1.11	0.31	0.29	0.43	0.32	0.72	0.50
	2018/19 Maximum	0.19	0.30	0.62	0.40	0.86	0.79	0.73	0.87	5.76	0.50	0.58	2.02	0.45	0.49	0.76	0.63	1.21	0.86
	2017/18 Minimum	0.14	0.22	0.29	0.26	0.57	0.50	0.39	0.60	3.64	0.35	0.42	1.17	0.33	0.22	0.51	0.39	0.43	0.53
	2017/18 Maximum	0.17	0.37	0.48	0.39	0.89	0.73	0.75	0.86	5.88	0.52	0.58	2.03	0.44	0.43	0.76	0.60	1.20	0.88
	2016/17 Minimum	0.13	0.18	0.31	0.23	0.51	0.45	0.45	0.54	3.02	0.32	0.37	0.99	0.31	0.23	0.46	0.34	0.70	0.46
	2016/17 Maximum	0.19	0.26	0.55	0.44	0.93	0.83	0.77	0.88	6.39	0.54	0.61	2.18	0.49	0.49	0.82	0.66	1.32	1.01

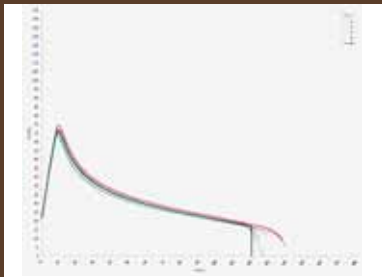
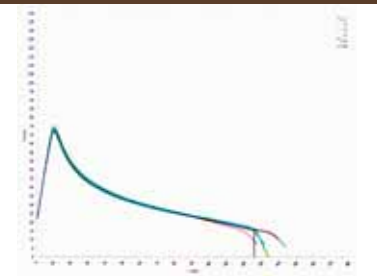
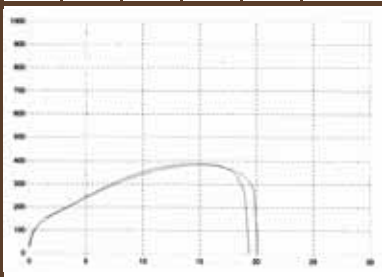

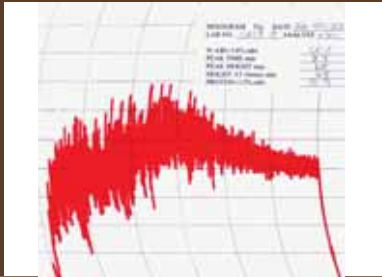

Note: Amino acid profiles were not determined for the 2020/21 and 2022/23 seasons

RSA Wheat Crop Quality Summary

RSA Crop Quality 2021/22 and 2023/24 Seasons

Country of origin	RSA Crop Average 2021/22						RSA Crop Average 2023/24						
Class and Grade bread wheat	Super	Gr1	Gr2	Gr3	COW	Average	Super	Gr1	Gr2	Gr3	COW	Average	
No. of samples	73	64	46	47	105	335	64	83	70	33	85	335	
WHEAT													
GRADING													
Protein (12% mb), %	13.3	12.0	11.0	10.1	12.0	11.9	13.3	12.0	11.0	10.4	11.6	11.8	
Moisture, %	11.3	11.2	11.1	11.2	11.1	11.2	10.8	11.1	11.0	11.1	11.2	11.1	
Falling number, sec	344	349	366	367	311	341	378	375	380	373	371	375	
1000 Kernel mass (13% mb), g	40.1	41.8	42.1	41.8	38.1	40.3	38.1	40	40.5	38.7	38.1	39.1	
Hlm (dirty), kg/hl	81.2	81.3	79.9	79.8	78.1	79.9	81.7	80.5	81.6	80.8	79.3	80.7	
Screenings (<1.8 mm sieve), %	0.69	0.82	0.92	0.91	2.04	1.20	1.01	1.24	1.04	1.27	2.37	1.45	
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	0.00	
Foreign matter, %	0.01	0.02	0.04	0.02	0.15	0.06	0.06	0.13	0.10	0.06	0.22	0.13	
Other grain & unthreshed ears, %	0.29	0.23	0.42	0.39	1.12	0.57	0.22	0.32	0.28	0.32	0.93	0.45	
Heat damaged kernels, %	0.01	0.01	0.00	0.00	0.04	0.01	0.01	0.01	0.01	0.03	0.04	0.02	
Immature kernels, %	0.09	0.04	0.02	0.02	0.03	0.04	0.10	0.10	0.06	0.04	0.14	0.09	
Insect damaged kernels, %	0.18	0.17	0.28	0.32	0.58	0.34	0.32	0.35	0.37	0.32	0.56	0.40	
Sprouted kernels, %	0.09	0.09	0.06	0.04	0.44	0.19	0.02	0.02	0.02	0.01	0.03	0.02	
Total damaged kernels, %	0.37	0.31	0.35	0.39	1.08	0.58	0.45	0.48	0.45	0.39	0.76	0.53	
Combined deviations, %	1.35	1.39	1.73	1.71	4.39	2.41	1.75	2.17	1.88	2.04	4.28	2.55	
Heavily frost damaged kernels, %	0.00	0.02	0.00	0.00	0.03	0.01	0.05	0.00	0.04	0.00	0.02	0.02	
Field fungi, %	0.44	0.38	0.23	0.17	0.77	0.47	0.28	0.32	0.22	0.27	0.60	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	Gr1	Gr2	Gr3	COW	Average	Super	Gr1	Gr2	Gr3	COW	Average
No. of samples		19	16	14	8	8	65	16	20	15	10	4	65
Bühler Extraction, %		74.0	74.1	73.7	73.8	73.3	73.9	73.2	73.2	72.6	72.1	71.7	72.8
FLOUR													
Colour, KJ (wet)	-4.9	-5.0	-5.0	-4.9	-4.8	-4.9	-4.8	-4.7	-4.9	-4.8	-4.5	-4.8	
Colour, Konica Minolta CM5 (dry)													
L*	93.6	93.73	93.75	93.96	93.55	93.70	93.62	93.67	93.89	93.82	93.72	93.73	
a*	0.51	0.48	0.46	0.47	0.49	0.49	0.54	0.54	0.50	0.47	0.57	0.52	
b*	9.83	9.89	9.84	9.77	9.91	9.85	10.23	10.01	10.12	10.11	9.66	10.08	
Ash (db), %	0.59	0.60	0.61	0.62	0.60	0.60	0.59	0.61	0.58	0.60	0.61	0.59	
Protein (12% mb), %	12.3	10.9	10.0	9.1	11.1	10.9	12.1	11.1	9.9	9.7	10.4	10.8	
Wet Gluten (14% mb), %	32.5	28.9	26.6	23.4	29.7	28.9	32.4	30.2	26.6	25.6	28.6	29.1	
Dry Gluten (14% mb), %	11.0	9.5	8.8	7.8	9.9	9.6	11.0	9.9	8.5	8.3	9.4	9.6	
Gluten Index	96	96	96	96	96	96	96	96	95	96	96	96	
100 g BAKING TEST													
Baking water absorption, %	62.4	60.8	60.1	59.0	61.1	61.0	62.3	61.0	59.7	59.7	60.3	60.8	
Loaf volume, cm ³	1150	1064	1018	938	1078	1065	1140	1068	968	950	970	1038	
Evaluation (see page 78)	0	0	0	0	0	0	0	0	0	0	0	0	
FARINOGRAM													
Water absorption (14% mb), %	61.5	59.9	59.3	58.0	59.6	60.0	61.3	60.3	59.2	58.9	59.5	60.0	
Development time, min	7.9	5.3	4.5	4.0	4.9	5.7	6.7	5.2	5.2	4.5	4.1	5.4	
Stability, mm	12.2	9.1	8.1	7.3	10.1	9.7	14.3	10.5	10.2	9.5	9.5	11.2	
Mixing tolerance index, BU	33	44	48	52	41	42	30	36	36	38	34	35	

RSA Crop Quality 2021/22 and 2023/24 Seasons

Country of origin	RSA Crop Average 2021/22						RSA Crop Average 2023/24					
Class and Grade bread wheat	Super	Gr1	Gr2	Gr3	COW	Average	Super	Gr1	Gr2	Gr3	COW	Average
No. of samples	19	16	14	8	8	65	16	20	15	10	4	65
ALVEOGRAM												
Strength (S), cm ²	51.3	41.1	37.2	33.2	43.2	42.5	44.8	40.7	36.0	33.6	37.3	39.3
Stability (P), mm	89	80	88	85	85	86	77	79	84	80	79	80
Distensibility (L), mm	136	127	108	93	126	121	145	129	103	102	116	122
P/L	0.69	0.66	0.98	0.92	0.69	0.77	0.55	0.62	0.88	0.87	0.68	0.71
												
EXTENSOGRAM												
Strength, cm ²	123	108	87	72	106	103	131	115	97	87	104	110
Max. height, BU	426	401	360	346	405	393	422	416	401	351	396	403
Extensibility, mm	215	198	177	152	188	191	227	203	176	177	189	198
												
MIXOGRAM												
Peak time, min	3.0	2.9	2.9	2.9	3.0	2.9	2.9	3.0	3.2	3.0	3.2	3.0
Water absorption (14% mb), %	62.6	60.8	59.8	59.0	61.2	60.9	62.3	61.0	59.7	59.7	60.3	60.8
												
MYCOTOXINS												
Aflatoxin B ₁ (µg/kg)	ND						ND					
Aflatoxin B ₂ (µg/kg)	ND						ND					
Aflatoxin G ₁ (µg/kg)	ND						ND					
Aflatoxin G ₂ (µg/kg)	ND						ND					
Fumonisin B ₁ (µg/kg)	ND						ND					
Fumonisin B ₂ (µg/kg)	ND						ND					
Fumonisin B ₃ (µg/kg)	ND						ND					
Deoxynivalenol (µg/kg) [max. value]	169 [1 085]						66 [478]					
15-ADON (µg/kg) [max. value]	16 [183]						ND					
Ochratoxin A (µg/kg)	ND						ND					
Zearalenone (µg/kg) [max. value]	4 [144]						ND					
HT-2 (µg/kg)	ND						ND					
T-2 Toxin (µg/kg)	ND						ND					
No. of samples	40						40					

RSA Wheat Crop Quality Summary

RSA Crop Quality 2022/23 and 2023/24 Seasons

Country of origin	RSA Crop Average 2022/23						RSA Crop Average 2023/24						
Class and Grade bread wheat	Super	Gr1	Gr2	Gr3	COW	Average	Super	Gr1	Gr2	Gr3	COW	Average	
No. of samples	103	55	47	35	95	335	64	83	70	33	85	335	
WHEAT													
GRADING													
Protein (12% mb), %	13.2	12.0	11.1	10.3	12.2	12.1	13.3	12.0	11.0	10.4	11.6	11.8	
Moisture, %	11.2	11.2	11.3	11.5	11.2	11.3	10.8	11.1	11.0	11.1	11.2	11.1	
Falling number, sec	370	372	378	374	331	361	378	375	380	373	371	375	
1000 Kernel mass (13% mb), g	36.8	37.4	38.6	39.2	35.4	37.0	38.1	40	40.5	38.7	38.1	39.1	
Hlm (dirty), kg/hl	80.3	80.4	80.7	79.5	78.7	79.8	81.7	80.5	81.6	80.8	79.3	80.7	
Screenings (<1.8 mm sieve), %	1.26	1.21	1.32	1.41	2.72	1.69	1.01	1.24	1.04	1.27	2.37	1.45	
Gravel, stones, turf and glass, %	0.00	0.01	0.01	0.01	0.03	0.01	0.00	0.00	0.00	0.00	0.00	0.00	
Foreign matter, %	0.11	0.11	0.11	0.12	0.21	0.14	0.06	0.13	0.10	0.06	0.22	0.13	
Other grain & unthreshed ears, %	0.33	0.36	0.38	0.39	0.78	0.48	0.22	0.32	0.28	0.32	0.93	0.45	
Heat damaged kernels, %	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.03	0.04	0.02	
Immature kernels, %	0.06	0.03	0.04	0.03	0.03	0.04	0.10	0.10	0.06	0.04	0.14	0.09	
Insect damaged kernels, %	0.45	0.48	0.55	0.58	0.66	0.54	0.32	0.35	0.37	0.32	0.56	0.40	
Sprouted kernels, %	0.11	0.07	0.04	0.03	0.42	0.17	0.02	0.02	0.02	0.01	0.03	0.02	
Total damaged kernels, %	0.62	0.58	0.64	0.63	1.11	0.76	0.45	0.48	0.45	0.39	0.76	0.53	
Combined deviations, %	2.32	2.27	2.45	2.55	4.82	3.06	1.75	2.17	1.88	2.04	4.28	2.55	
Heavily frost damaged kernels, %	0.00	0.00	0.01	0.00	0.11	0.03	0.05	0.00	0.04	0.00	0.02	0.02	
Field fungi, %	0.33	0.33	0.16	0.14	0.59	0.36	0.28	0.32	0.22	0.27	0.60	0.36	
Storage fungi, %	0.00	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	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	
		Super	Gr1	Gr2	Gr3	COW	Average	Super	Gr1	Gr2	Gr3	COW	Average
No. of samples	19	17	13	11	5	65	65	16	20	15	10	4	65
Bühler Extraction, %	74.4	73.9	73.7	73.1	73.3	73.8	73.8	73.2	73.2	72.6	72.1	71.7	72.8
FLOUR													
Colour, KJ (wet)	-5.0	-5.0	-5.0	-4.9	-5.0	-5.0	-4.8	-4.7	-4.9	-4.8	-4.5	-4.8	
Colour, Konica Minolta CM5 (dry)													
L*	93.6	93.69	93.67	93.76	93.8	93.68	93.62	93.67	93.89	93.82	93.72	93.73	
a*	0.51	0.48	0.47	0.44	0.48	0.48	0.54	0.54	0.50	0.47	0.57	0.52	
b*	10.02	10.26	10.58	9.99	10.23	10.20	10.23	10.01	10.12	10.11	9.66	10.08	
Ash (db), %	0.59	0.60	0.60	0.59	0.59	0.59	0.59	0.61	0.58	0.60	0.61	0.59	
Protein (12% mb), %	12.2	11.1	10.2	9.6	10.9	11.0	12.1	11.1	9.9	9.7	10.4	10.8	
Wet Gluten (14% mb), %	32.9	29.6	27.5	25.6	29.7	29.5	32.4	30.2	26.6	25.6	28.6	29.1	
Dry Gluten (14% mb), %	11.1	9.9	9.1	8.2	9.9	9.8	11.0	9.9	8.5	8.3	9.4	9.6	
Gluten Index	95	96	96	97	96	96	96	96	95	96	96	96	
100 g BAKING TEST													
Baking water absorption, %	62.4	61.0	60.0	59.7	60.9	61.0	62.3	61.0	59.7	59.7	60.3	60.8	
Loaf volume, cm ³	1034	972	916	898	963	966	1140	1068	968	950	970	1038	
Evaluation (see page 78)	0	0	0	0	0	0	0	0	0	0	0	0	
FARINOGRAM													
Water absorption (14% mb), %	60.3	59.7	58.7	58.3	59.2	59.4	61.3	60.3	59.2	58.9	59.5	60.0	
Development time, min	6.5	6.0	4.3	4.2	4.8	5.4	6.7	5.2	5.2	4.5	4.1	5.4	
Stability, mm	15.8	12.9	9.7	10.3	12.4	12.6	14.3	10.5	10.2	9.5	9.5	11.2	
Mixing tolerance index, BU	25	31	37	36	30	31	30	36	36	38	34	35	

RSA Crop Quality 2022/23 and 2023/24 Seasons

Country of origin	RSA Crop Average 2022/23						RSA Crop Average 2023/24					
	Super	Gr1	Gr2	Gr3	COW	Average	Super	Gr1	Gr2	Gr3	COW	Average
Class and Grade bread wheat												
No. of samples	19	17	13	11	5	65	16	20	15	10	4	65
ALVEOGRAM												
Strength (S), cm ²	48.0	42.7	35.6	35.4	40.6	41.4	44.8	40.7	36.0	33.6	37.3	39.3
Stability (P), mm	78	82	78	84	77	80	77	79	84	80	79	80
Distensibility (L), mm	152	130	119	101	137	130	145	129	103	102	116	122
P/L	0.52	0.66	0.72	0.86	0.60	0.66	0.55	0.62	0.88	0.87	0.68	0.71
EXTENSOGRAM												
Strength, cm ²	134	108	91	85	113	109	131	115	97	87	104	110
Max. height, BU	454	407	371	384	419	411	422	416	401	351	396	403
Extensibility, mm	218	194	178	159	200	192	227	203	176	177	189	198
MIXOGRAM												
Peak time, min	3.1	3.2	3.0	3.4	3.2	3.1	2.9	3.0	3.2	3.0	3.2	3.0
Water absorption (14% mb), %	62.4	61	60	59.5	60.9	60.9	62.3	61.0	59.7	59.7	60.3	60.8
MYCOTOXINS												
Aflatoxin B ₁ (µg/kg)	ND						ND					
Aflatoxin B ₂ (µg/kg)	ND						ND					
Aflatoxin G ₁ (µg/kg)	ND						ND					
Aflatoxin G ₂ (µg/kg)	ND						ND					
Fumonisin B ₁ (µg/kg)	ND						ND					
Fumonisin B ₂ (µg/kg)	ND						ND					
Fumonisin B ₃ (µg/kg)	ND						ND					
Deoxynivalenol (µg/kg) [max. value]	757 [6 463]						66 [478]					
15-ADON (µg/kg) [max. value]	46 [301]						ND					
Ochratoxin A (µg/kg)	ND						ND					
Zearalenone (µg/kg) [max. value]	1 [36]						ND					
HT-2 (µg/kg)	ND						ND					
T-2 Toxin (µg/kg)	ND						ND					
No. of samples	40						40					

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 108 to 119.

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).

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 110 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 α -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 a 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.

EXTENSOGGRAPH:

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 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^2 .

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 B₁, B₂, G₁, G₂, Fumonisin B₁, B₂, B₃, Deoxynivalenol, 15-ADON, HT2 Toxin, T-2 Toxin, Zearalenone and Ochratoxin A.

AMINO ACID PROFILE:

The protein bound amino acids (Aspartic acid (Asp), Glutamic acid (Glu), Serine (Ser), Glycine (Gly), Histidine (His), Arginine (Arg), Threonine (Thr), Alanine (Ala), Proline (Pro), Tyrosine (Tyr), Valine (Val), Isoleucine (Ileu), Leucine (Leu), Phenylalanine (Phe) and Lysine (Lys)) were determined by using In-house method No. 028, (AccQ-Tag method).

Samples (200 mg) are hydrolysed with 6 N hydrochloric acid (HCl) for 24 hours and then derivatised with 6-aminoquinolyl-N-hydroxysuccinimidyl carbamate (AQC) to produce stable derivatives. These amino acids are then analysed by a reverse phase UPLC method, using a Waters Acquity H-Class UPLC with Empower software (Waters, Millipore Corp., Milford, MA).

In-house method No. 15, where the sample is first oxidised and dried, was followed for the determination of Cysteine (as Cystic acid) and Methionine (as Methionine sulfone). The samples were then analysed with liquid chromatography using a modified Pico-Tag method.

For the determination of Tryptophan according to In-house method No. 007, the samples are hydrolysed under alkaline conditions with a saturated barium hydroxide solution heated to 110 °C for 20 hours. The hydrolysate is analysed by reverse phase liquid chromatography with UV detection at 285 nm.

Wheat Exports and Imports



Table S8: 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	79 193	Argentina	33 719	Argentina	4 725	Botswana	44 379	Cape Town	129 605
Eswatini (Swaziland)	3 276	Australia	260 151	Australia	25 122	Eswatini (Swaziland)	42 139	Durban	1 628 008
Lesotho	14 017	Brazil	135 833	Canada	11 928	Lesotho	51 443	East London	21 911
Namibia	26 267	Czech Republic	32 856	Czech Republic	3 200	Zambia	9 017	Port Elizabeth	48 362
Zambia	44 515	Germany	117 449	Germany	21 301	Zimbabwe	50 158	Richards Bay	73 822
Zimbabwe	85 053	Latvia	76 832	Latvia	22 113				
		Lithuania	232 867	Lithuania	46 541				
		Poland	512 319	Poland	46 327				
		Russian Federation	263 783	Russian Federation	36 095				
		United States	18 547						
Total	252 321	Total	1 684 356	Total	217 352	Total	197 136	Total	1 901 708

*Includes: Imports for RSA and Other Countries

Table S9: WHEAT EXPORTS/IMPORTS PER COUNTRY

2023/24 SEASON (30 Sep 2023 - 27 Sep 2024)

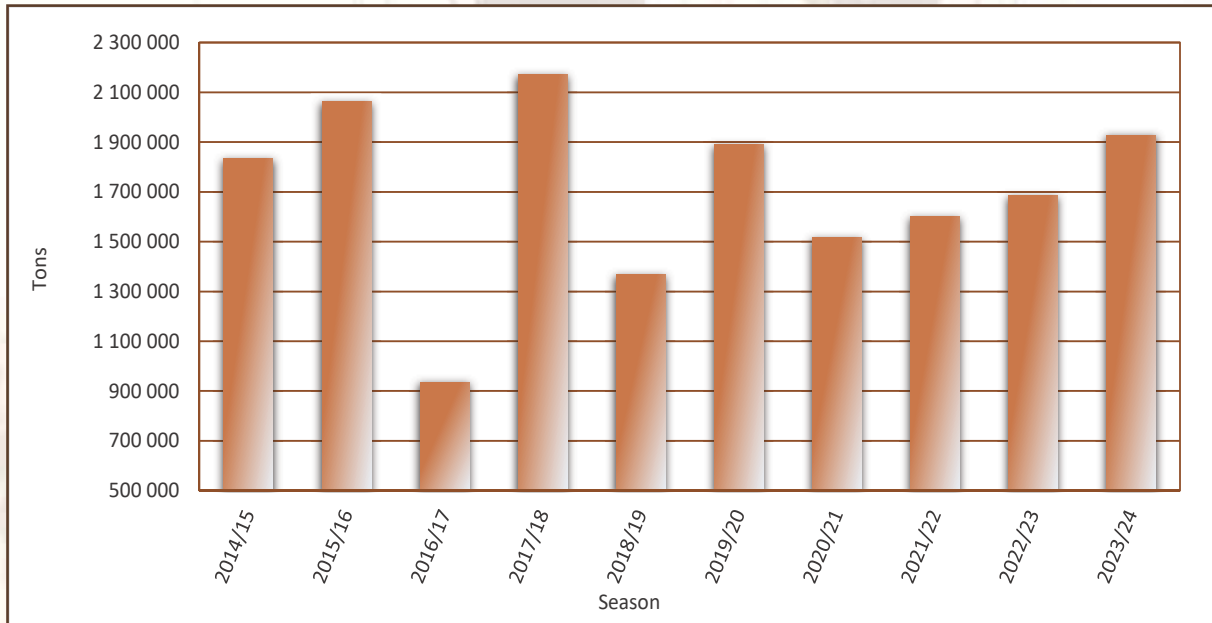
RSA EXPORTS		IMPORTS FOR RSA		IMPORTS FOR OTHER COUNTRIES		EXPORTS OF IMPORTED WHEAT		IMPORTS PER HARBOUR*	
To Country	Tons	From Country	Tons	From Country	Tons	To country	Tons	Harbour	Tons
Botswana	40 731	Argentina	3 899	Argentina	11 102	Botswana	74 550	Cape Town	196 543
Congo	999	Australia	390 060	Australia	19 387	Eswatini (Swaziland)	65 377	Durban	1 875 729
Lesotho	32 638	Canada	4 300	Estonia	11 469	Lesotho	46 140	East London	12 607
Namibia	11 254	Estonia	32 441	Latvia	7 516	Zambia	9 773	Port Elizabeth	54 779
Zambia	65 955	Latvia	137 608	Lithuania	45 010	Zimbabwe	39 919		
Zimbabwe	63 219	Lithuania	408 142	Poland	73 793				
		Poland	374 147	Russian Federation	43 882				
		Russian Federation	544 173						
		United States	32 729						
Total	214 796	Total	1 927 499	Total	212 159	Total	235 759	Total	2 139 658

*Includes: Imports for RSA and Other Countries

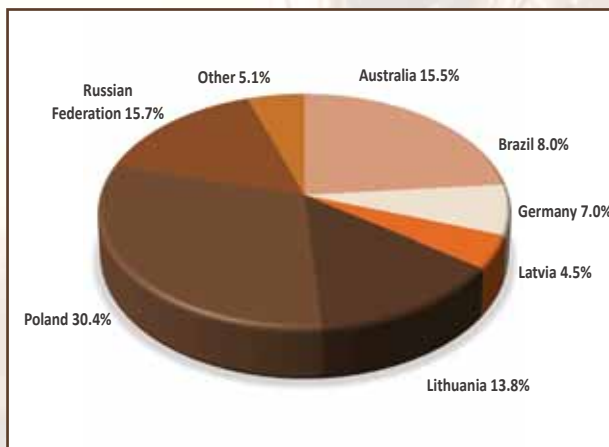
Quantity of wheat imported to the RSA

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 over 10 seasons



Graph 29: Wheat imports per origin for domestic use 2022/23 season



Graph 30: Wheat imports per origin for domestic use 2023/24 season

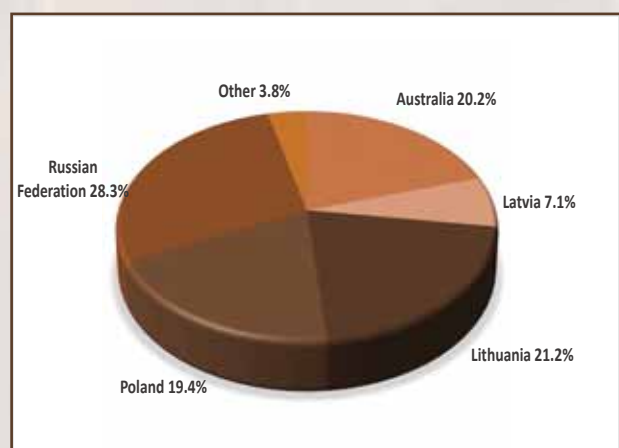


Table 8: Total wheat imports per country per season for use in the RSA

	Season										Total (Tons)
	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/2023	2023/2024	
Argentina	59 607	49 516	35 613	132 433	35 519	-	-	298 543	33 719	3 899	648 849
Australia	95 254	38 457	24 816	-	-	-	455 717	382 604	260 151	390 060	1 647 059
Brazil	-	-	-	-	-	-	-	242 639	135 833	-	378 472
Canada	105 457	102 816	27 841	90 944	85 428	51 001	136 481	-	-	4 300	604 268
Czech Republic	-	-	144 402	47 904	110 636	52 365	8 965	-	32 856	-	397 128
Estonia	-	-	-	-	-	-	-	-	-	32 441	32 441
Finland	-	-	-	-	-	21 860	-	-	-	-	21 860
Germany	348 385	283 451	237 508	282 312	358 343	274 283	51 461	2 732	117 449	-	1 955 924
Latvia	61 005	-	17 098	140 007	39 290	54 803	115 250	47 391	76 832	137 608	689 284
Lithuania	43 791	151 047	-	182 241	124 161	202 656	275 903	312 795	232 867	408 142	1 933 603
Poland	91 483	185 036	76 912	17 514	24 998	543 325	220 604	282 262	512 319	374 147	2 328 600
Romania	-	-	112 334	101 449	-	-	-	-	-	-	213 783
Russian Federation	719 784	956 705	182 993	955 697	401 385	536 757	210 399	-	263 783	544 173	4 771 676
Ukraine	279 364	109 350	13 568	135 669	48 210	94 726	7 341	-	-	-	688 228
USA	28 311	186 387	61 680	87 064	140 127	58 092	34 874	32 333	18 547	32 729	680 144
Total	1 832 441	2 062 765	934 765	2 173 234	1 368 097	1 889 868	1 516 995	1 601 299	1 684 356	1 927 499	16 991 319

Quality summary of imported wheat

(Wheat imported from 1 October 2022 to 29 September 2023) (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 (DOA) 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 82 to 101. This imported wheat quality is compared to a summary of the local crop quality of the corresponding (2022/23) season. To simplify the comparison between the quality of the different countries of import, the average quality per country was summarised in Table 9 on pages 80 and 81. 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 163 samples of wheat imported from the following ten countries were received (number of samples received in brackets): Argentina (7), Australia (16), Brazil (14), Canada (1), Germany (12), Latvia (10), Lithuania (27), Poland (46), the Russian Federation (27) and the USA (3). 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 2022/23 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. 12% of the imported samples had hectolitre mass values below 76 kg/hl (minimum requirement for South African Super Grade to Grade 2 wheat), compared to the 2% and 0.7% of the previous two seasons respectively. One of the samples originated in Brazil, four in Poland, five in Germany and ten in Lithuania.

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 Poland and the Russian Federation reported the highest levels of screenings.

One sample from Australia reported a falling number value below 220 seconds. All of the countries' averages, including that of Australia, were well above 300 seconds. The RSA national average for the same season was 361 seconds.

The average whole wheat protein content exceeded 10% (12% mb) for all the countries of import. The average flour protein content of Argentina and Germany were below 10% (12% mb) and that of the USA below 9% (12% mb). The resultant rheological quality of the samples was weak, especially the USA 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 cm², 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 cm², 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 concerns. All samples tested negative for Aflatoxin B₁, B₂, G₁, G₂, Fumonisin B₁, B₂, B₃, Ochratoxin A, HT-2 Toxin, T-2 Toxin and Zearalenone. Deoxynivalenol (DON) was the most prevalent mycotoxin present in these samples, with 15-ADON residues also detected on a number of 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 9: Summary of the quality results of imported wheat during the 2022/23 season

Quality parameter	Argentina			Australia			Brazil			Canada			Germany			Latvia						
	Ave	Min	Max	Ave	Min	Max	Ave	Min	Max	Ave	Min	Max	Ave	Min	Max	Ave	Min	Max				
Hectolitre mass, kg/hl	80.2	78.5	81.1	80.7	79.5	82.6	80.4	75.0	82.3	2.30	85.0	-	-	-	77.8	74.7	81.2	2.54	77.2	76.2	0.39	
Screenings (<1.8mm), %	1.75	1.50	2.13	1.84	1.14	2.67	2.39	1.51	3.44	0.50	1.39	-	-	-	1.97	1.49	2.96	0.47	1.98	3.42	0.55	
1000 Kernel mass, g (13 % mb)	32.9	31.7	34.3	35.8	31.1	44.4	4.41	32.7	31.2	36.2	1.81	34.6	-	-	41.9	38.4	44.7	1.82	38.5	37.2	0.96	
WWF Protein (12% mb), %	10.9	10.5	11.7	11.7	10.0	12.4	0.64	10.9	10.4	12.0	0.56	14.44	-	-	10.8	10.4	11.3	0.36	11.5	11.2	0.23	
WWF Falling number, sec	403	388	428	14.60	377	147	528	106.38	383	288	435	39.29	384	-	369	294	438	45.83	365	319	28.74	
Number of samples	7			16			14			1			12			10						
Flour moisture, %	13.4	13.2	13.8	0.25	13.6	13.0	14.5	0.38	13.3	12.9	13.8	0.26	13.7	-	13.7	13.1	14.5	0.40	13.6	13.3	14.1	0.28
Flour Protein, % (12 % mb)	9.8	9.4	10.6	0.45	10.6	9.8	11.3	0.57	10.0	9.4	11.0	0.61	13.43	-	9.6	9.1	10.1	0.43	10.3	10.0	10.6	0.29
Ash, % (db)	0.57	0.54	0.60	0.03	0.56	0.50	0.62	0.04	0.57	0.51	0.62	0.03	0.58	-	0.51	0.46	0.56	0.03	0.57	0.55	0.61	0.02
Colour, KJ (wet)	-4.6	-5.0	-4.0	0.48	-4.7	-5.0	-4.2	0.22	-4.9	-5.0	-4.5	0.15	-5.0	-	-4.5	-5.0	-4.0	0.36	-4.4	-4.5	-4.3	0.07
Konica Minolta CM-5 colour, L*	93.47	93.30	93.69	0.15	94.04	93.73	94.32	0.19	93.16	92.78	93.35	0.18	93.22	-	93.51	93.29	93.71	0.14	93.43	93.36	93.50	0.05
Konica Minolta CM-5 colour, b*	10.73	9.98	11.44	0.66	9.00	8.22	9.46	0.41	11.35	10.87	11.75	0.30	10.85	-	10.38	10.12	10.79	0.19	9.86	9.55	9.99	0.12
Wet gluten, % (14 % mb)	24.0	21.7	26.3	1.43	29.0	24.4	31.9	1.86	25.7	23.6	29.0	2.08	33.6	-	25.2	22.1	27.8	2.18	27.1	26.1	28.0	0.73
Dry gluten, % (14 % mb)	8.2	7.6	8.9	0.51	9.6	8.2	10.4	0.66	8.4	7.6	9.8	0.75	11.4	-	8.3	7.3	9.3	0.71	9.1	8.6	9.7	0.34
Gluten Index	99	97	99	0.76	95	84	99	4.00	98	97	99	0.77	97	-	97	95	98	1.06	98	97	99	0.92
Farinogram																						
Water absorption, % (14% mb)	56.3	54.9	57.3	0.84	58.8	55.7	60.8	1.54	57.7	55.4	58.8	1.09	62.7	-	54.6	53.4	55.9	0.99	56.2	55.8	56.6	0.28
Development time, min	1.8	1.4	2.0	0.24	5.1	2.7	6.7	1.28	3.3	1.5	9.8	2.86	7.8	-	2.9	1.7	7.9	1.85	2.6	2.2	3.0	0.32
Stability, mm	12.0	2.4	18.9	6.75	9.3	7.0	11.6	1.46	10.4	1.8	17.4	5.82	14.0	-	10.3	4.5	14.7	3.09	9.3	8.1	10.7	0.91
Alveogram																						
Strength, cm ²	41.6	33.5	45.3	3.98	43.3	33.5	53.7	6.83	42.1	37.2	46.6	3.54	61.5	-	33.0	29.1	39.3	3.41	34.5	32.1	37.6	1.73
Stability, mm	99	90	107	6.77	84	71	104	9.64	102	73	118	15.09	89	-	71	63	79	5.88	71	70	73	0.88
Distensibility, mm	76	63	86	7.64	115	88	144	18.36	81	56	115	21.01	151	-	102	91	118	8.49	116	105	124	5.58
P/L	1.32	1.14	1.51	0.15	0.76	0.53	1.18	0.18	1.37	0.68	2.11	0.50	0.59	-	0.70	0.55	0.81	0.07	0.61	0.57	0.70	0.04
Extensogram																						
Strength, cm ²	105	90	132	15.08	114	74	136	21.54	103	88	120	9.59	132	-	90	76	106	12.38	82	75	88	4.65
Max. height, BU	525	431	618	68.97	445	326	524	69.79	506	438	564	35.26	379	-	438	389	476	32.22	360	327	390	18.71
Extensibility, mm	149	137	161	9.98	189	161	221	17.35	151	136	160	7.23	154	-	148	131	166	12.60	162	149	172	6.83
Mixogram																						
Water absorption, % (14% mb)	59.6	59.2	60.5	0.50	60.5	59.6	61.3	0.64	59.9	59.2	60.9	0.66	64.1	-	59.4	59.0	59.9	0.42	60.2	59.8	60.5	0.33
Peak time, min	5.3	4.5	5.9	0.50	3.8	2.9	9.9	1.67	4.6	4.0	5.2	0.39	3.0	-	3.8	3.3	4.4	0.34	3.5	3.2	3.9	0.29
100 g Baking Test																						
Loaf volume, cm ³	855	780	997	75.94	1016	866	1189	89.30	804	742	887	40.13	1142	-	917	839	974	45.90	1043	971	1096	44.10
Evaluation	0	0	0	0	0	0	0	0	0	0	1	0	0	-	0	0	0	0	0	0	0	0
Number of samples	7			16			14			1			12			10						

Table 9: Summary of the quality results of imported wheat during the 2022/23 season (continue)

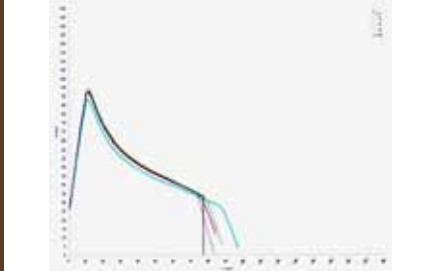
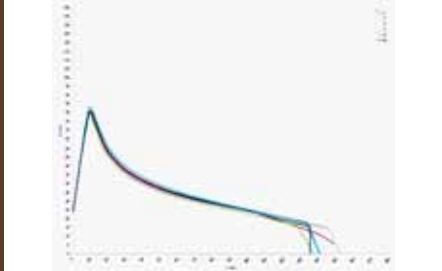
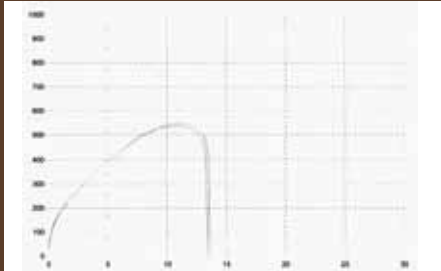
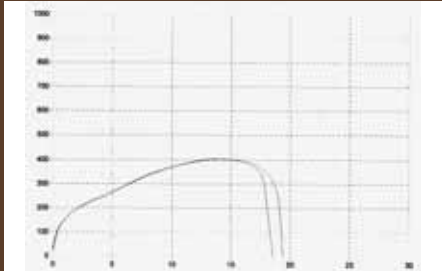
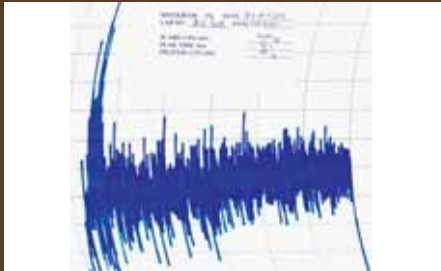
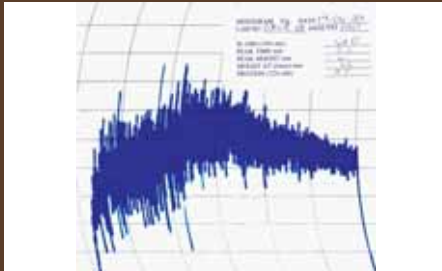
Quality parameter	Lithuania			Poland			Russian Federation			USA			RSA crop average 2022/23							
	Ave	Min	Max	Ave	Min	Max	Ave	Min	Max	Ave	Min	Max	Ave	Min	Max					
Hectolitre mass, kg/hl	76.4	74.2	78.0	78.8	74.2	82.0	80.8	77.4	83.7	2.13	79.7	79.6	79.7	70.6	85.7	2.05				
Screenings (<1.8mm), %	2.61	1.34	3.54	2.82	0.75	4.47	3.01	1.94	4.58	0.58	2.40	2.15	2.57	0.05	19.09	1.86				
1000 Kernel mass, g (13 % mb)	36.7	33.9	46.9	32.7	35.6	46.3	37.5	34.4	43.0	1.83	35.0	31.7	41.6	23.0	49.7	3.65				
WWF Protein (12% mb), %	11.3	10.8	12.3	0.43	11.5	10.4	12.2	0.51	11.1	10.9	11.6	10.2	10.8	8.1	15.7	1.27				
WWF Falling number, sec	339	289	424	35.34	349	280	437	37.43	347	253	446	341	376	116	858	71.37				
Number of samples	27			46			27			3			65							
Flour moisture, %	13.7	13.2	14.3	0.29	13.7	12.9	14.5	0.34	13.5	13.1	14.2	0.27	13.1	13.1	13.2	0.06	13.6	12.9	14.3	0.27
Flour Protein, % (12 % mb)	10.0	9.3	10.9	0.43	10.2	9.4	10.9	0.48	10.1	9.8	11.1	0.27	8.6	8.0	9.7	0.98	11.0	8.9	12.8	1.04
Ash, % (db)	0.53	0.42	0.59	0.04	0.52	0.43	0.57	0.03	0.55	0.49	0.75	0.05	0.50	0.48	0.53	0.03	0.59	0.51	0.66	0.03
Colour, KJ (wet)	-4.4	-5.0	-3.6	0.52	-4.4	-5.0	-3.6	0.41	-4.6	-5.0	-3.8	0.40	-5.0	-5.0	-5.0	0.00	-5.0	-4.4	-5.0	0.11
Konica Minolta CM-5 colour, L*	93.53	93.19	93.85	0.19	93.54	93.18	94.07	0.18	93.33	92.71	94.01	0.23	94.28	93.31	94.80	0.84	96.68	92.80	94.21	0.32
Konica Minolta CM-5 colour, b*	10.04	9.23	10.45	0.32	10.02	9.21	11.26	0.48	10.81	9.80	11.57	0.34	9.32	8.77	10.27	0.83	10.20	9.06	12.16	0.59
Wet gluten, % (14 % mb)	26.6	24.2	29.8	1.61	27.0	22.8	31.4	2.14	25.1	23.5	28.0	1.11	25.6	25.0	26.1	0.78	29.5	23.4	36.1	3.03
Dry gluten, % (14 % mb)	8.9	8.2	10.1	0.55	9.0	7.5	10.5	0.68	8.3	7.8	9.2	0.36	8.2	8.1	8.3	0.14	9.8	7.4	11.8	1.14
Gluten Index	98	96	100	0.98	96	82	100	3.21	98	96	100	0.83	96	95	96	0.71	96	87	99	2.88
Fainogram																				
Water absorption, % (14% mb)	55.2	53.6	56.8	0.97	55.7	51.6	57.3	1.18	56.2	55.1	57.5	0.59	51.9	49.3	56.7	4.19	59.4	55.7	61.9	1.44
Development time, min	2.4	1.9	3.5	0.44	2.5	1.4	5.8	0.84	2.1	1.7	2.8	0.28	1.3	1.0	1.7	0.36	5.4	2.2	14.4	1.77
Stability, mm	8.8	4.3	15.9	3.28	9.9	3.3	18.8	2.87	11.4	3.8	18.9	4.22	3.1	2.2	4.7	1.39	12.6	6.1	20.0	4.51
Alveogram																				
Strength, cm ²	36.0	31.2	39.8	2.20	36.9	20.5	46.8	4.56	38.3	32.3	48.0	3.51	22.3	15.0	36.2	12.07	41.4	24.9	59.8	7.40
Stability, mm	75	68	85	4.65	78	59	94	8.28	92	73	102	7.30	54	38	83	25.42	80	53	101	10.36
Distensibility, mm	106	87	122	10.92	100	64	125	15.04	79	65	93	7.64	89	83	96	6.56	130	67	192	28.04
P/L	0.72	0.56	0.98	0.11	0.80	0.57	1.21	0.17	1.18	0.83	1.45	0.17	0.59	0.45	0.86	0.23	0.66	0.30	1.24	0.21
Extensogram																				
Strength, cm ²	99	74	109	7.87	95	59	134	11.76	96	82	117	8.92	64	50	80	15.18	109	52	172	26.63
Max. height, BU	448	338	512	39.04	434	353	537	42.74	482	407	557	38.99	341	267	390	65.01	411	228	585	74.18
Extensibility, mm	161	144	189	10.57	161	105	186	15.23	148	130	175	10.04	133	115	151	18.01	192	139	256	26.03
Mixogram																				
Water absorption, % (14% mb)	59.8	59.1	60.8	0.47	60.1	59.2	60.8	0.51	59.9	59.6	61.0	0.29	58.6	58.1	59.5	0.81	60.9	58.7	63.2	1.21
Peak time, min	4.4	3.4	5.0	0.47	4.1	3.0	6.0	0.61	4.9	4.0	5.3	0.34	5.2	4.6	5.5	0.49	3.1	2.3	5.2	0.50
100 g Baking Test																				
Loaf volume, cm ³	938	687	1062	89.29	966	821	1107	79.21	918	830	1039	63.12	766	715	825	55.43	966	793	1196	98.27
Evaluation	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0.51
Number of samples	27			46			27			3			65							

Imported Wheat Quality - Argentina (25 Sep 2022 to 30 Sep 2023)

2022/23 Imported Wheat Quality Versus 2022/23 RSA Wheat Quality

Country of origin	Argentina Average						RSA Crop Average						
	Super	Gr1	Gr2	Gr3	COW	Average	Super	Gr1	Gr2	Gr3	COW	Average	
Class and Grade bread wheat													
No. of samples	-	2	5	-	-	7	103	55	47	35	95	335	
WHEAT													
GRADING													
Protein (12% mb), %	-	11.6	10.5	-	-	10.9	13.2	12.0	11.1	10.3	12.2	12.1	
Moisture, %	-	11.4	11.3	-	-	11.3	11.2	11.2	11.3	11.5	11.2	11.3	
Falling number, sec	-	408	402	-	-	403	370	372	378	374	331	361	
1000 Kernel mass (13% mb), g	-	34.2	32.4	-	-	32.9	36.8	37.4	38.6	39.2	35.4	37.0	
Hlm (dirty), kg/hl	-	78.9	80.7	-	-	80.2	80.3	80.4	80.7	79.5	78.7	79.8	
Screenings (<1.8 mm sieve), %	-	1.79	1.73	-	-	1.75	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	0.01	0.01	0.01	0.03	0.01	
Foreign matter, %	-	0.11	0.21	-	-	0.18	0.11	0.11	0.11	0.12	0.21	0.14	
Other grain & unthreshed ears, %	-	0.19	0.10	-	-	0.13	0.33	0.36	0.38	0.39	0.78	0.48	
Heat damaged kernels, %	-	0.00	0.00	-	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Immature kernels, %	-	0.00	0.07	-	-	0.05	0.06	0.03	0.04	0.03	0.03	0.04	
Insect damaged kernels, %	-	0.21	0.07	-	-	0.11	0.45	0.48	0.55	0.58	0.66	0.54	
Sprouted kernels, %	-	0.08	0.02	-	-	0.03	0.11	0.07	0.04	0.03	0.42	0.17	
Total damaged kernels, %	-	0.29	0.16	-	-	0.20	0.62	0.58	0.64	0.63	1.11	0.76	
Combined deviations, %	-	2.38	2.21	-	-	2.26	2.32	2.27	2.45	2.55	4.82	3.06	
Heavily frost damaged kernels, %	-	0.00	0.00	-	-	0.00	0.00	0.00	0.01	0.00	0.11	0.03	
Field fungi, %	-	0.08	0.46	-	-	0.35	0.33	0.33	0.16	0.14	0.59	0.36	
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	0	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	Gr1	Gr2	Gr3	COW	Average	Super	Gr1	Gr2	Gr3	COW	Average
No. of samples	-	2	5	-	-	7	19	16	14	8	8	65	
Bühler Extraction, %	-	72.8	71.9	-	-	72.1	74.4	73.9	73.7	73.1	73.3	73.8	
FLOUR													
Colour, KJ	-	-4.1	-4.8	-	-	-4.6	-5.0	-5.0	-5.0	-4.9	-5.0	-5.0	
Colour, Konica Minolta CM5 (dry)													
L*	-	93.58	93.42	-	-	93.47	93.60	93.69	93.67	93.76	93.80	93.68	
a*	-	5.44	0.46	-	-	1.88	0.51	0.48	0.47	0.44	0.48	0.48	
b*	-	10.05	11.01	-	-	10.73	10.02	10.26	10.58	9.99	10.23	10.20	
Ash (db), %	-	0.55	0.58	-	-	0.57	0.59	0.60	0.60	0.59	0.59	0.59	
Protein (12% mb), %	-	10.4	9.5	-	-	9.8	12.2	11.1	10.2	9.6	10.9	11.0	
Wet Gluten (14% mb), %	-	24.5	23.8	-	-	24.0	32.9	29.6	27.5	25.6	29.7	29.5	
Dry Gluten (14% mb), %	-	8.6	8.0	-	-	8.2	11.1	9.9	9.1	8.2	9.9	9.8	
Gluten Index	-	99	99	-	-	99	95	96	96	97	96	96	
100 g BAKING TEST													
Baking water absorption, %	-	60.3	59.3	-	-	59.6	62.4	61.0	60.0	59.7	60.9	61.0	
Loaf volume, cm ³	-	953	816	-	-	855	1034	972	916	898	963	966	
Evaluation	-	0	0	-	-	0	0	0	0	0	0	0	
FARINOGRAM													
Water absorption (14% mb), %	-	55.9	56.5	-	-	56.3	60.3	59.7	58.7	58.3	59.2	59.4	
Development time, min	-	2.0	1.7	-	-	1.8	6.5	6.0	4.3	4.2	4.8	5.4	
Stability, mm	-	18.9	9.3	-	-	12.0	15.8	12.9	9.7	10.3	12.4	12.6	
Mixing tolerance index, BU	-	36	39	-	-	38	25	31	37	36	30	31	

2022/23 Imported Wheat Quality Versus 2022/23 RSA Wheat Quality

Country of origin	Argentina Average						RSA Crop Average					
Class and Grade bread wheat	Super	Gr1	Gr2	Gr3	COW	Average	Super	Gr1	Gr2	Gr3	COW	Average
No. of samples	-	2	5	-	-	7	19	17	13	11	5	65
ALVEOGRAM												
Strength (S), cm ²	-	42.8	41.1	-	-	41.6	48.0	42.7	35.6	35.4	40.6	41.4
Stability (P), mm	-	94	101	-	-	99	78	82	78	84	77	80
Distensibility (L), mm	-	81	74	-	-	76	152	130	119	101	137	130
P/L	-	1.16	1.38	-	-	1.32	0.52	0.66	0.72	0.86	0.60	0.66
												
EXTENSOGRAM												
Strength, cm ²	-	126	97	-	-	105	134	108	91	85	113	109
Max. height, BU	-	612	491	-	-	525	454	407	371	384	419	411
Extensibility, mm	-	155	147	-	-	149	218	194	178	159	200	192
												
MIXOGRAM												
Peak time, min	-	5.7	5.1	-	-	5.3	3.1	3.2	3.0	3.4	3.2	3.1
Water absorption (14% mb), %	-	60.3	59.3	-	-	59.6	62.4	61	60	59.5	60.9	60.9
												
MYCOTOXINS												
Aflatoxin B ₁ (µg/kg)	ND						ND					
Aflatoxin B ₂ (µg/kg)	ND						ND					
Aflatoxin G ₁ (µg/kg)	ND						ND					
Aflatoxin G ₂ (µg/kg)	ND						ND					
Fumonisin B ₁ (µg/kg)	ND						ND					
Fumonisin B ₂ (µg/kg)	ND						ND					
Fumonisin B ₃ (µg/kg)	ND						ND					
Deoxynivalenol (µg/kg) [max. value]	174 [348]						757 [6 463]					
15-ADON (µg/kg)	ND						46 [301]					
Ochratoxin A (µg/kg)	ND						ND					
Zearalenone (µg/kg)	ND						1 [36]					
HT-2 (µg/kg)	ND						ND					
T-2 Toxin (µg/kg)	ND						ND					
No. of samples	2						40					

Imported Wheat Quality - Australia (25 Sep 2022 to 30 Sep 2023)

2022/23 Imported Wheat Quality Versus 2022/23 RSA Wheat Quality

Country of origin	Australia Average						RSA Crop Average					
Class and Grade bread wheat	Super	Gr1	Gr2	Gr3	COW	Average	Super	Gr1	Gr2	Gr3	COW	Average
No. of samples	-	9	3	1	3	16	103	55	47	35	95	335

WHEAT GRADING

Protein (12% mb), %	-	12.1	11.1	10	11.5	11.7	13.2	12.0	11.1	10.3	12.2	12.1
Moisture, %	-	10.5	10.7	10.6	10.5	10.6	11.2	11.2	11.3	11.5	11.2	11.3
Falling number, sec	-	372	514	468	221	377	370	372	378	374	331	361
1000 Kernel mass (13% mb), g	-	34.4	41.2	41.1	32.8	35.8	36.8	37.4	38.6	39.2	35.4	37.0
Hlm (dirty), kg/hl	-	80.7	80.6	79.6	81	80.7	80.3	80.4	80.7	79.5	78.7	79.8
Screenings (<1.8 mm sieve), %	-	1.78	1.76	1.66	2.16	1.84	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	0.01	0.01	0.01	0.03	0.01
Foreign matter, %	-	0.14	0.21	0.2	0.07	0.14	0.11	0.11	0.11	0.12	0.21	0.14
Other grain & unthreshed ears, %	-	0.43	0.38	0.3	0.24	0.38	0.33	0.36	0.38	0.39	0.78	0.48
Heat damaged kernels, %	-	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Immature kernels, %	-	0.03	0.00	0.00	0.04	0.02	0.06	0.03	0.04	0.03	0.03	0.04
Insect damaged kernels, %	-	0.04	0.07	0.00	0.11	0.06	0.45	0.48	0.55	0.58	0.66	0.54
Sprouted kernels, %	-	0.4	0.21	0.4	6.63	1.53	0.11	0.07	0.04	0.03	0.42	0.17
Total damaged kernels, %	-	0.48	0.29	0.4	6.77	1.62	0.62	0.58	0.64	0.63	1.11	0.76
Combined deviations, %	-	2.83	2.63	2.56	9.24	3.98	2.32	2.27	2.45	2.55	4.82	3.06
Heavily frost damaged kernels, %	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.11	0.03
Field fungi, %	-	0.68	1.23	1.4	0.58	0.81	0.33	0.33	0.16	0.14	0.59	0.36
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	0	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	Gr1	Gr2	Gr3	COW	Average	Super	Gr1	Gr2	Gr3	COW	Average
No. of samples	-	9	3	1	3	16	19	16	14	8	8	65
Bühler Extraction, %	-	72.5	72	71.8	72.5	72.4	74.4	73.9	73.7	73.1	73.3	73.8

FLOUR

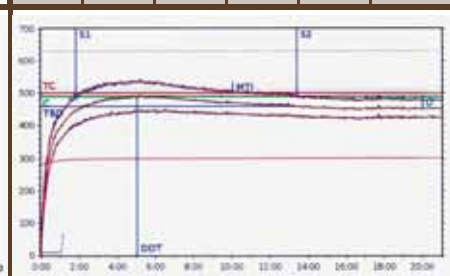
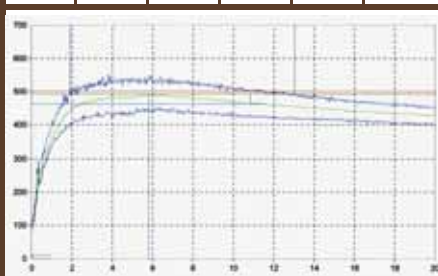
Colour, KJ	-	-4.8	-4.7	-4.7	-4.4	-4.7	-5.0	-5.0	-5.0	-4.9	-5.0	-5.0
Colour, Konica Minolta CM5 (dry)												
L*	-	94.08	94.16	94.23	93.76	94.04	93.6	93.69	93.67	93.76	93.8	93.68
a*	-	0.43	0.49	0.49	0.48	0.46	0.51	0.48	0.47	0.44	0.48	0.48
b*	-	9.11	8.57	8.24	9.36	9.00	10.02	10.26	10.58	9.99	10.23	10.20
Ash (db), %	-	0.54	0.55	0.56	0.61	0.56	0.59	0.60	0.60	0.59	0.59	0.59
Protein (12% mb), %	-	11.1	9.9	9.8	10.2	10.6	12.2	11.1	10.2	9.6	10.9	11.0
Wet Gluten (14% mb), %	-	29.8	28.6	28.3	27.3	29.0	32.9	29.6	27.5	25.6	29.7	29.5
Dry Gluten (14% mb), %	-	10.0	9.2	9.3	9.0	9.6	11.1	9.9	9.1	8.2	9.9	9.8
Gluten Index	-	97	90	93	98	95	95	96	96	97	96	96

100 g BAKING TEST

Baking water absorption, %	-	61	60.1	59.6	60	60.6	62.4	61.0	60.0	59.7	60.9	61.0
Loaf volume, cm ³	-	1043	906	939	1070	1016	1034	972	916	898	963	966
Evaluation	-	0	0	0	0	0	0	0	0	0	0	0

FARINOGRAM

Water absorption (14% mb), %	-	59.0	60.5	59.9	56.2	58.8	60.3	59.7	58.7	58.3	59.2	59.4
Development time, min	-	5.8	5.2	4.8	2.9	5.1	6.5	6.0	4.3	4.2	4.8	5.4
Stability, mm	-	10.2	8.1	7.8	8.5	9.3	15.8	12.9	9.7	10.3	12.4	12.6
Mixing tolerance index, BU	-	31	34	34	24	30	25	31	37	36	30	31

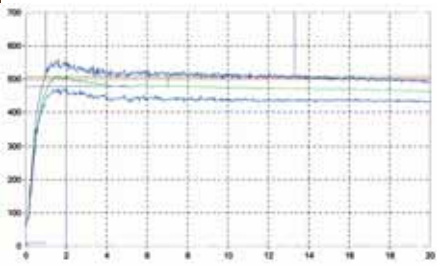
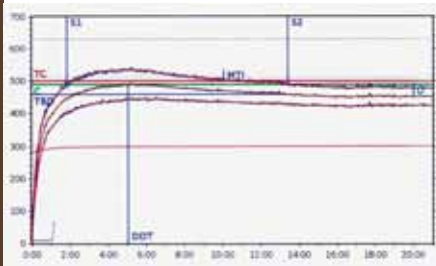


2022/23 Imported Wheat Quality Versus 2022/23 RSA Wheat Quality

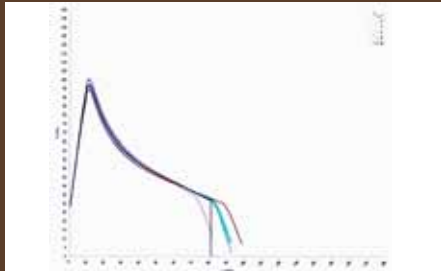
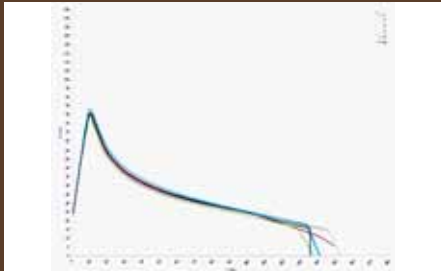

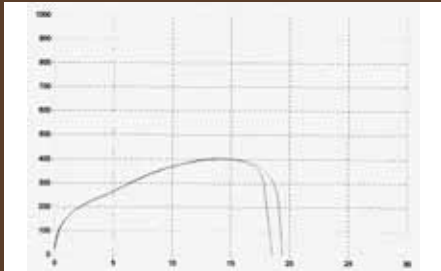
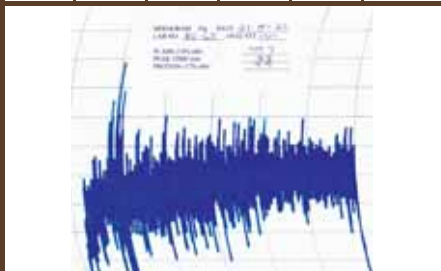
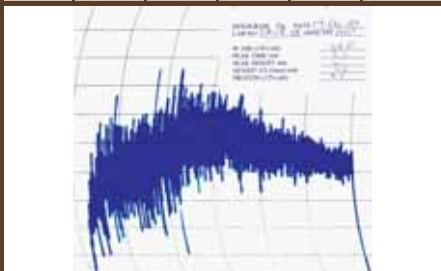
Country of origin	Australia Average						RSA Crop Average					
Class and Grade bread wheat	Super	Gr1	Gr2	Gr3	COW	Average	Super	Gr1	Gr2	Gr3	COW	Average
No. of samples	-	9	3	1	3	16	19	17	13	11	5	65
ALVEOGRAM												
Strength (S), cm ²	-	48.4	35.9	34.3	38	43.3	48.0	42.7	35.6	35.4	40.6	41.4
Stability (P), mm	-	85	93	86	74	84	78	82	78	84	77	80
Distensibility (L), mm	-	129	92	95	106	115	152	130	119	101	137	130
P/L	-	0.67	1.01	0.91	0.71	0.76	0.52	0.66	0.72	0.86	0.60	0.66
EXTENSOGRAM												
Strength, cm ²	-	127	80	80	120	114	134	108	91	85	113	109
Max. height, BU	-	474	339	327	503	445	454	407	371	384	419	411
Extensibility, mm	-	200	165	174	182	189	218	194	178	159	200	192
MIXOGRAM												
Peak time, min	-	3.3	5.4	3.0	3.8	3.8	3.1	3.2	3.0	3.4	3.2	3.1
Water absorption (14% mb), %	-	61	59.7	59.6	60	60.5	62.4	61	60	59.5	60.9	60.9
MYCOTOXINS												
Aflatoxin B ₁ (µg/kg)				ND							ND	
Aflatoxin B ₂ (µg/kg)				ND							ND	
Aflatoxin G ₁ (µg/kg)				ND							ND	
Aflatoxin G ₂ (µg/kg)				ND							ND	
Fumonisin B ₁ (µg/kg)				ND							ND	
Fumonisin B ₂ (µg/kg)				ND							ND	
Fumonisin B ₃ (µg/kg)				ND							ND	
Deoxynivalenol (µg/kg) [max. value]			247 [495]						757 [6 463]			
15-ADON (µg/kg)				ND					46 [301]			
Ochratoxin A (µg/kg)				ND							ND	
Zearalenone (µg/kg)				ND					1 [36]			
HT-2 (µg/kg)				ND							ND	
T-2 Toxin (µg/kg)				ND							ND	
No. of samples				6							40	

Imported Wheat Quality - Brazil (25 Sep 2022 to 30 Sep 2023)

2022/23 Imported Wheat Quality Versus 2022/23 RSA Wheat Quality

Country of origin	Brazil Average						RSA Crop Average						
Class and Grade bread wheat	Super	Gr1	Gr2	Gr3	COW	Average	Super	Gr1	Gr2	Gr3	COW	Average	
No. of samples	-	2	6	5	1	14	103	55	47	35	95	335	
WHEAT													
GRADING													
Protein (12% mb), %	-	11.9	10.9	10.7	10.4	10.9	13.2	12.0	11.1	10.3	12.2	12.1	
Moisture, %	-	11.5	11.6	11.4	11.7	11.5	11.2	11.2	11.3	11.5	11.2	11.3	
Falling number, sec	-	362	413	354	390	383	370	372	378	374	331	361	
1000 Kernel mass (13% mb), g	-	35.8	31.9	32.7	31.2	32.7	36.8	37.4	38.6	39.2	35.4	37.0	
Hlm (dirty), kg/hl	-	77.5	81.6	79.8	81.6	80.4	80.3	80.4	80.7	79.5	78.7	79.8	
Screenings (<1.8 mm sieve), %	-	1.87	2.54	2.22	3.44	2.39	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	0.01	0.01	0.01	0.03	0.01	
Foreign matter, %	-	0.00	0.14	0.07	0.10	0.09	0.11	0.11	0.11	0.12	0.21	0.14	
Other grain & unthreshed ears, %	-	0.13	0.37	0.1	0.36	0.24	0.33	0.36	0.38	0.39	0.78	0.48	
Heat damaged kernels, %	-	0.00	0.05	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	
Immature kernels, %	-	0.00	0.19	0.14	0.1	0.14	0.06	0.03	0.04	0.03	0.03	0.04	
Insect damaged kernels, %	-	0.49	0.01	0.42	0.00	0.23	0.45	0.48	0.55	0.58	0.66	0.54	
Sprouted kernels, %	-	0.00	0.00	0.00	0.00	0.00	0.11	0.07	0.04	0.03	0.42	0.17	
Total damaged kernels, %	-	0.49	0.26	0.56	0.1	0.39	0.62	0.58	0.64	0.63	1.11	0.76	
Combined deviations, %	-	2.49	3.31	2.94	4.00	3.11	2.32	2.27	2.45	2.55	4.82	3.06	
Heavily frost damaged kernels, %	-	0.00	0.02	0.06	0.00	0.03	0.00	0.00	0.01	0.00	0.11	0.03	
Field fungi, %	-	1.38	0.61	0.95	0.92	0.86	0.33	0.33	0.16	0.14	0.59	0.36	
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	0	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	Gr1	Gr2	Gr3	COW	Average	Super	Gr1	Gr2	Gr3	COW	Average
No. of samples	-	2	6	5	1	14	19	16	14	8	8	65	
Bühler Extraction, %	-	74.5	71.2	72.7	70.7	72.2	74.4	73.9	73.7	73.1	73.3	73.8	
FLOUR													
Colour, KJ	-	-4.8	-5.0	-4.9	-5.0	-4.9	-5.0	-5.0	-5.0	-4.9	-5.0	-5.0	
Colour, Konica Minolta CM5 (dry)													
L*	-	93.12	93.27	93.07	93.11	93.16	93.60	93.69	93.67	93.76	93.80	93.68	
a*	-	0.47	0.53	0.5	0.54	0.51	0.51	0.48	0.47	0.44	0.48	0.48	
b*	-	10.92	11.58	11.18	11.64	11.35	10.02	10.26	10.58	9.99	10.23	10.20	
Ash (db), %	-	0.54	0.59	0.55	0.57	0.57	0.59	0.60	0.60	0.59	0.59	0.59	
Protein (12% mb), %	-	10.9	9.8	10.0	9.4	10.0	12.2	11.1	10.2	9.6	10.9	11.0	
Wet Gluten (14% mb), %	-	28.7	24.9	25.9	24.0	25.7	32.9	29.6	27.5	25.6	29.7	29.5	
Dry Gluten (14% mb), %	-	9.6	8.1	8.5	7.9	8.4	11.1	9.9	9.1	8.2	9.9	9.8	
Gluten Index	-	98	98	98	99	98	95	96	96	97	96	96	
100 g BAKING TEST													
Baking water absorption, %	-	60.8	59.6	59.9	59.2	59.9	62.4	61.0	60.0	59.7	60.9	61.0	
Loaf volume, cm ³	-	830	811	789	788	804	1034	972	916	898	963	966	
Evaluation	-	1	0	1	0	0	0	0	0	0	0	0	
FARINOGRAM													
Water absorption (14% mb), %	-	56.4	58.1	57.5	58.8	57.7	60.3	59.7	58.7	58.3	59.2	59.4	
Development time, min	-	5.6	1.9	4.4	2.0	3.3	6.5	6.0	4.3	4.2	4.8	5.4	
Stability, mm	-	15.1	10.4	9.5	5.4	10.4	15.8	12.9	9.7	10.3	12.4	12.6	
Mixing tolerance index, BU	-	13	38	39	37	35	25	31	37	36	30	31	
													

2022/23 Imported Wheat Quality Versus 2022/23 RSA Wheat Quality

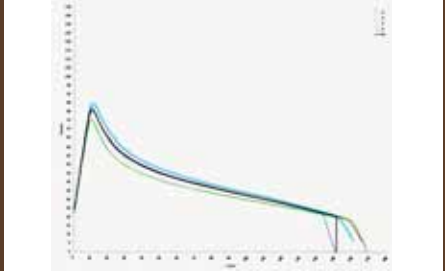
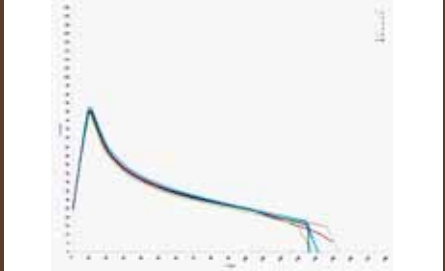
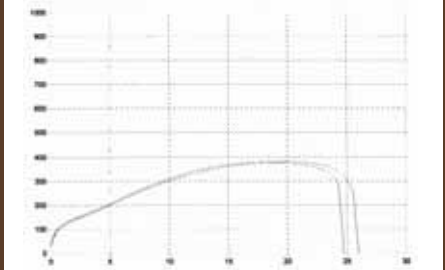
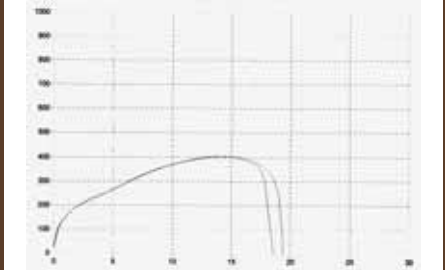
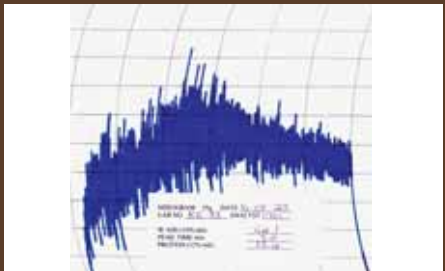
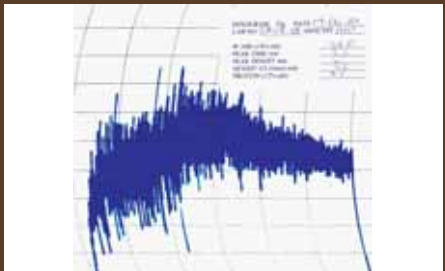
Country of origin	Brazil Average						RSA Crop Average					
Class and Grade bread wheat	Super	Gr1	Gr2	Gr3	COW	Average	Super	Gr1	Gr2	Gr3	COW	Average
No. of samples	-	2	6	5	1	14	19	17	13	11	5	65
ALVEOGRAM												
Strength (S), cm ²	-	42.2	44.3	40.2	38.7	42.1	48.0	42.7	35.6	35.4	40.6	41.4
Stability (P), mm	-	81	108	100	114	102	78	82	78	84	77	80
Distensibility (L), mm	-	109	77	80	60	81	152	130	119	101	137	130
P/L	-	0.75	1.43	1.45	1.90	1.37	0.52	0.66	0.72	0.86	0.60	0.66
												
EXTENSOGRAM												
Strength, cm ²	-	114	103	101	94	103	134	108	91	85	113	109
Max. height, BU	-	538	495	511	486	506	454	407	371	384	419	411
Extensibility, mm	-	158	155	147	142	151	218	194	178	159	200	192
												
MIXOGRAM												
Peak time, min	-	4.3	4.6	4.6	5.2	4.6	3.1	3.2	3.0	3.4	3.2	3.1
Water absorption (14% mb), %	-	60.8	59.6	59.9	59.2	59.9	62.4	61	60	59.5	60.9	60.9
												
MYCOTOXINS												
Aflatoxin B ₁ (µg/kg)				ND							ND	
Aflatoxin B ₂ (µg/kg)				ND							ND	
Aflatoxin G ₁ (µg/kg)				ND							ND	
Aflatoxin G ₂ (µg/kg)				ND							ND	
Fumonisin B ₁ (µg/kg)				ND							ND	
Fumonisin B ₂ (µg/kg)				ND							ND	
Fumonisin B ₃ (µg/kg)				ND							ND	
Deoxynivalenol (µg/kg) [max. value]				188 [323]							757 [6 463]	
15-ADON (µg/kg) [max. value]				ND							46 [301]	
Ochratoxin A (µg/kg)				ND							ND	
Zearalenone (µg/kg)				ND							1 [36]	
HT-2 (µg/kg)				ND							ND	
T-2 Toxin (µg/kg)				ND							ND	
No. of samples				3							40	

Imported Wheat Quality - Canada (25 Sep 2022 to 30 Sep 2023)

2022/23 Imported Wheat Quality Versus 2022/23 RSA Wheat Quality

Country of origin	Canada Average						RSA Crop Average					
Class and Grade bread wheat	Super	Gr1	Gr2	Gr3	COW	Average	Super	Gr1	Gr2	Gr3	COW	Average
No. of samples	1	-	-	-	-	1	103	55	47	35	95	335
WHEAT												
GRADING												
Protein (12% mb), %	14.4	-	-	-	-	14.4	13.2	12.0	11.1	10.3	12.2	12.1
Moisture, %	11.6	-	-	-	-	11.6	11.2	11.2	11.3	11.5	11.2	11.3
Falling number, sec	384	-	-	-	-	384	370	372	378	374	331	361
1000 Kernel mass (13% mb), g	34.6	-	-	-	-	34.6	36.8	37.4	38.6	39.2	35.4	37.0
Hlm (dirty), kg/hl	85.0	-	-	-	-	85.0	80.3	80.4	80.7	79.5	78.7	79.8
Screenings (<1.8 mm sieve), %	1.39	-	-	-	-	1.39	1.26	1.21	1.32	1.41	2.72	1.69
Gravel, stones, turf and glass, %	0.00	-	-	-	-	0.00	0.00	0.01	0.01	0.01	0.03	0.01
Foreign matter, %	0.00	-	-	-	-	0.00	0.11	0.11	0.11	0.12	0.21	0.14
Other grain & unthreshed ears, %	0.08	-	-	-	-	0.08	0.33	0.36	0.38	0.39	0.78	0.48
Heat damaged kernels, %	0.00	-	-	-	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Immature kernels, %	0.00	-	-	-	-	0.00	0.06	0.03	0.04	0.03	0.03	0.04
Insect damaged kernels, %	0.00	-	-	-	-	0.00	0.45	0.48	0.55	0.58	0.66	0.54
Sprouted kernels, %	0.00	-	-	-	-	0.00	0.11	0.07	0.04	0.03	0.42	0.17
Total damaged kernels, %	0.00	-	-	-	-	0.00	0.62	0.58	0.64	0.63	1.11	0.76
Combined deviations, %	1.47	-	-	-	-	1.47	2.32	2.27	2.45	2.55	4.82	3.06
Heavily frost damaged kernels, %	0.00	-	-	-	-	0.00	0.00	0.00	0.01	0.00	0.11	0.03
Field fungi, %	0.1	-	-	-	-	0.1	0.33	0.33	0.16	0.14	0.59	0.36
Storage fungi, %	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
Poisonous seeds (<i>Crotalaria spp.</i> , etc.)	0	-	-	-	-	0	0	0	0	0	0	0
Poisonous seeds (<i>Argemone mexicana</i> , etc.)	0	-	-	-	-	0	0	0	0	0	0	0
Live insects	No	-	-	-	-	No	No	No	No	No	No	No
Undesirable odour	No	-	-	-	-	No	No	No	No	No	No	No
WHEAT												
GRADING												
No. of samples	1	-	-	-	-	1	19	16	14	8	8	65
Bühler Extraction, %	73.1	-	-	-	-	73.1	74.4	73.9	73.7	73.1	73.3	73.8
FLOUR												
Colour, KJ	-5.0	-	-	-	-	-5.0	-5.0	-5.0	-5.0	-4.9	-5.0	-5.0
Colour, Konica Minolta CM5 (dry)												
L*	93.22	-	-	-	-	93.22	93.60	93.69	93.67	93.76	93.80	93.68
a*	0.71	-	-	-	-	0.71	0.51	0.48	0.47	0.44	0.48	0.48
b*	10.85	-	-	-	-	10.85	10.02	10.26	10.58	9.99	10.23	10.20
Ash (db), %	0.58	-	-	-	-	0.58	0.59	0.60	0.60	0.59	0.59	0.59
Protein (12% mb), %	13.4	-	-	-	-	13.4	12.2	11.1	10.2	9.6	10.9	11.0
Wet Gluten (14% mb), %	33.6	-	-	-	-	33.6	32.9	29.6	27.5	25.6	29.7	29.5
Dry Gluten (14% mb), %	11.4	-	-	-	-	11.4	11.1	9.9	9.1	8.2	9.9	9.8
Gluten Index	97	-	-	-	-	97	95	96	96	97	96	96
100 g BAKING TEST												
Baking water absorption, %	64.1	-	-	-	-	64.1	62.4	61.0	60.0	59.7	60.9	61.0
Loaf volume, cm ³	1142	-	-	-	-	1142	1034	972	916	898	963	966
Evaluation	0	-	-	-	-	0	0	0	0	0	0	0
FARINOGRAM												
Water absorption (14% mb), %	62.7	-	-	-	-	62.7	60.3	59.7	58.7	58.3	59.2	59.4
Development time, min	7.8	-	-	-	-	7.8	6.5	6.0	4.3	4.2	4.8	5.4
Stability, mm	14.0	-	-	-	-	14.0	15.8	12.9	9.7	10.3	12.4	12.6
Mixing tolerance index, BU	23	-	-	-	-	23	25	31	37	36	30	31

2022/23 Imported Wheat Quality Versus 2022/23 RSA Wheat Quality

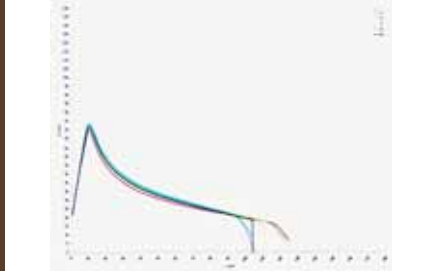
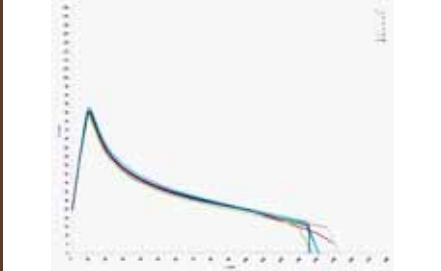
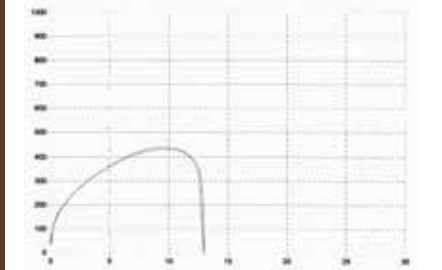
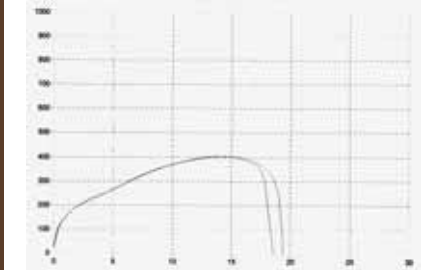
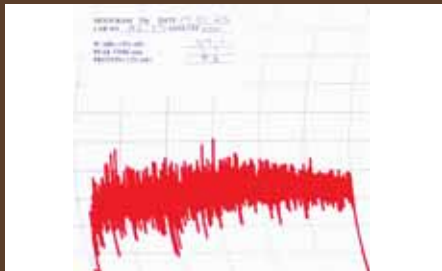
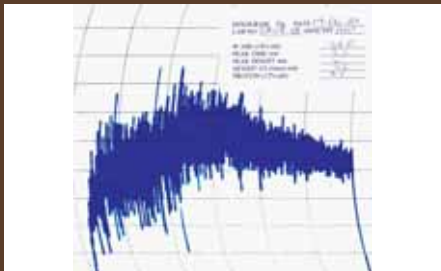
Country of origin	Canada Average						RSA Crop Average					
Class and Grade bread wheat	Super	Gr1	Gr2	Gr3	COW	Average	Super	Gr1	Gr2	Gr3	COW	Average
No. of samples	1	-	-	-	-	1	19	17	13	11	5	65
ALVEOGRAM												
Strength (S), cm ²	61.5	-	-	-	-	61.5	48.0	42.7	35.6	35.4	40.6	41.4
Stability (P), mm	89	-	-	-	-	89	78	82	78	84	77	80
Distensibility (L), mm	151	-	-	-	-	151	152	130	119	101	137	130
P/L	0.59	-	-	-	-	0.59	0.52	0.66	0.72	0.86	0.60	0.66
												
EXTENSOGRAM												
Strength, cm ²	132	-	-	-	-	132	134	108	91	85	113	109
Max. height, BU	379	-	-	-	-	379	454	407	371	384	419	411
Extensibility, mm	154	-	-	-	-	154	218	194	178	159	200	192
												
MIXOGRAM												
Peak time, min	3.0	-	-	-	-	3.0	3.1	3.2	3.0	3.4	3.2	3.1
Water absorption (14% mb), %	64.1	-	-	-	-	64.1	62.4	61	60	59.5	60.9	60.9
												
MYCOTOXINS												
Aflatoxin B ₁ (µg/kg)	ND						ND					
Aflatoxin B ₂ (µg/kg)	ND						ND					
Aflatoxin G ₁ (µg/kg)	ND						ND					
Aflatoxin G ₂ (µg/kg)	ND						ND					
Fumonisin B ₁ (µg/kg)	ND						ND					
Fumonisin B ₂ (µg/kg)	ND						ND					
Fumonisin B ₃ (µg/kg)	ND						ND					
Deoxynivalenol (µg/kg) [max. value]	<100 [<100]						757 [6 463]					
15-ADON (µg/kg)	ND						46 [301]					
Ochratoxin A (µg/kg)	ND						ND					
Zearalenone (µg/kg)	ND						1 [36]					
HT-2 (µg/kg)	ND						ND					
T-2 Toxin (µg/kg)	ND						ND					
No. of samples	1						40					

Imported Wheat Quality - Germany (25 Sep 2022 to 30 Sep 2023)

2022/23 Imported Wheat Quality Versus 2022/23 RSA Wheat Quality

Country of origin	Germany Average						RSA Crop Average					
	Super	Gr1	Gr2	Gr3	COW	Average	Super	Gr1	Gr2	Gr3	COW	Average
Class and Grade bread wheat	-	-	2	2	8	12	103	55	47	35	95	335
No. of samples	-	-	2	2	8	12	103	55	47	35	95	335
WHEAT												
GRADING												
Protein (12% mb), %	-	-	10.6	10.4	10.9	10.8	13.2	12.0	11.1	10.3	12.2	12.1
Moisture, %	-	-	12.2	11.8	12.1	12.1	11.2	11.2	11.3	11.5	11.2	11.3
Falling number, sec	-	-	362	308	386	369	370	372	378	374	331	361
1000 Kernel mass (13% mb), g	-	-	44.7	42.1	41.1	41.9	36.8	37.4	38.6	39.2	35.4	37.0
Hlm (dirty), kg/hl	-	-	81.1	79.5	76.6	77.8	80.3	80.4	80.7	79.5	78.7	79.8
Screenings (<1.8 mm sieve), %	-	-	1.50	2.76	1.89	1.97	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	0.01	0.01	0.01	0.03	0.01
Foreign matter, %	-	-	0.13	0.11	0.11	0.11	0.11	0.11	0.11	0.12	0.21	0.14
Other grain & unthreshed ears, %	-	-	0.44	0.58	2.74	2.00	0.33	0.36	0.38	0.39	0.78	0.48
Heat damaged kernels, %	-	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Immature kernels, %	-	-	0.00	0.00	0.00	0.00	0.06	0.03	0.04	0.03	0.03	0.04
Insect damaged kernels, %	-	-	0.00	0.00	0.11	0.07	0.45	0.48	0.55	0.58	0.66	0.54
Sprouted kernels, %	-	-	0.17	0.08	0.04	0.07	0.11	0.07	0.04	0.03	0.42	0.17
Total damaged kernels, %	-	-	0.17	0.08	0.15	0.14	0.62	0.58	0.64	0.63	1.11	0.76
Combined deviations, %	-	-	2.24	3.53	4.88	4.21	2.32	2.27	2.45	2.55	4.82	3.06
Heavily frost damaged kernels, %	-	-	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.11	0.03
Field fungi, %	-	-	0.28	0.12	0.15	0.17	0.33	0.33	0.16	0.14	0.59	0.36
Storage fungi, %	-	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ergot, %	-	-	0.00	0.02	0.01	0.01	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
Poisonous seeds (<i>Argemone mexicana</i> , etc.)	-	-	0	0	0	0	0	0	0	0	0	0
Live insects	-	-	No	No	No	No	No	No	No	No	No	No
Undesirable odour	-	-	No	No	No	No	No	No	No	No	No	No
WHEAT												
GRADING												
	Super	Gr1	Gr2	Gr3	COW	Average	Super	Gr1	Gr2	Gr3	COW	Average
No. of samples	-	-	2	2	8	12	19	16	14	8	8	65
Bühler Extraction, %	-	-	75.8	75.7	74.9	75.2	74.4	73.9	73.7	73.1	73.3	73.8
FLOUR												
Colour, KJ	-	-	-50	-4.7	-4.3	-4.5	-5.0	-5.0	-5.0	-4.9	-5.0	-5.0
Colour, Konica Minolta CM5 (dry)												
L*	-	-	93.64	93.63	93.45	93.51	93.60	93.69	93.67	93.76	93.80	93.68
a*	-	-	0.55	0.53	0.48	0.50	0.51	0.48	0.47	0.44	0.48	0.48
b*	-	-	10.74	10.34	10.31	10.38	10.02	10.26	10.58	9.99	10.23	10.20
Ash (db), %	-	-	0.51	0.54	0.5	0.51	0.59	0.60	0.60	0.59	0.59	0.59
Protein (12% mb), %	-	-	9.6	9.2	9.8	9.6	12.2	11.1	10.2	9.6	10.9	11.0
Wet Gluten (14% mb), %	-	-	24.6	24	25.7	25.2	32.9	29.6	27.5	25.6	29.7	29.5
Dry Gluten (14% mb), %	-	-	8.2	7.9	8.5	8.3	11.1	9.9	9.1	8.2	9.9	9.8
Gluten Index	-	-	98	98	97	97	95	96	96	97	96	96
100 g BAKING TEST												
Baking water absorption, %	-	-	59.4	59.1	59.6	59.4	62.4	61.0	60.0	59.7	60.9	61.0
Loaf volume, cm ³	-	-	969	927	902	917	1034	972	916	898	963	966
Evaluation	-	-	0	0	0	0	0	0	0	0	0	0
FARINOGRAM												
Water absorption (14% mb), %	-	-	53.6	54	55	54.6	60.3	59.7	58.7	58.3	59.2	59.4
Development time, min	-	-	5.1	2.0	2.6	2.9	6.5	6.0	4.3	4.2	4.8	5.4
Stability, mm	-	-	13.6	8.5	10.0	10.3	15.8	12.9	9.7	10.3	12.4	12.6
Mixing tolerance index, BU	-	-	17	26	28	26	25	31	37	36	30	31

2022/23 Imported Wheat Quality Versus 2022/23 RSA Wheat Quality

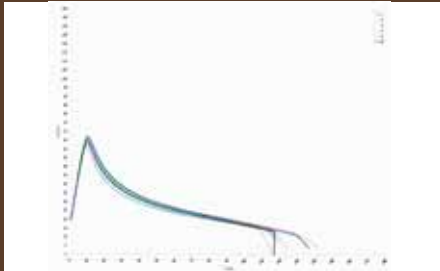
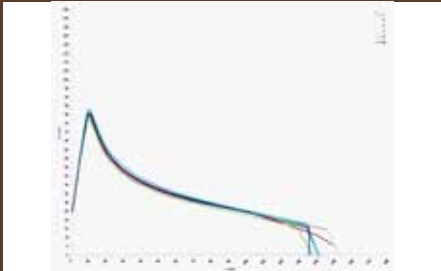
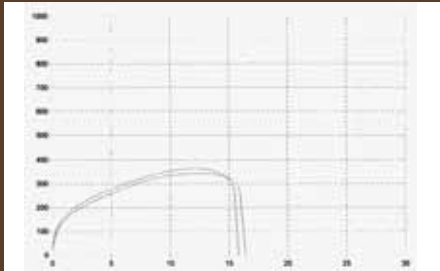
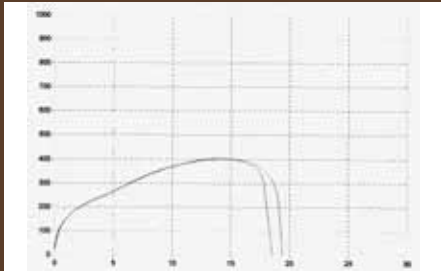
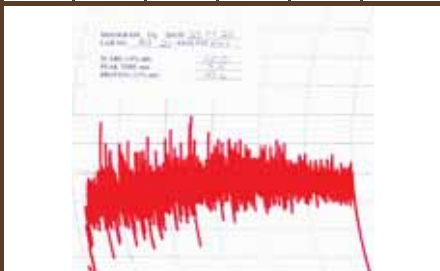
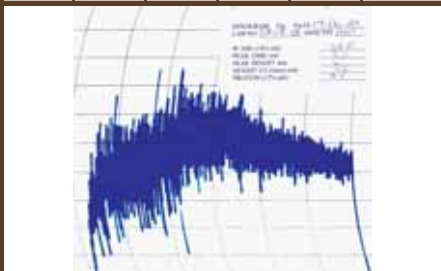
Country of origin	Germany Average						RSA Crop Average					
Class and Grade bread wheat	Super	Gr1	Gr2	Gr3	COW	Average	Super	Gr1	Gr2	Gr3	COW	Average
No. of samples	-	-	2	2	8	12	19	17	13	11	5	65
ALVEOGRAM												
Strength (S), cm ²	-	-	30.7	30.6	34.2	33.0	48.0	42.7	35.6	35.4	40.6	41.4
Stability (P), mm	-	-	66	69	73	71	78	82	78	84	77	80
Distensibility (L), mm	-	-	103	94	103	102	152	130	119	101	137	130
P/L	-	-	0.64	0.73	0.71	0.07	0.52	0.66	0.72	0.86	0.60	0.66
												
EXTENSOGRAM												
Strength, cm ²	-	-	85	79	94	90	134	108	91	85	113	109
Max. height, BU	-	-	443	434	438	438	454	407	371	384	419	411
Extensibility, mm	-	-	139	131	154	148	218	194	178	159	200	192
												
MIXOGRAM												
Peak time, min	-	-	3.5	3.6	3.9	3.8	3.1	3.2	3.0	3.4	3.2	3.1
Water absorption (14% mb), %	-	-	59.4	59.1	59.6	59.4	62.4	61	60	59.5	60.9	60.9
												
MYCOTOXINS												
Aflatoxin B ₁ (µg/kg)	ND						ND					
Aflatoxin B ₂ (µg/kg)	ND						ND					
Aflatoxin G ₁ (µg/kg)	ND						ND					
Aflatoxin G ₂ (µg/kg)	ND						ND					
Fumonisin B ₁ (µg/kg)	ND						ND					
Fumonisin B ₂ (µg/kg)	ND						ND					
Fumonisin B ₃ (µg/kg)	ND						ND					
Deoxynivalenol (µg/kg) [max. value]	ND						757 [6 463]					
15-ADON (µg/kg)	<100 [<100]						46 [301]					
Ochratoxin A (µg/kg)	ND						ND					
Zearalenone (µg/kg)	ND						1 [36]					
HT-2 (µg/kg)	ND						ND					
T-2 Toxin (µg/kg)	ND						ND					
No. of samples	3						40					

Imported Wheat Quality - Latvia (25 Sep 2022 to 30 Sep 2023)

2022/23 Imported Wheat Quality Versus 2022/23 RSA Wheat Quality

Country of origin	Latvia Average						RSA Crop Average					
Class and Grade bread wheat	Super	Gr1	Gr2	Gr3	COW	Average	Super	Gr1	Gr2	Gr3	COW	Average
No. of samples	-	-	5	-	5	10	103	55	47	35	95	335
WHEAT												
GRADING												
Protein (12% mb), %	-	-	11.3	-	11.7	11.5	13.2	12.0	11.1	10.3	12.2	12.1
Moisture, %	-	-	12.4	-	12.5	12.4	11.2	11.2	11.3	11.5	11.2	11.3
Falling number, sec	-	-	357	-	373	365	370	372	378	374	331	361
1000 Kernel mass (13% mb), g	-	-	38.9	-	38	38.5	36.8	37.4	38.6	39.2	35.4	37.0
Hlm (dirty), kg/hl	-	-	77.4	-	78.1	77.7	80.3	80.4	80.7	79.5	78.7	79.8
Screenings (<1.8 mm sieve), %	-	-	2.22	-	3.23	2.73	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	0.01	0.01	0.01	0.03	0.01
Foreign matter, %	-	-	0.17	-	0.16	0.16	0.11	0.11	0.11	0.12	0.21	0.14
Other grain & unthreshed ears, %	-	-	0.96	-	0.64	0.8	0.33	0.36	0.38	0.39	0.78	0.48
Heat damaged kernels, %	-	-	0.02	-	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00
Immature kernels, %	-	-	0.07	-	0.00	0.03	0.06	0.03	0.04	0.03	0.03	0.04
Insect damaged kernels, %	-	-	0.07	-	0.02	0.04	0.45	0.48	0.55	0.58	0.66	0.54
Sprouted kernels, %	-	-	0.12	-	0.09	0.11	0.11	0.07	0.04	0.03	0.42	0.17
Total damaged kernels, %	-	-	0.28	-	0.11	0.19	0.62	0.58	0.64	0.63	1.11	0.76
Combined deviations, %	-	-	3.63	-	4.14	3.88	2.32	2.27	2.45	2.55	4.82	3.06
Heavily frost damaged kernels, %	-	-	0.00	-	0.00	0.00	0.00	0.00	0.01	0.00	0.11	0.03
Field fungi, %	-	-	0.34	-	0.12	0.23	0.33	0.33	0.16	0.14	0.59	0.36
Storage fungi, %	-	-	0.11	-	0.10	0.10	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	0	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
No. of samples							19	16	14	8	8	65
Bühler Extraction, %	-	-	74.4	-	74.7	74.6	74.4	73.9	73.7	73.1	73.3	73.8
FLOUR												
Colour, KJ	-	-	-4.4	-	-4.4	-4.4	-5.0	-5.0	-5.0	-4.9	-5.0	-5.0
Colour, Konica Minolta CM5 (dry)												
L*	-	-	93.47	-	93.39	93.43	93.60	93.69	93.67	93.76	93.80	93.68
a*	-	-	0.59	-	0.63	0.61	0.51	0.48	0.47	0.44	0.48	0.48
b*	-	-	9.93	-	9.79	9.86	10.02	10.26	10.58	9.99	10.23	10.20
Ash (db), %	-	-	0.56	-	0.57	0.57	0.59	0.60	0.60	0.59	0.59	0.59
Protein (12% mb), %	-	-	10.1	-	10.6	10.3	12.2	11.1	10.2	9.6	10.9	11.0
Wet Gluten (14% mb), %	-	-	26.4	-	27.7	27.1	32.9	29.6	27.5	25.6	29.7	29.5
Dry Gluten (14% mb), %	-	-	8.8	-	9.3	9.1	11.1	9.9	9.1	8.2	9.9	9.8
Gluten Index	-	-	98	-	98	98	95	96	96	97	96	96
100 g BAKING TEST												
Baking water absorption, %	-	-	59.9	-	60.5	60.2	62.4	61.0	60.0	59.7	60.9	61.0
Loaf volume, cm ³	-	-	1008	-	1079	1043	1034	972	916	898	963	966
Evaluation	-	-	0	-	0	0	0	0	0	0	0	0
FARINOGRAM												
Water absorption (14% mb), %	-	-	56.1	-	56.4	56.2	60.3	59.7	58.7	58.3	59.2	59.4
Development time, min	-	-	2.7	-	2.5	2.6	6.5	6.0	4.3	4.2	4.8	5.4
Stability, mm	-	-	8.9	-	9.7	9.3	15.8	12.9	9.7	10.3	12.4	12.6
Mixing tolerance index, BU	-	-	26	-	25	25	25	31	37	36	30	31

2022/23 Imported Wheat Quality Versus 2022/23 RSA Wheat Quality

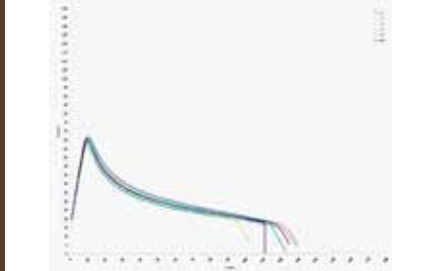
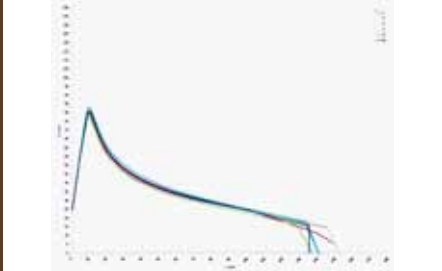
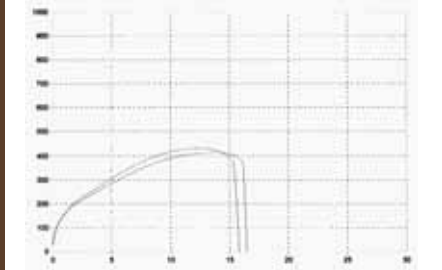
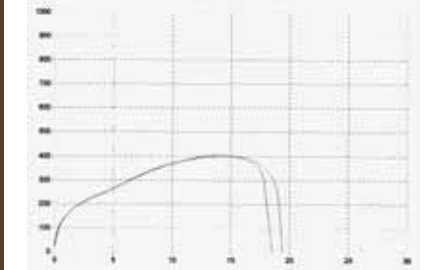
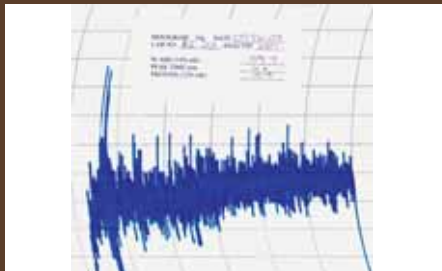
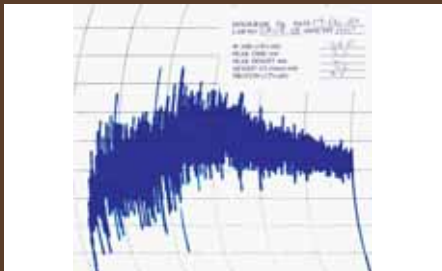
Country of origin	Latvia Average						RSA Crop Average					
Class and Grade bread wheat	Super	Gr1	Gr2	Gr3	COW	Average	Super	Gr1	Gr2	Gr3	COW	Average
No. of samples	-	-	5	-	5	10	19	17	13	11	5	65
ALVEOGRAM												
Strength (S), cm ²	-	-	33.2	-	35.9	34.5	48.0	42.7	35.6	35.4	40.6	41.4
Stability (P), mm	-	-	71	-	71	71	78	82	78	84	77	80
Distensibility (L), mm	-	-	112	-	120	116	152	130	119	101	137	130
P/L	-	-	0.64	-	0.59	0.61	0.52	0.66	0.72	0.86	0.60	0.66
												
EXTENSOGRAM												
Strength, cm ²	-	-	78	-	85	82	134	108	91	85	113	109
Max. height, BU	-	-	351	-	368	360	454	407	371	384	419	411
Extensibility, mm	-	-	159	-	166	162	218	194	178	159	200	192
												
MIXOGRAM												
Peak time, min	-	-	3.4	-	3.7	3.5	3.1	3.2	3.0	3.4	3.2	3.1
Water absorption (14% mb), %	-	-	59.9	-	60.5	60.2	62.4	61	60	59.5	60.9	60.9
												
MYCOTOXINS												
Aflatoxin B ₁ (µg/kg)	ND						ND					
Aflatoxin B ₂ (µg/kg)	ND						ND					
Aflatoxin G ₁ (µg/kg)	ND						ND					
Aflatoxin G ₂ (µg/kg)	ND						ND					
Fumonisin B ₁ (µg/kg)	ND						ND					
Fumonisin B ₂ (µg/kg)	ND						ND					
Fumonisin B ₃ (µg/kg)	ND						ND					
Deoxynivalenol (µg/kg) [max. value]	196 [212]						757 [6 463]					
15-ADON (µg/kg)	54 [108]						46 [301]					
Ochratoxin A (µg/kg)	ND						ND					
Zearalenone (µg/kg)	ND						1 [36]					
HT-2 (µg/kg)	ND						ND					
T-2 Toxin (µg/kg)	ND						ND					
No. of samples	2						40					

Imported Wheat Quality - Lithuania (25 Sep 2022 to 30 Sep 2023)

2022/23 Imported Wheat Quality Versus 2022/23 RSA Wheat Quality

Country of origin	Lithuania Average						RSA Crop Average						
Class and Grade bread wheat	Super	Gr1	Gr2	Gr3	COW	Average	Super	Gr1	Gr2	Gr3	COW	Average	
No. of samples	-	5	10	4	8	27	103	55	47	35	95	335	
WHEAT GRADING													
Protein (12% mb), %	-	12.1	11.0	11.1	11.1	11.3	13.2	12.0	11.1	10.3	12.2	12.1	
Moisture, %	-	12.3	12.5	12.4	12.2	12.3	11.2	11.2	11.3	11.5	11.2	11.3	
Falling number, sec	-	336	337	324	352	339	370	372	378	374	331	361	
1000 Kernel mass (13% mb), g	-	35.1	37.4	34.8	38.0	36.7	36.8	37.4	38.6	39.2	35.4	37.0	
Hlm (dirty), kg/hl	-	76.9	77.1	75.6	75.7	76.4	80.3	80.4	80.7	79.5	78.7	79.8	
Screenings (<1.8 mm sieve), %	-	2.53	2.56	2.57	2.76	2.61	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	0.01	0.01	0.01	0.03	0.01	
Foreign matter, %	-	0.13	0.19	0.17	0.12	0.16	0.11	0.11	0.11	0.12	0.21	0.14	
Other grain & unthreshed ears, %	-	0.74	0.4	0.55	1.69	0.87	0.33	0.36	0.38	0.39	0.78	0.48	
Heat damaged kernels, %	-	0.00	0.00	0.06	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	
Immature kernels, %	-	0.00	0.01	0.00	0.01	0.01	0.06	0.03	0.04	0.03	0.03	0.04	
Insect damaged kernels, %	-	0.10	0.22	0.08	0.2	0.17	0.45	0.48	0.55	0.58	0.66	0.54	
Sprouted kernels, %	-	0.06	0.04	0.07	0.00	0.04	0.11	0.07	0.04	0.03	0.42	0.17	
Total damaged kernels, %	-	0.16	0.27	0.21	0.22	0.22	0.62	0.58	0.64	0.63	1.11	0.76	
Combined deviations, %	-	3.57	3.43	3.49	4.79	3.86	2.32	2.27	2.45	2.55	4.82	3.06	
Heavily frost damaged kernels, %	-	0.00	0.02	0.01	0.07	0.03	0.00	0.00	0.01	0.00	0.11	0.03	
Field fungi, %	-	0.35	0.38	1.5	0.66	0.62	0.33	0.33	0.16	0.14	0.59	0.36	
Storage fungi, %	-	0.08	0.04	0.02	0.02	0.04	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	0	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	
Summary Statistics													
		Super	Gr1	Gr2	Gr3	COW	Average	Super	Gr1	Gr2	Gr3	COW	Average
No. of samples	-	5	10	4	8	27		19	16	14	8	8	65
Bühler Extraction, %	-	72.7	73.3	72.7	73.3	73.1		74.4	73.9	73.7	73.1	73.3	73.8
FLOUR													
Colour, KJ	-	-3.7	-4.7	-4.9	-4.3	-4.4		-5.0	-5.0	-5.0	-4.9	-5.0	-5.0
Colour, Konica Minolta CM5 (dry)													
L*	-	93.46	93.54	93.65	93.52	93.53		93.60	93.69	93.67	93.76	93.80	93.68
a*	-	0.61	0.57	0.56	0.52	0.56		0.51	0.48	0.47	0.44	0.48	0.48
b*	-	10.04	9.98	10.27	10.01	10.04		10.02	10.26	10.58	9.99	10.23	10.20
Ash (db), %	-	0.53	0.53	0.57	0.51	0.53		0.59	0.60	0.60	0.59	0.59	0.59
Protein (12% mb), %	-	10.8	9.8	9.8	9.9	10.0		12.2	11.1	10.2	9.6	10.9	11.0
Wet Gluten (14% mb), %	-	29.4	25.7	25.7	26.2	26.6		32.9	29.6	27.5	25.6	29.7	29.5
Dry Gluten (14% mb), %	-	9.9	8.6	8.7	8.7	8.9		11.1	9.9	9.1	8.2	9.9	9.8
Gluten Index	-	97	98	98	98	98		95	96	96	97	96	96
100 g BAKING TEST													
Baking water absorption, %	-	60.7	59.6	59.6	59.7	59.8		62.4	61.0	60.0	59.7	60.9	61.0
Loaf volume, cm ³	-	1027	919	910	920	938		1034	972	916	898	963	966
Evaluation	-	0	0	0	1	0		0	0	0	0	0	0
FARINOGRAM													
Water absorption (14% mb), %	-	56.3	54.9	54.6	55.4	55.2		60.3	59.7	58.7	58.3	59.2	59.4
Development time, min	-	2.9	2.1	2.2	2.4	2.4		6.5	6.0	4.3	4.2	4.8	5.4
Stability, mm	-	11.5	7.5	6.9	9.6	8.8		15.8	12.9	9.7	10.3	12.4	12.6
Mixing tolerance index, BU	-	26	38	41	30	34		25	31	37	36	30	31

2022/23 Imported Wheat Quality Versus 2022/23 RSA Wheat Quality

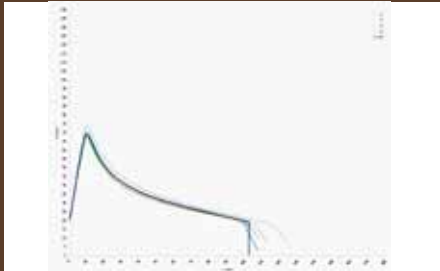
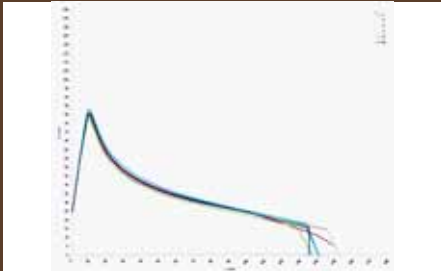
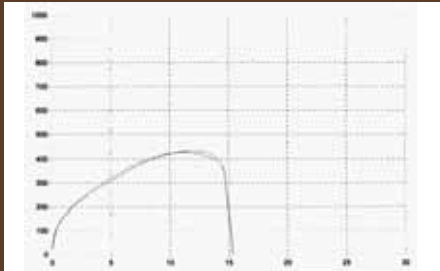
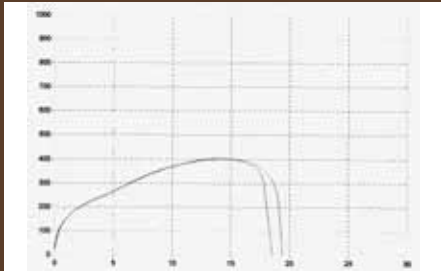
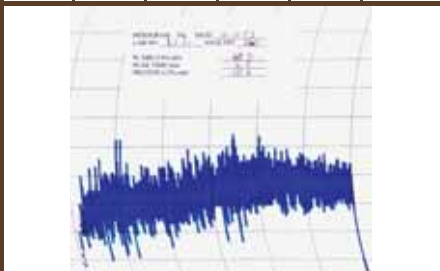
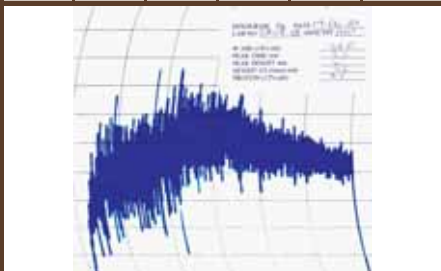
Country of origin	Lithuania Average						RSA Crop Average					
Class and Grade bread wheat	Super	Gr1	Gr2	Gr3	COW	Average	Super	Gr1	Gr2	Gr3	COW	Average
No. of samples	-	5	10	4	8	27	19	17	13	11	5	65
ALVEOGRAM												
Strength (S), cm ²	-	38.7	35.2	35.6	35.4	36.0	48.0	42.7	35.6	35.4	40.6	41.4
Stability (P), mm	-	75	75	70	77	75	78	82	78	84	77	80
Distensibility (L), mm	-	113	102	113	101	106	152	130	119	101	137	130
P/L	-	0.67	0.75	0.63	0.77	0.72	0.52	0.66	0.72	0.86	0.60	0.66
												
EXTENSOGRAM												
Strength, cm ²	-	103	98	99	96	99	134	108	91	85	113	109
Max. height, BU	-	434	462	441	444	448	454	407	371	384	419	411
Extensibility, mm	-	174	155	165	158	161	218	194	178	159	200	192
												
MIXOGRAM												
Peak time, min	-	4	4.6	4.8	4.3	4.4	3.1	3.2	3.0	3.4	3.2	3.1
Water absorption (14% mb), %	-	60.7	59.6	59.6	59.7	59.8	62.4	61	60	59.5	60.9	60.9
												
MYCOTOXINS												
Aflatoxin B ₁ (µg/kg)				ND							ND	
Aflatoxin B ₂ (µg/kg)				ND							ND	
Aflatoxin G ₁ (µg/kg)				ND							ND	
Aflatoxin G ₂ (µg/kg)				ND							ND	
Fumonisin B ₁ (µg/kg)				ND							ND	
Fumonisin B ₂ (µg/kg)				ND							ND	
Fumonisin B ₃ (µg/kg)				ND							ND	
Deoxynivalenol (µg/kg) [max. value]				178 [327]							757 [6 463]	
15-ADON (µg/kg)				0 [<100]							46 [301]	
Ochratoxin A (µg/kg)				ND							ND	
Zearalenone (µg/kg)				ND							1 [36]	
HT-2 (µg/kg)				ND							ND	
T-2 Toxin (µg/kg)				ND							ND	
No. of samples				10							40	

Imported Wheat Quality - Poland (25 Sep 2022 to 30 Sep 2023)

2022/23 Imported Wheat Quality Versus 2022/23 RSA Wheat Quality

Country of origin	Poland Average						RSA Crop Average						
Class and Grade bread wheat	Super	Gr1	Gr2	Gr3	COW	Average	Super	Gr1	Gr2	Gr3	COW	Average	
No. of samples	-	8	10	5	23	46	103	55	47	35	95	335	
WHEAT GRADING													
Protein (12% mb), %	-	12.0	11.0	11.6	11.5	11.5	13.2	12.0	11.1	10.3	12.2	12.1	
Moisture, %	-	12.0	11.7	12.0	12.1	12.0	11.2	11.2	11.3	11.5	11.2	11.3	
Falling number, sec	-	342	339	362	353	349	370	372	378	374	331	361	
1000 Kernel mass (13% mb), g	-	40.0	40.7	41.7	41.1	40.9	36.8	37.4	38.6	39.2	35.4	37.0	
Hlm (dirty), kg/hl	-	79.0	78.8	76.0	79.2	78.8	80.3	80.4	80.7	79.5	78.7	79.8	
Screenings (<1.8 mm sieve), %	-	2.58	2.47	2.45	3.15	2.82	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	0.01	0.01	0.01	0.03	0.01	
Foreign matter, %	-	0.1	0.11	0.11	0.19	0.15	0.11	0.11	0.11	0.12	0.21	0.14	
Other grain & unthreshed ears, %	-	0.71	0.52	0.76	0.83	0.74	0.33	0.36	0.38	0.39	0.78	0.48	
Heat damaged kernels, %	-	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Immature kernels, %	-	0.04	0.04	0.00	0.01	0.02	0.06	0.03	0.04	0.03	0.03	0.04	
Insect damaged kernels, %	-	0.08	0.09	0.06	0.03	0.06	0.45	0.48	0.55	0.58	0.66	0.54	
Sprouted kernels, %	-	0.04	0.04	0.00	0.02	0.02	0.11	0.07	0.04	0.03	0.42	0.17	
Total damaged kernels, %	-	0.17	0.16	0.06	0.06	0.10	0.62	0.58	0.64	0.63	1.11	0.76	
Combined deviations, %	-	3.56	3.26	3.37	4.23	3.81	2.32	2.27	2.45	2.55	4.82	3.06	
Heavily frost damaged kernels, %	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.11	0.03	
Field fungi, %	-	0.15	0.38	0.17	0.19	0.22	0.33	0.33	0.16	0.14	0.59	0.36	
Storage fungi, %	-	0.05	0.00	0.00	0.02	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	
Poisonous seeds (<i>Crotalaria spp.</i> , etc.)	-	0	0	0	0	0	0	0	0	0	0	0	
Poisonous seeds (<i>Argemone mexicana</i> , etc.)	-	0	0	0	1	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	
WHEAT GRADING (Continued)													
		Super	Gr1	Gr2	Gr3	COW	Average	Super	Gr1	Gr2	Gr3	COW	Average
No. of samples	-	8	10	5	23	46	46	19	16	14	8	8	65
Bühler Extraction, %	-	73.3	73.5	72.7	73.5	73.4	73.4	74.4	73.9	73.7	73.1	73.3	73.8
FLOUR													
Colour, KJ	-	-4.3	-4.7	-4.0	-4.4	-4.4	-4.4	-5.0	-5.0	-5.0	-4.9	-5.0	-5.0
Colour, Konica Minolta CM5 (dry)													
L*	-	93.49	93.58	93.55	93.54	93.54	93.54	93.60	93.69	93.67	93.76	93.80	93.68
a*	-	0.57	0.49	0.41	0.53	0.52	0.52	0.51	0.48	0.47	0.44	0.48	0.48
b*	-	9.96	10.04	9.39	10.17	10.02	10.02	10.02	10.26	10.58	9.99	10.23	10.20
Ash (db), %	-	0.52	0.52	0.52	0.52	0.52	0.52	0.59	0.60	0.60	0.59	0.59	0.59
Protein (12% mb), %	-	10.7	9.8	10.3	10.3	10.2	10.2	12.2	11.1	10.2	9.6	10.9	11.0
Wet Gluten (14% mb), %	-	28.6	25.3	27.4	27.1	27.0	27.0	32.9	29.6	27.5	25.6	29.7	29.5
Dry Gluten (14% mb), %	-	9.7	8.3	9.1	9.1	9.0	9.0	11.1	9.9	9.1	8.2	9.9	9.8
Gluten Index	-	96	95	96	97	96	96	95	96	96	97	96	96
100 g BAKING TEST													
Baking water absorption, %	-	60.6	59.6	60.2	60.1	60.1	60.1	62.4	61.0	60.0	59.7	60.9	61.0
Loaf volume, cm ³	-	1003	878	1003	984	966	966	1034	972	916	898	963	966
Evaluation	-	0	0	0	0	0	0	0	0	0	0	0	0
FARINOGRAM													
Water absorption (14% mb), %	-	56.3	54.6	56.2	55.9	55.7	55.7	60.3	59.7	58.7	58.3	59.2	59.4
Development time, min	-	3.4	2.0	2.2	2.5	2.5	2.5	6.5	6.0	4.3	4.2	4.8	5.4
Stability, mm	-	11.2	8.1	11.4	9.8	9.9	9.9	15.8	12.9	9.7	10.3	12.4	12.6
Mixing tolerance index, BU	-	19	31	26	26	26	26	25	31	37	36	30	31

2022/23 Imported Wheat Quality Versus 2022/23 RSA Wheat Quality

Country of origin	Poland Average						RSA Crop Average					
Class and Grade bread wheat	Super	Gr1	Gr2	Gr3	COW	Average	Super	Gr1	Gr2	Gr3	COW	Average
No. of samples	-	8	10	5	23	46	19	17	13	11	5	65
ALVEOGRAM												
Strength (S), cm ²	-	38.8	32.8	40.4	37.2	36.9	48.0	42.7	35.6	35.4	40.6	41.4
Stability (P), mm	-	78	74	84	78	78	78	82	78	84	77	80
Distensibility (L), mm	-	110	92	101	100	100	152	130	119	101	137	130
P/L	-	0.72	0.83	0.85	0.81	0.8	0.52	0.66	0.72	0.86	0.60	0.66
												
EXTENSOGRAM												
Strength, cm ²	-	94	88	94	98	95	134	108	91	85	113	109
Max. height, BU	-	414	437	430	441	434	454	407	371	384	419	411
Extensibility, mm	-	168	147	163	164	161	218	194	178	159	200	192
												
MIXOGRAM												
Peak time, min	-	3.8	4.6	3.9	4.0	4.1	3.1	3.2	3.0	3.4	3.2	3.1
Water absorption (14% mb), %	-	60.6	59.6	60.2	60.1	60.1	62.4	61	60	59.5	60.9	60.9
												
MYCOTOXINS												
Aflatoxin B ₁ (µg/kg)	ND						ND					
Aflatoxin B ₂ (µg/kg)	ND						ND					
Aflatoxin G ₁ (µg/kg)	ND						ND					
Aflatoxin G ₂ (µg/kg)	ND						ND					
Fumonisin B ₁ (µg/kg)	ND						ND					
Fumonisin B ₂ (µg/kg)	ND						ND					
Fumonisin B ₃ (µg/kg)	ND						ND					
Deoxynivalenol (µg/kg) [max. value]	0 [<100]						757 [6 463]					
15-ADON (µg/kg)	33 [180]						46 [301]					
Ochratoxin A (µg/kg)	ND						ND					
Zearalenone (µg/kg)	ND						1 [36]					
HT-2 (µg/kg)	ND						ND					
T-2 Toxin (µg/kg)	ND						ND					
No. of samples	16						40					

Imported Wheat Quality - Russian Federation (25 Sep 2022 to 30 Sep 2023)

2022/23 Imported Wheat Quality Versus 2022/23 RSA Wheat Quality

Country of origin	Russian Federation Average						RSA Crop Average					
Class and Grade bread wheat	Super	Gr1	Gr2	Gr3	COW	Average	Super	Gr1	Gr2	Gr3	COW	Average
No. of samples	-	-	8	-	19	27	103	55	47	35	95	335

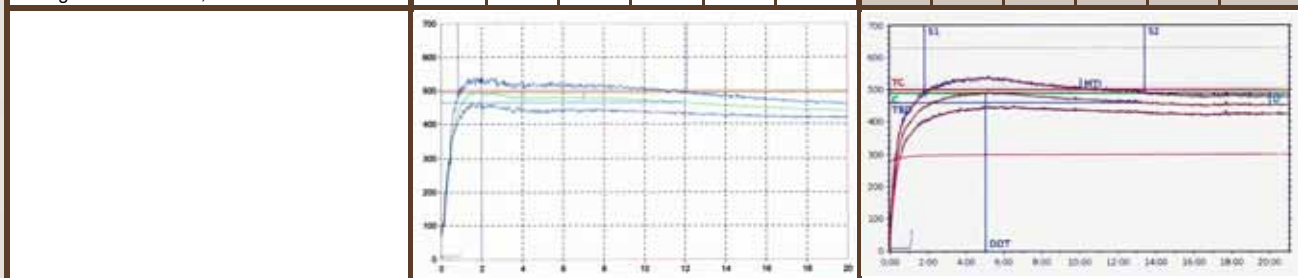
WHEAT GRADING												
Protein (12% mb), %	-	-	11.1	-	11.1	11.1	13.2	12.0	11.1	10.3	12.2	12.1
Moisture, %	-	-	10.9	-	11.2	11.1	11.2	11.2	11.3	11.5	11.2	11.3
Falling number, sec	-	-	369	-	338	347	370	372	378	374	331	361
1000 Kernel mass (13% mb), g	-	-	37.5	-	37.5	37.5	36.8	37.4	38.6	39.2	35.4	37.0
Hlm (dirty), kg/hl	-	-	81.8	-	80.3	80.8	80.3	80.4	80.7	79.5	78.7	79.8
Screenings (<1.8 mm sieve), %	-	-	2.84	-	3.09	3.01	1.26	1.21	1.32	1.41	2.72	1.69
Gravel, stones, turf and glass, %	-	-	0.01	-	0.00	0.00	0.00	0.01	0.01	0.01	0.03	0.01
Foreign matter, %	-	-	0.11	-	0.24	0.20	0.11	0.11	0.11	0.12	0.21	0.14
Other grain & unthreshed ears, %	-	-	0.15	-	0.37	0.3	0.33	0.36	0.38	0.39	0.78	0.48
Heat damaged kernels, %	-	-	0.02	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Immature kernels, %	-	-	0.02	-	0.00	0.00	0.06	0.03	0.04	0.03	0.03	0.04
Insect damaged kernels, %	-	-	0.35	-	1.54	1.19	0.45	0.48	0.55	0.58	0.66	0.54
Sprouted kernels, %	-	-	0.04	-	0.07	0.06	0.11	0.07	0.04	0.03	0.42	0.17
Total damaged kernels, %	-	-	0.42	-	1.61	1.26	0.62	0.58	0.64	0.63	1.11	0.76
Combined deviations, %	-	-	3.51	-	5.30	4.77	2.32	2.27	2.45	2.55	4.82	3.06
Heavily frost damaged kernels, %	-	-	0.00	-	0.00	0.00	0.00	0.00	0.01	0.00	0.11	0.03
Field fungi, %	-	-	0.16	-	0.2	0.19	0.33	0.33	0.16	0.14	0.59	0.36
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	0	0
Poisonous seeds (<i>Argemone mexicana</i> , etc.)	-	-	1	-	4	3	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	Gr1	Gr2	Gr3	COW	Average	Super	Gr1	Gr2	Gr3	COW	Average
No. of samples	-	-	8	-	19	27	19	16	14	8	8	65
Bühler Extraction, %	-	-	72.5	-	72.0	72.0	74.4	73.9	73.7	73.1	73.3	73.8

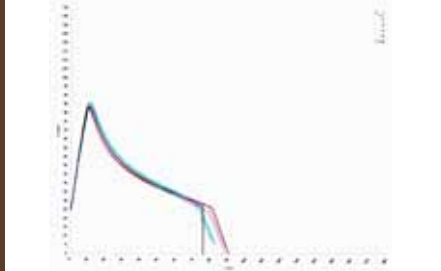
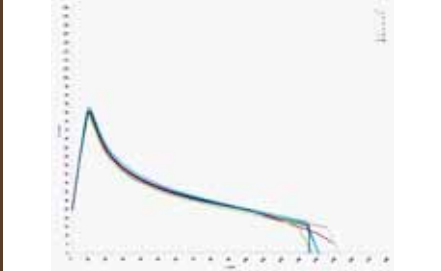
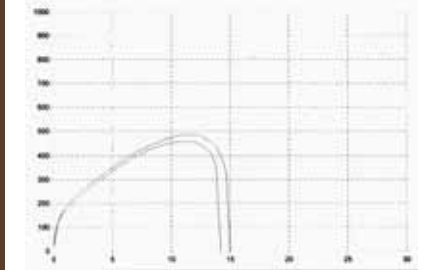
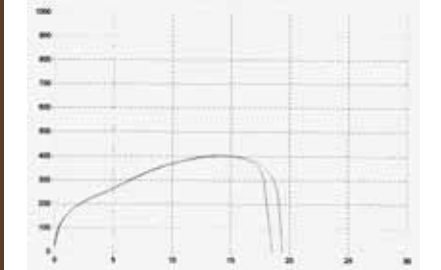
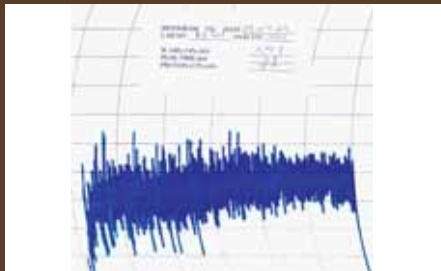
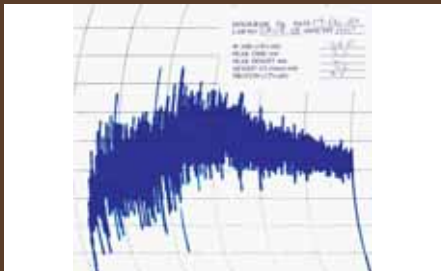
FLOUR												
Colour, KJ	-	-	-4.8	-	-4.5	-4.6	-5.0	-5.0	-5.0	-4.9	-5.0	-5.0
Colour, Konica Minolta CM5 (dry)												
L*	-	-	93.37	-	93.32	93.33	93.60	93.69	93.67	93.76	93.80	93.68
a*	-	-	0.46	-	0.45	0.45	0.51	0.48	0.47	0.44	0.48	0.48
b*	-	-	10.84	-	10.8	10.81	10.02	10.26	10.58	9.99	10.23	10.20
Ash (db), %	-	-	0.54	-	0.56	0.55	0.59	0.60	0.60	0.59	0.59	0.59
Protein (12% mb), %	-	-	10.0	-	10.1	10.1	12.2	11.1	10.2	9.6	10.9	11.0
Wet Gluten (14% mb), %	-	-	24.7	-	25.3	25.1	32.9	29.6	27.5	25.6	29.7	29.5
Dry Gluten (14% mb), %	-	-	8.2	-	8.4	8.3	11.1	9.9	9.1	8.2	9.9	9.8
Gluten Index	-	-	99	-	98	98	95	96	96	97	96	96

100 g BAKING TEST												
Baking water absorption, %	-	-	59.8	-	59.9	59.9	62.4	61.0	60.0	59.7	60.9	61.0
Loaf volume, cm ³	-	-	907	-	923	918	1034	972	916	898	963	966
Evaluation	-	-	0	-	0	0	0	0	0	0	0	0

FARINOGRAM												
Water absorption (14% mb), %	-	-	56.4	-	56.2	56.2	60.3	59.7	58.7	58.3	59.2	59.4
Development time, min	-	-	2.1	-	2.1	2.1	6.5	6.0	4.3	4.2	4.8	5.4
Stability, mm	-	-	11.6	-	11.3	11.4	15.8	12.9	9.7	10.3	12.4	12.6
Mixing tolerance index, BU	-	-	27	-	26	26	25	31	37	36	30	31



2022/23 Imported Wheat Quality Versus 2022/23 RSA Wheat Quality

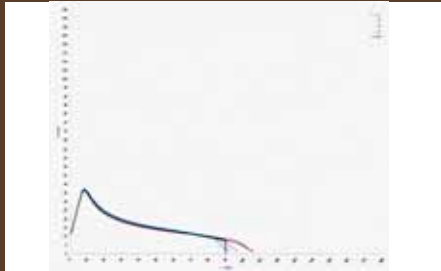
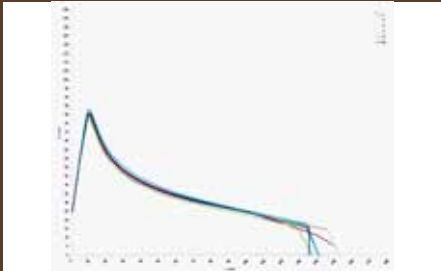
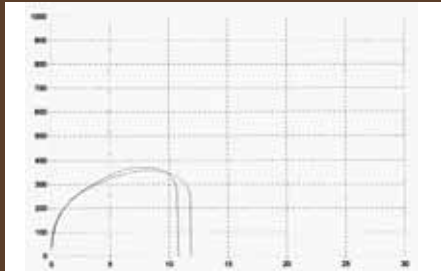
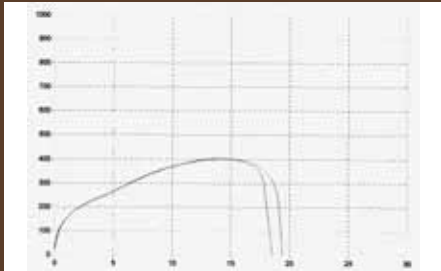
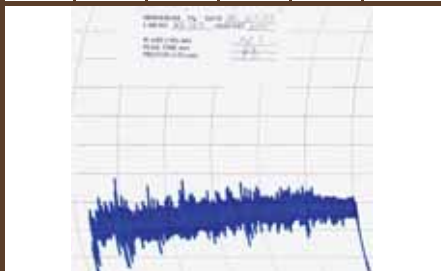
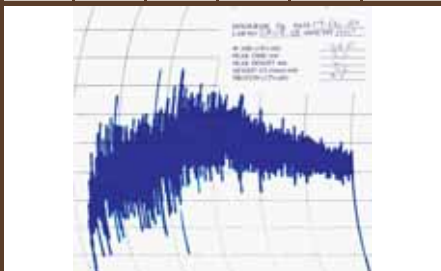
Country of origin	Russian Federation Average						RSA Crop Average					
Class and Grade bread wheat	Super	Gr1	Gr2	Gr3	COW	Average	Super	Gr1	Gr2	Gr3	COW	Average
No. of samples	-	-	8	-	19	27	19	17	13	11	5	65
ALVEOGRAM												
Strength (S), cm ²	-	-	39.5	-	37.7	38.3	48.0	42.7	35.6	35.4	40.6	41.4
Stability (P), mm	-	-	95	-	91	92	78	82	78	84	77	80
Distensibility (L), mm	-	-	79	-	79	79	152	130	119	101	137	130
P/L	-	-	1.22	-	1.17	1.18	0.52	0.66	0.72	0.86	0.60	0.66
												
EXTENSOGRAM												
Strength, cm ²	-	-	94	-	97	96	134	108	91	85	113	109
Max. height, BU	-	-	475	-	485	482	454	407	371	384	419	411
Extensibility, mm	-	-	146	-	148	148	218	194	178	159	200	192
												
MIXOGRAM												
Peak time, min	-	-	4.7	-	5.0	4.9	3.1	3.2	3.0	3.4	3.2	3.1
Water absorption (14% mb), %	-	-	59.8	-	59.9	59.9	62.4	61	60	59.5	60.9	60.9
												
MYCOTOXINS												
Aflatoxin B ₁ (µg/kg)	ND						ND					
Aflatoxin B ₂ (µg/kg)	ND						ND					
Aflatoxin G ₁ (µg/kg)	ND						ND					
Aflatoxin G ₂ (µg/kg)	ND						ND					
Fumonisin B ₁ (µg/kg)	ND						ND					
Fumonisin B ₂ (µg/kg)	ND						ND					
Fumonisin B ₃ (µg/kg)	ND						ND					
Deoxynivalenol (µg/kg) [max. value]	0 [<100]						757 [6 463]					
15-ADON (µg/kg)	0 [<100]						46 [301]					
Ochratoxin A (µg/kg)	ND						ND					
Zearalenone (µg/kg)	ND						1 [36]					
HT-2 (µg/kg)	ND						ND					
T-2 Toxin (µg/kg)	ND						ND					
No. of samples	7						40					


Imported Wheat Quality - USA (25 Sep 2022 to 30 Sep 2023)

2022/23 Imported Wheat Quality Versus 2022/23 RSA Wheat Quality

Country of origin	USA Average						RSA Crop Average					
Class and Grade bread wheat	Super	Gr1	Gr2	Gr3	COW	Average	Super	Gr1	Gr2	Gr3	COW	Average
No. of samples	-	-	1	-	1	2	103	55	47	35	95	335
WHEAT GRADING												
Protein (12% mb), %	-	-	10.8	-	9.8	10.2	13.2	12.0	11.1	10.3	12.2	12.1
Moisture, %	-	-	11.9	-	12.0	11.9	11.2	11.2	11.3	11.5	11.2	11.3
Falling number, sec	-	-	341	-	359	353	370	372	378	374	331	361
1000 Kernel mass (13% mb), g	-	-	41.6	-	31.8	35.0	36.8	37.4	38.6	39.2	35.4	37.0
Hlm (dirty), kg/hl	-	-	79.7	-	79.7	79.7	80.3	80.4	80.7	79.5	78.7	79.8
Screenings (<1.8 mm sieve), %	-	-	2.15	-	2.53	2.4	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	0.01	0.01	0.01	0.03	0.01
Foreign matter, %	-	-	0.00	-	0.18	0.12	0.11	0.11	0.11	0.12	0.21	0.14
Other grain & unthreshed ears, %	-	-	0.32	-	0.63	0.53	0.33	0.36	0.38	0.39	0.78	0.48
Heat damaged kernels, %	-	-	0.26	-	0.29	0.28	0.00	0.00	0.00	0.00	0.00	0.00
Immature kernels, %	-	-	0.00	-	0.00	0.00	0.06	0.03	0.04	0.03	0.03	0.04
Insect damaged kernels, %	-	-	0.00	-	3.13	2.09	0.45	0.48	0.55	0.58	0.66	0.54
Sprouted kernels, %	-	-	0.00	-	0.00	0.00	0.11	0.07	0.04	0.03	0.42	0.17
Total damaged kernels, %	-	-	0.26	-	3.42	2.37	0.62	0.58	0.64	0.63	1.11	0.76
Combined deviations, %	-	-	2.73	-	6.13	5.00	2.32	2.27	2.45	2.55	4.82	3.06
Heavily frost damaged kernels, %	-	-	0.00	-	0.00	0.00	0.00	0.00	0.01	0.00	0.11	0.03
Field fungi, %	-	-	1.18	-	0.77	0.91	0.33	0.33	0.16	0.14	0.59	0.36
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	0	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
Summary Statistics												
	Super	Gr1	Gr2	Gr3	COW	Average	Super	Gr1	Gr2	Gr3	COW	Average
No. of samples	-	-	1	-	2	3	19	16	14	8	8	65
Bühler Extraction, %	-	-	75.1	-	71.6	72.7	74.4	73.9	73.7	73.1	73.3	73.8
FLOUR												
Colour, KJ	-	-	-5.0	-	-5.0	-5.0	-5.0	-5.0	-5.0	-4.9	-5.0	-5.0
Colour, Konica Minolta CM5 (dry)												
L*	-	-	93.31	-	94.77	94.28	93.60	93.69	93.67	93.76	93.80	93.68
a*	-	-	0.57	-	0.25	0.35	0.51	0.48	0.47	0.44	0.48	0.48
b*	-	-	10.27	-	8.84	9.32	10.02	10.26	10.58	9.99	10.23	10.20
Ash (db), %	-	-	0.53	-	0.49	0.5	0.59	0.60	0.60	0.59	0.59	0.59
Protein (12% mb), %	-	-	9.7	-	8.0	8.6	12.2	11.1	10.2	9.6	10.9	11.0
Wet Gluten (14% mb), %	-	-	26.1	-	25.0	25.6	32.9	29.6	27.5	25.6	29.7	29.5
Dry Gluten (14% mb), %	-	-	8.1	-	8.3	8.2	11.1	9.9	9.1	8.2	9.9	9.8
Gluten Index	-	-	96	-	95	96	95	96	96	97	96	96
100 g BAKING TEST												
Baking water absorption, %	-	-	59.5	-	57.2	58.0	62.4	61.0	60.0	59.7	60.9	61.0
Loaf volume, cm ³	-	-	825	-	737	766	1034	972	916	898	963	966
Evaluation	-	-	0	-	0	0	0	0	0	0	0	0
FARINOGRAM												
Water absorption (14% mb), %	-	-	56.7	-	49.5	51.9	60.3	59.7	58.7	58.3	59.2	59.4
Development time, min	-	-	1.7	-	1.1	1.3	6.5	6.0	4.3	4.2	4.8	5.4
Stability, mm	-	-	4.7	-	2.3	3.1	15.8	12.9	9.7	10.3	12.4	12.6
Mixing tolerance index, BU	-	-	48	-	73	65	25	31	37	36	30	31

2022/23 Imported Wheat Quality Versus 2022/23 RSA Wheat Quality

Country of origin	USA Average						RSA Crop Average					
Class and Grade bread wheat	Super	Gr1	Gr2	Gr3	COW	Average	Super	Gr1	Gr2	Gr3	COW	Average
No. of samples	-	-	1	-	1	2	19	17	13	11	5	65
ALVEOGRAM												
Strength (S), cm ²	-	-	36.2	-	15.3	22.3	48.0	42.7	35.6	35.4	40.6	41.4
Stability (P), mm	-	-	83	-	39	54	78	82	78	84	77	80
Distensibility (L), mm	-	-	96	-	86	89	152	130	119	101	137	130
P/L	-	-	0.86	-	0.46	0.59	0.52	0.66	0.72	0.86	0.60	0.66
												
EXTENSOGRAM												
Strength, cm ²	-	-	80	-	56	64	134	108	91	85	113	109
Max. height, BU	-	-	390	-	316	341	454	407	371	384	419	411
Extensibility, mm	-	-	151	-	124	133	218	194	178	159	200	192
												
MIXOGRAM												
Peak time, min	-	-	4.6	-	5.5	5.2	3.1	3.2	3.0	3.4	3.2	3.1
Water absorption (14% mb), %	-	-	59.5	-	58.1	58.6	62.4	61	60	59.5	60.9	60.9
												
MYCOTOXINS												
Aflatoxin B ₁ (µg/kg)	ND						ND					
Aflatoxin B ₂ (µg/kg)	ND						ND					
Aflatoxin G ₁ (µg/kg)	ND						ND					
Aflatoxin G ₂ (µg/kg)	ND						ND					
Fumonisin B ₁ (µg/kg)	ND						ND					
Fumonisin B ₂ (µg/kg)	ND						ND					
Fumonisin B ₃ (µg/kg)	ND						ND					
Deoxynivalenol (µg/kg) [max. value]	195 [390]						757 [6 463]					
15-ADON (µg/kg)	0 [<100]						46 [301]					
Ochratoxin A (µg/kg)	ND						ND					
Zearalenone (µg/kg)	ND						1 [36]					
HT-2 (µg/kg)	ND						ND					
T-2 Toxin (µg/kg)	ND						ND					
No. of samples	2						40					



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

Southern African Grain Laboratories NPC

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

Mrs FS Radebe
Acting Chief Executive Officer

Effective Date: 01 November 2024
Certificate Expires: 31 October 2029



Facility Number: T0116

ANNEXURE A

SCHEDULE OF ACCREDITATION

Facility Number: **T0116**

Permanent Address of Laboratory:

Souther African Grain
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 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)
Ms T de Beer (Rheological Methods)
Ms S Makhoba (In-House Method 026)
Ms T Mabobo (In-House Methods 001 & 010)
Mr J Kobola (All Grading Methods)
Ms J Ntimane (All Chemical Methods)

Postal Address:

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Private Bag X1
The Willows
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Tel: (012) 807-4019

Fax: N/A

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

Nominated Representative:

Mrs H Meyer

Issue No.: 33

Date of Issue: 29 August 2024

Expiry Date: 31 October 2029

Material or Products Tested	Type of Tests / Properties Measured, Range of Measurement	Standard Specifications, Techniques / Equipment Used
CHEMICAL		
Ground Barley	Moisture (Oven Method)	Analytical EBC Method 3.2, latest Edition (2 hour; 130 ⁰ 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 ⁰ C) (2 hour; 130 ⁰ 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 ⁰ C) (72 hour; 103 ⁰ C)
Animal feed, Plant tissue and Sunflower (Milled)	Moisture (Oven Method)	AgriLASA 2.1, Latest Edition (5 hours, 105 ⁰ C)

Facility Number: T0116

Animal feed, Plant tissue and Sunflower (Milled)	Moisture (Oven Method)	AgriLASA 2.1, Latest Edition (5 hours, 105°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°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
NUTRIENTS AND CONTAMINANTS		
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
Grain based food and feed products (fortified and unfortified) and fortification mixes		
Yeast and Bread	Vitamin D ₂ (HPLC)	In-House method 029

Facility Number: T0116

Food and feed	Multi-Mycotoxin: -Aflatoxin G ₁ , B ₁ , G ₂ , B ₂ and total -Deoxynivalenol (DON), 15-ADON -Fumonisin B ₁ , B ₂ , B ₃ -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

GOVERNMENT NOTICES • GOEWERMENTSKENNISGEWINGS

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 (± 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 (± 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



