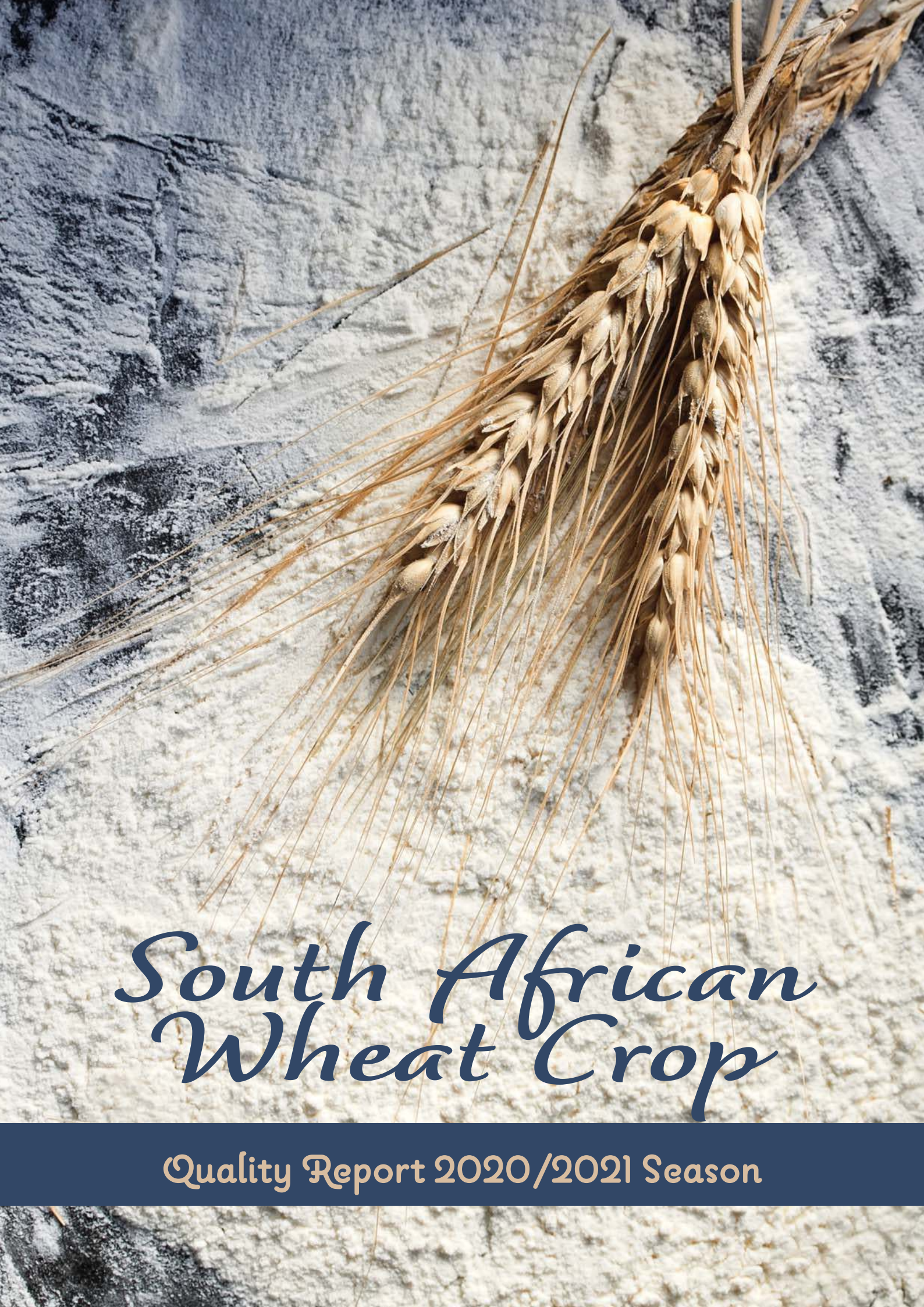

South African Wheat Crop

Quality Report 2020/2021 Season

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South African

Commercial Wheat Quality for the 2020/2021 Season

Acknowledgements

With gratitude to:

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

Summary

The 2020/21 season's commercial wheat crop was set at 2 120 000 tons, which is 585 000 tons (38%) higher than the previous season's crop and also the highest since the 2008/09 season. A total area of 509 800 hectares was utilised for wheat production and the average yield was 4.16 tons per hectare (Figures obtained from the CEC).

The whole wheat protein average of 12.0% decreased by 0.9% 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 42% (64.2% last season). The average hectoliter mass equaled the 78.9 kg/hl of the previous season, which was the lowest since the 2010/11 season, when the use of an instrument that complies to ISO standard 7971-3 (e.g. Kern 222) became compulsory. The ten-year national average is 80.4 kg/hl. 10% of the samples reported values below the minimum requirement of 76 kg/hl for Super Grade, Grade 1 and Grade 2.

The average falling number this season was 372 seconds. 6.4% (16) of the samples analysed gave falling number values below 250 seconds and of these 11 were below 220 seconds. The average mixogram peak time of 3.2 minutes was slightly longer than the 3.0 minutes of the previous season. The ten-year average is 2.9 minutes.

Introduction

This report provides the results of the twenty-third 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. The number of samples analysed for the purpose of this survey had to be decreased to 250 as a result of a reduced amount approved for funding of this project. The samples were selected to provide as best possible a proportional representation of the production of wheat in all the different production regions.

The samples were graded, visual cultivar identification performed and the thousand kernel mass determined. Sub-samples were milled on a Quadromat Junior mill for mixograph analyses. 49 composite samples per class and grade for each production region 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 30 samples randomly selected to represent the different production regions. No amino acid profile analyses were conducted this season.

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 all 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 2019/20 (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.

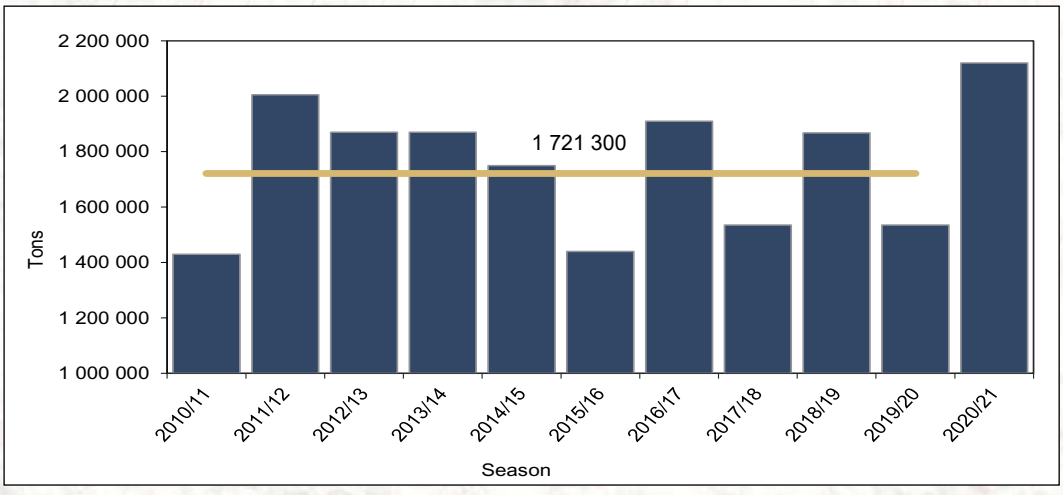
Production

Wheat contributed 72% to the total winter cereal crop production in South Africa this season. Other winter crops produced are malting barley, canola and cereal 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 32 and 33.

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

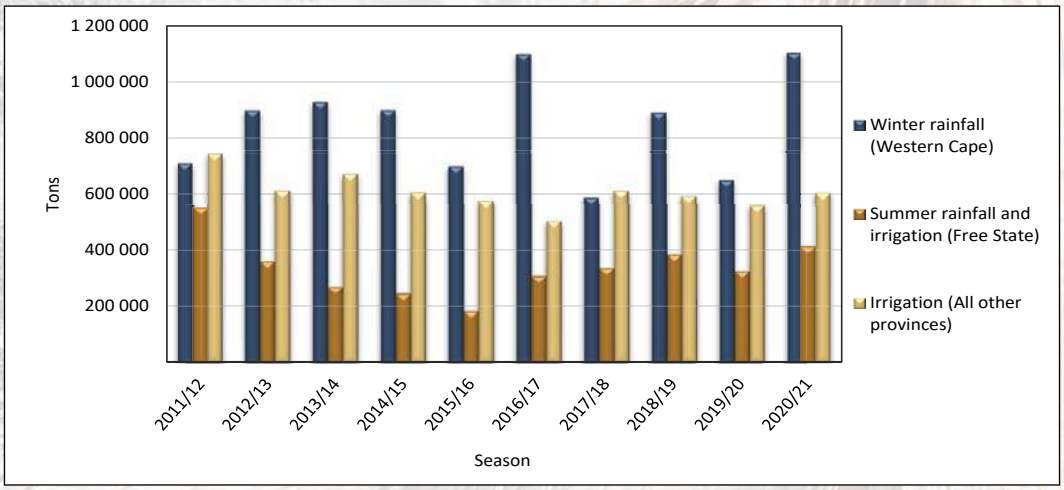
Graph 1: Wheat production in the RSA from the 2010/11 to 2020/21 seasons



Figures provided by the CEC.

The final production figure of 2 120 000 tons is 23% higher than the ten-year production average of 1 721 300 tons (2010/11 to 2019/20 seasons). The Western Cape produced 1 103 000 tons of wheat this season (year on year increase of 70%), contributing 52% of the total crop, compared to the 42% of the previous season. The Free State's wheat production (413 600 tons) increased by almost 27% year on year and reported the second highest provincial production figure. The irrigation areas of the Northern Cape, the third largest wheat producing area this season, produced 271 950 tons, 9 450 tons (4%) more than last season. The remainder of the wheat was produced mainly in Limpopo with 147 200 tons, representing an increase of 23% compared to the 2019/20 season and North West, where production increased by 4% to 82 200 tons. Please see Graphs 1 and 2.

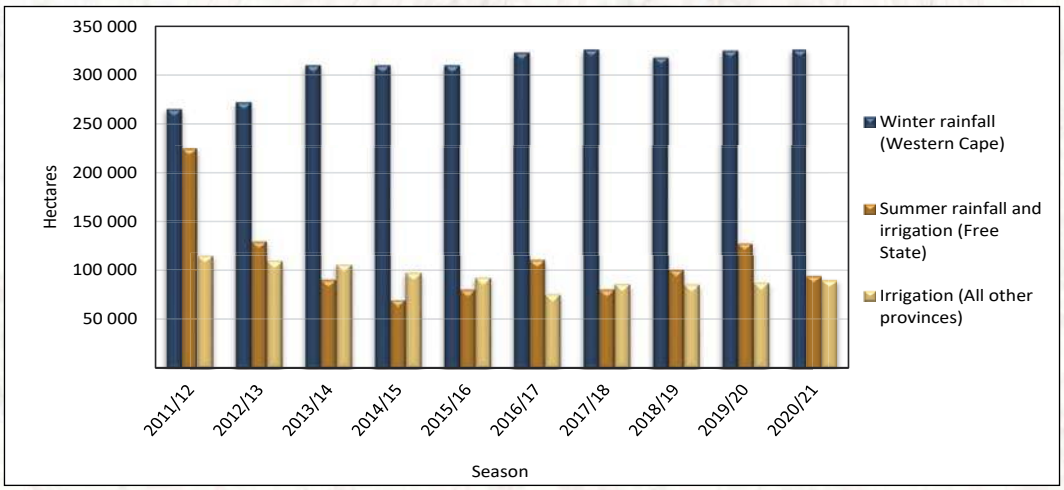
Graph 2: Wheat production figures per production area over ten seasons



Figures provided by the CEC.

Despite the increase in production, the area utilised for wheat production decreased by almost 6% to 509 800 hectares from 540 000 hectares in the previous season. Hectares cultivated under wheat in the Western Cape increased marginally by less than 1%, while a 27% reduction was observed in the Free State. Nationally, dry land and irrigation areas showed decreases of 6% and 3% respectively year on year. Please see Graph 3.

Graph 3: Area planted per production area over ten seasons

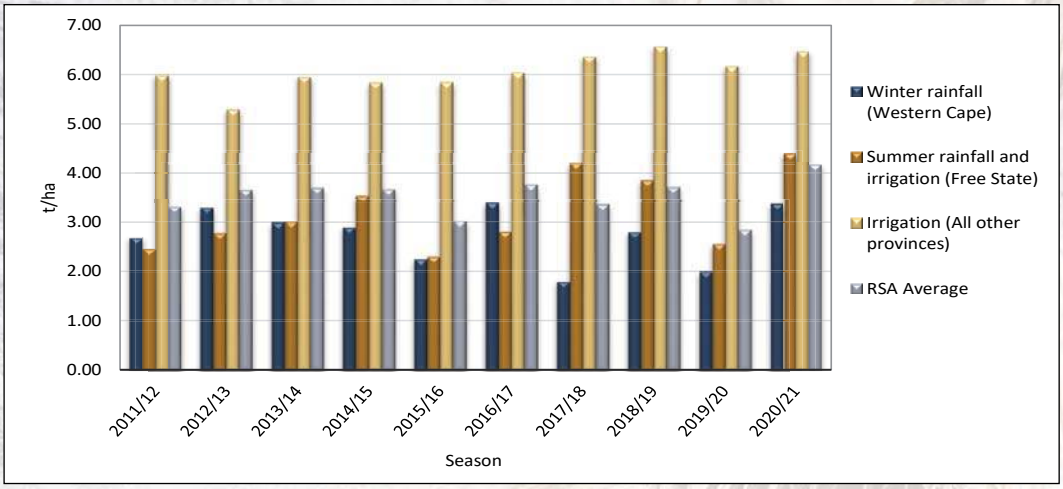


Figures provided by the CEC.

The yield in the main production areas ranged from 3.38 tons per hectare (t/ha) in the winter rainfall area of the Western Cape to 7.35 t/ha for irrigation wheat produced in the Northern Cape. The Free State (summer rainfall and irrigation areas) averaged 4.40 t/ha. The national yield average increased from 2.84 t/ha in the previous season to 4.16 t/ha this season. Please see Graph 4 as well as Table 1 on the next page.

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

Graph 4: Average yield per production area over ten seasons



Figures provided by the CEC.

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

Table 1: Wheat production overview over two seasons

Province	Type of production	2020/21			2019/20		
		Hectares planted, ha	Production, tons	Yield, t/ha	Hectares planted, ha	Production, tons	Yield, t/ha
Western Cape	Dryland	322 900	1 086 000	3.36	317 000	618 800	1.95
	Irrigation	3 100	17 000	5.48	8 000	31 200	3.90
	Total	326 000	1 103 000	3.38	325 000	650 000	2.00
Northern Cape	Dryland	-	-	-	-	-	-
	Irrigation	37 000	271 950	7.35	37 500	262 500	7.00
	Total	37 000	271 950	7.35	37 500	262 500	7.00
Free State	Dryland	48 000	94 000	1.96	84 500	97 500	1.15
	Irrigation	46 000	319 600	6.95	43 500	228 500	5.25
	Total	94 000	413 600	4.40	128 000	326 000	2.55
Eastern Cape	Dryland	1 200	6 120	5.10	190	255	1.34
	Irrigation	2 800	19 880	7.10	2 910	17 895	6.15
	Total	4 000	26 000	6.50	3 100	18 150	5.85
KwaZulu-Natal	Dryland	-	-	-	-	-	-
	Irrigation	7 800	48 360	6.20	7 500	45 750	6.10
	Total	7 800	48 360	6.20	7 500	45 750	6.10
Mpumalanga	Dryland	-	-	-	-	-	-
	Irrigation	3 000	19 500	6.50	4 000	25 200	6.30
	Total	3 000	19 500	6.50	4 000	25 200	6.30
Limpopo	Dryland	6 815	30 700	4.50	3 200	10 000	3.13
	Irrigation	16 185	116 500	7.20	16 800	110 000	6.55
	Total	23 000	147 200	6.40	20 000	120 000	6.00
Gauteng	Dryland	100	390	3.90	90	270	3.00
	Irrigation	1 200	7 800	0.50	1 310	8 130	6.21
	Total	1 300	8 190	6.30	1 400	8 400	6.00
North West	Dryland	330	990	3.00	-	-	-
	Irrigation	13 370	81 210	6.07	13 500	79 000	5.85
	Total	13 700	82 200	6.00	13 500	79 000	5.85
RSA	**Dryland**	**379 345**	**1 218 200**	**3.21**	**404 980**	**726 825**	**1.79**
	Irrigation	**130 455**	**901 800**	**6.91**	**135 020**	**808 175**	**5.99**
	Total	**509 800**	**2 120 000**	**4.16**	**540 000**	**1 535 000**	**2.84**

Figures provided by the CEC.

Supply and Demand

World wheat production for the 2020/21 season is estimated at 775.82 million metric tons according to the *World Agricultural Supply and Demand Estimates (WASDE) report 614 of 12 July 2021*, world production for 2021/22 is projected to be 792.40 million metric tons.

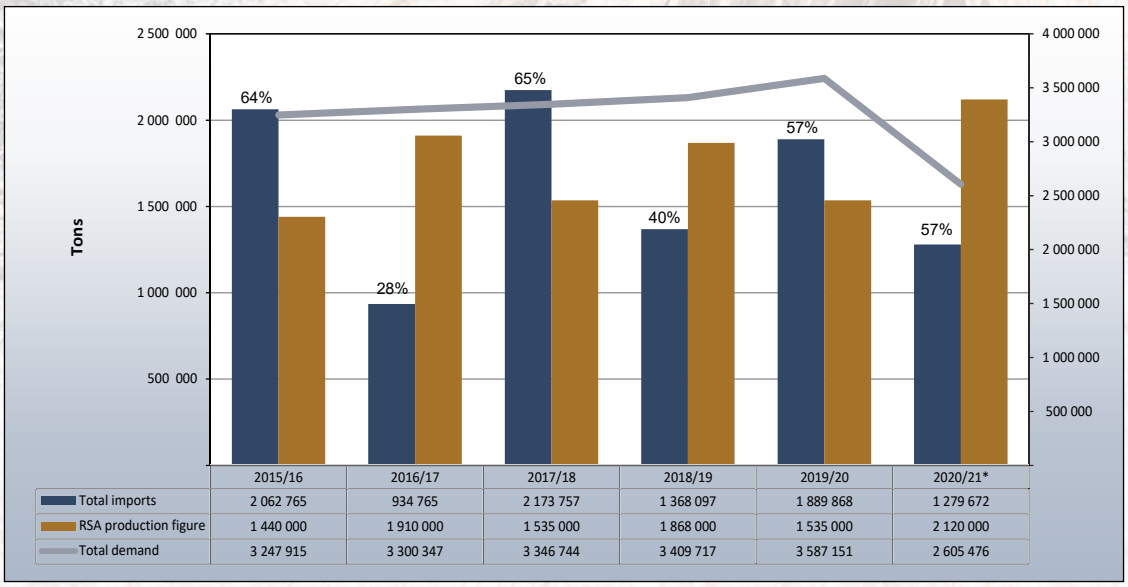
South Africa is a net importer of wheat and relies on imports to supply local demand. Wheat processing demand (human, animal and gristing) in 2019/20 was the highest of the past 22 seasons (3 437 768 tons). Nine months into the 2020/21 season, this figure stands at 2 482 965 tons, 72% of the previous season's figure.

During the 2019/20 season, 1 889 868 tons of wheat were imported. This figure is 38% higher than the amount of wheat imported during 2018/19. The ten-year import average is 1 669 632 tons. 57% of the wheat imported during the 2019/20 season for local use, originated in Poland (29%) and the Russian Federation (28%). Please see pages 84 to 101 for the quality of the wheat imported during 2019/20. 125 342 tons of wheat were exported to countries such as Zambia, Namibia and Eswatini during the corresponding period.

The amount of wheat imported for local consumption during the current marketing season (up to 16 July 2021), amounts to 1 341 727 tons according to SAGIS. The majority of this wheat originated in Australia (31%), Lithuania (19%) and Poland (17%).

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

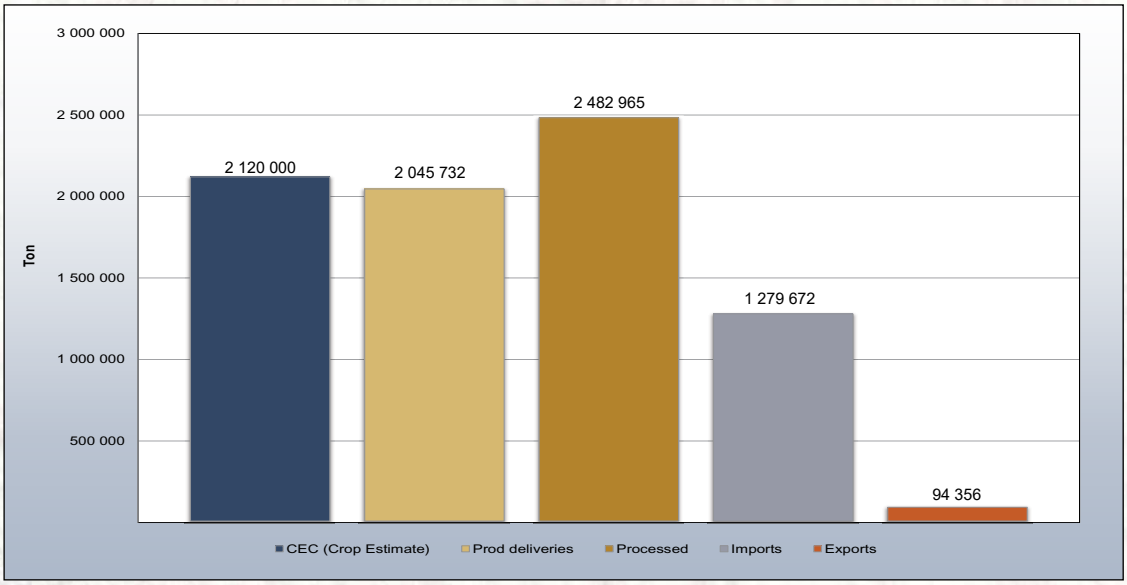
Graph 5: Wheat import figures as a percentage of the total demand over six seasons



	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21*
Total imports	2 062 765	934 765	2 173 757	1 368 097	1 889 868	1 279 672
RSA production figure	1 440 000	1 910 000	1 535 000	1 868 000	1 535 000	2 120 000
Total demand	3 247 915	3 300 347	3 346 744	3 409 717	3 587 151	2 605 476

**2020/21 season figure includes imports and total demand from October to July.*

Graph 6: Wheat supply and demand overview 2020/21 season (Oct - June)



Figures provided by SAGIS, (Publication date: 2021-07-27)

SAGIS South African Grain Information Service NPC
Suid Afrikaanse Graaninligtingsdiens NWM
Reg no. 1997/019186/08

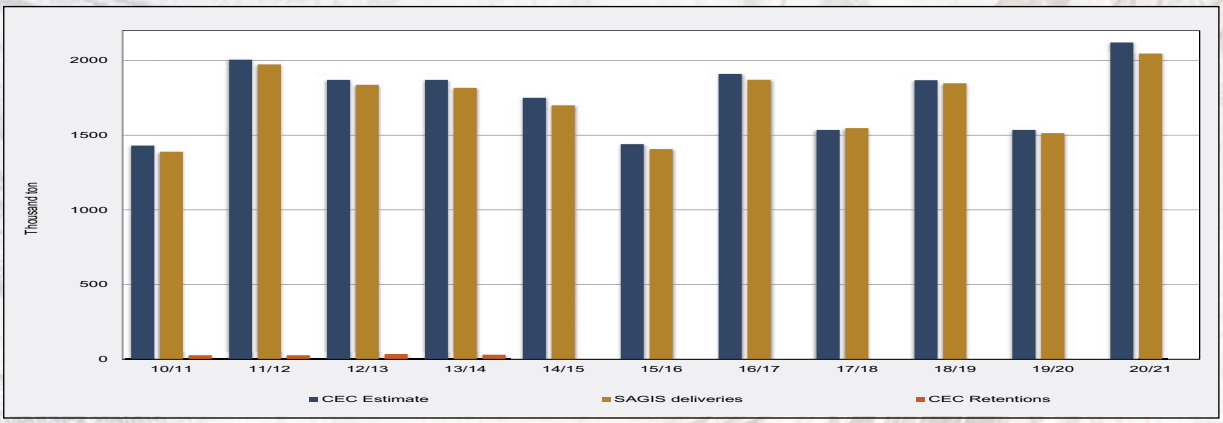
WHEAT: SUPPLY AND DEMAND TABLE BASED ON SAGIS' INFO

Publication date: 2021/07/27

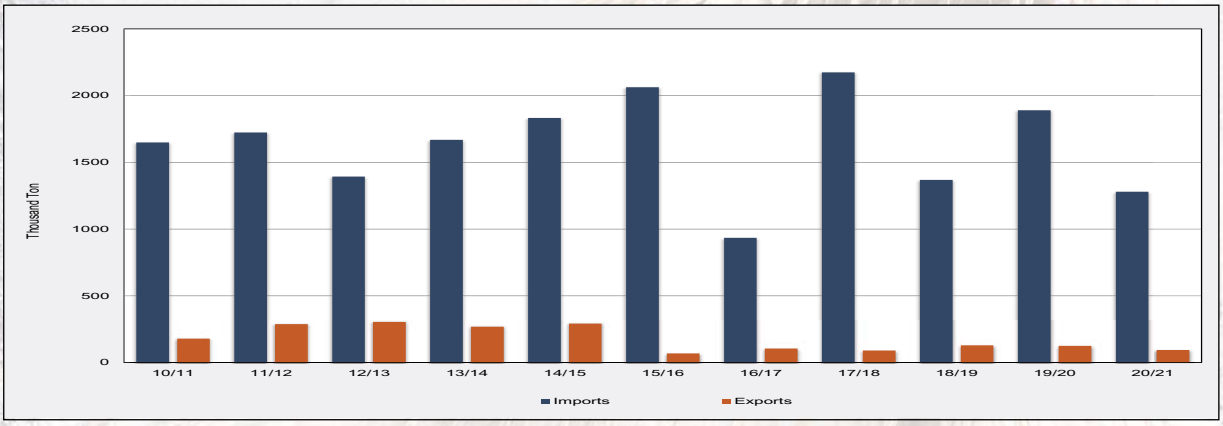
	Season (Oct - Sep)																Current Season Oct - Jun	10 Year average 2010/11 - 2018/19
	04/05	05/06	06/07	07/08	08/09	09/10	10/11	11/12	12/13	13/14	14/15	15/16	16/17	17/18	18/19	19/20	20/21	
																	9	
CEC (Crop Estimate)	1 680 000	1 905 000	2 105 000	1 905 000	2 130 000	1 958 000	1 430 000	2 005 000	1 870 000	1 870 000	1 750 000	1 440 000	1 910 000	1 535 000	1 868 000	1 535 000	2 120 000	**1 721 300**
CEC (Retention)	38 000	50 000	40 000	42 000	43 000	29 000	27 000	26 500	35 000	30 000	0	0	0	0	0	0	0	**11 850**
SUPPLY																		
Opening stock (1 Oct)	598 000	574 000	582 000	376 000	509 000	694 000	579 000	478 000	651 180	489 253	488 526	596 823	827 232	341 424	721 534	539 079	364 908	**571 205**
Prod deliveries	1 670 000	1 893 000	2 045 000	1 876 000	2 130 000	1 910 000	1 389 000	1 973 000	1 837 137	1 816 981	1 699 546	1 406 752	1 870 525	1 547 486	1 847 171	1 513 300	2 045 732	**1 690 090**
Imports	1 227 000	1 055 000	777 000	1 396 000	1 192 000	1 285 000	1 649 000	1 724 000	1 393 215	1 668 412	1 832 441	2 062 765	934 765	2 173 757	1 368 097	1 889 868	1 279 672	**1 669 632**
Surplus	6 000	9 000	32 000	0	13 000	0	23 000	14 000	0	0	15 151	8 807	9 249	5 611	11 994	9 812	17 718	**9 762**
Total supply	3 501 000	3 531 000	3 436 000	3 648 000	3 844 000	3 889 000	3 640 000	4 189 000	3 881 532	3 974 646	4 035 664	4 075 147	3 641 771	4 068 278	3 948 796	3 952 059	3 708 030	**3 940 689**
DEMAND																		
Processed	2 736 000	2 793 000	2 820 000	2 845 000	2 857 000	3 017 000	2 945 000	3 202 000	3 040 086	3 175 834	3 112 718	3 144 414	3 163 196	3 229 861	3 254 656	3 437 768	2 482 965	**3 170 553**
-human	2 734 000	2 781 000	2 818 000	2 844 000	2 849 000	2 991 000	2 944 000	3 066 000	3 008 378	3 122 134	3 109 022	3 142 077	3 160 660	3 226 649	3 251 410	3 414 602	2 477 636	**3 144 493**
-animal	2 000	12 000	2 000	1 000	8 000	26 000	1 000	136 000	31 694	53 695	3 696	2 337	2 536	3 212	3 246	23 166	5 329	**26 058**
-gristing	0	0	0	0	0	0	0	0	14	5	0	0	0	0	0	0	0	**2**
-bio-fuel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Withdrawn by producers	7 000	10 000	7 000	12 000	12 000	14 000	6 000	4 000	3 934	3 127	1 320	1 834	1 880	884	941	1 767	3 861	**2 569**
Released to end-consumers	2 000	4 000	4 000	2 000	5 000	3 000	6 000	7 000	7 322	3 095	2 802	1 907	1 256	1 990	2 186	1 269	1 101	**3 483**
Seed for planting purposes	18 000	26 000	17 000	22 000	26 000	17 000	13 000	18 000	15 998	18 198	22 705	18 800	24 067	18 237	19 222	16 595	20 362	**18 482**
Net receipts(-)/disp(+)	6 000	5 000	1 000	26 000	19 000	15 000	13 000	19 000	19 990	16 172	7 468	12 435	5 101	4 992	3 523	4 410	2 831	**10 609**
Deficit	0	0	0	9 000	0	4 000	0	0	713	1 243	0	0	0	0	0	0	0	**196**
Exports	158 000	111 000	211 000	223 000	231 000	240 000	179 000	288 000	304 236	268 451	291 828	68 525	104 847	90 780	129 189	125 342	94 356	**185 020**
Total Demand	2 927 000	2 949 000	3 060 000	3 139 000	3 150 000	3 310 000	3 162 000	3 538 000	3 392 279	3 486 120	3 438 841	3 247 915	3 300 347	3 346 744	3 409 717	3 587 151	2 605 476	3 390 911
Ending Stock (30 Sep)	574 000	582 000	376 000	509 000	694 000	579 000	478 000	651 000	489 253	488 526	596 823	827 232	341 424	721 534	539 079	364 908	1 102 554	549 778
- processed p/month	228 000	232 800	235 000	237 100	238 100	251 400	245 400	266 800	253 341	264 653	259 393	262 035	263 600	269 155	271 221	286 481	275 885	**264 208**
- months' stock	2.5	2.5	1.6	2.1	2.9	2.3	1.9	2.4	1.9	1.8	1.8	3.2	1.3	2.7	2.0	1.3	4.0	**2**

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

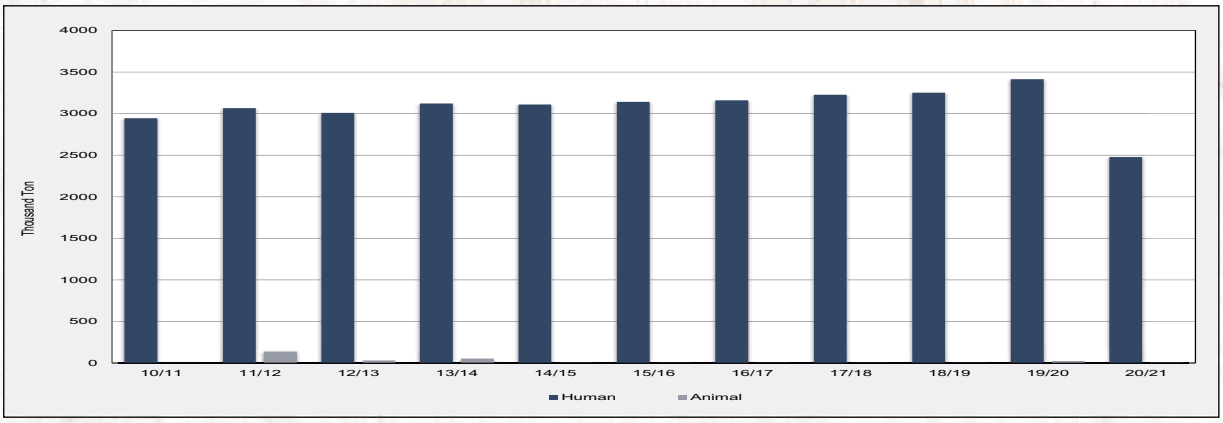
Graph 7: Wheat: CEC Estimate, Retentions and SAGIS deliveries over ten seasons



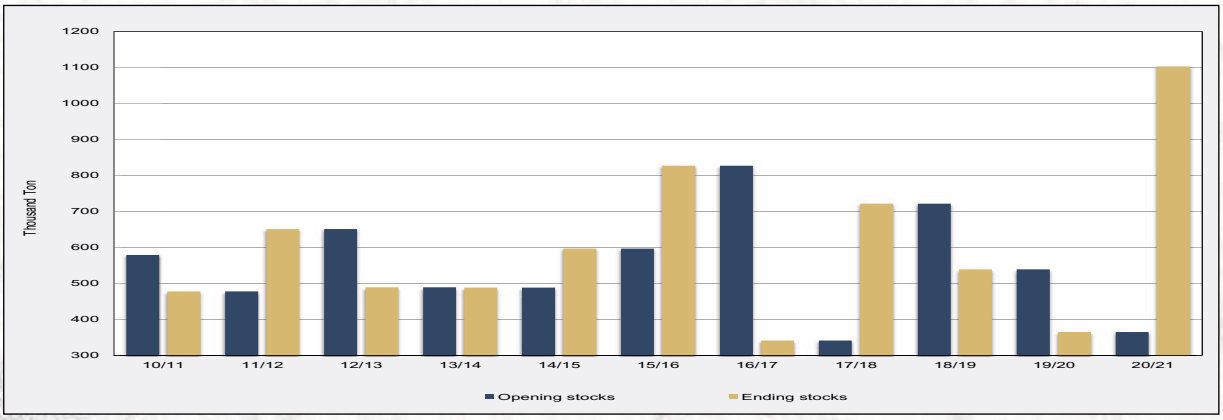
Graph 8: Wheat: Imports and exports over ten seasons



Graph 9: Wheat: RSA consumption over ten seasons



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



Figures provided by SAGIS, 20/21 figures (Oct - Jul)

SAGIS South African Grain Information Service NPC
Suid Afrikaanse Graaninligtingsdiens NWM
Reg no. 1997/019186/08

WHOLE WHEAT PROCESSED PER PROVINCE

PROGRESSIVE: October 2016 to September 2017 (Full 2016/17 Marketing Year)

	Northern Cape Eastern Cape	Western Cape	KwaZulu-Natal Mpumalanga	Limpopo North West	Free State	Gauteng	Total
Processed	242 358	594 069	602 895	120	575 048	1 160 655	**3 175 145**

PROGRESSIVE: October 2017 to September 2018 (Full 2017/18 Marketing Year)

	Northern Cape Eastern Cape	Western Cape	KwaZulu-Natal Mpumalanga	Limpopo North West	Free State	Gauteng	Total
Processed	258 424	612 419	633 743	35	593 084	1 147 087	**3 244 792**

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

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

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 (2020/21 Marketing Year) **Publication Date: 2021/07/27**

	Northern Cape Eastern Cape	Western Cape	KwaZulu-Natal Mpumalanga	Limpopo North West	Free State	Gauteng	Total
Processed	232 089	491 465	522 377	145	406 710	851 280	**2 504 066**

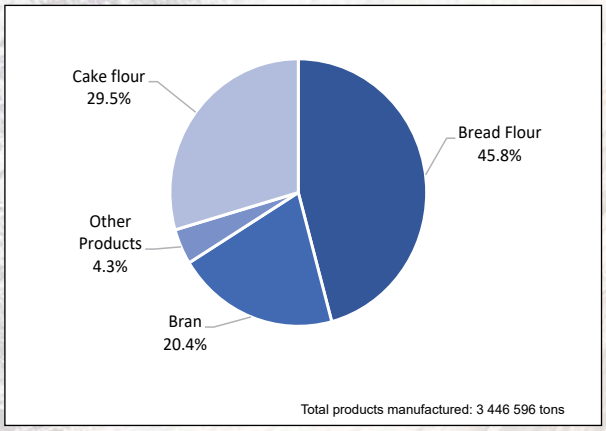
** Please note that included are the products destined for exports*

Wheat Product Information

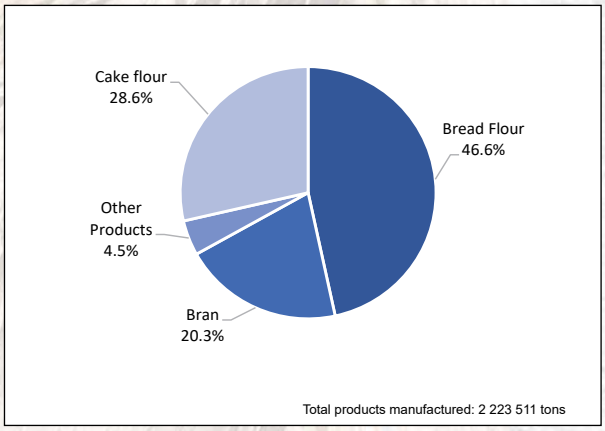
The Minister of Agriculture, Land Reform and Rural Development approved the proposed continuation and amendment of statutory measures, namely registration and the keeping of information and submitting monthly returns in respect of maize products and wheaten products manufactured, processed, imported and/or exported, to SAGIS, for a further period of four years, to lapse on 14 November 2022.

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

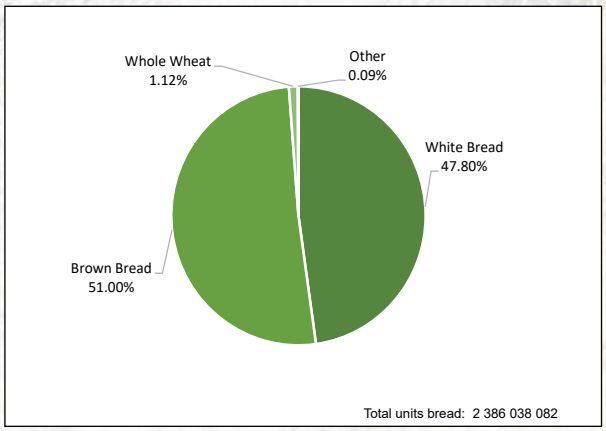
Graph 11: Wheat products manufactured from Oct 2019 - Sept 2020



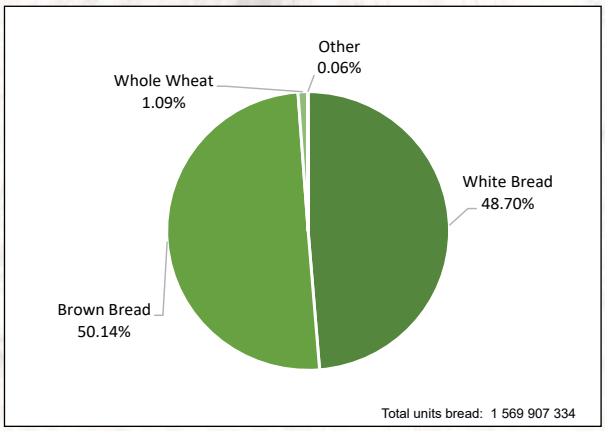
Graph 12: Wheat products manufactured from Oct 2020 - May 2021



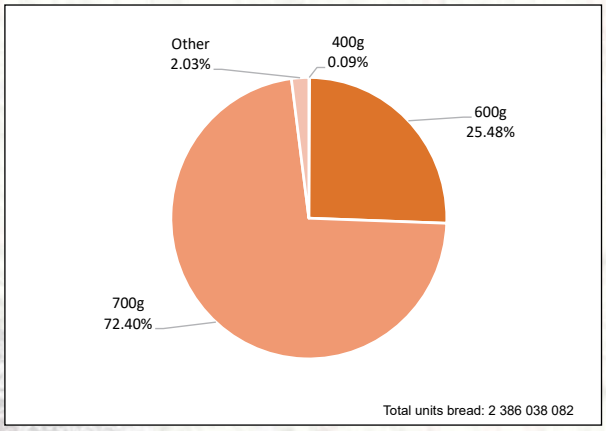
Graph 13: Pan baked bread per type from Oct 2019 - Sept 2020



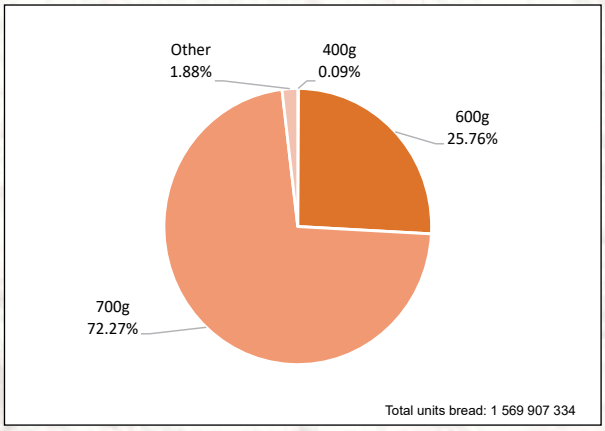
Graph 14: Pan baked bread per type from Oct 2020 - May 2021



Graph 15: Pan baked bread per mass Oct 2019 - Sept 2020



Graph 16: Pan baked bread per mass Oct 2020 - May 2021



WHEATEN PRODUCTS MANUFACTURED PER MARKETING YEAR					
	Marketing year: Oct 2016 - Sep 2017 Manufactured Tons Progressive: 12 Months	Marketing year: Oct 2017 - Sep 2018 Manufactured Tons Progressive: 12 Months	Marketing year: Oct 2018 - Sep 2019 Manufactured Tons Progressive: 12 Months	Marketing year: Oct 2019 - Sep 2020 Manufactured Tons Progressive: 12 Months	Marketing year: Oct 2020 - Sep 2021 Manufactured Tons Progressive: 8 Months (Oct-May)
Cake Flour	859 666	884 754	953 185	1 016 500	636 512
Self-Raising Flour	17 845	17 169	19 464	19 179	12 015
White Bread Flour	1 086 256	1 139 270	1 131 181	1 174 102	824 077
Brown Bread Flour	427 996	408 574	396 131	396 342	208 729
Other Flour (Industrial)	143 889	121 959	108 941	124 713	83 735
Whole Wheat Meal	3 566	3 196	5 445	8 072	4 337
Bran	630 287	653 359	669 835	703 550	450 956
Semolina	18 782	18 675	7 192	4 138	3 150
Total	3 188 287	3 246 956	3 291 374	3 446 596	2 223 511

WHEATEN PRODUCTS IMPORTED PER MARKETING YEAR					
	Marketing year: Oct 2016 - Sep 2017 Imported Tons Progressive: 12 Months	Marketing year: Oct 2017 - Sep 2018 Imported Tons Progressive: 12 Months	Marketing year: Oct 2018 - Sep 2019 Imported Tons Progressive: 12 Months	Marketing year: Oct 2019 - Sep 2020 Imported Tons Progressive: 12 Months	Marketing year: Oct 2020 - Sep 2021 Imported Tons Progressive: 8 Months (Oct - May)
Cake Flour	0	4 998	5 934	5 254	2 715
Self-Raising Flour	0	30	50	35	14
White Bread Flour	0	9 740	11 436	12 383	7 063
Brown Bread Flour	0	8 589	8 353	8 088	4 026
Other Flour (Industrial)	0	0	0	0	0
Whole Wheat Meal	0	0	0	0	0
Bran	243	915	5 742	7 329	4 445
Semolina	0	0	0	0	0
Total	243	24 272	31 515	33 089	18 263

WHEATEN PRODUCTS EXPORTED PER MARKETING YEAR					
	Marketing year: Oct 2016 - Sep 2017 Exported Tons Progressive: 12 Months	Marketing year: Oct 2017 - Sep 2018 Exported Tons Progressive: 12 Months	Marketing year: Oct 2018 - Sep 2019 Exported Tons Progressive: 12 Months	Marketing year: Oct 2019 - Sep 2020 Exported Tons Progressive: 12 Months	Marketing year: Oct 2020 - Sep 2021 Exported Tons Progressive: 8 Months (Oct - May)
Cake Flour	1 714	2 396	5 667	4 719	1 099
Self-Raising Flour	29	35	248	2 201	3 115
White Bread Flour	1 966	8 662	4 271	5 612	2 831
Brown Bread Flour	3 796	19 130	5 404	17 019	8 085
Other Flour (Industrial)	86	115	61	70	21
Whole Wheat Meal	0	24	27	21	9
Bran	223	612	1 118	1 022	0
Semolina	0	0	8	17	4
Total	7 814	30 974	16 804	30 681	15 164

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Reg no. 1997/019186/08
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PAN BAKED PRODUCTS MANUFACTURED PER YEAR					
	Marketing year: Oct 2016 - Sep 2017 Manufactured Units Progressive: 12 Months	Marketing year: Oct 2017 - Sep 2018 Manufactured Units Progressive: 12 Months	Marketing year: Oct 2018 - Sep 2019 Manufactured Units Progressive: 12 Months	Marketing year: Oct 2019 - Sep 2020 Manufactured Units Progressive: 12 Months	Marketing year: Oct 2020 - Sep 2021 Manufactured Units Progressive: 8 Months (Oct-May)
WHITE BREAD					
400g (Units)	2 772 734	1 828 673	1 580 130	1 503 633	1 172 915
600g (Units)	192 408 295	249 818 607	268 757 988	247 511 992	161 078 093
700g (Units)	839 930 529	854 936 392	883 820 063	880 836 097	596 550 627
Other (Units)	7 153 230	9 648 404	13 142 668	10 640 346	5 810 318
White Bread (Total Units)	**1 042 264 788**	**1 116 232 076**	**1 167 300 849**	**1 140 492 068**	**764 611 953**
BROWN BREAD					
400g (Units)	1 131 378	859 906	811 216	659 354	235 052
600g (Units)	235 801 836	302 612 906	338 257 246	359 714 338	242 841 305
700g (Units)	805 745 291	804 768 160	813 553 145	840 722 226	534 452 153
Other (Units)	16 638 015	17 726 350	17 669 489	15 706 019	9 701 140
Brown Bread (Total Units)	**1 059 316 520**	**1 125 967 322**	**1 170 291 096**	**1 216 801 937**	**787 229 650**
WHOLE WHEAT					
400g (Units)	16 565	14 648	13 968	12 305	7 532
600g (Units)	617 299	576 869	595 774	564 692	334 328
700g (Units)	7 397 611	6 032 062	6 023 626	5 847 337	3 478 707
Other (Units)	22 364 064	23 390 073	22 413 722	20 240 473	13 346 009
Whole Wheat (Total Units)	**30 395 539**	**30 013 652**	**29 047 090**	**26 664 807**	**17 166 576**
OTHER					
400g (Units)	56 236	62 396	38 205	21 651	20 404
600g (Units)	431 695	290 477	397 131	216 720	86 678
700g (Units)	399 645	136 163	112 121	110 366	58 181
Other (Units)	2 833 618	3 066 399	3 721 635	1 730 533	733 892
Other (Total Units)	**3 721 194**	**3 555 435**	**4 269 092**	**2 079 270**	**899 155**
Total	**2 135 698 041**	**2 275 768 485**	**2 370 908 127**	**2 386 038 082**	**1 569 907 334**

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PAN BAKED PRODUCTS MANUFACTURED PER BAKERY GROUP PER MARKETING YEAR				
SUPERMARKET GROUPS	**Oct 2016 - Sept 2017**	**Oct 2017 - Sept 2018**	**Oct 2018 - Sept 2019**	**Oct 2019 - Sept 2020**
WHITE BREAD				
400g (Units)	1 708 887	980 345	606 900	435 794
600g (Units)	67 867 486	105 739 976	114 444 552	101 611 890
700g (Units)	9 082 503	6 494 600	6 986 343	6 017 531
Other (Units)	739 982	1 478 805	1 299 940	1 148 119
White Bread (Total Units)	**79 398 858**	**114 693 726**	**123 337 735**	**109 213 334**
BROWN BREAD				
400g (Units)	567 628	507 773	292 319	197 268
600g (Units)	80 174 746	127 508 240	145 809 635	153 594 543
700g (Units)	7 007 442	5 442 190	5 445 780	4 378 811
Other (Units)	1 214 836	1 863 458	1 203 893	1 036 721
Brown Bread (Total Units)	**88 964 652**	**135 321 661**	**152 751 627**	**159 207 343**
WHOLE WHEAT				
400g (Units)	0	0	0	0
600g (Units)	540 024	500 022	495 269	488 165
700g (Units)	1 589 267	1 594 414	1 740 562	1 713 047
Other (Units)	0	0	4	0
Whole Wheat (Total Units)	**2 129 291**	**2 094 436**	**2 235 835**	**2 201 212**
OTHER				
400g (Units)	0	0	0	0
600g (Units)	0	0	0	0
700g (Units)	0	0	0	0
Other (Units)	2 622 203	2 889 186	2 130 828	1 583 457
Other (Total Units)	**2 622 203**	**2 889 186**	**2 130 828**	**1 583 457**
Total	**173 115 004**	**254 999 009**	**280 456 025**	**272 205 346**

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

BAKERY GROUPS	**Oct 2016 - Sept 2017**	**Oct 2017 - Sept 2018**	**Oct 2018 - Sept 2019**	**Oct 2019 - Sept 2020**
WHITE BREAD				
400g (Units)	0	0	165 688	136 279
600g (Units)	80 324 523	84 504 991	84 113 612	79 850 986
700g (Units)	795 030 558	811 564 534	820 062 468	817 929 774
Other (Units)	2 889 156	2 420 401	2 605 639	2 159 109
White Bread (Total Units)	**878 244 237**	**898 489 926**	**906 947 407**	**900 076 148**
BROWN BREAD				
400g (Units)	0	0	181 022	144 912
600g (Units)	112 110 830	109 838 873	104 643 715	120 455 384
700g (Units)	770 418 129	766 277 755	761 916 315	792 552 789
Other (Units)	12 412 987	12 702 186	12 770 639	11 546 359
Brown Bread (Total Units)	**894 941 946**	**888 818 814**	**879 511 691**	**924 699 444**
WHOLE WHEAT				
400g (Units)	0	0	0	0
600g (Units)	0	0	0	0
700g (Units)	5 425 364	4 086 745	3 937 854	3 835 162
Other (Units)	22 347 510	23 373 606	22 403 350	20 227 987
Whole Wheat (Total Units)	**27 772 874**	**27 460 351**	**26 341 204**	**24 063 149**
OTHER				
400g (Units)	0	0	0	0
600g (Units)	0	0	0	0
700g (Units)	0	0	0	0
Other (Units)	0	0	0	0
Other (Total Units)	**0**	**0**	**0**	**0**
Total	**1 800 959 057**	**1 814 769 091**	**1 812 800 302**	**1 848 838 741**

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

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PAN BAKED PRODUCTS MANUFACTURED PER BAKERY GROUP PER MARKETING YEAR				
INDEPENDENT BAKERIES	**Oct 2016 - Sept 2017**	**Oct 2017 - Sept 2018**	**Oct 2018 - Sept 2019**	**Oct 2019 - Sept 2020**
WHITE BREAD				
400g (Units)	66 090	148 214	135 349	325 777
600g (Units)	8 543 599	26 082 469	34 042 890	31 384 458
700g (Units)	18 074 488	19 319 718	39 407 253	40 654 695
Other (Units)	421 944	2 546 092	6 396 891	5 037 458
White Bread (Total Units)	**27 106 121**	**48 096 493**	**79 982 383**	**77 402 388**
BROWN BREAD				
400g (Units)	724	1 808	26 445	3 172
600g (Units)	7 459 079	28 544 450	44 596 357	42 025 354
700g (Units)	10 695 586	17 383 098	34 054 069	32 609 567
Other (Units)	374 945	806 675	1 413 562	1 002 647
Brown Bread (Total Units)	**18 530 334**	**46 736 031**	**80 090 433**	**75 640 740**
WHOLE WHEAT				
400g (Units)	0	0	0	0
600g (Units)	1 440	1 235	1 937	1 651
700g (Units)	93 640	104 694	112 768	105 837
Other (Units)	7 248	5 640	5 134	4 689
Whole Wheat (Total Units)	**102 328**	**111 569**	**119 839**	**112 177**
OTHER				
400g (Units)	0	0	76 101	0
600g (Units)	0	0	0	0
700g (Units)	1 265	2 408	1 396 277	0
Other (Units)	0	0	0	5 742
Other (Total Units)	**1 265**	**2 408**	**1 472 378**	**5 742**
Total	**45 740 048**	**94 946 501**	**161 665 033**	**153 161 047**

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

INDEPENDENT SUPERMARKETS	**Oct 2016 - Sept 2017**	**Oct 2017 - Sept 2018**	**Oct 2018 - Sept 2019**	**Oct 2019 - Sept 2020**
WHITE BREAD				
400g (Units)	997 757	730 464	672 193	604 941
600g (Units)	35 672 687	33 770 423	36 156 934	34 661 823
700g (Units)	17 742 980	19 162 517	17 363 999	16 227 832
Other (Units)	3 102 148	3 195 367	2 840 198	2 294 760
White Bread (Total Units)	**57 515 572**	**56 858 771**	**57 033 324**	**53 789 356**
BROWN BREAD				
400g (Units)	563 026	347 836	311 430	314 002
600g (Units)	36 057 181	37 103 999	43 207 539	43 636 601
700g (Units)	17 624 134	16 303 093	12 136 981	11 179 951
Other (Units)	2 635 247	2 353 988	2 281 395	2 119 486
Brown Bread (Total Units)	**56 879 588**	**56 108 916**	**57 937 345**	**57 250 040**
WHOLE WHEAT				
400g (Units)	16 565	14 460	13 968	12 305
600g (Units)	75 835	107 734	98 568	74 876
700g (Units)	289 340	268 201	232 442	193 245
Other (Units)	9 306	10 827	5 234	7 843
Whole Wheat (Total Units)	**391 046**	**401 222**	**350 212**	**288 269**
OTHER				
400g (Units)	56 236	68 805	38 205	21 651
600g (Units)	431 695	292 276	321 030	216 720
700g (Units)	398 380	133 755	112 121	110 366
Other (Units)	211 415	204 399	194 530	141 334
Other (Total Units)	**1 097 726**	**699 235**	**665 886**	**490 071**
Total	**115 883 932**	**114 068 144**	**115 986 767**	**111 817 736**

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 has three major wheat-breeding programs. 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 and bakers 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 reducing the number of years' data (from three to two) required for final release of irrigation cultivars as well as relaxed quality criteria with regards to certain quality parameters for high yielding lines.

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 Classification of Wheat Breeders' Lines 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 Breeders' lines 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 receival 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, seed can be harvested and replanted, which results in less seed being sold. In South Africa, approximately 70% of wheat is planted with farm saved seed. The investment in the development of new cultivars is as a result only covered by a small portion of the market. A lack of return on investment therefore prevent 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 statutory 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 recommended by role-players in the different industries as the body to administer the breeding and technology levy and will make payments to the seed companies from funds collected by means of the levies. The payments will be according to actual performance, calculated each year based on the market share achieved. 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 previous version of the grading regulations, as detailed in Government Notice NO. R. 64 of 29 January 2016, made provision for five grades of Bread Wheat, namely Grade 1, Grade 2, Grade 3, Grade 4 and Utility Grade.

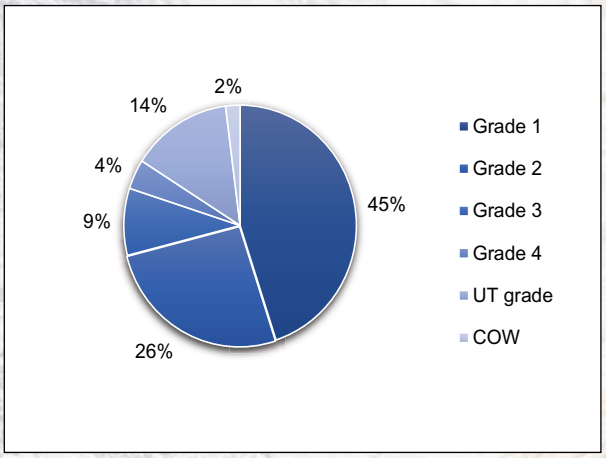
The 250 representative crop samples received of the 2020/21 season were graded as follows: 28% was graded Super Grade, 14% was graded Grade 1, 12% was graded Grade 2, 12% was graded Grade 3 and 34% Class Other Wheat (COW).

Of the 85 samples received that were downgraded to COW, 9% had a protein content lower than 9.5%, 13% had falling number values below 220 seconds, 11% had hectolitre mass values below 76 kg/hl, 35% had screenings levels higher than 3%, 40% had other grain and unthreshed ears levels higher than 1%, 12% had insect damaged kernels levels higher than 2%, 24% had total damaged kernels levels higher than 2%, 36% had combined/collective deviation levels exceeding 5% and 19% had field fungi levels higher than 2%. Single samples reported sprouted kernel and storage fungi percentages exceeding the maximum permissible deviation or the presence of poisonous seeds, undesirable odours and live insects. Most samples that were downgraded had more than one grading parameter below the minimum value required and/or higher than the maximum permissible deviation.

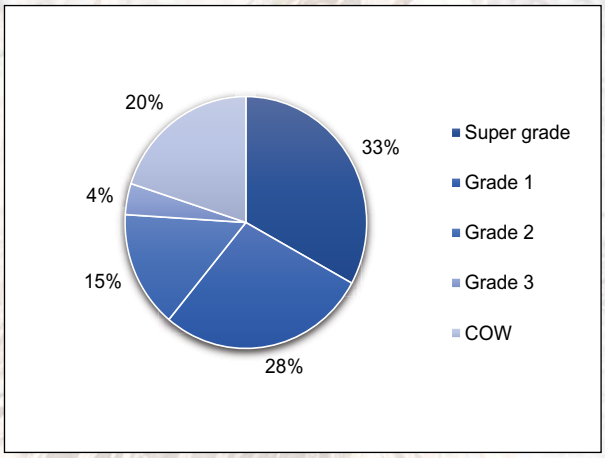
57% of the downgraded samples originated from the Western Cape, 28% from the Free State and 15% from the irrigation areas.

40% of wheat samples originating in the Free State were graded Super Grade. 60% of the wheat samples from the irrigation areas and 7% of wheat samples from the Western Cape Province graded Super Grade.

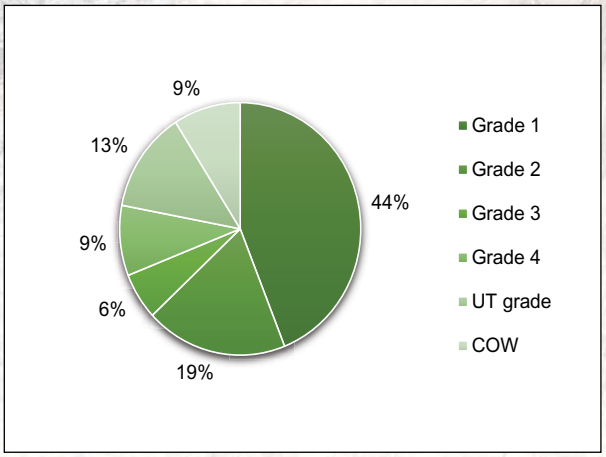
Graph 17: Percentage of samples per Class and grade in the 2018/19 season according to the previous grading regulations



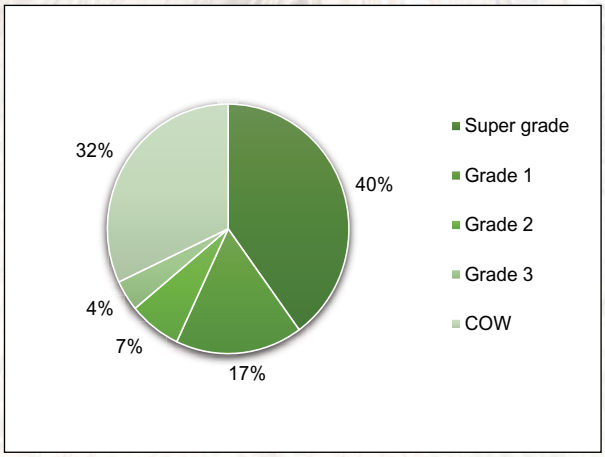
Graph 18: Percentage of samples per Class and grade in the 2018/19 season according to the current grading regulations



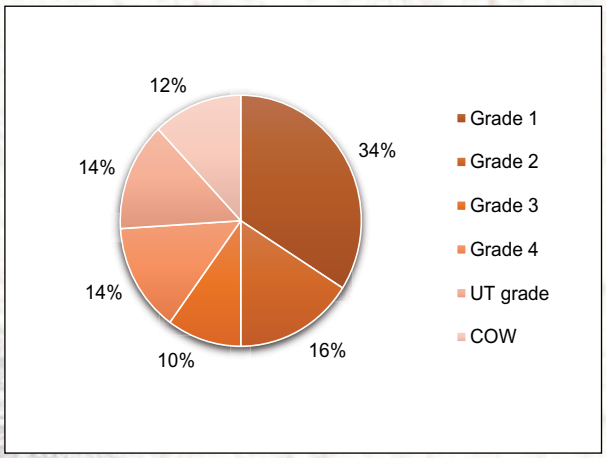
Graph 19: Percentage of samples per Class and grade in the 2019/20 season according to the previous grading regulations



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



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



Graph 22: Percentage of samples per Class and grade in the 2020/21 season according to the current grading regulations

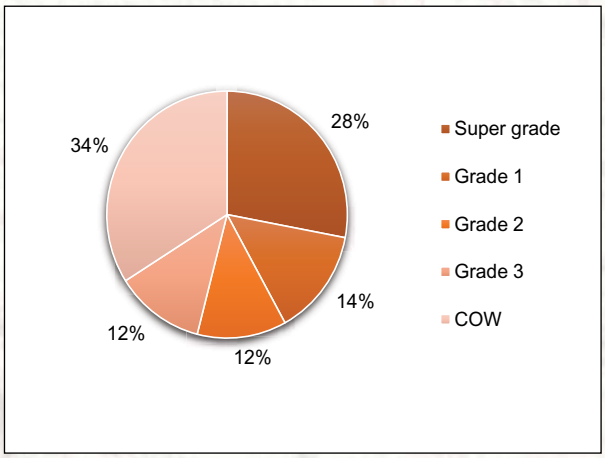


Table 2: Bread Wheat Grading Table - Government Notice No. R.1547 of 29 November 2019

Grade	Minimum			Maximum percentage permissible deviation (m/m)									
				A	B	C	D	E	F	G	H	I	J
	Hectolitre mass, kg/hl	Falling number, seconds	Protein content, %	Heavily frost damaged kernels	Field fungi	Storage fungi	Screenings	Other grain and unthreshed ears	Gravel, stones and turf	Foreign matter plus F	Heat damaged kernels	Damaged kernels plus H	Deviations (D + E + G + I) collectively
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	-

Wheat seed sold by commercial grain storage companies to wheat producers for the 2020 planting season

Cultivar	%	Cultivar	%
SST 0166	30.75	PAN 3161	0.41
SST 0117	20.19	SST 374	0.32
SST 056	8.60	Renoster	0.30
SST 0147	7.52	SST 8154	0.26
SST 015	6.02	PAN 3111	0.20
SST 0127	5.96	PAN 3471	0.17
SST 087	3.80	SST 347	0.14
PAN 3541	3.27	PAN 3400	0.13
SST 884	2.22	SST 875	0.12
SST 895	1.91	Duzi	0.05
PAN 3497	1.51	SST 866	0.05
SST 88	1.30	SST 806	0.04
SST 8135	1.04	Kariega	0.03
Matlabas	0.87	SST 843	0.02
SST 835	0.70	SST 317	0.018
PAN 3644	0.59	Senqu	0.011
SST 356	0.55	SST 398	0.0044
Koedoes	0.50	Koonap	0.0042
PAN 3368	0.42		
			100

Most popular cultivars according to cultivar identification

Farmers in the Western Cape preferred SST 0117 (27.4%). SST 0166 (23.5%), SST 056 (16.8%) and SST 087 (13.1%) were also popular cultivars.

In the Vaal and Orange River areas SST 8135 (20.0%), PAN 3400 (14.4%), SST 884 (13.2%) and SST 8154 (12.3%) were the most popular cultivars.

The most preferred cultivars in North West province were SST 843 (27.2%), followed by SST 884 (21.8%) and SST 8135 (19.9%).

In regions 21 to 24 of the Free State the most planted cultivar was PAN 3368 (15.9%), followed by PAN 3400 (15.0%) and SST 8135 (11.6%). PAN 3161 was the preferred cultivar in regions 25 to 28 and represented 22.3%. SST 8135 (15.4%) and SST 884 (8.9%) were also popular cultivars.

In the irrigation areas of Mpumalanga, Gauteng and KwaZulu-Natal, SST 8135 (42.4%) was the preferred cultivar, followed by SST 884 (26.0%) and SST 835 (8.7%).

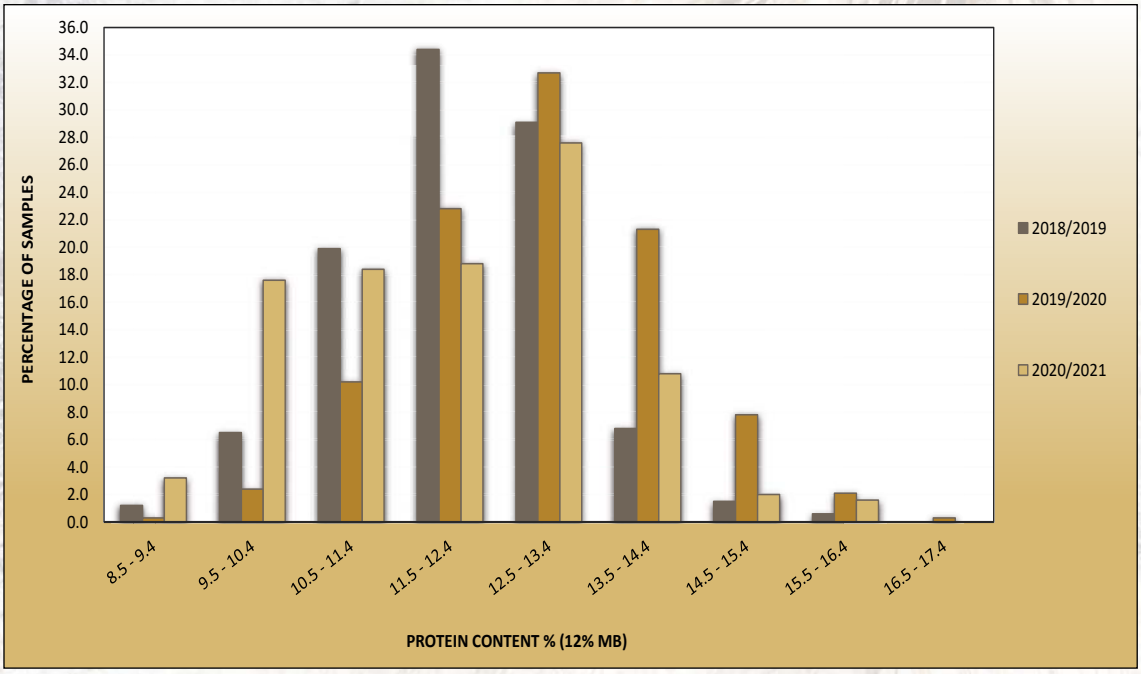
The above-mentioned percentages are weighted averages based on the top five cultivars per region provided on pages 38 to 63. The top five cultivars per region were calculated from the cultivar identification done on each of the 250 crop samples.

Crop quality of the 2020/21 season

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

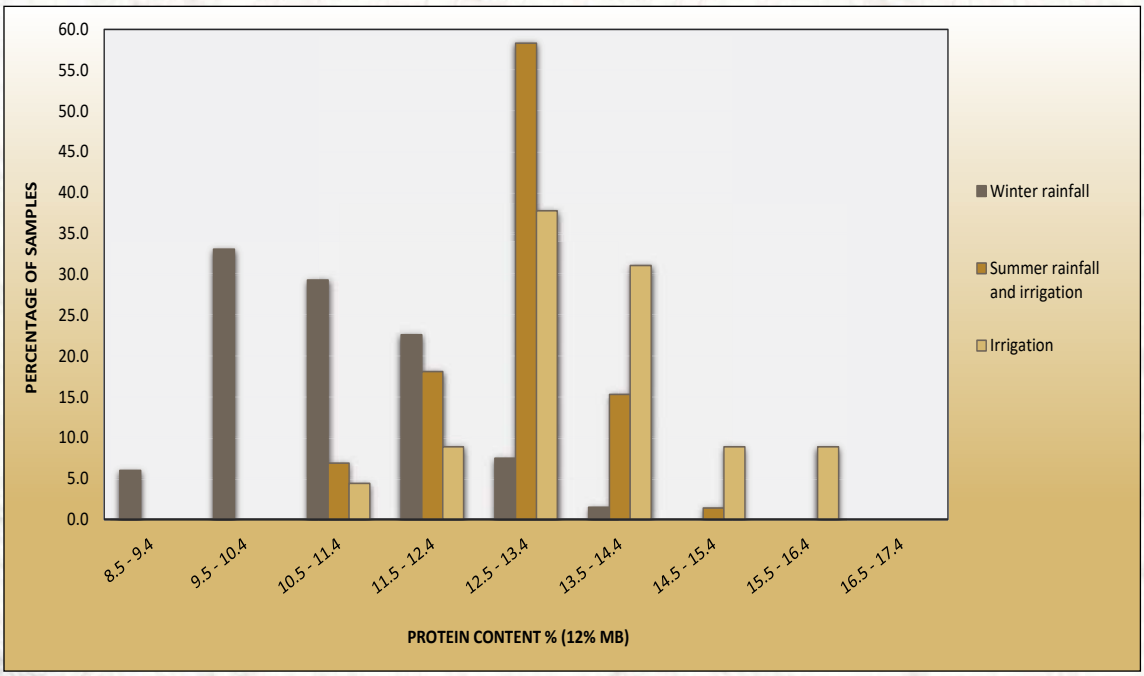
The national whole wheat protein average decreased from 12.9% in the previous season to 12.0%. The ten-year national average is 12.1%. Protein content is generally a function of the growing environment (soil and climatic conditions) as well as fertiliser application. Please see Graphs 23 and 24 for the protein content distribution over the last three seasons and between the three major production areas.

Graph 23: Protein content distribution over the last three seasons



The Summer rainfall and Irrigation areas of the Free State reported the highest whole wheat protein average, namely 13.5%. The production regions in the Winter rainfall area of the Western Cape averaged 10.9% and the Irrigation areas 12.9%.

Graph 24: Protein content distribution between the three production areas during the 2020/21 season



Flour protein content is on average 0.5 to 1.2% lower than that of whole wheat and averaged 11.2% this season, 0.7% percent lower than the previous season. The protein loss 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 78.9 kg/hl equaled that of the previous season and is also the joined lowest average reported over the last eleven seasons. The ten-year national average is 80.4 kg/hl. 25 samples (10%) reported values below the 76 kg/hl minimum level for Super grade, Grade 1 and Grade 2 wheat, of these 11 samples originated in the Western Cape (Winter rainfall area), 13 in the Free State and one in KwaZulu-Natal. Regional averages ranged from 77.8 kg/hl in the Free State and 78.1 kg/hl in the Western Cape to 80.9 kg/hl in the Irrigation areas.

The 1000 kernel mass, reported on a 13% moisture basis, increased from 35.6 g last season to 38.2 g this season. The 2018/19 season's average was 39.2 g. Averages over production areas varied from 36.7 g in the Summer rainfall and irrigation areas of the Free State to 37.4 g in the Irrigation areas and 39.2 g in the Winter rainfall areas. The weighted average percentage screenings obtained with a 1.8 mm slotted sieve was 1.63%, compared to the 1.92% and 1.49% of the previous two seasons respectively. The Summer rainfall and irrigation areas reported the highest average percentage, namely 2.16% and the Irrigation areas the lowest of 1.07%. 31 (12%) of the 250 samples exceeded the 3% maximum permissible screenings level for Super grade to Grade 3. Most (55%) of these samples originated in the Western Cape.

The national weighted average falling number value was 372 seconds, higher than the 353 seconds of last season's average and slightly higher than the ten-year weighted average value of 369 seconds. 16 (6.4%) of the samples analysed for this survey reported falling number values below 250 seconds, 11 (4%) of these were below 220 seconds and were downgraded to COW as a result. These samples originated mainly from the Free State (N=8), with one sample each from Mpumalanga, North West and KwaZulu-Natal. Last season 8% of the samples analysed as part of the survey, was downgraded to COW due to a low falling number. The highest regional average falling number value of 401 seconds this season, was reported for the Western Cape and the lowest, namely 302 seconds for the Free State. All falling number values reported, are corrected for the altitude at which the test is performed.

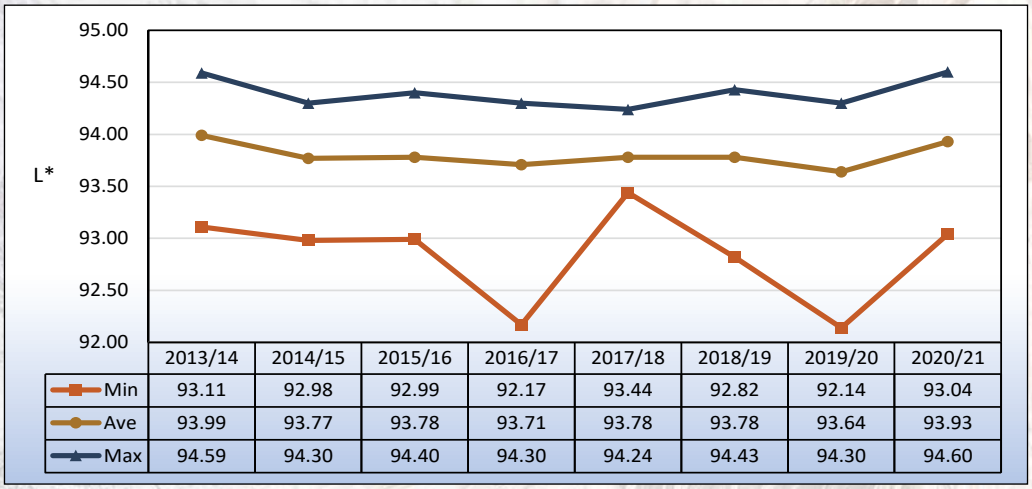
The weighted mixogram peak time on flour milled on the Quadromat Junior mill averaged 3.2 minutes compared to the 3.0 minutes of the previous season and the 2.9 minutes of the ten-year average. The weighted mixogram peak time of the flour from the Bühler mill was 2.9 minutes, compared to the 2.6 minutes of the previous five seasons. 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 74.1% compared to the 74.8% 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. For the past nine seasons, a dry colour determination by means of a Konica Minolta CM-5 spectrophotometer has been done on the composite flour samples. 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 25 (L*), 26 (a*) and 27 (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.

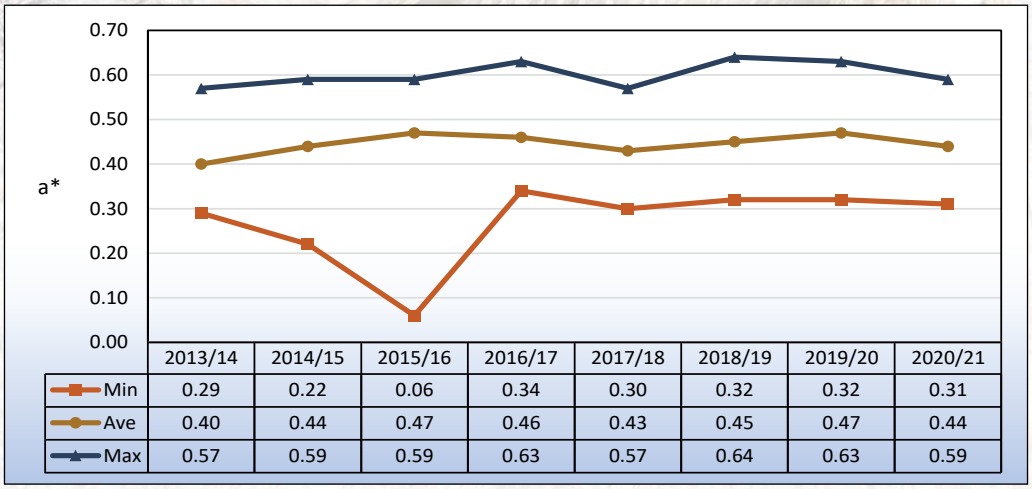
The average ash content was 0.60 % on a dry basis (moisture free basis), compared to the 0.64% of the previous season's average. According to the Wheat product regulations (Government Notice No. R. 405 of 5 May 2017), cake flour's ash content should not exceed 0.65%, white bread flour's ash content should be between 0.60 to 1.00% and that of all-purpose wheat flour between 0.55 and 0.75%.

Graph 25: Range of L* values over eight seasons



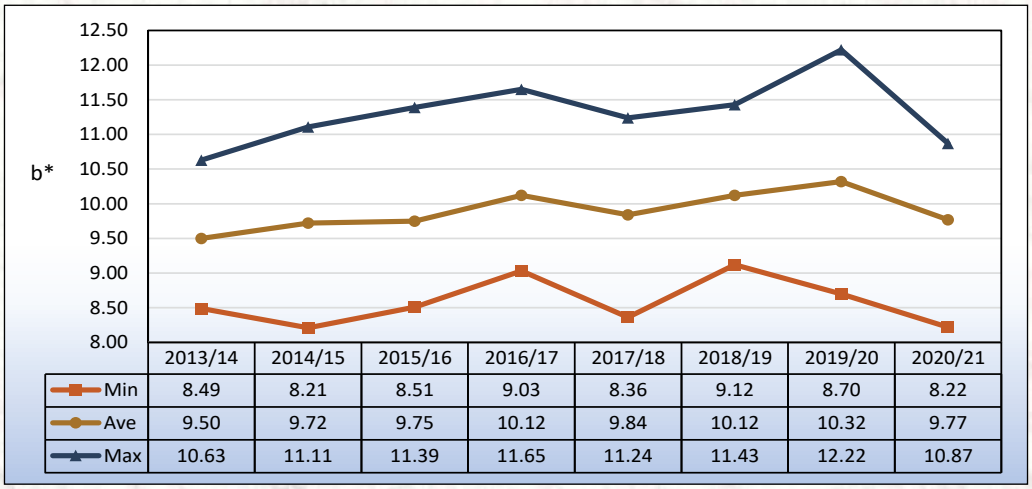
	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21
Min	93.11	92.98	92.99	92.17	93.44	92.82	92.14	93.04
Ave	93.99	93.77	93.78	93.71	93.78	93.78	93.64	93.93
Max	94.59	94.30	94.40	94.30	94.24	94.43	94.30	94.60

Graph 26: Range of a* values over eight seasons



	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21
Min	0.29	0.22	0.06	0.34	0.30	0.32	0.32	0.31
Ave	0.40	0.44	0.47	0.46	0.43	0.45	0.47	0.44
Max	0.57	0.59	0.59	0.63	0.57	0.64	0.63	0.59

Graph 27: Range of b* value sover eight seasons



	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21
Min	8.49	8.21	8.51	9.03	8.36	9.12	8.70	8.22
Ave	9.50	9.72	9.75	10.12	9.84	10.12	10.32	9.77
Max	10.63	11.11	11.39	11.65	11.24	11.43	12.22	10.87

The Rapid Visco Analyser (RVA) average peak viscosity of the samples analysed was 2211 cP (centipoise), the minimum viscosity 1671 cP and the final viscosity 2491 cP. These values compared well with the 2018/19 season's values of 2218 cP, 1675 cP and 2516 cP respectively The effect of sprout damage on the starch and gelatinisation properties of wheat were well illustrated in the previous season with values of 1852 cP, 1407 cP and 2049 cP respectively. The analysis conditions were kept constant during all the analyses. Results are reported on a 14% moisture basis.

The wet gluten (14% mb) averaged 29.9% and the dry gluten, also on a 14% moisture basis, 10.1%. The previous season, these values averaged 31.1% and 10.6% respectively. The lower gluten values this season are expected given the lower average protein content compared to the 2019/20 season. The average gluten index value was 95 (equal to last season) and ranged between 90 and 99. The gluten index provides an indication of the gluten strength (higher being better) and is not influenced by the protein content. A value between 70 and 100 is generally accepted as good quality for pan bread baking purposes.

The farinograph analysis resulted in an average water absorption of 59.3% (60.2% the previous season) and an average development time of 5.6 minutes (5.4 minutes the previous season). The stability value of 8.5 minutes was almost half a minute longer than the previous average. The mixing tolerance index was 36, compared to the previous season's average of 41 BU.

The average alveogram strength was 38.3 cm² and the average P/L value 0.63 (42.6 cm² and 0.60 the previous season). The distensibility of the dough decreased on average compared to the previous season. The stability value of 75 mm was slightly lower than the 79 mm of the previous season.

The average extensogram strength decreased from 112 cm² in the previous season to 99 cm². The maximum height in Brabender Units was also lower than last season (362 BU in 2020/21 versus 383 BU in 2019/20) as was the average extensibility value of 200 mm this season compared to 211 mm the previous season.

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.

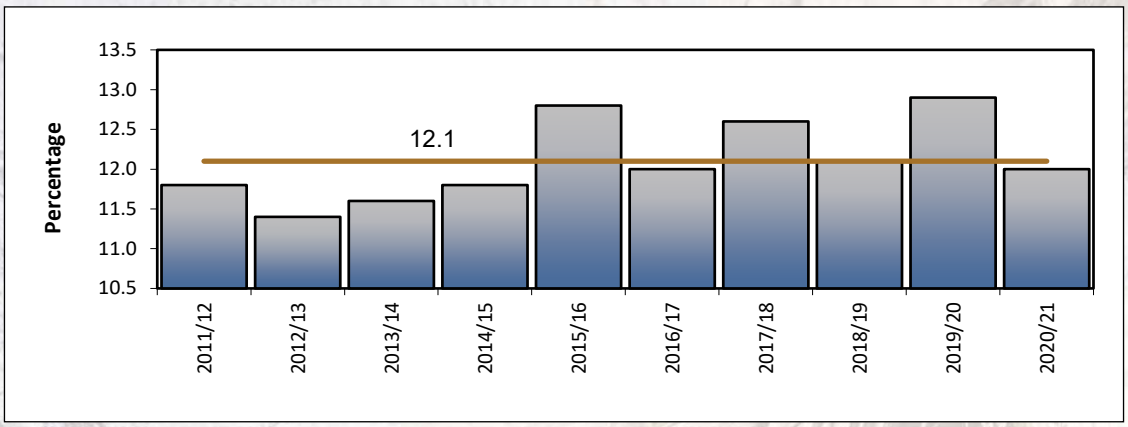
Mycotoxin analyses were performed on 30 wheat samples, randomly selected to represent different regions as well as grades. The samples were tested by means of a SANAS ISO/IEC 17025 accredited multi-mycotoxin method using UPLC-MS/MS. With this technique simultaneous quantification and confirmation of Aflatoxin B_1, B_2, G_1, G_2, Fumonisin B_1, B_2, B_3, Deoxynivalenol, 15-ADON, HT-2 Toxin, T-2 Toxin, Zearalenone and Ochratoxin A are possible in one run.

13 samples tested positive for deoxynivalenol (DON) residues, with two of these samples exceeding the national maximum allowable level of 2 000 µg/kg for cereal grain intended for further processing. The average value of the 13 positive results was 891 µg/kg (ppb) and the highest value obtained 3 088 µg/kg. Last season, six samples tested positive for DON residues with an average value of 300 µg/kg (ppb), the highest value obtained was 1 017 µg/kg. Please see the mycotoxin results in Table 6 on pages 65 and 66.

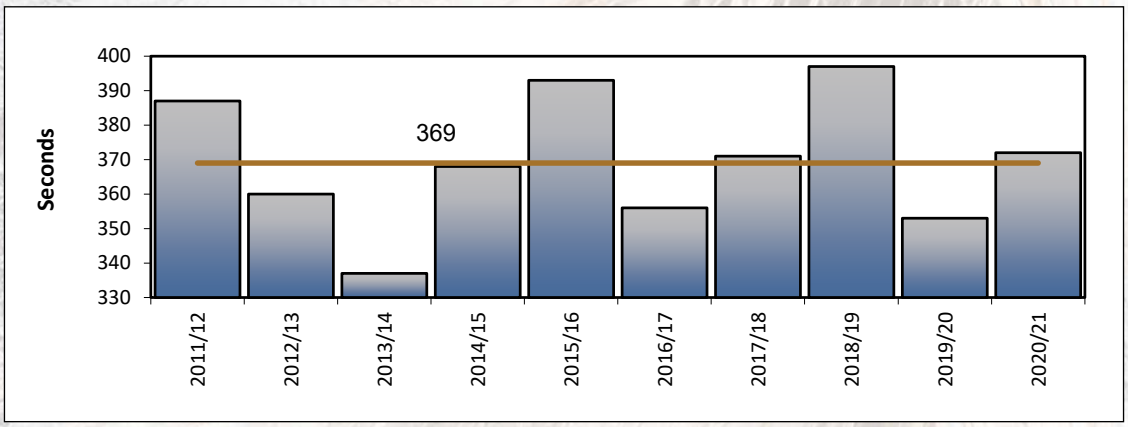
Table 3: Weighted average results for the last three seasons

	2020/21					2019/20					2018/19				
Region	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	11.5	404	79.0	2.7	*4*	12.4	423	76.6	2.7	*4*	11.9	444	79.2	2.8	*3*
2	10.6	387	77.7	3.3	*11*	11.9	381	76.6	3.2	*11*	11.6	409	79.3	3.1	*10*
3	10.7	418	77.7	3.0	*64*	13.3	362	75.8	2.9	*41*	12.1	411	79.8	2.7	*78*
4	10.7	417	78.4	3.2	*24*	12.2	353	77.1	3.1	*21*	11.1	378	80.9	2.8	*22*
5	11.3	386	78.8	2.8	*8*	12.8	342	79.5	2.8	*17*	11.1	386	80.3	2.9	*21*
6	11.6	343	78.7	2.8	*22*	13.0	389	78.3	2.7	*26*	12.0	341	79.3	2.8	*27*
7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10	13.1	369	82.5	2.7	*22*	12.7	356	82.8	2.5	*25*	12.1	377	84.5	2.7	*30*
11	12.6	410	81.2	2.9	*6*	12.6	421	82.0	2.8	*16*	12.0	446	83.5	2.8	*14*
12	-	-	-	-	-	12.2	268	80.4	2.6	*3*	12.7	439	84.3	2.4	*3*
13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
14	13.9	397	78.1	3.8	*4*	14.2	240	80.1	4.4	*4*	13.5	440	80.2	2.8	*3*
15	-	-	-	-	-	13.2	401	78.3	3.0	*9*	11.5	368	80.8	3.0	*8*
16						12.6	284	77.5	3.0	*4*	12.0	399	83.0	2.4	*4*
17	14.5	422	78.9	3.8	*1*	13.0	306	77.0	2.9	*5*	13.0	390	81.8	2.4	*2*
18	13.5	367	78.7	2.8	*2*	12.2	436	82.6	2.9	*1*	11.9	418	81.8	2.5	*2*
19	13.3	366	79.0	3.6	*5*	13.6	256	78.0	3.9	*14*	12.1	403	82.4	3.1	*7*
20	12.6	380	79.1	3.5	*8*	12.2	366	79.6	3.1	*31*	12.1	424	82.6	2.7	*18*
21	12.6	399	76.1	2.9	*1*	-	-	-	-	-	12.2	456	83.3	2.9	*2*
22	13.3	385	69.9	2.8	*2*	14.2	397	80.4	3.3	*1*	11.7	387	82.0	2.5	*3*
23	12.6	413	81.3	3.0	*5*	14.2	358	76.9	3.1	*17*	12.9	504	83.1	2.6	*2*
24	12.8	363	77.1	3.2	*6*	12.6	349	74.5	3.1	*11*	12.8	473	81.4	2.8	*9*
25	14.9	173	73.5	4.0	*5*	15.0	293	79.6	3.1	*4*	13.5	405	81.5	3.0	*8*
26	15.0	277	77.5	5.0	*5*	13.6	255	77.6	3.1	*8*	13.5	356	78.5	3.0	*4*
27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
28	13.3	282	79.1	3.5	*21*	13.6	266	78.7	3.1	*21*	13.4	353	80.2	3.1	*9*
29	12.7	345	83.3	2.4	*1*	12.9	357	79.5	3.3	*3*	11.9	379	84.5	3.0	*2*
30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
32	12.9	271	79.4	3.7	*3*	-	-	-	-	-	-	-	-	-	-
33	12.1	368	82.5	3.3	*9*	11.7	404	82.9	3.3	*7*	12.5	338	80.1	3.5	*6*
34	12.9	347	81.2	2.7	*1*	12.6	283	79.7	3.0	*6*	11.4	373	83.1	3.2	*7*
35	-	-	-	-	-	12.1	431	83.1	2.8	*15*	12.0	380	83.2	3.1	*23*
36	12.7	311	80.2	3.3	*10*	12.8	393	81.8	3.1	*10*	12.6	450	84.0	2.6	*10*
Ave.	**12.0**	**372**	**78.9**	**3.2**	***250***	**12.9**	**353**	**78.9**	**3.0**	***333***	**12.1**	**397**	**81.3**	**2.8**	***337***

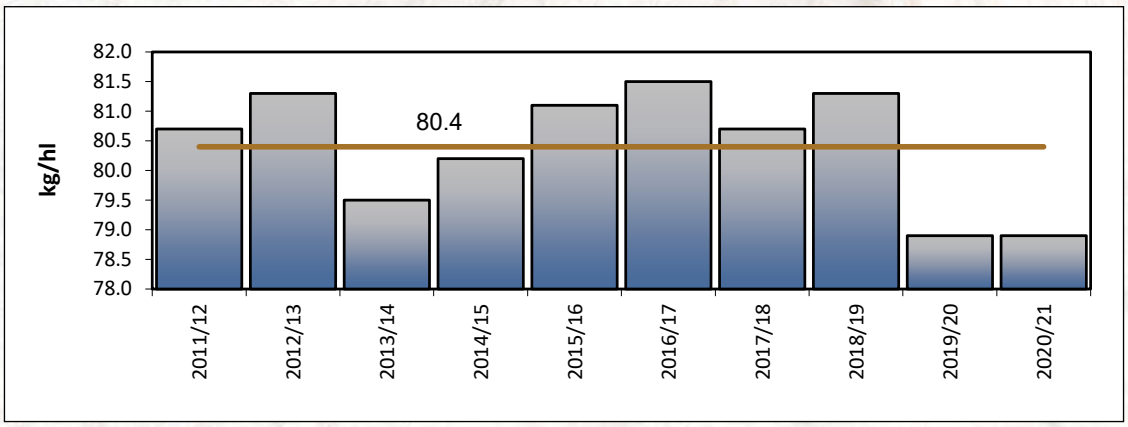
Graph 28a: Weighted average whole wheat protein (12% mb) over ten seasons



Graph 28b: Weighted average falling number over ten seasons



Graph 28c: Weighted average hectolitre mass over ten seasons



Graph 28d: Weighted average mixogram peak time (Quadromat mill) over ten seasons

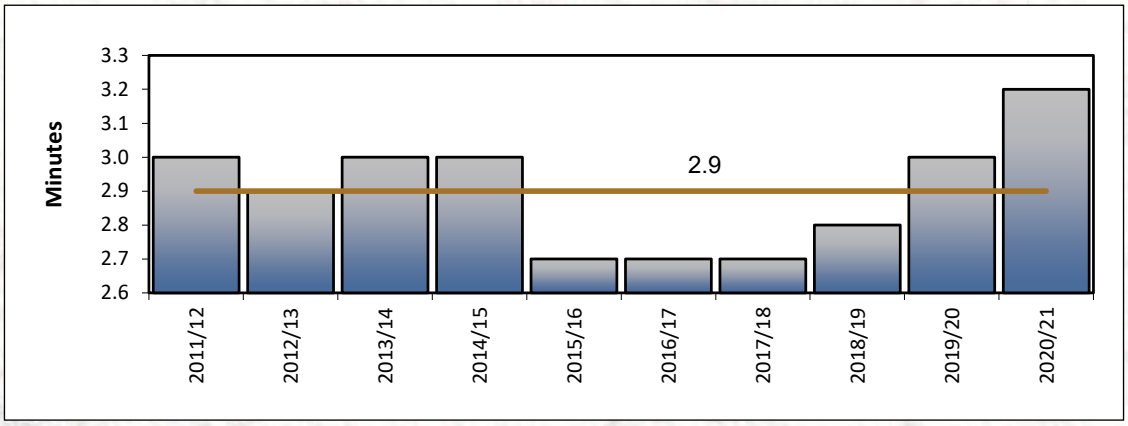


Table 4: Comparison of Flour Quality over the last four seasons

Flour Quality 2020/21 season			
Flour protein (12% mb) (%)	11.2	Farinogram abs. (14% mb) (%)	59.3
Bread volume 100 g (cm³)	1104	Farinogram dev. time (min)	5.6
Mixogram (Bühler) peak time (min)	2.9	Alveogram strength (cm²)	38.3
Wet gluten (14% mb) (%)	29.9	Alveogram P/L	0.63
Dry gluten (14% mb) (%)	10.1	Extensogram strength (cm²)	99

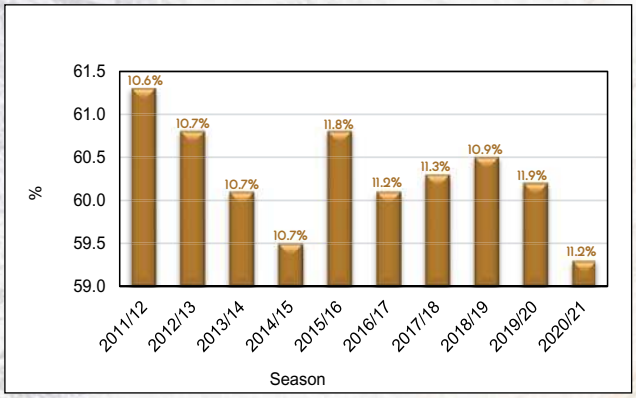
Flour Quality 2019/20 season			
Flour protein (12% mb) (%)	11.9	Farinogram abs. (14% mb) (%)	60.2
Bread volume 100 g (cm³)	1130	Farinogram dev. time (min)	5.4
Mixogram (Bühler) peak time (min)	2.6	Alveogram strength (cm²)	42.6
Wet gluten (14% mb) (%)	31.1	Alveogram P/L	0.60
Dry gluten (14% mb) (%)	10.6	Extensogram strength (cm²)	112

Flour Quality 2018/19 season			
Flour protein (12% mb) (%)	10.9	Farinogram abs. (14% mb) (%)	60.5
Bread volume 100 g (cm³)	1033	Farinogram dev. time (min)	5.0
Mixogram (Bühler) peak time (min)	2.6	Alveogram strength (cm²)	34.6
Wet gluten (14% mb) (%)	30.1	Alveogram P/L	0.81
Dry gluten (14% mb) (%)	10.1	Extensogram strength (cm²)	92

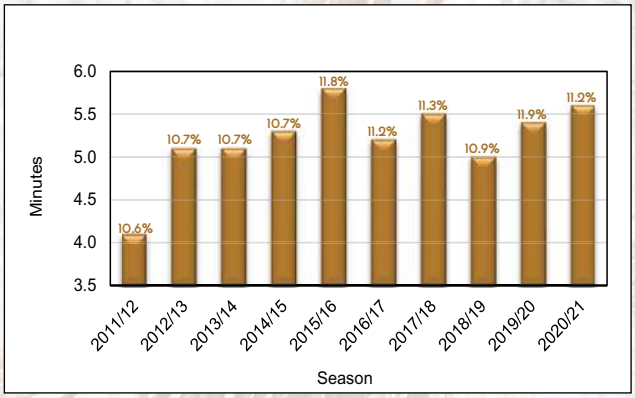
Flour Quality 2017/18 season			
Flour protein (12% mb) (%)	11.3	Farinogram abs. (14% mb) (%)	60.3
Bread volume 100 g (cm³)	1096	Farinogram dev. time (min)	5.5
Mixogram (Bühler) peak time (min)	2.6	Alveogram strength (cm²)	39.2
Wet gluten (14% mb) (%)	30.7	Alveogram P/L	0.81
Dry gluten (14% mb) (%)	10.4	Extensogram strength (cm²)	106

Graph 29a-h: Comparison of rheological quality over ten seasons (Flour protein content (12% mb) is indicated above each bar)

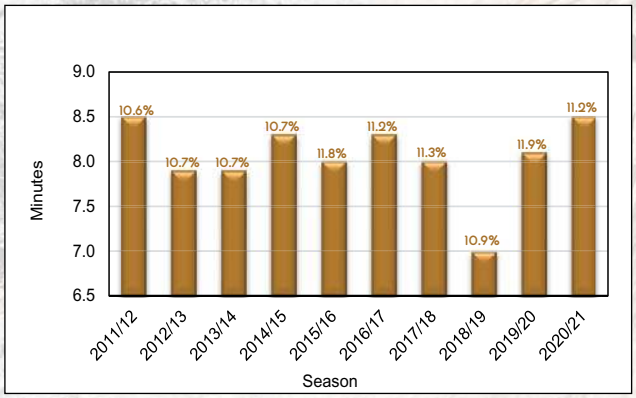
Graph 29a: Farinogram absorption (14%mb)



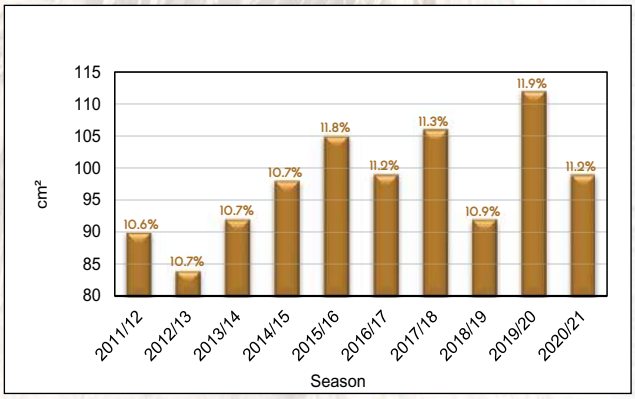
Graph 29b: Farinogram development time



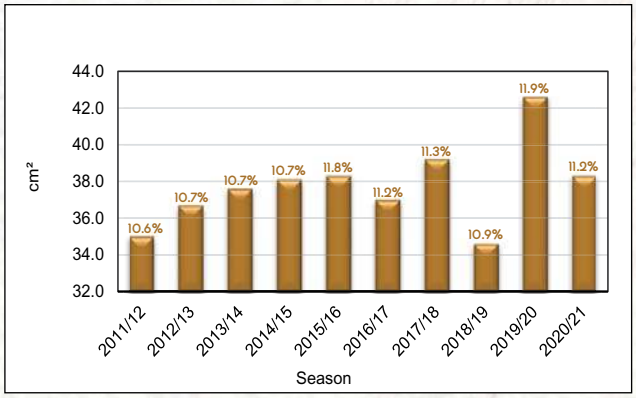
Graph 29c: Farinogram stability



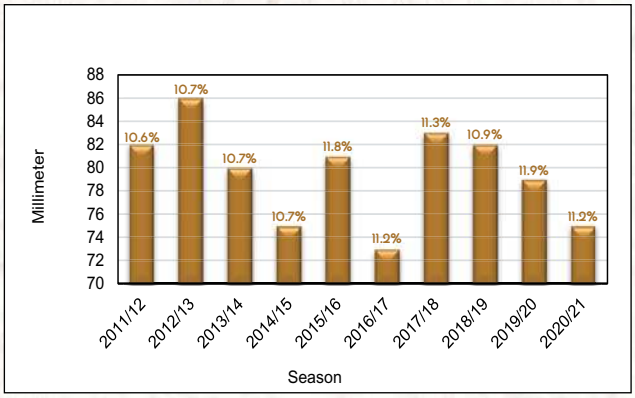
Graph 29d: Extensogram strength



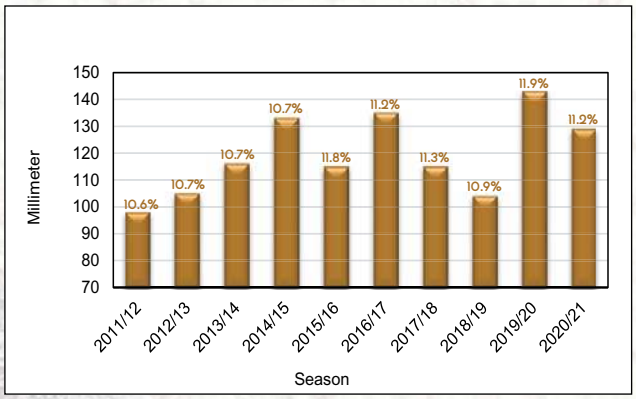
Graph 29e: Alveogram strength



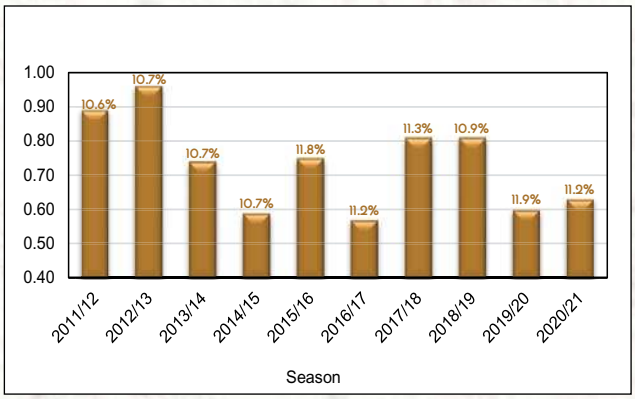
Graph 29f: Alveogram stability



Graph 29g: Alveogram distensibility



Graph 29h: Alveogram P/L



Regional Quality Summary

Winter Rainfall Area

(Western Cape)

The Western Cape Province has a Mediterranean climate, characterised by cool, wet winters and hot dry summers. More than 80% of the rainfall occurs in winter between April and September, making the Western Cape a predominantly winter rainfall area. Mean annual rainfall varies from 200 to 450 mm. Arable land in this area covers approximately 1.5 million hectares, with winter cereals (wheat, barley, canola and oats) the major crops cultivated. At present, the Western Cape accounts for half of the wheat produced in South Africa. The Swartland (on the West Coast) and the Rûens (Southern Cape) are the main distinguishable geographic regions of the winter rainfall area.

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

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

The climatic conditions in the Swartland during the 2020 production season, was substantially better than in 2019. Rainfall started as early as April in most regions and the distribution of rainfall during the growing season (May to October) was optimal. The excellent climatic conditions are reflected in the yields obtained.

Climatic conditions in the Rûens were also much more favourable than during the 2019 production season. Less rainfall was received during April than in the Swartland, but good emergence and early development were obtained. Some dry spells occurred in the Eastern Rûens, resulting in lower yields in this area, while high rainfall occurred in other areas of the Rûens during harvesting. In general, the Rûens experienced an excellent year, also reflected in the yields obtained as observed in the Swartland.

The hectolitre mass averaged 78.1 kg/hl compared to the previous season's 77.2 kg/hl. The thousand kernel mass averaged 39.2 g, 5.2 g higher than the previous season and also 1 g higher than the national average of 38.2 g. The average falling number was 401 seconds, the highest of the three production areas. The whole wheat protein content averaged 10.9% (12% mb), a 1.9% decrease compared to the previous season.

The average percentage screenings of 1.75% was 0.64% lower than in the 2019/20 season. This season is the first of several seasons in which the Winter rainfall area's screening percentage is not the highest of the three production areas. The mixogram peak time (Quadromat Junior mill) averaged 3.0 minutes. The Bühler extraction averaged 73.5% (average of wheat grades Super to Grade 3 and COW), compared to the 74.0% in 2019/20. The average wet colour of the flour was -5.0 KJ units and the Konica Minolta CM-5 (dry colour) L* value (indicating lightness) 94.28, previously 93.90. Both these colour values indicate a white/light flour that is preferred by millers and bakers and which also compares well to previous seasons. The average ash content was 0.59%.

The flour protein content averaged 10.5%, compared to the 11.7% of the previous season. The average wet and dry gluten values were 27.8% and 9.4% (14% mb). The gluten index was 95, equal to the previous two seasons. The average farinogram absorption was 59.1% and the development time 4.8 minutes, the stability averaged 8.2 minutes. The average alveogram strength was 36.0 cm²

(40.8 cm² previously) and the P/L value averaged 0.73. The average strength on the extensogram was 85 cm² compared to 109 cm² last season. The decrease in strength values can be attributed to the lower protein content this season. The mixogram peak time on the Bühler milled flour averaged 2.8 minutes, slightly longer than in previous seasons. The 100-gram baking test showed on average an excellent relationship between protein content and bread volume.

Summer Rainfall and Irrigation Area
(Free State)

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

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

Both the North Western and Eastern Free State received excellent rainfall during the period leading up to planting time. Good rains also occurred during the rest of the growing season (October to December 2020). Extremely high rainfall figures were recorded in the Eastern Free State, specifically at the Bethlehem weather station. These excessive rainfall events unfortunately resulted in a delay in the harvesting process and subsequent pre-harvest sprouting (sprouting in the ear).

The average hectolitre mass was 77.8 kg/hl, the lowest average of the three production areas. The average in 2019/20 was 77.4 kg/hl. The thousand kernel mass of 36.7 g, was 4.3 g higher than the previous season, but still the lowest of the three areas. The average percentage screenings was 2.16%, the highest average of the different production areas. The average whole wheat protein content of 13.5% was 0.2% lower than in the previous season, but still the highest of the three areas. The national average this season is 12.0%. The falling number averages 302 seconds, again the lowest average of the three production areas.

The mixogram (Quadromat Junior) peak time increased to 3.6 minutes, compared to the 3.1 minutes of the previous season and the national average of 3.2 minutes. The average Bühler extraction percentage in the Free State was 74.1%, equal to this season's national average. The Kent Jones flour colour was -4.3 KJ units and the Konica Minolta CM-5 L* value 93.43, compared to the -4.1 KJ and 92.93 of the previous season. The average ash content was 0.59% and the average flour protein content 1.0% lower than the previous season at 12.0%. The wet gluten content (14% mb) was 32.3% and the dry gluten 11.0%, decreasing by 2.2% and 0.9% respectively compared to the previous season. The gluten index averaged 96 as in 2019/20.

The average farinogram water absorption of 59.8% showed a 1.8% reduction compared to the previous season's 61.3% but was still the highest of the three areas this season. The development time averaged 6.9 minutes and the stability 9.7 minutes, respectively 0.7 and 1.1 minutes longer than in 2019/20. The average alveogram strength of 42.2 cm² was 5.9 cm² lower than the previous season, while the extensogram strength decreased by 7 cm² compared to last season. The Bühler milled flour had an average mixograph peak time of 3.3 minutes, the longest of the three areas. The national average is 2.9 minutes this season. The 100-gram baking test showed that the relationship between protein content and bread volume was excellent between the different grades.

Irrigation Areas

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

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

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

Temperature conditions during this season showed slight deviations to the long-term average in all of the production regions. Minimum temperatures in the KwaZulu-Natal and Cooler Irrigation regions were below normal during July and August, which could explain the higher yields obtained in these regions. In the Highveld region, minimum temperatures were very close to the long-term average. In the Warmer Irrigation region, the minimum temperatures were slightly lower than the long-term average.

As in the previous season, the irrigation wheat had the highest weighted average hectolitre mass of the three production areas, namely 80.9 kg/hl. This value is slightly higher than the 80.7 kg/hl of the 2019/20 season. The thousand kernel mass decreased by almost a gram to 37.4 g. The average falling number was 363 seconds, 360 seconds in the previous season. The screenings averaged 1.07%, again the lowest of the three areas as observed in the previous three seasons.

The whole wheat protein content was on average 12.9% compared to the 12.6% of the previous season. The flour protein content was 11.8%, 11.6% previously. The mixogram (Quadromat Junior) peak time averaged 3.1 minutes, similar to the previous season and the national average. The average Bühler extraction was 74.9%, again the highest of the three areas.

The dry colour L* value was 93.71 and the Kent Jones wet colour value -4.7 KJ units, very similar to the previous season. The ash content averaged 0.61%. The average wet and dry gluten values were 31.6% and 10.8% respectively, both higher than in the previous season. The gluten index averaged 95, equal to the previous season. The average farinogram water absorption was 59.5% (60.3% during the previous season), the development time and stability averaged 5.9 minutes and 8.2 minutes respectively.

Alveogram strength averaged 39.5 cm² and the P/L 0.51 (41.7 cm² and 0.65 respectively the previous season). The average extensogram strength was 111 cm², compared to 112 cm² last season. The mixogram peak time averaged 3.0 minutes. The relationship between protein content and 100 g bread volume was shown to be excellent.

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

Please see the results provided per individual production region on pages 38 to 63.

Table 5: Regional quality weighted averages

	Winter rainfall area (Western Cape)			Summer rainfall and Irrigation area (Free State)			Irrigation areas			RSA average		
Number of samples per area	**133**			**45**			**72**			**250**		
Regions	**1 - 6**			**21 - 28**			**10 - 11, 14, 17 - 20, 29 - 34, 36**			**All**		
Hectolitre mass dirty, kg/hl	78.1			77.8			80.9			78.9		
1000 kernel mass (13% mb), g	39.2			36.7			37.4			38.2		
Falling number, sec	401			302			363			372		
Screenings (1.8 mm sieve), %	1.75			2.16			1.07			1.63		
Protein (12% mb), % (WWF)	10.9			13.5			12.9			12.0		
Mixogram peak time, min (Quadromat Junior)	3.0			3.6			3.1			3.2		
Composite samples per class and grade	***Super B3***	***B1 COW***	***B2***	***Super B3***	***B1 COW***	***B2***	***Super B3***	***B1 COW***	***B2***	***Super B3***	***B1 COW***	***B2***
Composite samples, n = 69	***4 5***	***4 5***	***5***	***5 -***	***1 2***	***-***	***12 -***	***4 -***	***2***	***21 5***	***9 7***	***7***
Bühler extraction, %	73.7 73.9	73.3 73.1	73.8	73.8 -	74.3 74.6	-	74.8 -	75.2 -	75.5	74.3 73.9	74.2 73.6	74.3
Flour colour, KJ (wet)	-5.0 -5.0	-5.0 -4.9	-5.0	-4.4 -	-4.5 -4.0	-	-4.7 -	-4.7 -	-5.0	-4.7 -5.0	-4.8 -4.7	-5.0
Flour colour, Konica Minolta CM-5 (dry)						-						
L*	94.12 94.44	94.18 94.34	94.28	93.45 -	93.66 93.24	-	93.69 -	93.70 -	93.87	93.72 94.44	93.91 94.03	94.16
a*	0.45 0.35	0.40 0.36	0.39	0.46 -	0.49 0.47	-	0.49 -	0.50 -	0.43	0.48 0.35	0.46 0.39	0.40
b*	9.81 9.47	9.58 9.75	9.75	10.26 -	10.19 10.15	-	9.50 -	10.13 -	9.90	9.74 9.47	9.89 9.57	9.79
Ash (db), %	0.60 0.59	0.59 0.60	0.59	0.56 -	0.70 0.60	-	0.62 -	0.60 -	0.61	0.60 0.59	0.60 0.60	0.60

WWF = Whole Wheat Flour

Table 5: Regional quality weighted averages (continue)

	Winter rainfall area (Western Cape)			Summer rainfall and Irrigation area (Free State)			Irrigation areas			RSA average		
Regions	**1 - 6**			**21 - 28**			**10 - 11, 14, 17 - 20, 29 - 34, 36**			**All**		
Composite samples per class and grade	***Super***	***B1***	***B2***	***Super***	***B1***	***B2***	***Super***	***B1***	***B2***	***Super***	***B1***	***B2***
	B3	***COW***		***B3***	***COW***		***B3***	***COW***		***B3***	***COW***	
Composite samples, n = 69	***4***	***4***	***5***	***5***	***1***	***-***	***12***	***4***	***2***	***21***	***9***	***7***
	5	***5***		***-***	***2***		***-***	***-***		***5***	***7***	
Flour protein (12% mb), %	12.1	11.0	10.1	12.2	10.3	-	12.3	11.2	9.9	12.3	11.0	10.0
	9.6	10.0		-	12.1		-	-		9.6	10.6	
Wet gluten (14% mb), %	33.0	29.8	26.8	32.5	29.2	-	32.9	30.0	26.9	32.8	29.8	26.8
	24.1	26.6		-	33.1		-	-		24.1	28.5	
Dry gluten (14% mb), %	11.4	10.3	9.0	11.2	9.5	-	11.4	10.0	8.4	11.4	10.0	8.8
	7.9	8.9		-	11.4		-	-		7.9	9.6	
Gluten Index	94	96	94	97	95	-	95	95	97	96	95	95
	95	94		-	95		-	-		95	94	
Farinogram: Water absorption (14% mb), %	60.9	60.2	59.1	60.0	58.0	-	60.0	58.5	58.0	60.2	59.2	58.7
	57.5	58.5		-	60.1		-	-		57.5	59.0	
Farinogram: Development time, min	5.7	5.4	4.8	7.5	5.0	-	6.2	5.2	5.4	6.4	5.2	5.0
	4.0	4.5		-	6.3		-	-		4.0	5.0	
Farinogram: Stability, min	8.9	8.8	8.0	11.0	5.6	-	8.5	8.0	6.9	9.2	8.1	7.7
	7.8	7.7		-	8.4		-	-		7.8	7.9	
Alveogram: Strength (S), cm²	43.1	40.3	34.3	47.0	24.9	-	41.7	37.0	31.2	43.2	37.1	33.4
	30.9	33.7		-	38.8		-	-		30.9	35.2	
Alveogram: P/L	0.58	0.68	0.78	0.63	0.69	-	0.49	0.54	0.56	0.54	0.62	0.72
	0.83	0.76		-	0.45		-	-		0.83	0.67	
Extensogram: Strength, cm²	98	95	80	122	79	-	119	102	88	115	97	82
	74	84		-	108		-	-		74	91	
Mixogram peak time, min	2.6	2.7	2.7	3.4	2.8	-	2.9	3.0	3.1	3.0	2.8	2.8
	3.2	2.8		-	3.1		-	-		3.2	2.9	
Relationship between protein and bread volume	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.

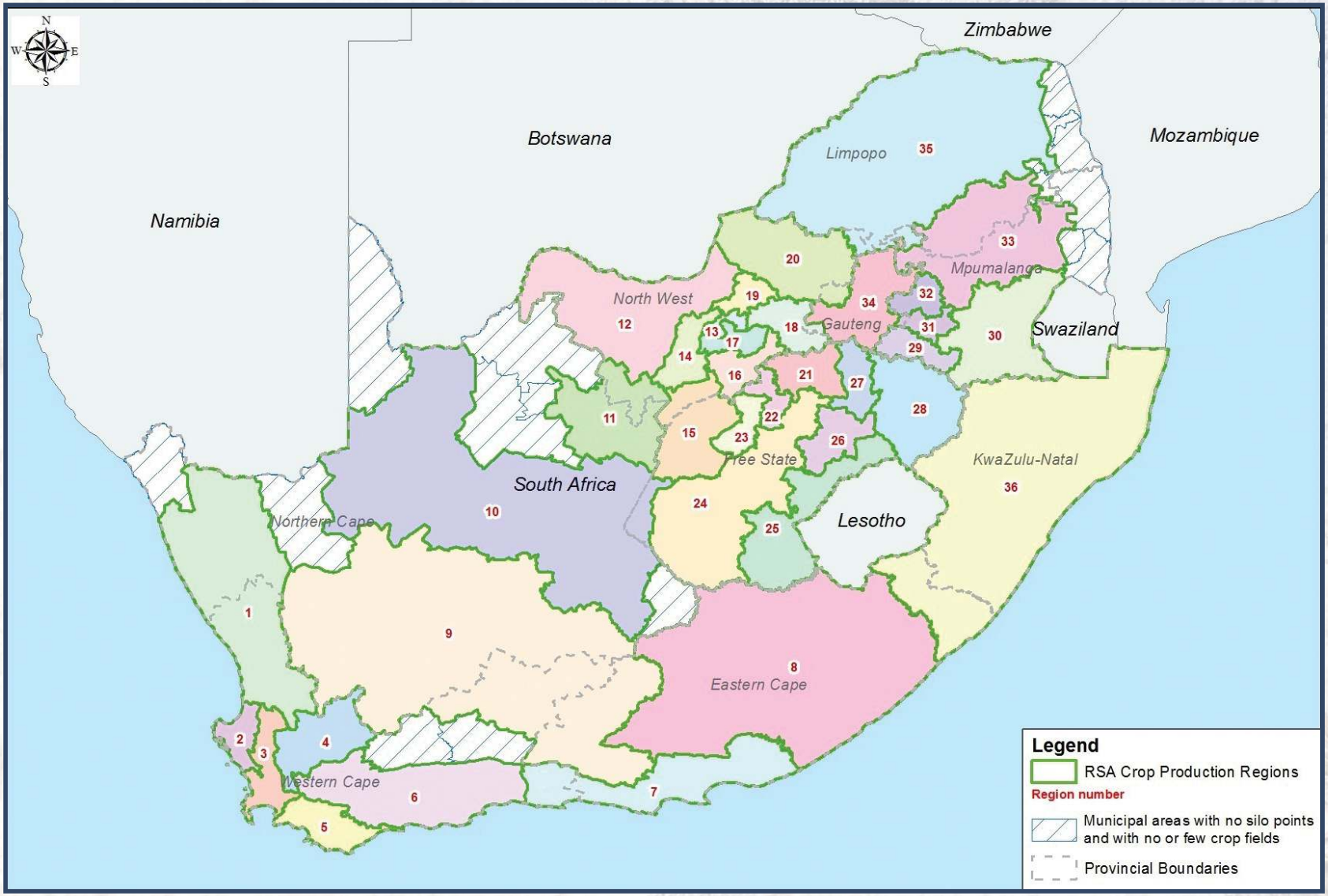
The 9 provinces are divided into 36 grain production regions.

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 the next page.

The production regions from which wheat samples were received for the crop quality survey of the 2020/21 production season, are named and described on pages 34 to 37. All the silo/intake stands as well as the type of storage structure, situated in a particular region, are provided.

Figure 2: RSA Crop Production Regions map



Regional map with gratitude to Agbiz Grain and SiQ.

Grain Production Regions

Silo/Intake stands per region indicating type of storage structure

Region 1: Namakwaland Region

Kaap Agri	Graafwater *(Bags/Bins)*		

Region 2: Swartland Western Region

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

Region 3: Swartland Central Region

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

Region 4: Swartland Eastern Region

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

Region 5: Rûens Western Region

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

Region 6: Rûens Easter 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	Modderrivier *(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 *(Bins/Bulk)*	Senwes	Jan Kempdorp *(Bins)*
GWK	Jan Kempdorp *(Bags/Bunkers)*	Senwes	Magogong *(Bins)*
Senwes	Hartswater *(Bins)*	Senwes	Tadcaster *(Bins)*

Region 14: North West Southern Region			
NWK	Barberspan *(Bins)*	NWK	Taaibospan *(Bins)*
NWK	Delareyville *(Bins)*	Suidwes Landbou	Amalia *(Bins)*
NWK	Excelsior *(Bins)*	Suidwes Landbou	Hallatshope *(Bins)*
NWK	Geysdorp *(Bins)*	Suidwes Landbou	Migdol *(Bins)*
NWK	Migdol *(Bins)*	Suidwes Landbou	Schweizer-Reneke *(Bins)*
NWK	Nooitgedacht *(Bins)*		

Region 17: North West Central-Northern Region (Ottosdal)			
NWK	Boschpoort *(Bags/Bins/Bulk)*	NWK	Vermaas *(Bins)*
NWK	Kleinharts *(Bins)*	Senwes	Hartbeesfontein *(Bins)*
NWK	Ottosdal *(Bins)*	Senwes	Melliodora *(Bins)*
NWK	Rostrataville *(Bins)*	Senwes	Werda *(Bins)*

Region 18: North West Central Region (Ventersdorp)			
NWK	Bodenstein *(Bins)*	Senwes	Makokskraal *(Bins)*
NWK	Coligny *(Bins)*	Senwes	Potchefstroom*(Bins)*
Senwes	Buckingham *(Bins)*	Senwes	Ventersdorp Silo A *(Bins)*
Senwes	Enselspruit *(Bins)*	Senwes	Ventersdorp Silo B *(Bins)*

Region 19: North West Central Region (Lichtenburg)			
Afgri	Lichtenburg *(Bunkers)*	NWK	Lottie Halte *(Bins)*
NWK	Grootpan 1 *(Bins)*	NWK	Lusthof *(Bins)*
NWK	Grootpan 2 *(Bins)*	NWK	Lichtenburg Silo 3 *(Bins)*
NWK	Halfpad *(Bins)*	NWK	Lichtenburg Silo 5 *(Bins)*
NWK	Hibernia *(Bins)*		

Region 20: North West Eastern Region			
Afgri	Battery *(Bins)*	NWK	Derby *(Bins)*
Afgri	Beestekraal *(Bunker)*	NWK	Koster *(Bins)*
Afgri	Brits *(Bins)*	NWK	Swartruggens *(Bins)*
NWK	Boons *(Bins)*	NWK	Syferbult *(Bins)*

Region 21: Free State North-Western Region (Viljoenskroon)			
Afgri	Kommandonek *(Bunkers)*	Senwes	Vierfontein *(Bins)*
Senwes	Attie *(Bins)*	Senwes	Viljoenskroon G232 *(Bins)*
Senwes	Groenbloem *(Bins)*	Senwes	Viljoenskroon G266 *(Bins)*
Senwes	Heuningspruit *(Bins)*	Senwes	Vredefort *(Bins)*
Senwes	Koppies *(Bins)*	Senwes	Weiveld *(Bins)*
Senwes	Rooiwal *(Bins)*		

Grain Production Regions

Silo/Intake stands per region indicating type of storage structure

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

Senwes	Allanrigde *(Bins)*	Senwes	Odendaalsrus *(Bins)*
Senwes	Bothaville Silo A *(Bins)*	Senwes	Schoonspruit *(Bins)*
Senwes	Bothaville Silo B *(Bins)*	Senwes	Schuttesdraai *(Bins)*
Senwes	Mirage *(Bins)*	Suidwes Landbou	Misgunst *(Bunkers)*

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

Senwes	Bultfontein *(Bins)*	Senwes	Tierfontein *(Bins)*
Senwes	Losdoorns *(Bins)*	Senwes	Wesselsbron *(Bins/Bunkers)*
Senwes	Protespan *(Bins)*	Senwes	Willemsrus *(Bins)*

Region 24: Free State Central Region

Senwes	Bloemfontein *(Bins)*	Senwes	Petrusburg *(Bins)*
Senwes	Brandfort *(Bins)*	Senwes	Theunissen *(Bins)*
Senwes	De Brug *(Bins)*	Senwes	Van Tonder *(Bins)*
Senwes	Geneva *(Bins)*	Senwes	Welgeleë *(Bins)*
Senwes	Hennenman *(Bins)*	Senwes	Winburg *(Bins)*
Senwes	Kroonstad *(Bins)*		

Region 25: Free State South-Western Region

Afgri	Bethlehem *(Bins)*	OVK	Marseilles *(Bins)*
Afgri	Slabberts *(Bins)*	OVK	Modderpoort *(Bins)*
OVK	Clocolan *(Bins)*	OVK	Tweespruit *(Bins)*
OVK	Ficksburg *(Bins)*	OVK	Westminster *(Bins)*
OVK	Fouriesburg *(Bins)*	Senwes	Dewetsdorp *(Bins)*

Region 26: Free State South-Eastern Region

Afgri	Kaallaagte *(Bins)*	Afgri	Monte Video *(Bins)*
Afgri	Libertas *(Bins)*	Afgri	Senekal *(Bins)*
Afgri	Marquard *(Bins)*	Senwes	Arlington *(Bins)*
Afgri	Meets *(Bins)*	Senwes	Steynsrus *(Bins)*

Region 28: Free State Eastern Region

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

Region 29: Mpumalanga Southern Region

Afgri	Balfour *(Bins)*	Afgri	Leeuspruit *(Bins)*
Afgri	Greylingstad *(Bins)*	Afgri	Platrand *(Bins)*
Afgri	Grootvlei *(Bins)*	Afgri	Standerton *(Bins)*
Afgri	Harvard *(Bins)*	Afgri	Val *(Bins)*
Afgri	Holmdene *(Bins)*		

Grain Production Regions

Silo/Intake stands per region indicating type of storage structure

Region 32: Mpumalanga Western Region

Afgri	Argent Silo *(Bins/Bunkers)*	Afgri	Hawerklip *(Bins)*
Afgri	Delmas *(Bunkers)*	Afgri	Kendal *(Bins)*
Afgri	Dryden *(Bins)*	Afgri	Ogies *(Bins)*
Afgri	Eloff *(Bins)*	Afgri	Vlakfontein *(Bunkers)*
Afgri	Endicott *(Bins)*	Afgri	

Region 33: Mpumalanga Northern Region

Afgri	Arnot *(Bins)*	Afgri	Middelburg *(Bins)*
Afgri	Driefontein *(Bins)*	Afgri	Pan *(Bins)*
Afgri	Lydenburg *(Bins)*	Afgri	Stoffberg *(Bins)*
Afgri	Marble Hall *(Bins)*	Afgri	Wonderfontein *(Bins)*

Region 34: Gauteng Region

Afgri	Bloekomspruit *(Bins)*	Afgri	Nigel *(Bins)*
Afgri	Bronkhorstspruit *(Bins)*	Afgri	Pretoria Wes *(Bins)*
Afgri	Glenroy *(Bins)*	Afgri	Vogelvallei *(Bunkers)*
Afgri	Goeie Hoek *(Bins)*	Senwes	Middelvlei *(Bins)*
Afgri	Kaalfontein *(Bins)*	Senwes	Oberholzer *(Bins)*
Afgri	Kliprivier *(Bunkers)*	Senwes	Raathsvlei *(Bins)*
Afgri	Meyerton *(Bunkers)*		

Region 36: KwaZulu-Natal Region

Afgri	Bergville *(Bins/Bunkers)*	Afgri	Paulpietersburg *(Bins)*
Afgri	Bloedrivier *(Bins)*	Afgri	Pietermaritzburg *(Bins)*
Afgri	Dannhauser *(Bins)*	Afgri	Vryheid *(Bins)*
Afgri	Dundee *(Bins)*	Afgri	Winterton *(Bins/Bunkers)*
Afgri	Mizpah *(Bins)*		

South African quality data per production region

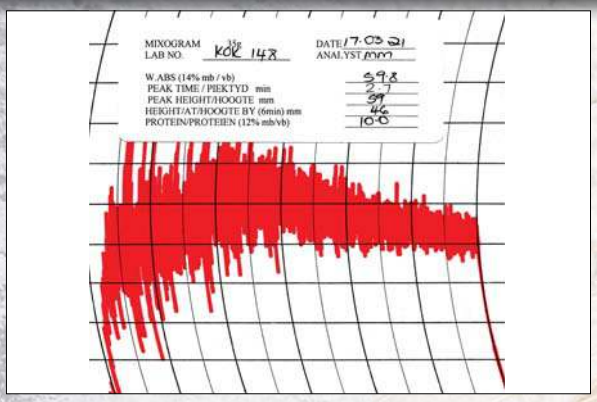
WINTER RAINFALL WHEAT

PRODUCTION REGION	(1) Namakwaland Region				(2) Swartland Western Region			
WHEAT								
	ave	**min**	**max**	**stdev**	**ave**	**min**	**max**	**stdev**
Protein (12% mb), %	11.5	10.3	13.3	1.36	10.6	9.5	12.4	0.92
Falling number, sec	404	380	424	21.23	387	352	428	26.53
Moisture, %	10.6	10.3	10.7	0.19	10.9	10.5	11.2	0.26
1000 Kernel mass (13% mb), g	39.5	36.7	41.8	2.13	36.6	34.4	39.9	1.86
Hectolitre mass (dirty), kg/hl	79.0	77.7	79.5	0.87	77.7	74.3	80.3	1.89
Screenings (<1.8 mm sieve), %	3.22	2.37	3.70	0.61	2.08	0.63	3.35	1.01
Total damaged kernels, %	1.12	0.28	2.58	1.01	0.53	0.00	1.20	0.34
Combined deviations, %	4.82	4.11	5.41	0.58	3.10	0.99	5.95	1.47
Number of samples			***4***				***11***	
CULTIVARS								
Cultivars with highest % occurrence	SST 0117	34.8			SST 0117	39.1		
	SST 0166	24.0			SST 056	15.9		
	SST 087	16.5			SST 0166	12.6		
	SST 056	14.5			SST 087	12.5		
	SST 015	6.3			SST 88	10.8		
Number of samples			***4***				***11***	
MIXOGRAM (Quadromat Junior)								
	ave	**min**	**max**	**stdev**	**ave**	**min**	**max**	**stdev**
Peak time, min	2.7	2.4	2.9	0.21	3.3	2.9	3.9	0.34
Tail height (6 min), mm	48	44	51	3.30	44	41	50	2.42
Number of samples			***4***				***11***	
	COMPOSITE SAMPLES									
CLASS AND GRADE	**Super**	**B1**	**B2**	**B3**	**COW**	**Super**	**B1**	**B2**	**B3**	**COW**
Bühler Extraction, %	-	-	-	-	71.1	-	-	73.4	73.8	73.1
FLOUR										
Protein (12% mb), %	-	-	-	-	10.6	-	-	10.3	9.3	10.2
Moisture, %	-	-	-	-	13.9	-	-	13.6	13.6	13.4
Ash (db), %	-	-	-	-	0.65	-	-	0.60	0.56	0.58
Colour, KJ (wet)	-	-	-	-	-5.0	-	-	-5.0	-5.0	-5.0
Colour, Konica Minolta CM5 (dry)										
L*	-	-	-	-	94.44	-	-	94.35	94.58	94.41
a*	-	-	-	-	0.34	-	-	0.33	0.31	0.33
b*	-	-	-	-	9.41	-	-	10.58	10.13	10.46
RVA										
Peak Viscosity, cP	-	-	-	-	2209	-	-	2433	2534	2390
Minimum viscosity (Trough), cP	-	-	-	-	1607	-	-	1791	1789	1662
Final Viscosity, cP	-	-	-	-	2542	-	-	2929	3015	2836
Peak Time, min	-	-	-	-	7.00	-	-	7.00	7.00	7.00
GLUTEN										
Wet gluten (14% mb), %	-	-	-	-	29.8	-	-	25.8	23.1	26.5
Dry gluten (14% mb), %	-	-	-	-	10.1	-	-	8.9	7.7	8.8
Gluten Index	-	-	-	-	91	-	-	95	95	95
FARINOGRAM										
Water absorption (14% mb), %	-	-	-	-	60.0	-	-	57.0	55.6	56.4
Development time, min	-	-	-	-	4.2	-	-	5.3	2.2	5.2
Stability, min	-	-	-	-	6.7	-	-	9.4	7.6	8.9
Mixing tolerance index, BU	-	-	-	-	38	-	-	31	23	32
EXTENSOGRAM (45 min pull)										
Area, cm^2	-	-	-	-	82	-	-	92	83	99
Maximum height, BU	-	-	-	-	329	-	-	372	349	364
Extensibility, mm	-	-	-	-	178	-	-	180	170	198
ALVEOGRAM										
Strength (S), cm^2	-	-	-	-	36.4	-	-	34.6	32.6	34.3
Stability (P), mm	-	-	-	-	84	-	-	73	70	69
Distensibility (L), mm	-	-	-	-	109	-	-	120	115	132
Configuration ratio (P/L)	-	-	-	-	0.77	-	-	0.61	0.61	0.52
MIXOGRAM										
Peak time, min	-	-	-	-	2.6	-	-	2.9	3.2	3.2
100 g BAKING TEST										
Loaf volume, cm^3	-	-	-	-	998	-	-	1028	993	1015
Evaluation (see page 74)	-	-	-	-	0	-	-	0	0	0

Rheological Graphs Per Production Region

MIXOGRAM

1



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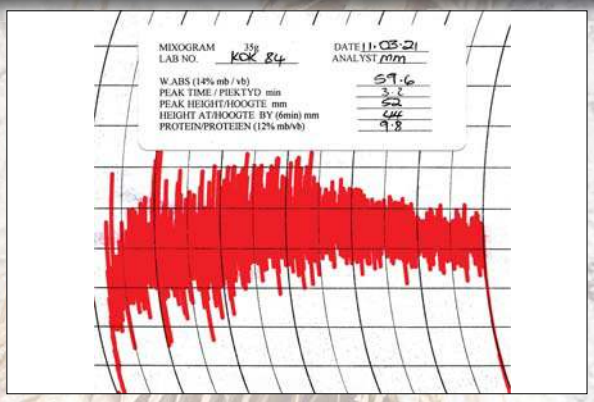
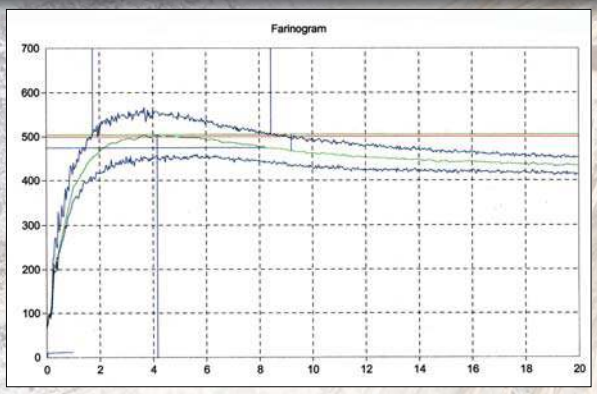


FARINOGRAM

1



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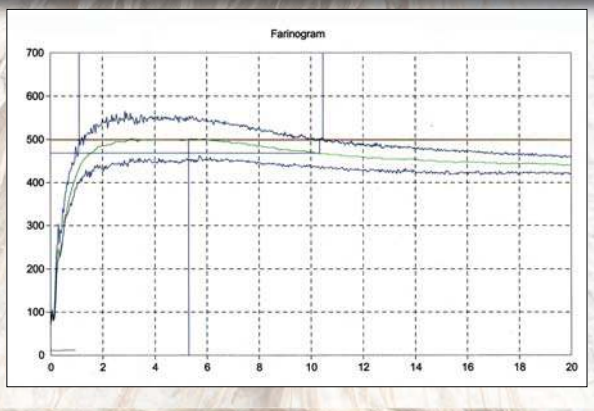
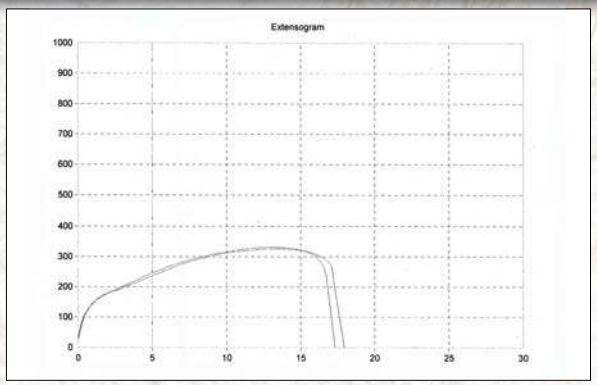


EXTENSOGRAM

1



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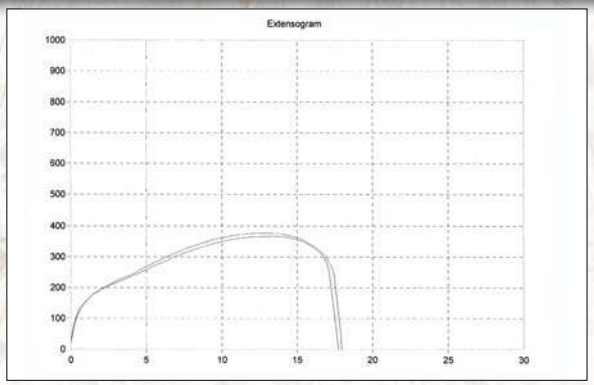
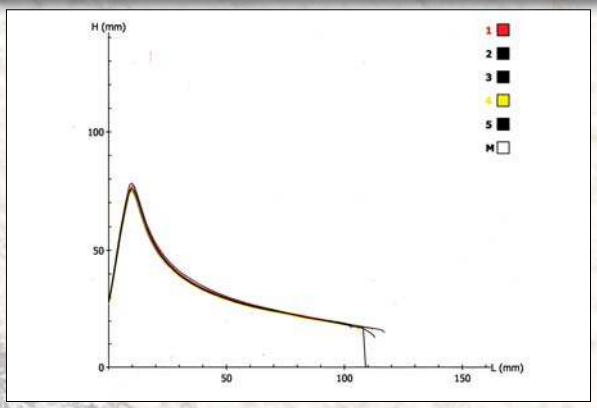


ALVEOGRAM

1



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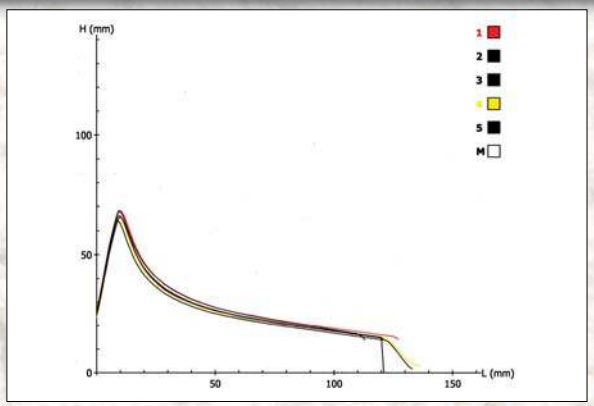


South African quality data per production region

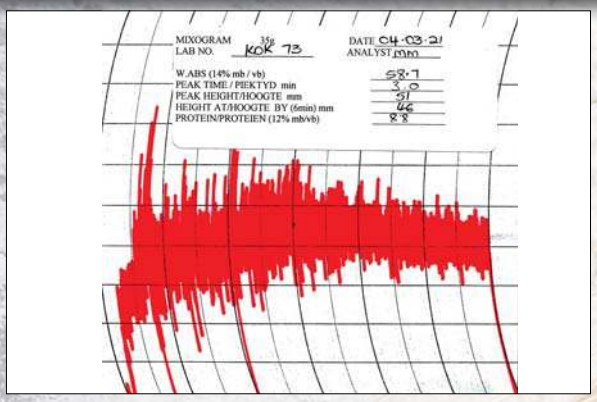
WINTER RAINFALL WHEAT

PRODUCTION REGION	(3) Swartland Central Region				(4) Swartland Eastern Region			
WHEAT								
	ave	**min**	**max**	**stdev**	**ave**	**min**	**max**	**stdev**
Protein (12% mb), %	10.7	8.6	13.5	1.07	10.7	9.0	13.1	1.24
Falling number, sec	418	334	542	46.25	417	370	494	35.43
Moisture, %	10.8	9.6	11.6	0.33	10.8	9.9	11.4	0.39
1000 Kernel mass (13% mb), g	38.3	30.8	43.2	2.52	37.4	29.8	43.6	3.19
Hectolitre mass (dirty), kg/hl	77.7	72.1	80.6	1.44	78.4	74.6	80.0	1.14
Screenings (<1.8 mm sieve), %	1.88	0.20	3.62	0.85	2.03	1.25	3.52	0.60
Total damaged kernels, %	1.07	0.10	9.66	1.56	0.67	0.00	2.88	0.70
Combined deviations, %	3.71	0.62	12.67	2.14	3.20	1.90	6.06	1.06
Number of samples	***64***				***24***			
CULTIVARS								
Cultivars with highest % occurrence	SST 0166	26.5			SST 0117	22.4		
	SST 0117	24.3			SST 0166	21.8		
	SST 056	18.0			SST 056	17.4		
	SST 087	13.5			SST 087	13.9		
	SST 0127	9.7			SST 0127	9.5		
Number of samples	***64***				***24***			
MIXOGRAM (Quadromat Junior)								
	ave	**min**	**max**	**stdev**	**ave**	**min**	**max**	**stdev**
Peak time, min	3.0	2.5	3.7	0.24	3.2	2.6	3.8	0.31
Tail height (6 min), mm	46	39	52	2.95	45	39	50	2.83
Number of samples	***64***				***24***			
	COMPOSITE SAMPLES							
CLASS AND GRADE	**Super**	**B1**	**B2**	**B3**	**COW**	**Super**	**B1**	**B2**	**B3**	**COW**
Bühler Extraction, %	72.9	74.2	74.0	73.9	73.6	71.1	70.6	73.5	73.8	74.1
FLOUR										
Protein (12% mb), %	12.1	11.2	10.2	10.2	9.8	12.3	10.9	10.2	9.6	9.4
Moisture, %	13.2	13.0	14.1	13.8	13.5	13.4	13.9	13.2	13.2	14.1
Ash (db), %	0.59	0.57	0.56	0.56	0.59	0.60	0.57	0.60	0.58	0.54
Colour, KJ (wet)	-5.0	-5.0	-5.0	-5.0	-5.0	-5.0	-5.0	-5.0	-5.0	-5.0
Colour, Konica Minolta CM5 (dry)										
L*	94.28	94.31	94.47	94.60	94.43	94.31	94.32	94.34	94.46	94.48
a*	0.38	0.34	0.36	0.33	0.36	0.39	0.37	0.39	0.35	0.37
b*	10.28	9.76	9.74	9.52	9.86	10.18	10.25	10.09	9.80	9.80
RVA										
Peak Viscosity, cP	2305	2269	2410	2435	2389	2226	2290	2280	2353	2315
Minimum viscosity (Trough), cP	1588	1572	1606	1700	1692	1540	1639	1560	1695	1600
Final Viscosity, cP	2655	2636	2841	2881	2818	2524	2627	2721	2814	2788
Peak Time, min	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00
GLUTEN										
Wet gluten (14% mb), %	32.9	30.4	26.4	23.4	25.5	32.3	27.7	26.4	25.3	23.7
Dry gluten (14% mb), %	11.4	10.4	8.6	7.6	8.4	10.9	9.6	8.9	8.0	7.9
Gluten Index	95	94	95	96	94	95	96	94	93	95
FARINOGRAM										
Water absorption (14% mb), %	59.9	60.0	58.2	56.9	58.0	60.1	57.0	57.8	57.4	57.0
Development time, min	6.3	5.7	6.2	4.3	4.0	5.4	6.5	5.3	5.7	5.2
Stability, min	11.7	8.7	9.2	7.9	8.1	8.8	12.6	8.5	8.1	8.1
Mixing tolerance index, BU	22	32	31	35	28	30	24	36	37	35
EXTENSOGRAM (45 min pull)										
Area, cm^2	74	105	91	72	84	117	114	80	77	80
Maximum height, BU	258	367	351	305	346	363	452	330	317	312
Extensibility, mm	201	213	188	172	173	230	188	175	176	186
ALVEOGRAM										
Strength (S), cm^2	42.7	41.0	35.0	28.9	34.6	46.2	44.5	36.1	33.3	30.6
Stability (P), mm	79	83	75	74	82	77	70	78	74	74
Distensibility (L), mm	137	122	117	92	98	168	175	111	112	98
Configuration ratio (P/L)	0.58	0.68	0.64	0.80	0.84	0.46	0.40	0.70	0.66	0.76
MIXOGRAM										
Peak time, min	2.5	2.6	2.8	3.3	3.1	2.7	3.4	3.0	3.1	2.9
100 g BAKING TEST										
Loaf volume, cm^3	1155	1103	1064	983	1001	1168	1108	1072	1057	982
Evaluation (see page 74)	0	0	0	0	0	0	0	0	0	0

Rheological Graphs Per Production Region

MIXOGRAM

3



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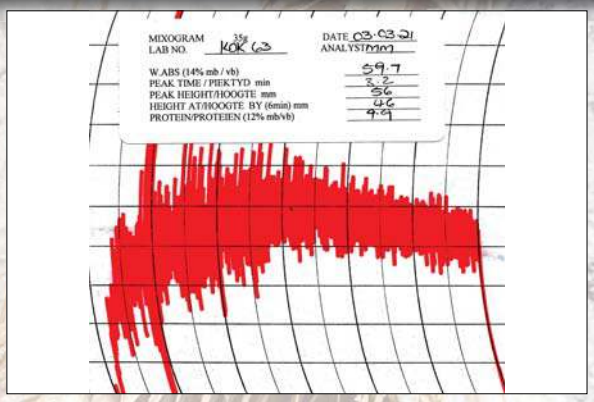
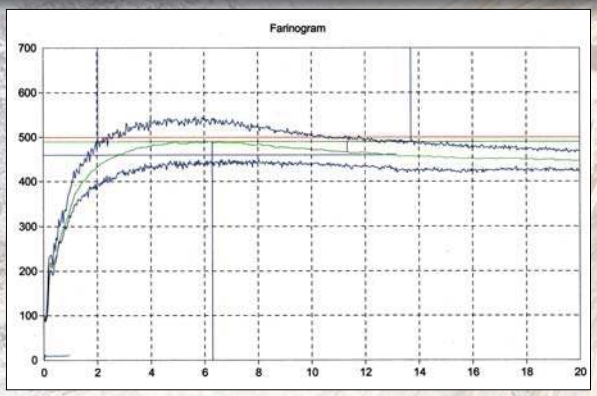


FARINOGRAM

3



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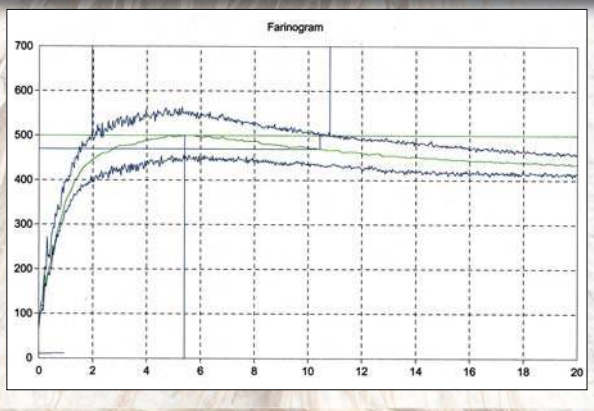
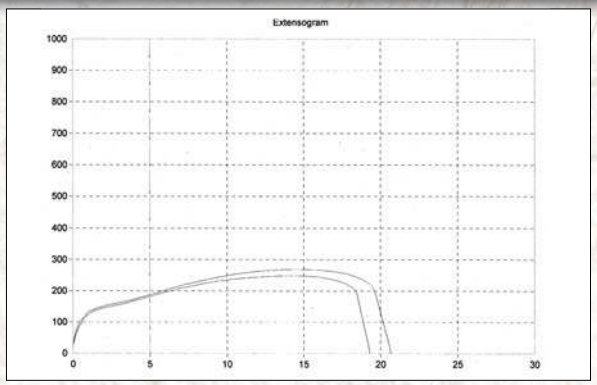


EXTENSOGRAM

3



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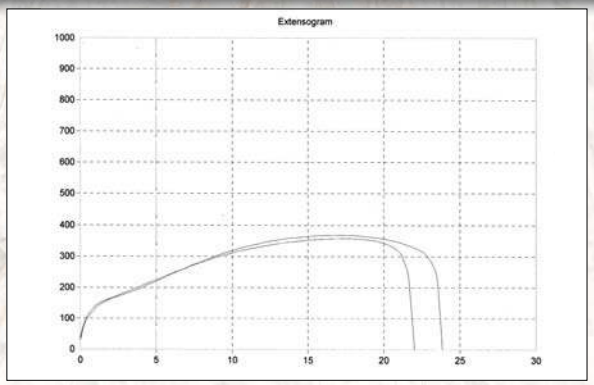
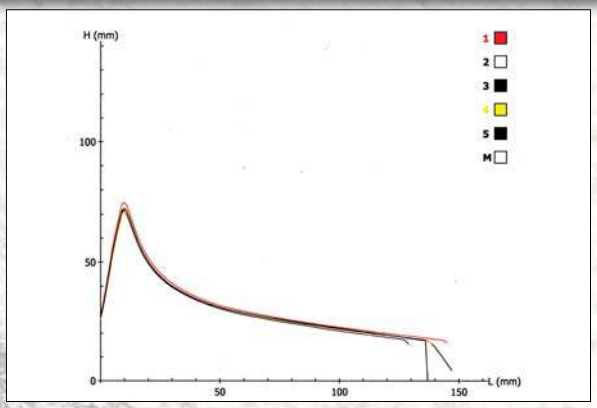


ALVEOGRAM

3



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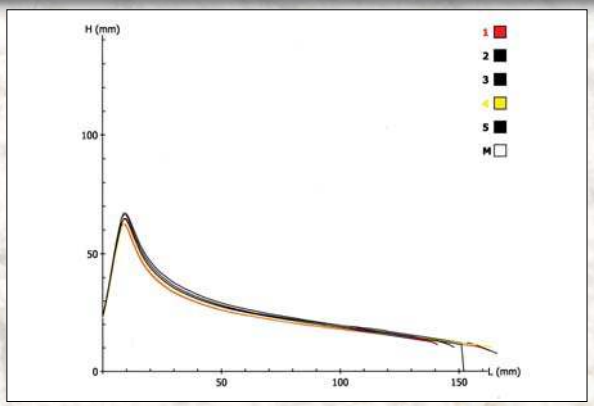


South African quality data per production region

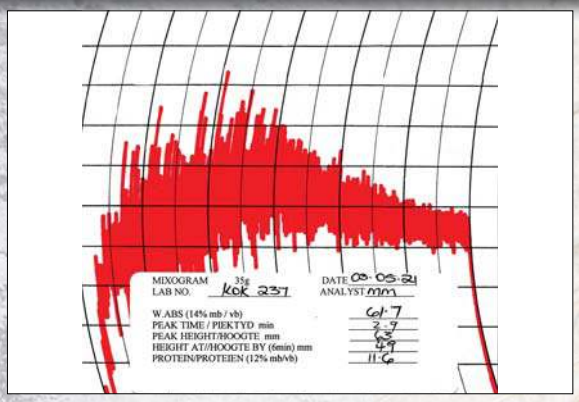
WINTER RAINFALL WHEAT

PRODUCTION REGION	(5) Rûens Western Region				(6) Rûens Eastern Region			
WHEAT	**ave**	**min**	**max**	**stdev**	**ave**	**min**	**max**	**stdev**
Protein (12% mb), %	11.3	10.0	13.0	1.09	11.6	10.2	13.6	0.88
Falling number, sec	386	351	424	24.68	343	293	399	25.47
Moisture, %	12.1	11.8	12.3	0.18	11.9	11.3	12.2	0.26
1000 Kernel mass (13% mb), g	44.2	42.1	45.8	1.35	43.0	40.8	45.7	1.33
Hectolitre mass (dirty), kg/hl	78.8	75.9	81.4	2.03	78.7	74.2	81.4	1.71
Screenings (<1.8 mm sieve), %	1.07	0.09	3.39	1.08	0.88	0.14	2.79	0.70
Total damaged kernels, %	0.77	0.32	1.72	0.45	0.78	0.02	2.00	0.56
Combined deviations, %	2.27	0.57	4.41	1.18	2.10	0.32	6.81	1.57
Number of samples	***8***				***22***			
CULTIVARS								
Cultivars with highest % occurrence	SST 0117	36.9			SST 0117	31.2		
	SST 0166	21.5			SST 0166	22.8		
	SST 087	12.9			SST 056	16.8		
	SST 0127	12.6			SST 087	11.0		
	SST 056	7.0			SST 0127	9.4		
Number of samples	***8***				***22***			
MIXOGRAM (Quadromat Junior)	**ave**	**min**	**max**	**stdev**	**ave**	**min**	**max**	**stdev**
Peak time, min	2.8	2.6	3.1	0.16	2.8	2.4	3.2	0.20
Tail height (6 min), mm	48	44	52	3.11	50	44	55	3.00
Number of samples	***8***				***22***			
	COMPOSITE SAMPLES							
CLASS AND GRADE	**Super**	**B1**	**B2**	**B3**	**COW**	**Super**	**B1**	**B2**	**B3**	**COW**
Bühler Extraction, %	76.5	74.4	74.0	74.1	-	74.1	73.9	73.9	73.8	73.8
FLOUR										
Protein (12% mb), %	11.9	10.9	9.5	9.0	-	12.2	11.1	10.3	9.8	10.1
Moisture, %	13.6	13.7	13.6	13.9	-	13.9	13.9	13.5	13.5	13.1
Ash (db), %	0.59	0.59	0.58	0.63	-	0.62	0.61	0.63	0.60	0.63
Colour, KJ (wet)	-5.0	-5.0	-5.0	-5.0	-	-4.9	-4.9	-5.0	-4.9	-4.7
Colour, Konica Minolta CM5 (dry)										
L*	93.98	93.98	94.18	94.23	-	93.92	94.11	94.07	94.31	93.95
a*	0.47	0.45	0.48	0.38	-	0.54	0.45	0.41	0.37	0.39
b*	9.70	9.35	8.79	9.63	-	9.09	8.94	9.56	8.29	9.24
RVA										
Peak Viscosity, cP	2078	2234	2661	2398	-	2229	2304	2332	2225	2118
Minimum viscosity (Trough), cP	1549	1632	1838	1618	-	1628	1719	1663	1650	1640
Final Viscosity, cP	2368	2572	3111	2848	-	2543	2667	2780	2549	2409
Peak Time, min	7.00	7.00	7.00	7.00	-	7.00	7.00	7.00	7.00	7.00
GLUTEN										
Wet gluten (14% mb), %	32.9	30.3	27.1	23.0	-	33.9	30.6	28.2	25.6	27.7
Dry gluten (14% mb), %	11.5	10.6	9.1	7.7	-	11.8	10.4	9.4	8.5	9.1
Gluten Index	94	97	94	97	-	93	95	94	95	93
FARINOGRAM										
Water absorption (14% mb), %	60.3	60.6	61.2	56.6	-	63.1	63.2	61.1	60.8	61.2
Development time, min	5.2	4.3	3.5	4.2	-	5.7	4.9	3.7	3.8	4.0
Stability, min	7.7	7.1	6.4	7.7	-	7.4	6.9	6.6	7.9	6.8
Mixing tolerance index, BU	40	33	42	37	-	39	41	38	31	39
EXTENSOGRAM (45 min pull)										
Area, cm^2	106	84	63	71	-	94	78	73	67	75
Maximum height, BU	364	305	252	294	-	298	280	275	310	286
Extensibility, mm	206	203	175	177	-	220	194	187	153	182
ALVEOGRAM										
Strength (S), cm^2	41.1	37.0	31.2	26.3	-	42.2	38.7	34.4	33.6	32.7
Stability (P), mm	76	79	91	70	-	89	95	86	97	86
Distensibility (L), mm	139	122	82	87	-	124	96	104	77	94
Configuration ratio (P/L)	0.55	0.65	1.11	0.80	-	0.72	0.99	0.83	1.26	0.91
MIXOGRAM										
Peak time, min	2.8	2.3	2.4	3.1	-	2.3	2.4	2.4	3.1	2.2
100 g BAKING TEST										
Loaf volume, cm^3	1068	1014	888	832	-	1147	1061	1067	925	1004
Evaluation (see page 74)	0	0	0	0	-	0	0	0	0	0

Rheological Graphs Per Production Region

MIXOGRAM

5



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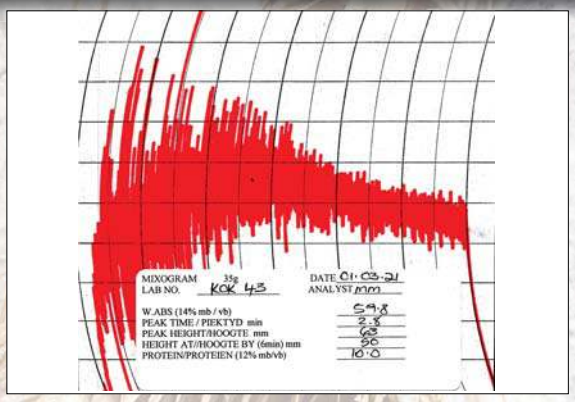
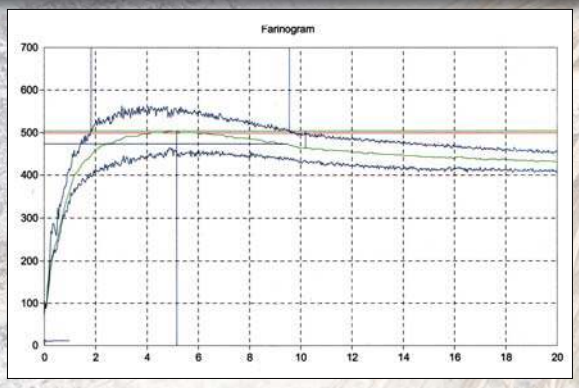


FARINOGRAM

5



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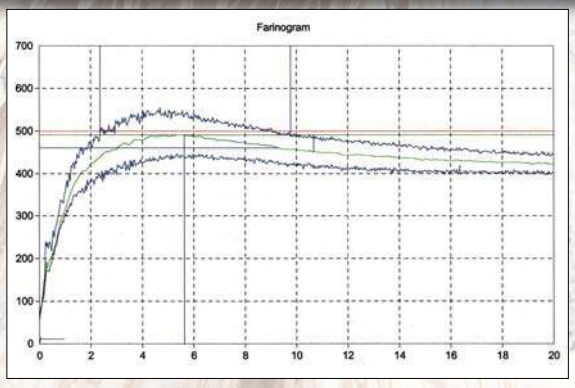
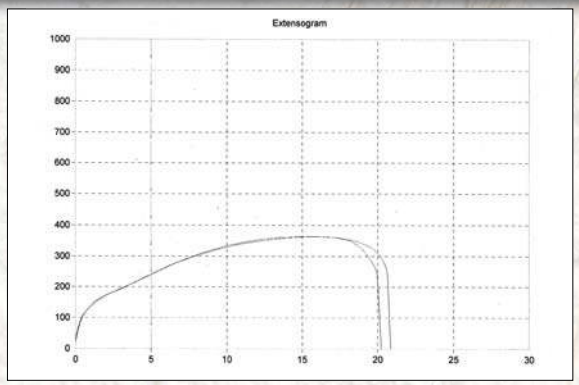


EXTENSOGRAM

5



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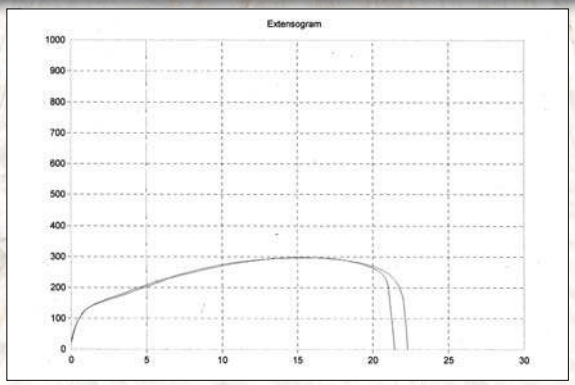
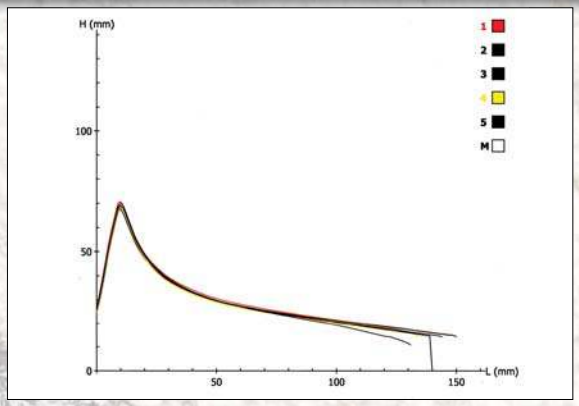


ALVEOGRAM

5



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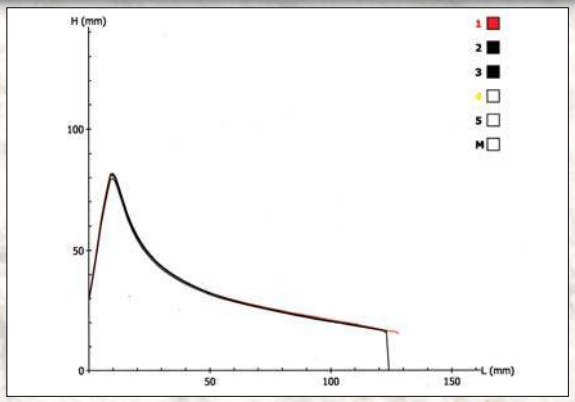


South African quality data per production region

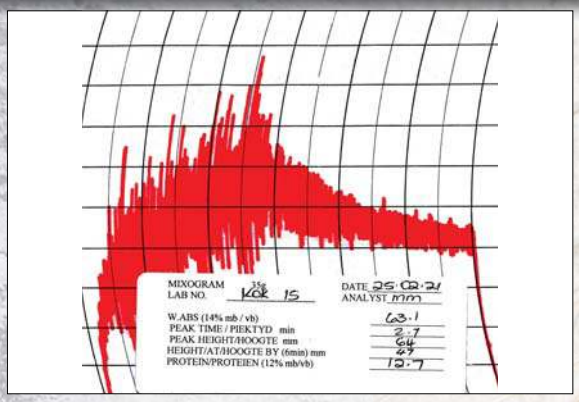
IRRIGATION WHEAT

PRODUCTION REGION	(10) Griqualand West Region				(11) Vaalharts Region			
WHEAT								
	ave	**min**	**max**	**stdev**	**ave**	**min**	**max**	**stdev**
Protein (12% mb), %	13.1	12.1	13.6	0.43	12.6	11.2	13.5	0.81
Falling number, sec	369	318	432	25.71	410	367	453	42.25
Moisture, %	10.4	9.4	11.4	0.69	10.7	10.1	11.2	0.55
1000 Kernel mass (13% mb), g	36.2	33.8	38.4	0.99	36.5	32.6	40.5	3.00
Hectolitre mass (dirty), kg/hl	82.5	78.3	85.3	1.60	81.2	78.7	83.6	2.45
Screenings (<1.8 mm sieve), %	0.81	0.19	3.24	0.75	1.54	0.16	3.28	1.51
Total damaged kernels, %	0.42	0.02	0.90	0.27	0.22	0.00	0.68	0.25
Combined deviations, %	1.47	0.33	4.10	0.99	2.41	0.40	4.04	1.64
Number of samples			***22***				***6***	
CULTIVARS								
Cultivars with highest % occurrence	SST 8135		18.4		SST 8135		25.8	
	PAN 3400		14.5		PAN 3400		14.2	
	SST 884		13.3		SST 884		12.8	
	SST 8154		12.3		SST 8154		12.3	
	PAN 3497		7.5		PAN 3471		10.5	
Number of samples			***22***				***6***	
MIXOGRAM (Quadromat Junior)								
	ave	**min**	**max**	**stdev**	**ave**	**min**	**max**	**stdev**
Peak time, min	2.7	2.5	3.0	0.12	2.9	2.6	3.0	0.15
Tail height (6 min), mm	47	41	50	2.46	47	45	49	1.72
Number of samples			***22***				***6***	
	COMPOSITE SAMPLES							
CLASS AND GRADE	**Super**	**B1**	**B2**	**B3**	**COW**	**Super**	**B1**	**B2**	**B3**	**COW**
Bühler Extraction, %	76.0	76.0	-	-	-	75.3	-	-	-	-
FLOUR										
Protein (12% mb), %	12.4	11.4	-	-	-	12.2	-	-	-	-
Moisture, %	14.4	13.9	-	-	-	14.0	-	-	-	-
Ash (db), %	0.58	0.55	-	-	-	0.60	-	-	-	-
Colour, KJ (wet)	-5.0	-5.0	-	-	-	-4.9	-	-	-	-
Colour, Konica Minolta CM5 (dry)										
L*	93.92	94.06	-	-	-	93.90	-	-	-	-
a*	0.59	0.56	-	-	-	0.53	-	-	-	-
b*	10.47	10.61	-	-	-	10.39	-	-	-	-
RVA										
Peak Viscosity, cP	2235	2435	-	-	-	2474	-	-	-	-
Minimum viscosity (Trough), cP	1764	1954	-	-	-	2002	-	-	-	-
Final Viscosity, cP	2413	2805	-	-	-	2737	-	-	-	-
Peak Time, min	7.00	7.00	-	-	-	7.00	-	-	-	-
GLUTEN										
Wet gluten (14% mb), %	34.3	31.3	-	-	-	32.7	-	-	-	-
Dry gluten (14% mb), %	11.5	10.4	-	-	-	10.7	-	-	-	-
Gluten Index	95	94	-	-	-	95	-	-	-	-
FARINOGRAM										
Water absorption (14% mb), %	60.5	58.6	-	-	-	59.8	-	-	-	-
Development time, min	5.8	5.7	-	-	-	5.5	-	-	-	-
Stability, min	7.8	8.0	-	-	-	7.7	-	-	-	-
Mixing tolerance index, BU	40	38	-	-	-	36	-	-	-	-
EXTENSOGRAM (45 min pull)										
Area, cm^2	112	100	-	-	-	119	-	-	-	-
Maximum height, BU	353	370	-	-	-	399	-	-	-	-
Extensibility, mm	234	199	-	-	-	221	-	-	-	-
ALVEOGRAM										
Strength (S), cm^2	39.9	35.2	-	-	-	40.0	-	-	-	-
Stability (P), mm	63	64	-	-	-	66	-	-	-	-
Distensibility (L), mm	165	136	-	-	-	159	-	-	-	-
Configuration ratio (P/L)	0.38	0.47	-	-	-	0.42	-	-	-	-
MIXOGRAM										
Peak time, min	2.6	2.8	-	-	-	2.8	-	-	-	-
100 g BAKING TEST										
Loaf volume, cm^3	1187	1143	-	-	-	1256	-	-	-	-
Evaluation (see page 74)	0	0	-	-	-	0	-	-	-	-

Rheological Graphs Per Production Region

MIXOGRAM

10



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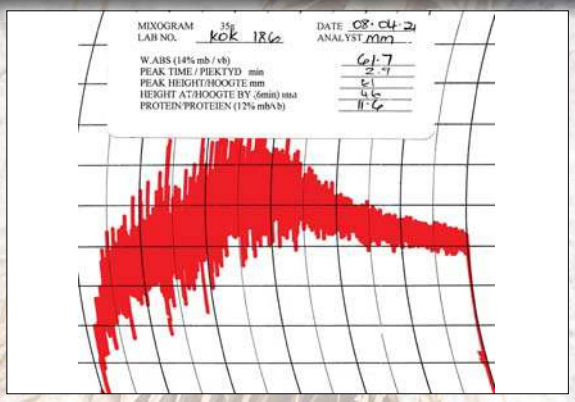
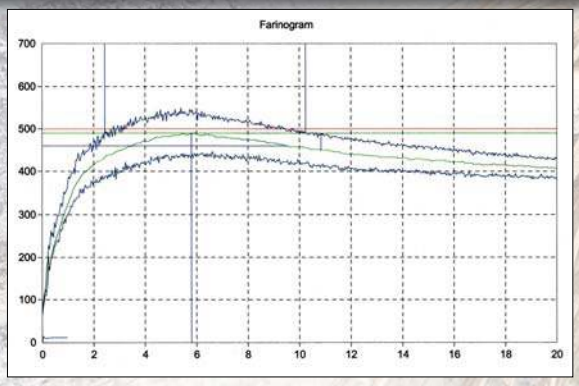


FARINOGRAM

10



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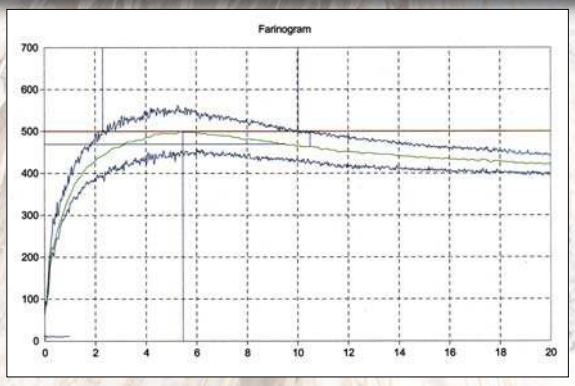
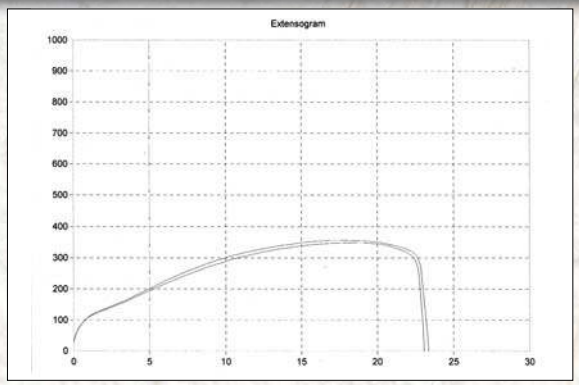


EXTENSOGRAM

10



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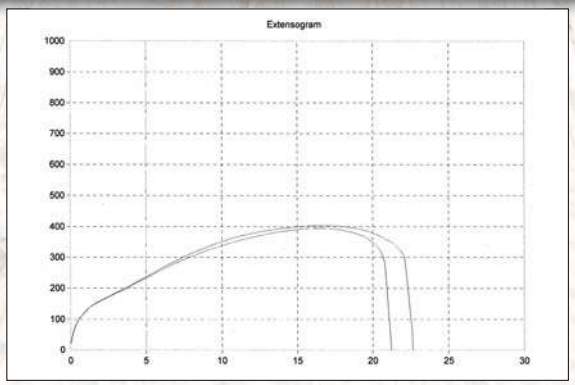
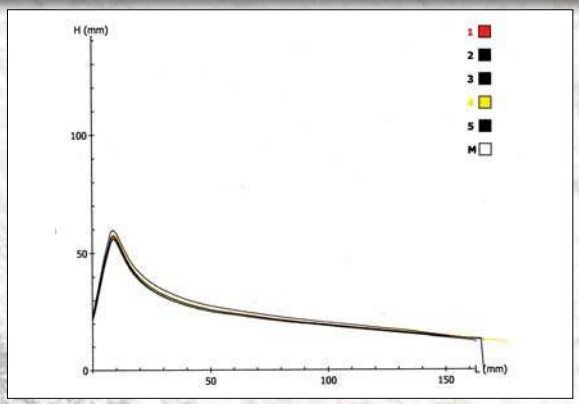


ALVEOGRAM

10



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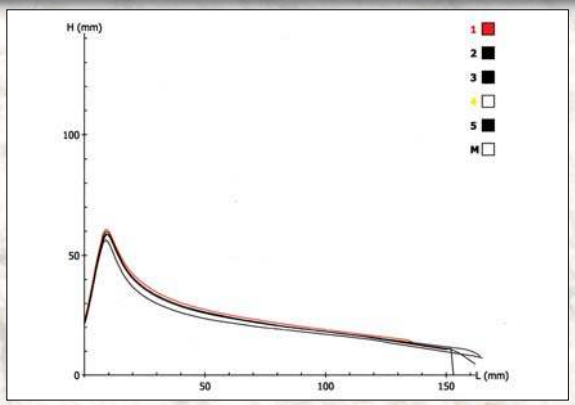


South African quality data per production region

IRRIGATION WHEAT

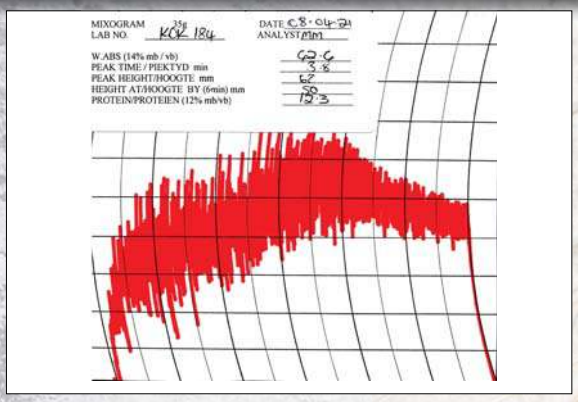
PRODUCTION REGION	(14) North West Southern Region				(17) North West Central-Northern Region (Ottosdal)			
WHEAT								
	ave	**min**	**max**	**stdev**	**ave**	**min**	**max**	**stdev**
Protein (12% mb), %	13.9	13.3	14.2	0.40	14.5	-	-	-
Falling number, sec	397	384	417	15.59	422	-	-	-
Moisture, %	11.7	11.6	11.8	0.10	11.5	-	-	-
1000 Kernel mass (13% mb), g	35.2	34.0	36.8	1.17	34.0	-	-	-
Hectolitre mass (dirty), kg/hl	78.1	76.9	79.7	1.28	78.9	-	-	-
Screenings (<1.8 mm sieve), %	0.37	0.13	0.60	0.21	1.64	-	-	-
Total damaged kernels, %	0.59	0.48	0.82	0.16	0.08	-	-	-
Combined deviations, %	1.99	0.95	2.80	0.80	1.92	-	-	-
Number of samples	***4***				***1***			
CULTIVARS								
Cultivars with highest % occurrence	SST 843	25.8			SST 843	59.0		
	SST 8154	21.0			SST 8135	41.0		
	SST 8135	18.8			-	-		
	SST 8156	16.8			-	-		
	PAN 3497	6.8			-	-		
Number of samples	***4***				***1***			
MIXOGRAM (Quadromat Junior)								
	ave	**min**	**max**	**stdev**	**ave**	**min**	**max**	**stdev**
Peak time, min	3.8	3.1	4.8	0.76	3.8	-	-	-
Tail height (6 min), mm	51	49	56	3.20	52	-	-	-
Number of samples	***4***				***1***			

	COMPOSITE SAMPLES									
CLASS AND GRADE	**Super**	**B1**	**B2**	**B3**	**COW**	**Super**	**B1**	**B2**	**B3**	**COW**
Bühler Extraction, %	72.6	-	-	-	-	72.9	-	-	-	-
FLOUR										
Protein (12% mb), %	13.2	-	-	-	-	13.5	-	-	-	-
Moisture, %	13.9	-	-	-	-	13.9	-	-	-	-
Ash (db), %	0.62	-	-	-	-	0.69	-	-	-	-
Colour, KJ (wet)	-4.9	-	-	-	-	-4.7	-	-	-	-
Colour, Konica Minolta CM5 (dry)										
L*	93.90	-	-	-	-	93.65	-	-	-	-
a*	0.49	-	-	-	-	0.48	-	-	-	-
b*	9.16	-	-	-	-	9.22	-	-	-	-
RVA										
Peak Viscosity, cP	2504	-	-	-	-	2486	-	-	-	-
Minimum viscosity (Trough), cP	1881	-	-	-	-	1842	-	-	-	-
Final Viscosity, cP	2697	-	-	-	-	2646	-	-	-	-
Peak Time, min	7.00	-	-	-	-	7.00	-	-	-	-
GLUTEN										
Wet gluten (14% mb), %	33.6	-	-	-	-	33.0	-	-	-	-
Dry gluten (14% mb), %	11.9	-	-	-	-	12.4	-	-	-	-
Gluten Index	97	-	-	-	-	99	-	-	-	-
FARINOGRAM										
Water absorption (14% mb), %	60.4	-	-	-	-	61.4	-	-	-	-
Development time, min	7.7	-	-	-	-	8.3	-	-	-	-
Stability, min	13.5	-	-	-	-	13.6	-	-	-	-
Mixing tolerance index, BU	23	-	-	-	-	25	-	-	-	-
EXTENSOGRAM (45 min pull)										
Area, cm^2	138	-	-	-	-	155	-	-	-	-
Maximum height, BU	466	-	-	-	-	539	-	-	-	-
Extensibility, mm	226	-	-	-	-	211	-	-	-	-
ALVEOGRAM										
Strength (S), cm^2	54.9	-	-	-	-	58.3	-	-	-	-
Stability (P), mm	79	-	-	-	-	87	-	-	-	-
Distensibility (L), mm	149	-	-	-	-	144	-	-	-	-
Configuration ratio (P/L)	0.53	-	-	-	-	0.60	-	-	-	-
MIXOGRAM										
Peak time, min	3.4	-	-	-	-	3.3	-	-	-	-
100 g BAKING TEST										
Loaf volume, cm^3	1407	-	-	-	-	1160	-	-	-	-
Evaluation (see page 74)	0	-	-	-	-	0	-	-	-	-

Rheological Graphs Per Production Region

MIXOGRAM

14



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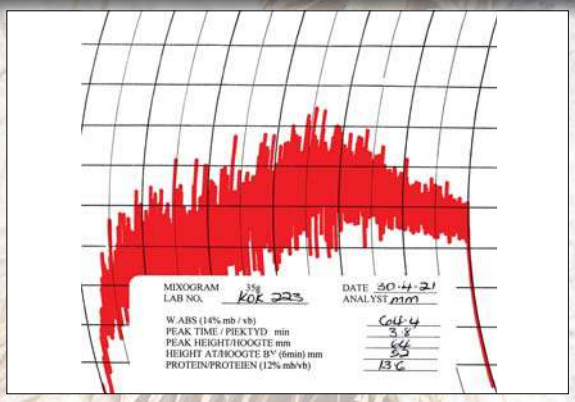
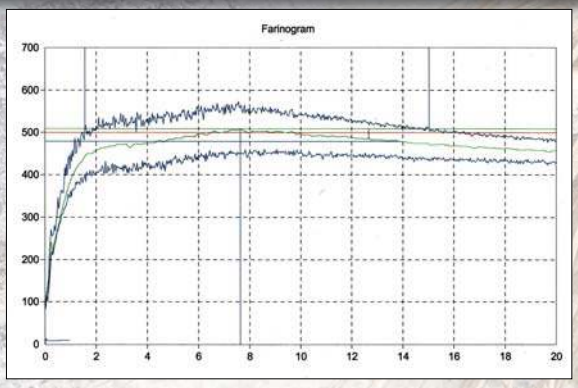


FARINOGRAM

14



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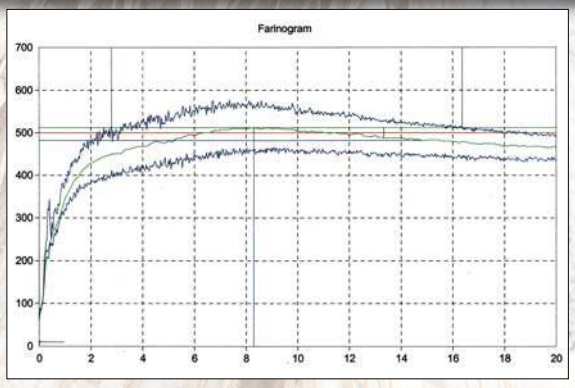
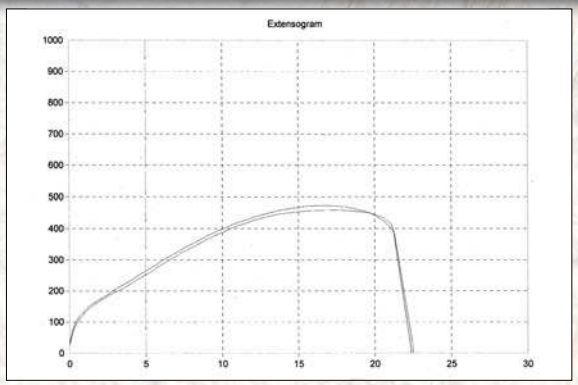


EXTENSOGRAM

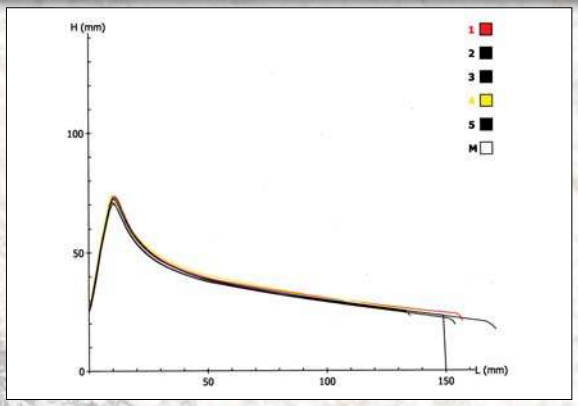
14



17

ALVEOGRAM

14



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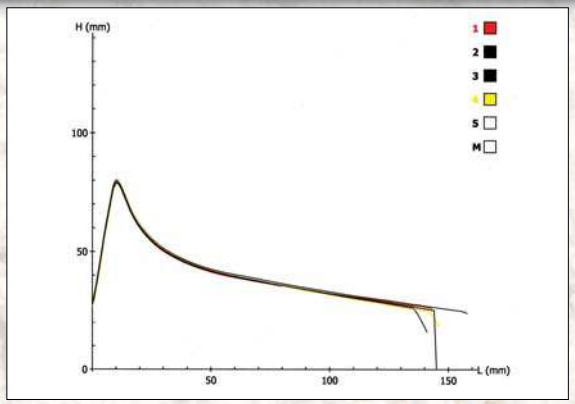


South African quality data per production region

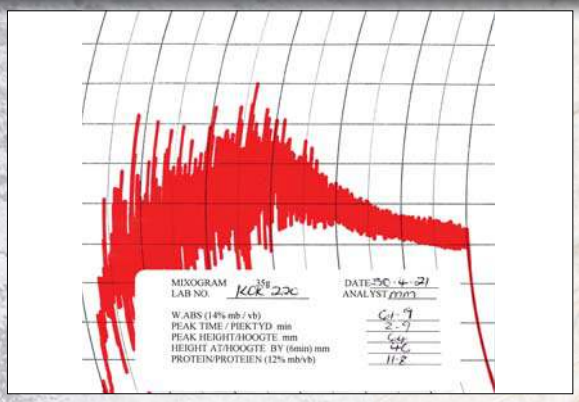
IRRIGATION WHEAT

PRODUCTION REGION	(18) North West Central Region (Ventersdorp)				(19) North West Central Region (Lichtenburg)			
WHEAT								
	ave	**min**	**max**	**stdev**	**ave**	**min**	**max**	**stdev**
Protein (12% mb), %	13.5	13.1	13.8	0.49	13.3	12.6	14.4	0.66
Falling number, sec	367	364	369	3.54	366	313	426	47.87
Moisture, %	12.2	12.0	12.3	0.21	11.8	11.5	12.2	0.31
1000 Kernel mass (13% mb), g	37.5	37.1	37.8	0.49	37.0	33.5	39.3	2.16
Hectolitre mass (dirty), kg/hl	78.7	78.0	79.4	0.99	79.0	77.3	79.9	1.01
Screenings (<1.8 mm sieve), %	1.23	0.95	1.51	0.40	1.01	0.05	2.32	0.96
Total damaged kernels, %	1.52	1.34	1.70	0.25	0.29	0.10	0.62	0.20
Combined deviations, %	2.99	2.91	3.07	0.11	1.41	0.23	2.62	1.15
Number of samples		***2***				***5***		
CULTIVARS								
Cultivars with highest % occurrence		SST 884	72.0			SST 843	35.2	
		PAN 3471	19.0			SST 8135	24.0	
		SST 843	9.0			SST 884	23.4	
		-	-			SST 895	10.4	
		-	-			PAN 3497	5.0	
Number of samples		***2***				***5***		
MIXOGRAM (Quadromat Junior)								
	ave	**min**	**max**	**stdev**	**ave**	**min**	**max**	**stdev**
Peak time, min	2.8	2.6	2.9	0.21	3.6	3.0	4.5	0.65
Tail height (6 min), mm	46	46	46	0.00	52	50	57	2.77
Number of samples		***2***				***5***		
	COMPOSITE SAMPLES							
CLASS AND GRADE	**Super**	**B1**	**B2**	**B3**	**COW**	**Super**	**B1**	**B2**	**B3**	**COW**
Bühler Extraction, %	72.4	-	-	-	-	74.2	-	-	-	-
FLOUR										
Protein (12% mb), %	12.1	-	-	-	-	12.4	-	-	-	-
Moisture, %	13.9	-	-	-	-	13.7	-	-	-	-
Ash (db), %	0.74	-	-	-	-	0.60	-	-	-	-
Colour, KJ (wet)	-4.1	-	-	-	-	-4.8	-	-	-	-
Colour, Konica Minolta CM5 (dry)										
L*	93.04	-	-	-	-	93.72	-	-	-	-
a*	0.59	-	-	-	-	0.45	-	-	-	-
b*	9.97	-	-	-	-	9.64	-	-	-	-
RVA										
Peak Viscosity, cP	2298	-	-	-	-	2448	-	-	-	-
Minimum viscosity (Trough), cP	1704	-	-	-	-	1902	-	-	-	-
Final Viscosity, cP	2412	-	-	-	-	2651	-	-	-	-
Peak Time, min	7.00	-	-	-	-	7.00	-	-	-	-
GLUTEN										
Wet gluten (14% mb), %	33.8	-	-	-	-	31.2	-	-	-	-
Dry gluten (14% mb), %	11.3	-	-	-	-	11.1	-	-	-	-
Gluten Index	90	-	-	-	-	95	-	-	-	-
FARINOGRAM										
Water absorption (14% mb), %	61.0	-	-	-	-	60.4	-	-	-	-
Development time, min	5.5	-	-	-	-	7.9	-	-	-	-
Stability, min	6.1	-	-	-	-	10.3	-	-	-	-
Mixing tolerance index, BU	53	-	-	-	-	36	-	-	-	-
EXTENSOGRAM (45 min pull)										
Area, cm^2	95	-	-	-	-	138	-	-	-	-
Maximum height, BU	370	-	-	-	-	454	-	-	-	-
Extensibility, mm	186	-	-	-	-	228	-	-	-	-
ALVEOGRAM										
Strength (S), cm^2	31.3	-	-	-	-	45.9	-	-	-	-
Stability (P), mm	78	-	-	-	-	79	-	-	-	-
Distensibility (L), mm	93	-	-	-	-	134	-	-	-	-
Configuration ratio (P/L)	0.84	-	-	-	-	0.59	-	-	-	-
MIXOGRAM										
Peak time, min	2.8	-	-	-	-	3.3	-	-	-	-
100 g BAKING TEST										
Loaf volume, cm^3	1095	-	-	-	-	1267	-	-	-	-
Evaluation (see page 74)	0	-	-	-	-	0	-	-	-	-

Rheological Graphs Per Production Region

MIXOGRAM

18



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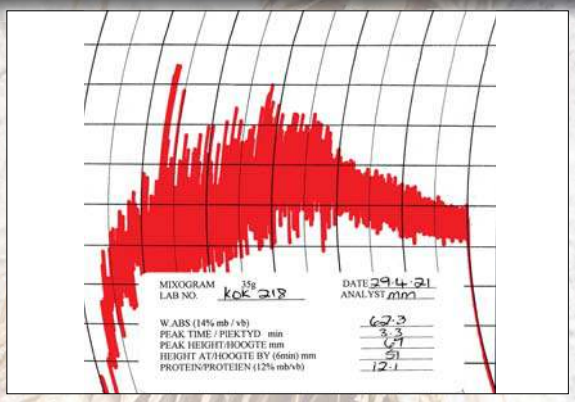
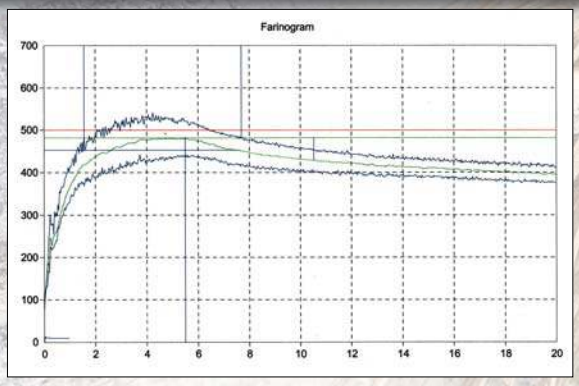


FARINOGRAM

18



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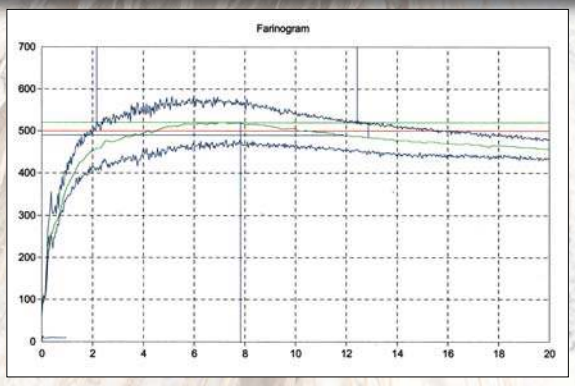
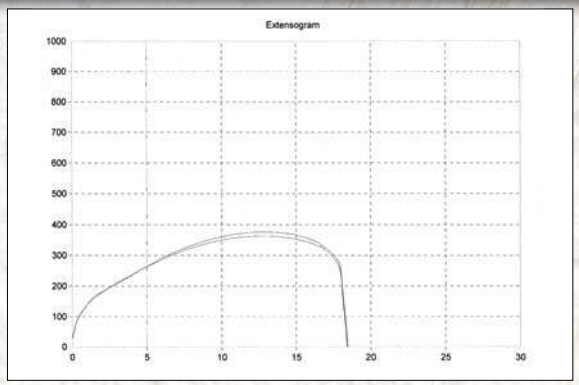


EXTENSOGRAM

18



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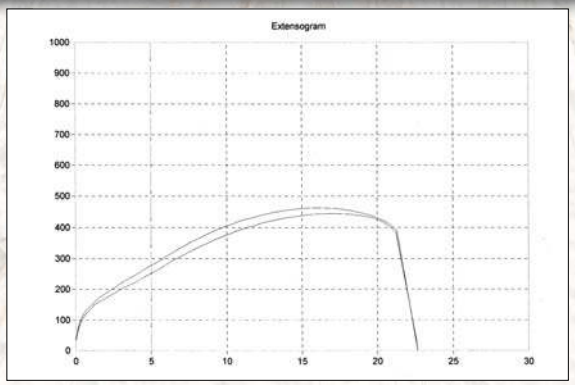
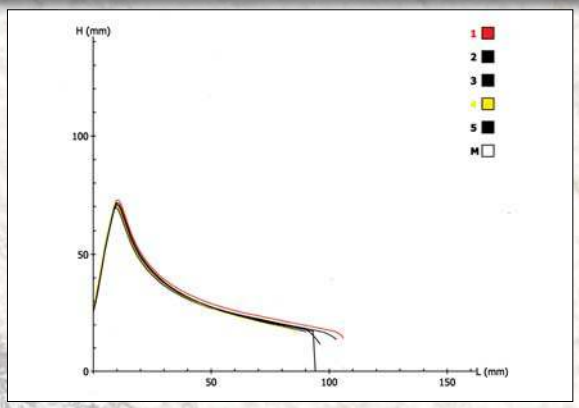


ALVEOGRAM

18



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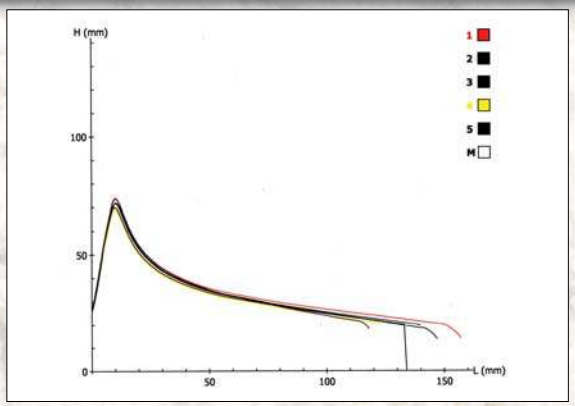


South African quality data per production region

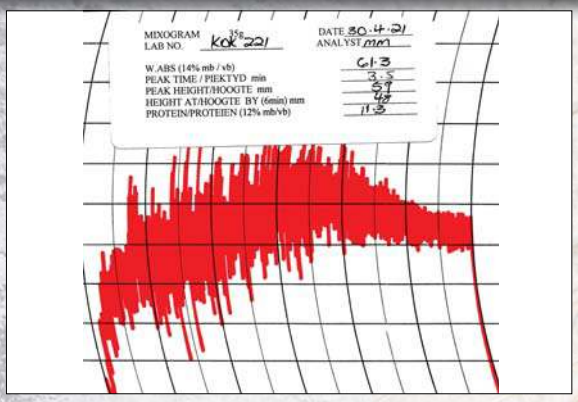
	IRRIGATION WHEAT				SUMMER RAINFALL AND IRRIGATION			
PRODUCTION REGION	**(20) North West Eastern Region**				**(21) Free State North-Western Region (Viljoenskroon)**			
WHEAT								
	ave	**min**	**max**	**stdev**	**ave**	**min**	**max**	**stdev**
Protein (12% mb), %	12.6	11.9	13.4	0.53	12.6	-	-	-
Falling number, sec	380	164	560	113.59	399	-	-	-
Moisture, %	11.5	10.7	12.2	0.48	11.0	-	-	-
1000 Kernel mass (13% mb), g	38.7	36.6	40.1	1.33	35.2	-	-	-
Hectolitre mass (dirty), kg/hl	79.1	76.2	82.3	2.05	76.1	-	-	-
Screenings (<1.8 mm sieve), %	0.89	0.34	1.40	0.33	4.01	-	-	-
Total damaged kernels, %	1.23	0.02	3.20	1.28	1.12	-	-	-
Combined deviations, %	2.54	0.36	5.06	1.66	5.49	-	-	-
Number of samples	***8***				***1***			
CULTIVARS								
Cultivars with highest % occurrence	SST 843	23.4			PAN 3400	45.0		
	SST 884	21.9			SST 8156	33.0		
	SST 8135	20.3			SST 8154	13.0		
	DUZI	10.8			SST 884	9.0		
	PAN 3400	7.9			-	-		
Number of samples	***8***				***1***			
MIXOGRAM (Quadromat Junior)								
	ave	**min**	**max**	**stdev**	**ave**	**min**	**max**	**stdev**
Peak time, min	3.5	2.7	4.1	0.46	2.9	-	-	-
Tail height (6 min), mm	48	44	56	3.70	47	-	-	-
Number of samples	***8***				***1***			

	COMPOSITE SAMPLES									
CLASS AND GRADE	**Super**	**B1**	**B2**	**B3**	**COW**	**Super**	**B1**	**B2**	**B3**	**COW**
Bühler Extraction, %	75.0	76.6	-	-	-	-	-	-	-	75.9
FLOUR										
Protein (12% mb), %	12.2	11.3	-	-	-	-	-	-	-	12.0
Moisture, %	13.5	13.3	-	-	-	-	-	-	-	13.9
Ash (db), %	0.56	0.60	-	-	-	-	-	-	-	0.63
Colour, KJ (wet)	-4.4	-4.3	-	-	-	-	-	-	-	-4.2
Colour, Konica Minolta CM5 (dry)										
L*	93.38	93.52	-	-	-	-	-	-	-	93.17
a*	0.47	0.45	-	-	-	-	-	-	-	0.53
b*	9.79	9.90	-	-	-	-	-	-	-	10.87
RVA										
Peak Viscosity, cP	2416	2319	-	-	-	-	-	-	-	2098
Minimum viscosity (Trough), cP	1822	1895	-	-	-	-	-	-	-	1773
Final Viscosity, cP	2621	2478	-	-	-	-	-	-	-	2210
Peak Time, min	7.00	7.00	-	-	-	-	-	-	-	6.80
GLUTEN										
Wet gluten (14% mb), %	33.1	29.3	-	-	-	-	-	-	-	33.3
Dry gluten (14% mb), %	11.5	9.9	-	-	-	-	-	-	-	11.4
Gluten Index	97	97	-	-	-	-	-	-	-	94
FARINOGRAM										
Water absorption (14% mb), %	60.7	57.9	-	-	-	-	-	-	-	59.7
Development time, min	7.0	5.9	-	-	-	-	-	-	-	5.7
Stability, min	8.4	8.4	-	-	-	-	-	-	-	6.9
Mixing tolerance index, BU	42	37	-	-	-	-	-	-	-	48
EXTENSOGRAM (45 min pull)										
Area, cm^2	131	108	-	-	-	-	-	-	-	101
Maximum height, BU	421	403	-	-	-	-	-	-	-	347
Extensibility, mm	230	201	-	-	-	-	-	-	-	215
ALVEOGRAM										
Strength (S), cm^2	37.2	38.1	-	-	-	-	-	-	-	35.0
Stability (P), mm	75	64	-	-	-	-	-	-	-	62
Distensibility (L), mm	108	153	-	-	-	-	-	-	-	157
Configuration ratio (P/L)	0.69	0.42	-	-	-	-	-	-	-	0.39
MIXOGRAM										
Peak time, min	3.1	3.2	-	-	-	-	-	-	-	2.9
100 g BAKING TEST										
Loaf volume, cm^3	1216	1144	-	-	-	-	-	-	-	1142
Evaluation (see page 74)	0	0	-	-	-	-	-	-	-	0

Rheological Graphs Per Production Region

MIXOGRAM

20



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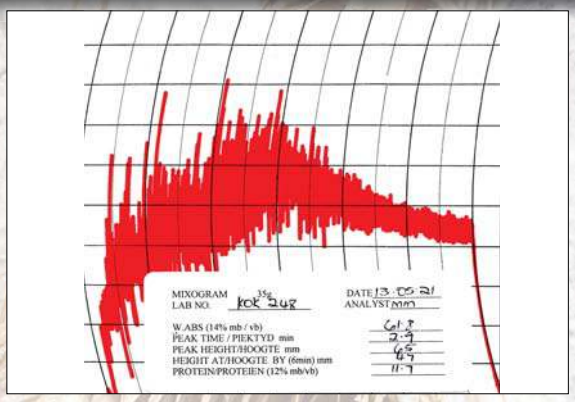
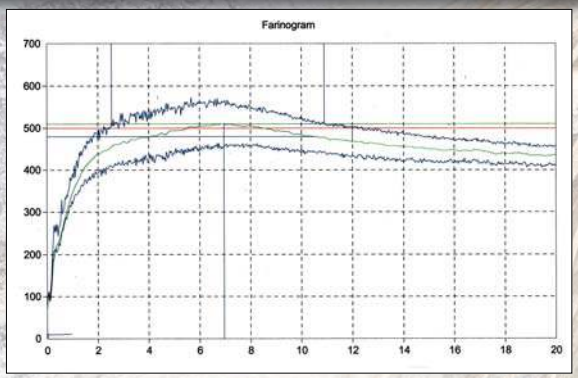


FARINOGRAM

20



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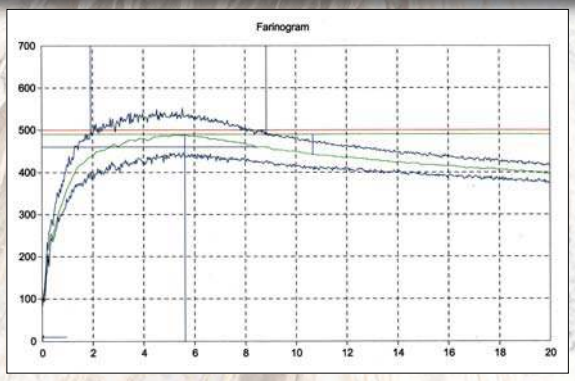
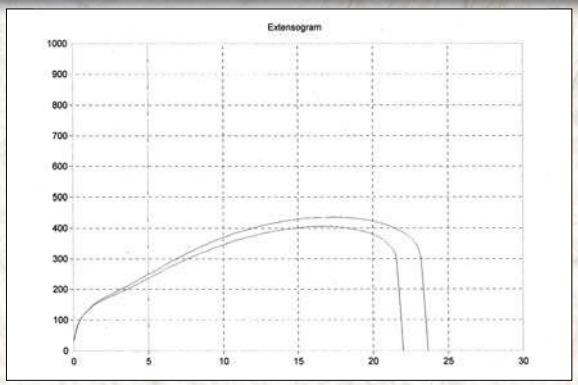


EXTENSOGRAM

20



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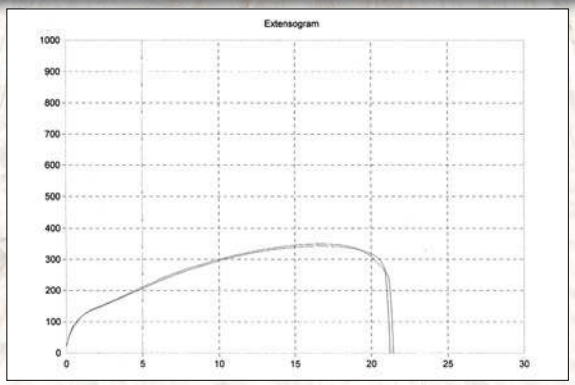
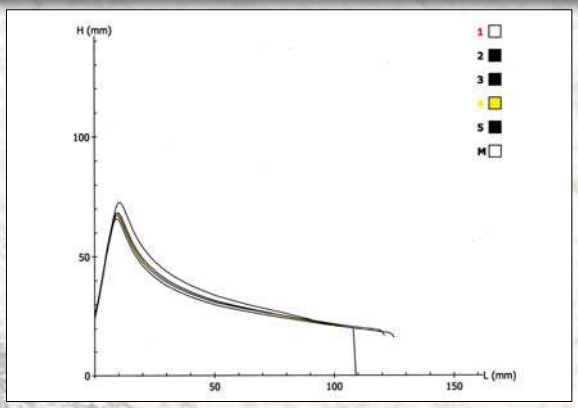


ALVEOGRAM

20



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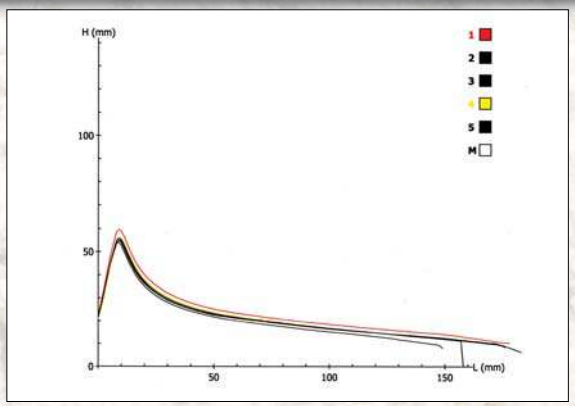


South African quality data per production region

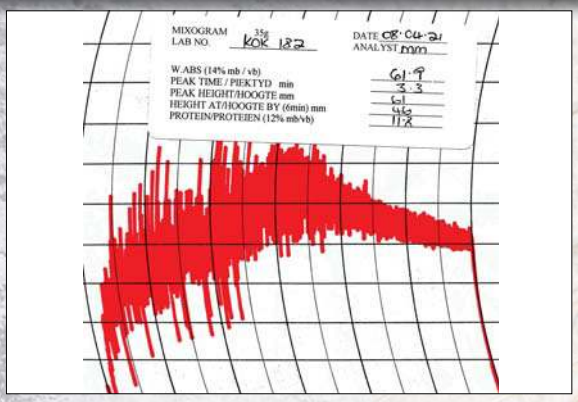
SUMMER RAINFALL AND IRRIGATION WHEAT

PRODUCTION REGION	(22) Free State North-Western Region (Bothaville)				(23) Free State North-Western Region (Bultfontein)			
WHEAT	**ave**	**min**	**max**	**stdev**	**ave**	**min**	**max**	**stdev**
Protein (12% mb), %	13.3	12.8	13.8	0.71	12.6	11.3	13.8	1.01
Falling number, sec	385	242	527	201.53	413	325	504	81.70
Moisture, %	10.8	10.4	11.1	0.49	10.9	10.1	11.6	0.69
1000 Kernel mass (13% mb), g	33.1	30.7	35.4	3.32	36.4	32.2	38.9	2.54
Hectolitre mass (dirty), kg/hl	69.9	66.0	73.7	5.44	81.3	79.1	83.8	1.99
Screenings (<1.8 mm sieve), %	6.28	2.74	9.81	5.00	1.41	0.28	2.11	0.68
Total damaged kernels, %	1.32	1.28	1.36	0.06	0.39	0.20	0.64	0.18
Combined deviations, %	10.13	5.22	15.03	6.94	2.06	0.52	2.91	0.93
Number of samples	***2***				***5***			
CULTIVARS								
Cultivars with highest % occurrence	PAN 3497	50.0			PAN 3368	23.8		
	PAN 3400	26.5			PAN 3111	19.2		
	PAN 3541	8.0			SST 884	13.6		
	SST 8156	6.5			SST 8135	10.8		
	SST 8154	4.5			PAN 3400	8.4		
Number of samples	***2***				***5***			
MIXOGRAM (Quadromat Junior)	**ave**	**min**	**max**	**stdev**	**ave**	**min**	**max**	**stdev**
Peak time, min	2.8	2.3	3.3	0.71	3.0	2.6	3.2	0.25
Tail height (6 min), mm	43	40	46	4.24	47	42	52	4.22
Number of samples	***2***				***5***			
	COMPOSITE SAMPLES							
CLASS AND GRADE	**Super**	**B1**	**B2**	**B3**	**COW**	**Super**	**B1**	**B2**	**B3**	**COW**
Bühler Extraction, %	-	-	-	-	-	74.4	-	-	-	-
FLOUR										
Protein (12% mb), %	-	-	-	-	-	11.8	-	-	-	-
Moisture, %	-	-	-	-	-	14.2	-	-	-	-
Ash (db), %	-	-	-	-	-	0.52	-	-	-	-
Colour, KJ (wet)	-	-	-	-	-	-5.0	-	-	-	-
Colour, Konica Minolta CM5 (dry)										
L*	-	-	-	-	-	93.68	-	-	-	-
a*	-	-	-	-	-	0.45	-	-	-	-
b*	-	-	-	-	-	10.43	-	-	-	-
RVA										
Peak Viscosity, cP	-	-	-	-	-	2149	-	-	-	-
Minimum viscosity (Trough), cP	-	-	-	-	-	1821	-	-	-	-
Final Viscosity, cP	-	-	-	-	-	2478	-	-	-	-
Peak Time, min	-	-	-	-	-	7.00	-	-	-	-
GLUTEN										
Wet gluten (14% mb), %	-	-	-	-	-	31.5	-	-	-	-
Dry gluten (14% mb), %	-	-	-	-	-	10.7	-	-	-	-
Gluten Index	-	-	-	-	-	97	-	-	-	-
FARINOGRAM										
Water absorption (14% mb), %	-	-	-	-	-	60.1	-	-	-	-
Development time, min	-	-	-	-	-	5.4	-	-	-	-
Stability, min	-	-	-	-	-	9.6	-	-	-	-
Mixing tolerance index, BU	-	-	-	-	-	23	-	-	-	-
EXTENSOGRAM (45 min pull)										
Area, cm^2	-	-	-	-	-	110	-	-	-	-
Maximum height, BU	-	-	-	-	-	401	-	-	-	-
Extensibility, mm	-	-	-	-	-	205	-	-	-	-
ALVEOGRAM										
Strength (S), cm^2	-	-	-	-	-	48.5	-	-	-	-
Stability (P), mm	-	-	-	-	-	82	-	-	-	-
Distensibility (L), mm	-	-	-	-	-	138	-	-	-	-
Configuration ratio (P/L)	-	-	-	-	-	0.59	-	-	-	-
MIXOGRAM										
Peak time, min	-	-	-	-	-	3.0	-	-	-	-
100 g BAKING TEST										
Loaf volume, cm^3	-	-	-	-	-	1141	-	-	-	-
Evaluation (see page 74)	-	-	-	-	-	0	-	-	-	-

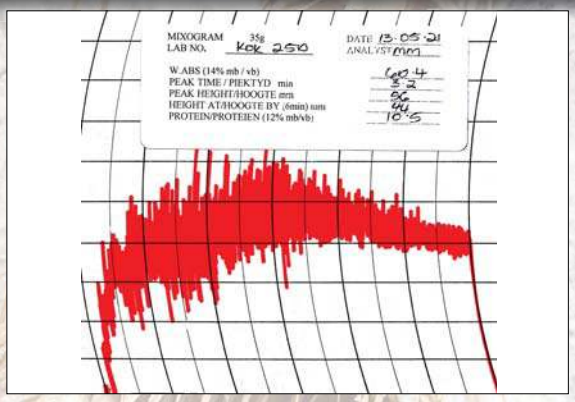
Rheological Graphs Per Production Region

MIXOGRAM

22



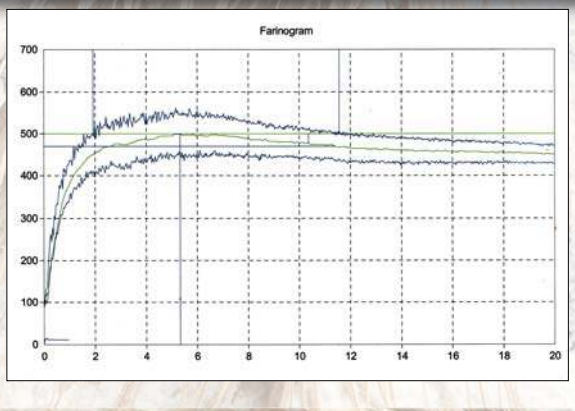
23



FARINOGRAM

22

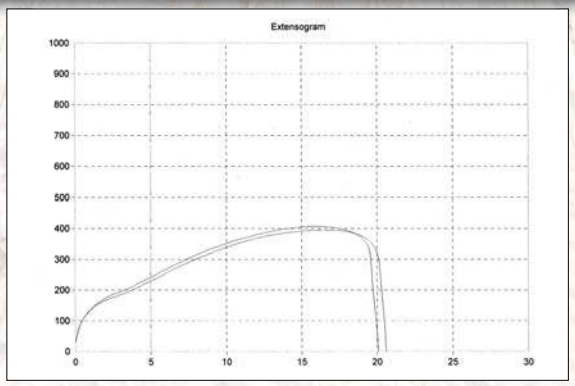
23



EXTENSOGRAM

22

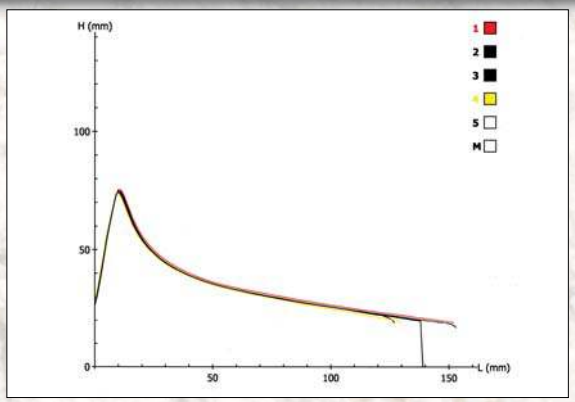
23



ALVEOGRAM

22

23



South African quality data per production region

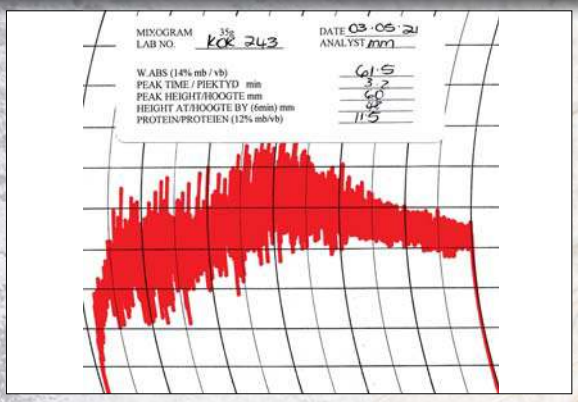
SUMMER RAINFALL AND IRRIGATION WHEAT

PRODUCTION REGION	(24) Free State Central Region				(25) Free State South-Western Region			
WHEAT								
	ave	**min**	**max**	**stdev**	**ave**	**min**	**max**	**stdev**
Protein (12% mb), %	12.8	11.7	13.6	0.76	14.9	13.5	16.2	1.09
Falling number, sec	363	313	385	30.55	173	47	303	118.56
Moisture, %	10.8	10.4	11.3	0.36	12.0	11.7	12.3	0.24
1000 Kernel mass (13% mb), g	32.1	27.0	36.8	3.73	36.3	32.9	39.8	3.10
Hectolitre mass (dirty), kg/hl	77.1	68.7	81.4	4.58	73.5	70.1	76.7	2.42
Screenings (<1.8 mm sieve), %	2.91	1.51	4.62	1.07	2.86	1.06	5.31	1.69
Total damaged kernels, %	0.55	0.00	0.84	0.32	5.67	0.74	11.70	4.90
Combined deviations, %	4.80	2.87	9.44	2.52	9.40	3.97	13.18	3.72
Number of samples			***6***				***5***	
CULTIVARS								
Cultivars with highest % occurrence	SST 8135		18.0		PAN 3161		40.4	
	PAN 3368		17.2		PAN 3368		16.2	
	PAN 3400		11.7		SST 347		16.2	
	SCHEEPERS 69		8.5		MATLABAS		13.8	
	SST 347		8.2		SST 356		8.0	
Number of samples			***6***				***5***	
MIXOGRAM (Quadromat Junior)								
	ave	**min**	**max**	**stdev**	**ave**	**min**	**max**	**stdev**
Peak time, min	3.2	2.9	3.4	0.16	4.0	3.1	5.7	0.99
Tail height (6 min), mm	46	43	50	2.61	51	43	54	4.58
Number of samples			***6***				***5***	
	COMPOSITE SAMPLES							
CLASS AND GRADE	**Super**	**B1**	**B2**	**B3**	**COW**	**Super**	**B1**	**B2**	**B3**	**COW**
Bühler Extraction, %	75.0	74.3	-	-	-	72.7	-	-	-	-
FLOUR										
Protein (12% mb), %	12.2	10.3	-	-	-	11.7	-	-	-	-
Moisture, %	13.8	13.6	-	-	-	13.3	-	-	-	-
Ash (db), %	0.61	0.70	-	-	-	0.55	-	-	-	-
Colour, KJ (wet)	-4.6	-4.5	-	-	-	-3.8	-	-	-	-
Colour, Konica Minolta CM5 (dry)										
L*	93.49	93.66	-	-	-	93.21	-	-	-	-
a*	0.50	0.49	-	-	-	0.42	-	-	-	-
b*	10.42	10.19	-	-	-	10.85	-	-	-	-
RVA										
Peak Viscosity, cP	2190	1563	-	-	-	1488	-	-	-	-
Minimum viscosity (Trough), cP	1741	1309	-	-	-	1257	-	-	-	-
Final Viscosity, cP	2331	1682	-	-	-	1645	-	-	-	-
Peak Time, min	7.00	6.40	-	-	-	6.53	-	-	-	-
GLUTEN										
Wet gluten (14% mb), %	33.7	29.2	-	-	-	32.2	-	-	-	-
Dry gluten (14% mb), %	12.1	9.5	-	-	-	11.0	-	-	-	-
Gluten Index	94	95	-	-	-	99	-	-	-	-
FARINOGRAM										
Water absorption (14% mb), %	59.3	58.0	-	-	-	61.4	-	-	-	-
Development time, min	5.2	5.0	-	-	-	5.4	-	-	-	-
Stability, min	8.0	5.6	-	-	-	10.2	-	-	-	-
Mixing tolerance index, BU	34	60	-	-	-	24	-	-	-	-
EXTENSOGRAM (45 min pull)										
Area, cm^2	110	79	-	-	-	85	-	-	-	-
Maximum height, BU	373	330	-	-	-	321	-	-	-	-
Extensibility, mm	219	176	-	-	-	192	-	-	-	-
ALVEOGRAM										
Strength (S), cm^2	38.2	24.9	-	-	-	42.2	-	-	-	-
Stability (P), mm	62	64	-	-	-	90	-	-	-	-
Distensibility (L), mm	165	93	-	-	-	100	-	-	-	-
Configuration ratio (P/L)	0.38	0.69	-	-	-	0.90	-	-	-	-
MIXOGRAM										
Peak time, min	2.8	2.8	-	-	-	3.2	-	-	-	-
100 g BAKING TEST										
Loaf volume, cm^3	1243	1030	-	-	-	1067	-	-	-	-
Evaluation (see page 74)	0	0	-	-	-	0	-	-	-	-

Rheological Graphs Per Production Region

MIXOGRAM

24



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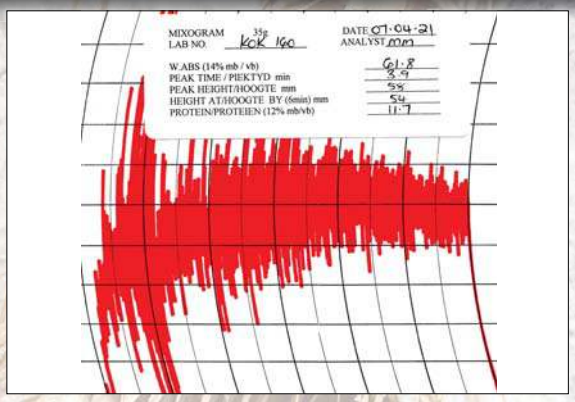
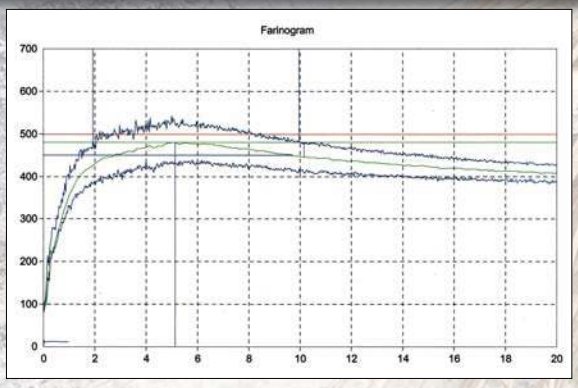


FARINOGRAM

24



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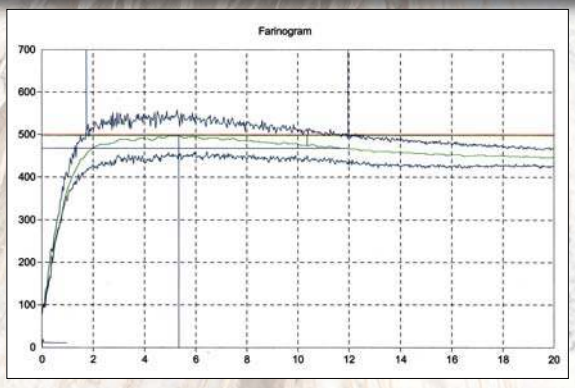
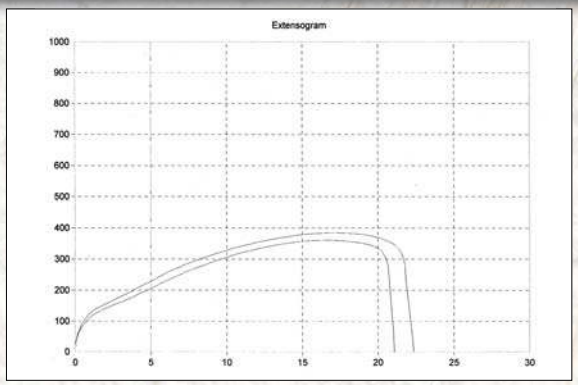


EXTENSOGRAM

24



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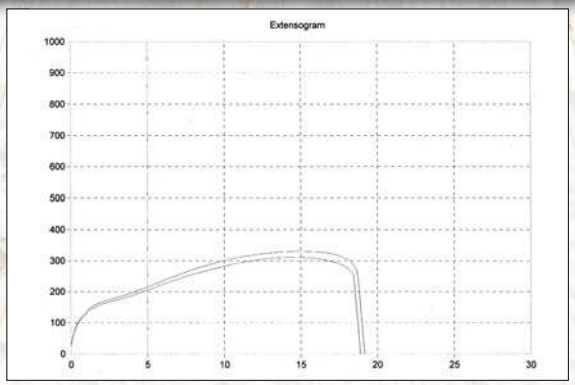
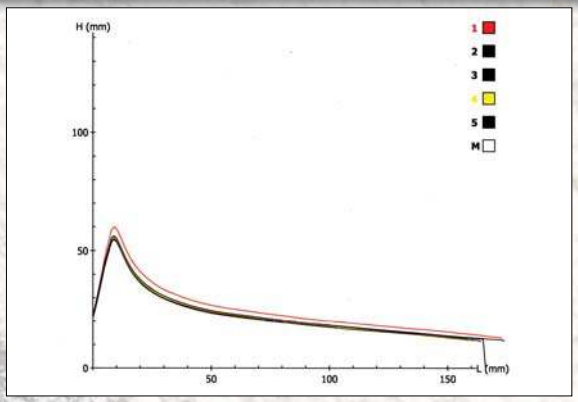


ALVEOGRAM

24



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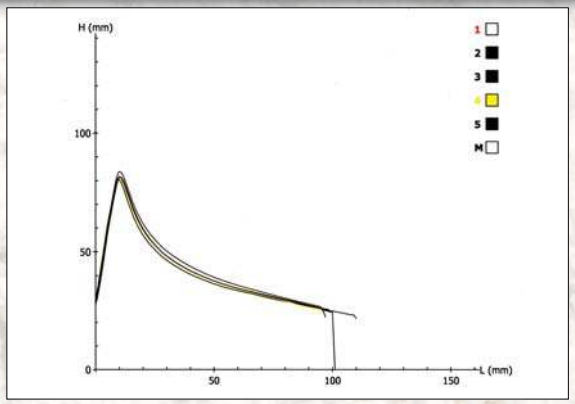


South African quality data per production region

SUMMER RAINFALL AND IRRIGATION WHEAT

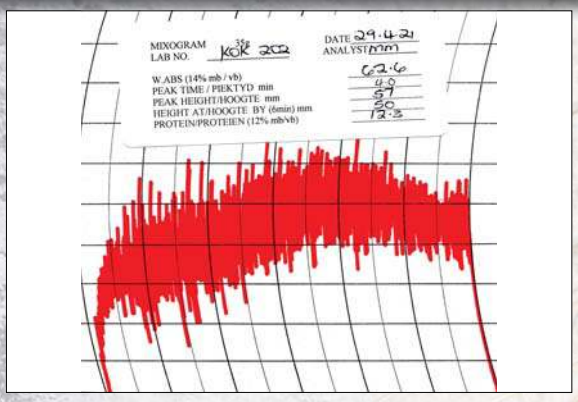
PRODUCTION REGION	(26) Free State South-Eastern Region				(28) Free State Eastern Region			
WHEAT	**ave**	**min**	**max**	**stdev**	**ave**	**min**	**max**	**stdev**
Protein (12% mb), %	15.0	13.7	16.4	1.11	13.3	11.1	14.9	0.91
Falling number, sec	277	50	391	132.53	282	73	417	95.85
Moisture, %	11.7	11.5	12.0	0.22	12.1	11.4	12.4	0.27
1000 Kernel mass (13% mb), g	37.6	30.8	41.6	4.15	38.4	29.3	42.5	3.11
Hectolitre mass (dirty), kg/hl	77.5	71.9	79.7	3.18	79.1	71.2	83.8	3.33
Screenings (<1.8 mm sieve), %	1.28	0.35	3.50	1.28	1.69	0.37	7.00	1.43
Total damaged kernels, %	1.60	0.00	4.28	1.60	1.03	0.00	2.96	0.91
Combined deviations, %	3.36	0.92	5.73	2.11	3.08	0.78	7.76	2.05
Number of samples	***5***				***21***			
CULTIVARS								
Cultivars with highest % occurrence	PAN 3161	52.4			SST 8135	22.7		
	PAN 3368	20.4			SST 884	13.2		
	MATLABAS	10.0			PAN 3161	10.8		
	SST 387	10.0			PAN 3400	10.6		
	SST 347	3.4			SST 387	8.8		
Number of samples	***5***				***21***			
MIXOGRAM (Quadromat Junior)	**ave**	**min**	**max**	**stdev**	**ave**	**min**	**max**	**stdev**
Peak time, min	5.0	3.6	8.0	1.87	3.5	2.6	5.0	0.63
Tail height (6 min), mm	50	45	55	3.54	50	41	57	4.21
Number of samples	***5***				***21***			

	COMPOSITE SAMPLES									
CLASS AND GRADE	**Super**	**B1**	**B2**	**B3**	**COW**	**Super**	**B1**	**B2**	**B3**	**COW**
Bühler Extraction, %	72.8	-	-	-	-	74.2	-	-	-	73.3
FLOUR										
Protein (12% mb), %	13.2	-	-	-	-	12.3	-	-	-	12.1
Moisture, %	14.3	-	-	-	-	13.6	-	-	-	13.3
Ash (db), %	0.53	-	-	-	-	0.58	-	-	-	0.57
Colour, KJ (wet)	-4.1	-	-	-	-	-4.6	-	-	-	-3.7
Colour, Konica Minolta CM5 (dry)										
L*	93.34	-	-	-	-	93.55	-	-	-	93.30
a*	0.45	-	-	-	-	0.48	-	-	-	0.40
b*	10.20	-	-	-	-	9.40	-	-	-	9.43
RVA										
Peak Viscosity, cP	2271	-	-	-	-	2165	-	-	-	760
Minimum viscosity (Trough), cP	1858	-	-	-	-	1699	-	-	-	473
Final Viscosity, cP	2544	-	-	-	-	2312	-	-	-	763
Peak Time, min	6.93	-	-	-	-	7.00	-	-	-	5.33
GLUTEN										
Wet gluten (14% mb), %	31.9	-	-	-	-	33.4	-	-	-	32.8
Dry gluten (14% mb), %	11.4	-	-	-	-	10.9	-	-	-	11.3
Gluten Index	98	-	-	-	-	96	-	-	-	96
FARINOGRAM										
Water absorption (14% mb), %	58.3	-	-	-	-	60.8	-	-	-	60.4
Development time, min	15.2	-	-	-	-	6.5	-	-	-	6.9
Stability, min	18.5	-	-	-	-	8.9	-	-	-	9.8
Mixing tolerance index, BU	0	-	-	-	-	37	-	-	-	33
EXTENSOGRAM (45 min pull)										
Area, cm^2	175	-	-	-	-	129	-	-	-	115
Maximum height, BU	616	-	-	-	-	427	-	-	-	409
Extensibility, mm	217	-	-	-	-	224	-	-	-	209
ALVEOGRAM										
Strength (S), cm^2	61.2	-	-	-	-	44.9	-	-	-	42.5
Stability (P), mm	92	-	-	-	-	78	-	-	-	73
Distensibility (L), mm	131	-	-	-	-	140	-	-	-	144
Configuration ratio (P/L)	0.70	-	-	-	-	0.56	-	-	-	0.51
MIXOGRAM										
Peak time, min	4.9	-	-	-	-	3.2	-	-	-	3.3
100 g BAKING TEST										
Loaf volume, cm^3	1251	-	-	-	-	1172	-	-	-	1157
Evaluation (see page 74)	0	-	-	-	-	0	-	-	-	0

Rheological Graphs Per Production Region

MIXOGRAM

26



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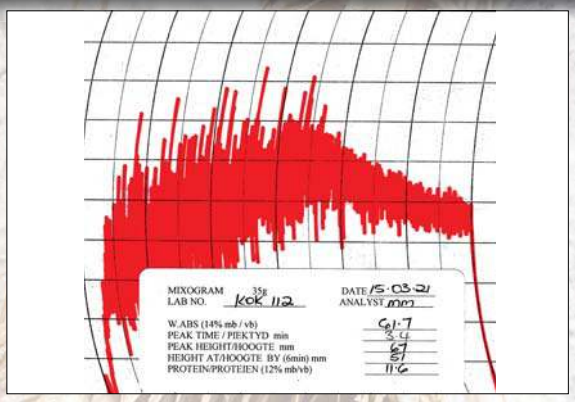
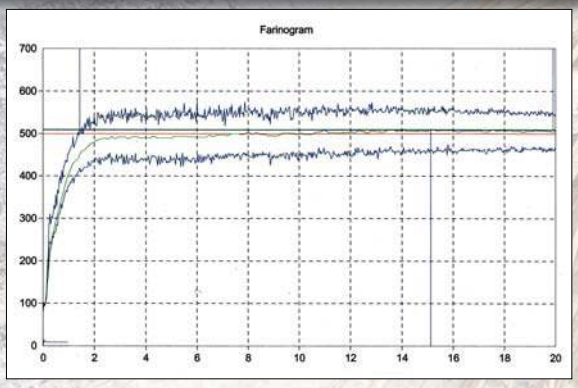


FARINOGRAM

26



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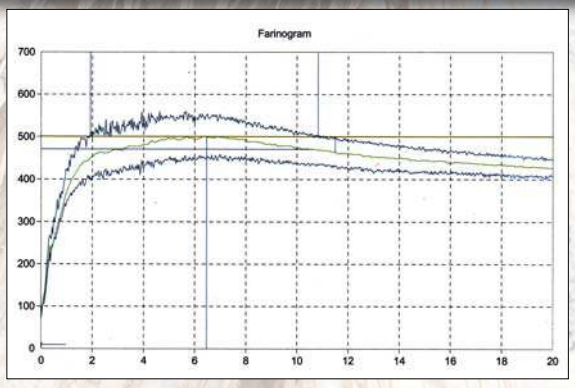
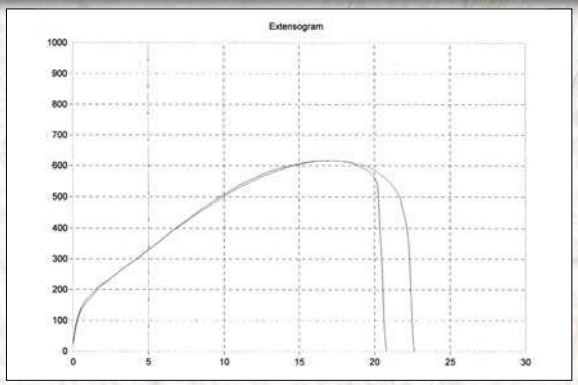


EXTENSOGRAM

26



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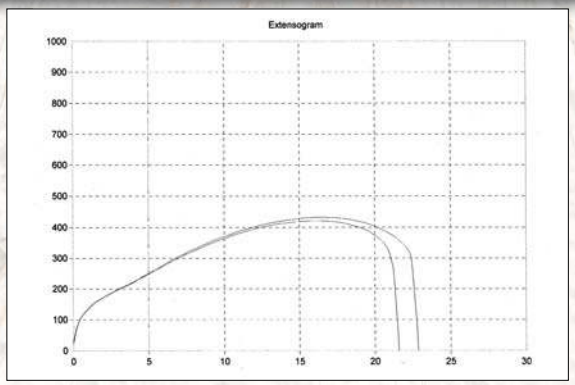
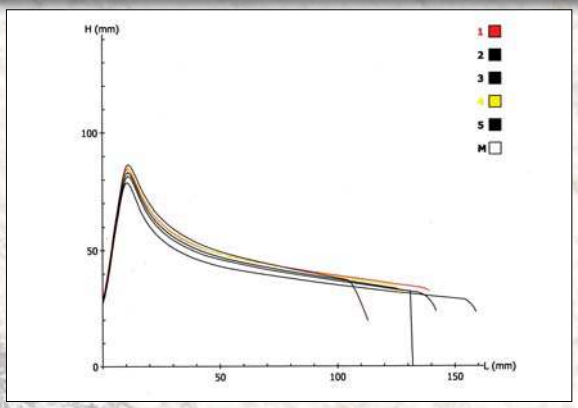


ALVEOGRAM

26



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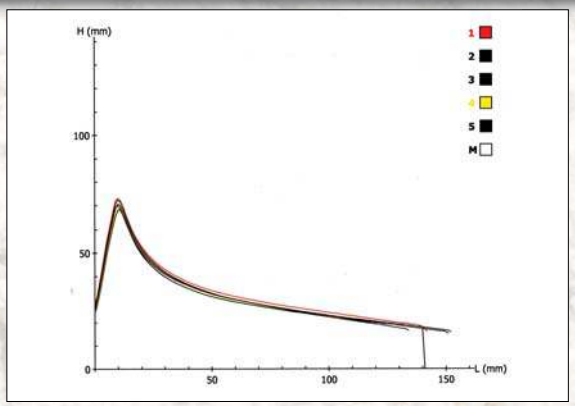


South African quality data per production region

IRRIGATION WHEAT

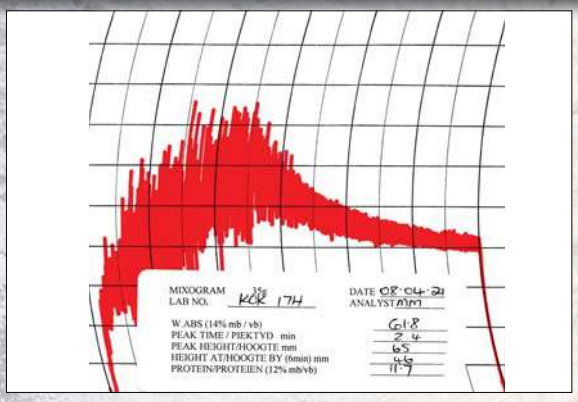
PRODUCTION REGION	(29) Mpumalanga Southern Region				(32) Mpumalanga Western Region			
WHEAT	**ave**	**min**	**max**	**stdev**	**ave**	**min**	**max**	**stdev**
Protein (12% mb), %	12.7	-	-	-	12.9	11.5	14.2	1.36
Falling number, sec	345	-	-	-	271	210	329	59.53
Moisture, %	11.8	-	-	-	11.9	11.3	12.5	0.60
1000 Kernel mass (13% mb), g	46.2	-	-	-	40.2	37.1	42.5	2.77
Hectolitre mass (dirty), kg/hl	83.3	-	-	-	79.4	77.8	80.8	1.50
Screenings (<1.8 mm sieve), %	0.42	-	-	-	0.60	0.19	0.93	0.38
Total damaged kernels, %	0.72	-	-	-	1.17	0.84	1.66	0.43
Combined deviations, %	1.42	-	-	-	2.06	1.03	2.77	0.91
Number of samples		***1***				***3***		
CULTIVARS								
Cultivars with highest % occurrence		SST 884	54.0			SST 884	36.0	
		PAN 3471	32.0			SST 8135	25.3	
		SST 8156	14.0			SST 8156	19.3	
		-	-			SST 8154	7.0	
		-	-			SST 843	7.0	
Number of samples		***1***				***3***		
MIXOGRAM (Quadromat Junior)	**ave**	**min**	**max**	**stdev**	**ave**	**min**	**max**	**stdev**
Peak time, min	2.4	-	-	-	3.7	3.3	4.1	0.40
Tail height (6 min), mm	46	-	-	-	49	48	49	0.58
Number of samples		***1***				***3***		

	COMPOSITE SAMPLES									
CLASS AND GRADE	**Super**	**B1**	**B2**	**B3**	**COW**	**Super**	**B1**	**B2**	**B3**	**COW**
Bühler Extraction, %	77.2	-	-	-	-	75.9	74.0	-	-	-
FLOUR										
Protein (12% mb), %	11.7	-	-	-	-	12.0	10.8	-	-	-
Moisture, %	13.9	-	-	-	-	13.5	13.3	-	-	-
Ash (db), %	0.63	-	-	-	-	0.60	0.61	-	-	-
Colour, KJ (wet)	-5.0	-	-	-	-	-3.9	-4.6	-	-	-
Colour, Konica Minolta CM5 (dry)										
L*	94.29	-	-	-	-	93.38	93.73	-	-	-
a*	0.45	-	-	-	-	0.42	0.42	-	-	-
b*	8.22	-	-	-	-	9.11	9.71	-	-	-
RVA										
Peak Viscosity, cP	2249	-	-	-	-	1959	1401	-	-	-
Minimum viscosity (Trough), cP	1781	-	-	-	-	1671	1182	-	-	-
Final Viscosity, cP	2441	-	-	-	-	2070	1518	-	-	-
Peak Time, min	7.00	-	-	-	-	6.93	6.47	-	-	-
GLUTEN										
Wet gluten (14% mb), %	33.4	-	-	-	-	31.6	28.7	-	-	-
Dry gluten (14% mb), %	11.5	-	-	-	-	11.0	9.5	-	-	-
Gluten Index	94	-	-	-	-	96	94	-	-	-
FARINOGRAM										
Water absorption (14% mb), %	59.2	-	-	-	-	58.9	58.2	-	-	-
Development time, min	4.5	-	-	-	-	5.7	3.5	-	-	-
Stability, min	5.0	-	-	-	-	6.7	7.8	-	-	-
Mixing tolerance index, BU	65	-	-	-	-	58	30	-	-	-
EXTENSOGRAM (45 min pull)										
Area, cm^2	95	-	-	-	-	102	103	-	-	-
Maximum height, BU	300	-	-	-	-	356	415	-	-	-
Extensibility, mm	223	-	-	-	-	208	188	-	-	-
ALVEOGRAM										
Strength (S), cm^2	34.7	-	-	-	-	37.6	37.6	-	-	-
Stability (P), mm	58	-	-	-	-	61	75	-	-	-
Distensibility (L), mm	205	-	-	-	-	170	116	-	-	-
Configuration ratio (P/L)	0.28	-	-	-	-	0.36	0.65	-	-	-
MIXOGRAM										
Peak time, min	2.3	-	-	-	-	3.0	3.2	-	-	-
100 g BAKING TEST										
Loaf volume, cm^3	1195	-	-	-	-	1196	1086	-	-	-
Evaluation (see page 74)	0	-	-	-	-	0	0	-	-	-

Rheological Graphs Per Production Region

MIXOGRAM

29



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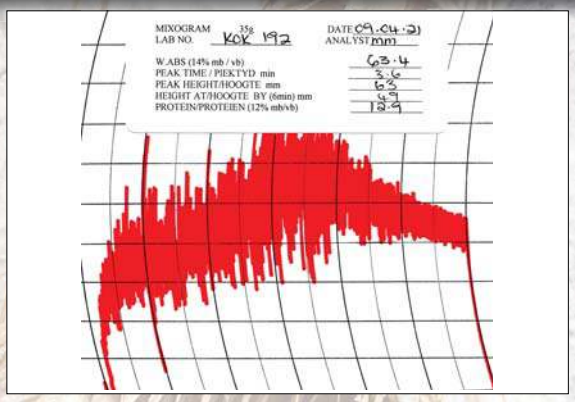
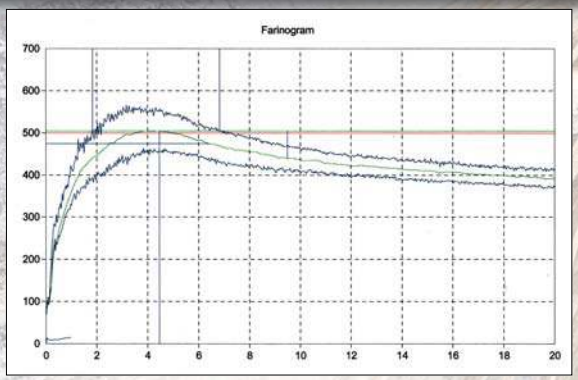


FARINOGRAM

29



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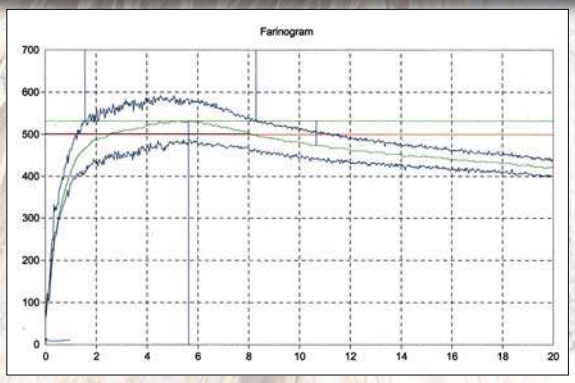
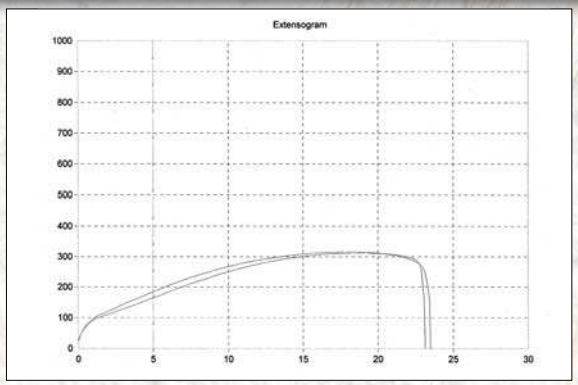


EXTENSOGRAM

29



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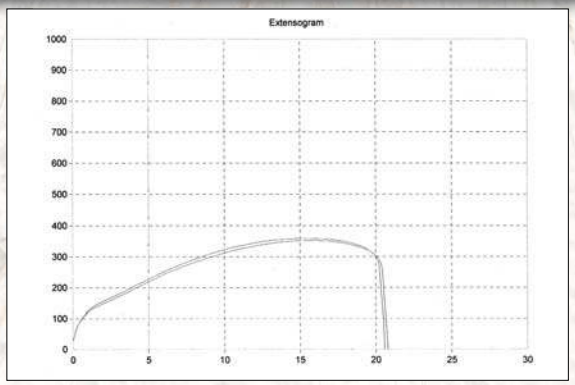
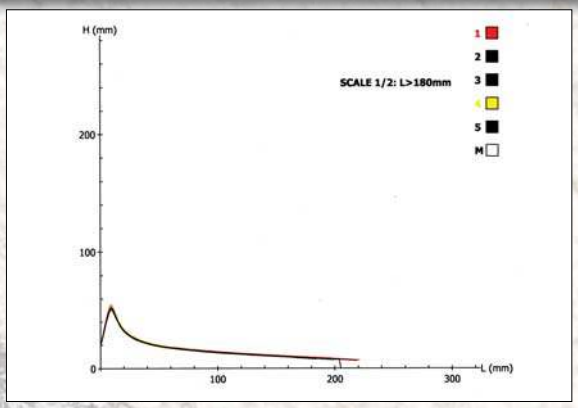


ALVEOGRAM

29



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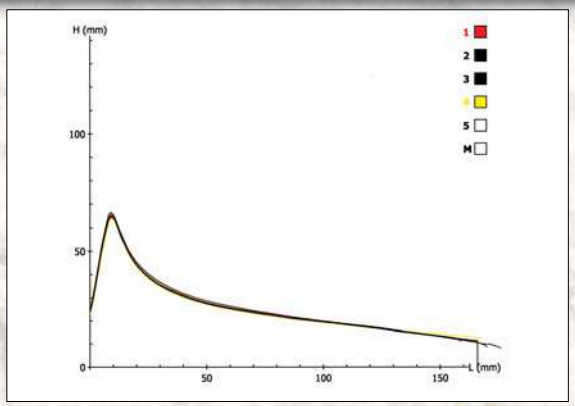


South African quality data per production region

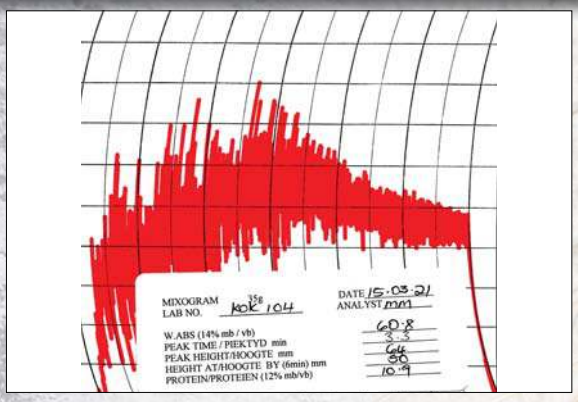
IRRIGATION WHEAT

PRODUCTION REGION	(33) Mpumalanga Northern Region				(34) Gauteng Region			
WHEAT								
	ave	**min**	**max**	**stdev**	**ave**	**min**	**max**	**stdev**
Protein (12% mb), %	12.1	10.6	13.0	0.96	12.9	-	-	-
Falling number, sec	368	281	402	36.02	347	-	-	-
Moisture, %	11.0	10.4	11.4	0.43	12.0	-	-	-
1000 Kernel mass (13% mb), g	37.9	34.5	42.8	2.39	44.0	-	-	-
Hectolitre mass (dirty), kg/hl	82.5	79.8	84.6	1.60	81.2	-	-	-
Screenings (<1.8 mm sieve), %	0.95	0.37	2.09	0.50	0.65	-	-	-
Total damaged kernels, %	0.76	0.00	1.76	0.58	1.28	-	-	-
Combined deviations, %	2.00	0.89	3.03	0.73	1.93	-	-	-
Number of samples			***9***				***1***	
CULTIVARS								
Cultivars with highest % occurrence	SST 8135		49.4		SST 884		100.0	
	SST 884		27.2		-		-	
	SST 835		7.3		-		-	
	SST 895		7.0		-		-	
	SST 843		3.6		-		-	
Number of samples			***9***				***1***	
MIXOGRAM (Quadromat Junior)								
	ave	**min**	**max**	**stdev**	**ave**	**min**	**max**	**stdev**
Peak time, min	3.3	2.5	3.8	0.42	2.7	-	-	-
Tail height (6 min), mm	48	38	55	5.12	46	-	-	-
Number of samples			***9***				***1***	
	COMPOSITE SAMPLES									
CLASS AND GRADE	**Super**	**B1**	**B2**	**B3**	**COW**	**Super**	**B1**	**B2**	**B3**	**COW**
Bühler Extraction, %	75.2	74.2	75.5	-	-	75.0	-	-	-	-
FLOUR										
Protein (12% mb), %	12.2	11.2	10.0	-	-	11.8	-	-	-	-
Moisture, %	13.5	14.1	13.3	-	-	14.2	-	-	-	-
Ash (db), %	0.59	0.62	0.65	-	-	0.62	-	-	-	-
Colour, KJ (wet)	-4.7	-4.9	-5.0	-	-	-4.7	-	-	-	-
Colour, Konica Minolta CM5 (dry)										
L*	93.38	93.47	93.73	-	-	93.89	-	-	-	-
a*	0.51	0.58	0.50	-	-	0.46	-	-	-	-
b*	9.78	10.30	9.90	-	-	8.54	-	-	-	-
RVA										
Peak Viscosity, cP	2088	2408	2505	-	-	2297	-	-	-	-
Minimum viscosity (Trough), cP	1708	1831	1955	-	-	1849	-	-	-	-
Final Viscosity, cP	2239	2667	2725	-	-	2461	-	-	-	-
Peak Time, min	7.00	7.00	7.00	-	-	7.00	-	-	-	-
GLUTEN										
Wet gluten (14% mb), %	32.9	30.5	27.1	-	-	32.7	-	-	-	-
Dry gluten (14% mb), %	11.5	10.1	8.9	-	-	11.6	-	-	-	-
Gluten Index	98	95	97	-	-	94	-	-	-	-
FARINOGRAM										
Water absorption (14% mb), %	60.0	59.3	58.1	-	-	58.2	-	-	-	-
Development time, min	5.3	5.7	5.5	-	-	4.2	-	-	-	-
Stability, min	8.3	7.7	6.9	-	-	5.4	-	-	-	-
Mixing tolerance index, BU	37	40	47	-	-	58	-	-	-	-
EXTENSOGRAM (45 min pull)										
Area, cm^2	116	98	83	-	-	89	-	-	-	-
Maximum height, BU	400	373	351	-	-	278	-	-	-	-
Extensibility, mm	218	197	171	-	-	228	-	-	-	-
ALVEOGRAM										
Strength (S), cm^2	43.6	37.2	30.0	-	-	31.4	-	-	-	-
Stability (P), mm	75	73	69	-	-	49	-	-	-	-
Distensibility (L), mm	144	122	107	-	-	218	-	-	-	-
Configuration ratio (P/L)	0.52	0.60	0.64	-	-	0.22	-	-	-	-
MIXOGRAM										
Peak time, min	2.9	2.8	3.2	-	-	2.6	-	-	-	-
100 g BAKING TEST										
Loaf volume, cm^3	1229	1163	1017	-	-	1150	-	-	-	-
Evaluation (see page 74)	0	0	0	-	-	0	-	-	-	-

Rheological Graphs Per Production Region

MIXOGRAM

33



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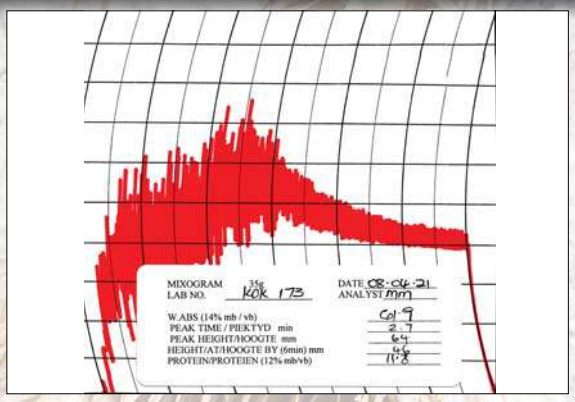
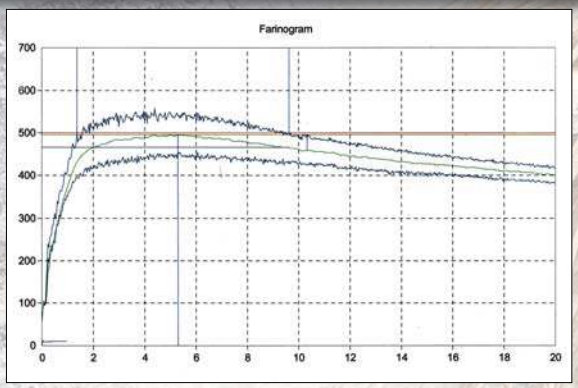


FARINOGRAM

33



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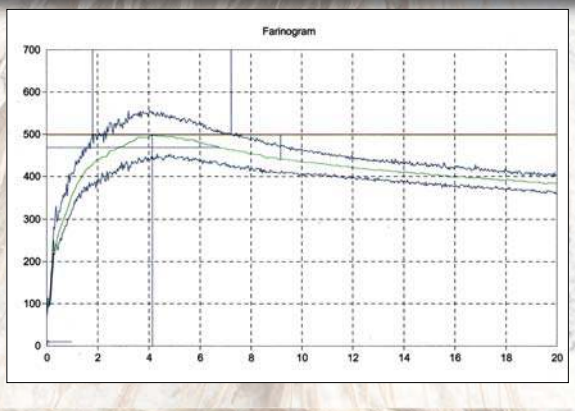

EXTENSOGRAM

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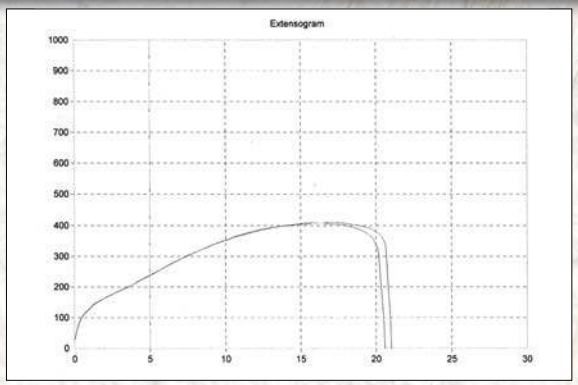

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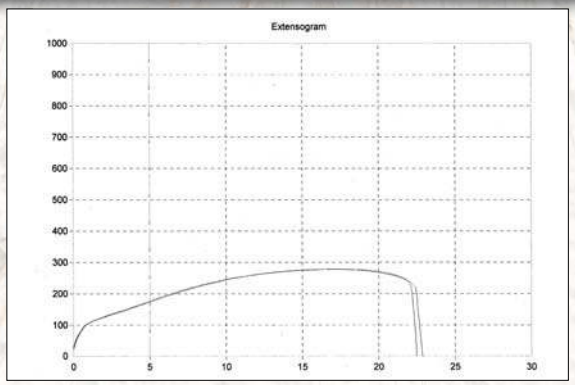
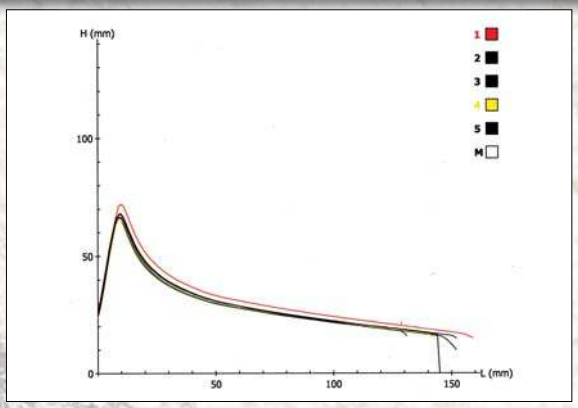


ALVEOGRAM

33



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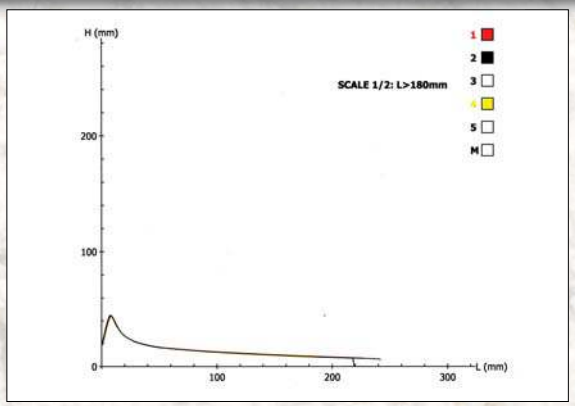


South African quality data per production region

IRRIGATION WHEAT

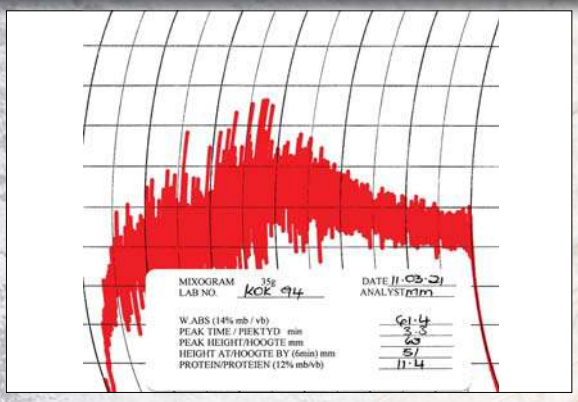
PRODUCTION REGION	(36) KwaZulu-Natal			
WHEAT				
	ave	**min**	**max**	**stdev**
Protein (12% mb), %	12.7	11.3	13.4	0.63
Falling number, sec	311	110	385	76.53
Moisture, %	11.1	10.7	11.6	0.28
1000 Kernel mass (13% mb), g	37.8	34.6	40.3	1.65
Hectolitre mass (dirty), kg/hl	80.2	74.6	83.2	2.66
Screenings (<1.8 mm sieve), %	2.06	0.76	8.92	2.42
Total damaged kernels, %	1.08	0.00	4.14	1.27
Combined deviations, %	3.78	0.76	16.60	4.59
Number of samples		***10***		
CULTIVARS				
Cultivars with highest % occurrence		SST 8135	49.8	
		SST 835	14.3	
		PAN 3400	11.9	
		SST 884	11.6	
		SST 8154	7.8	
Number of samples		***10***		
MIXOGRAM (Quadromat Junior)				
	ave	**min**	**max**	**stdev**
Peak time, min	3.3	2.9	4.4	0.44
Tail height (6 min), mm	50	43	55	3.50
Number of samples		***10***		

CLASS AND GRADE	Super	B1	B2	B3	COW
Bühler Extraction, %	75.5	-	75.5	-	-
FLOUR					
Protein (12% mb), %	12.2	-	9.9	-	-
Moisture, %	13.8	-	13.8	-	-
Ash (db), %	0.56	-	0.56	-	-
Colour, KJ (wet)	-5.0	-	-5.0	-	-
Colour, Konica Minolta CM5 (dry)					
L*	93.87	-	94.01	-	-
a*	0.46	-	0.36	-	-
b*	9.75	-	9.90	-	-
RVA					
Peak Viscosity, cP	1950	-	1761	-	-
Minimum viscosity (Trough), cP	1676	-	1548	-	-
Final Viscosity, cP	2091	-	1938	-	-
Peak Time, min	6.80	-	7.00	-	-
GLUTEN					
Wet gluten (14% mb), %	32.6	-	26.6	-	-
Dry gluten (14% mb), %	10.9	-	7.8	-	-
Gluten Index	97	-	96	-	-
FARINOGRAM					
Water absorption (14% mb), %	59.9	-	57.8	-	-
Development time, min	7.3	-	5.2	-	-
Stability, min	9.5	-	6.9	-	-
Mixing tolerance index, BU	36	-	47	-	-
EXTENSOGRAM (45 min pull)					
Area, cm^2	132	-	92	-	-
Maximum height, BU	426	-	340	-	-
Extensibility, mm	230	-	196	-	-
ALVEOGRAM					
Strength (S), cm^2	45.4	-	32.4	-	-
Stability (P), mm	72	-	64	-	-
Distensibility (L), mm	162	-	134	-	-
Configuration ratio (P/L)	0.44	-	0.48	-	-
MIXOGRAM					
Peak time, min	3.2	-	2.9	-	-
100 g BAKING TEST					
Loaf volume, cm^3	1208	-	1027	-	-
Evaluation (see page 74)	0	-	0	-	-

Rheological Graphs Per Production Region

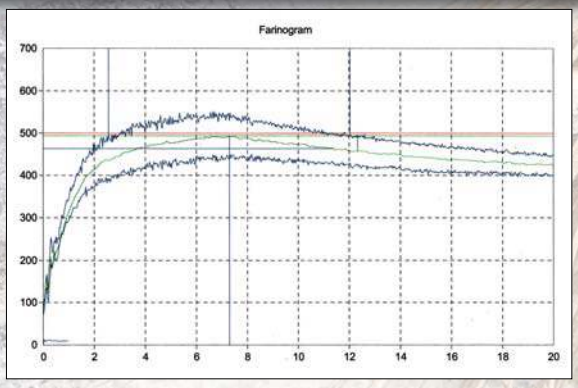
MIXOGRAM

36



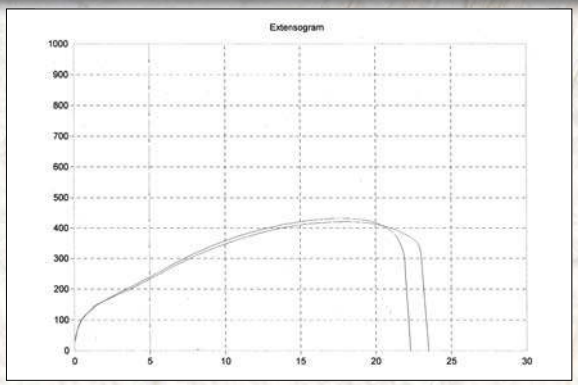
FARINOGRAM

36



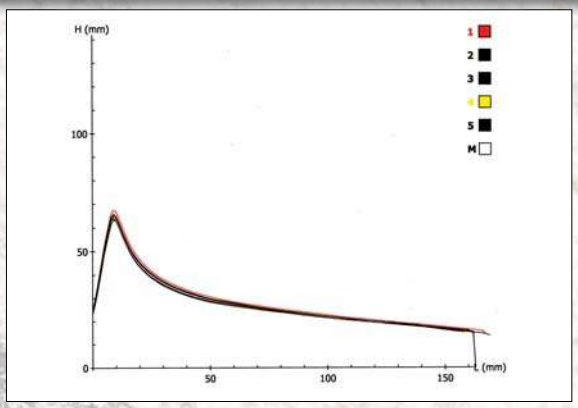
EXTENSOGRAM

36



ALVEOGRAM

36



Mycotoxins

Mycotoxins, toxic chemical compounds produced by moulds, can contaminate commodities either in the field or during storage and are invisible, odourless and tasteless. According to the Food and Agriculture Organization, food losses due to mycotoxin contamination are estimated at 25% on a global scale and pose a real threat to food security, especially in Africa where the magnitude of losses is difficult to estimate because of a lack of information.

Effective management to prevent food losses or adverse health effects as a result of long-term exposure to contaminated food is only possible when adequate reliable testing data is available. Well-timed interventions in the food and feed value chain can then be based on these testing results.

Mycotoxin production is foremost a food safety issue, although the occurrence of moulds can also lead to damage ranging from rancidity, odour, flavour changes, loss of nutrients and germ layer destruction resulting in a reduction in quality. The only proven way to determine whether grain, cereals, feed or food are contaminated, is by analytical testing. Most mycotoxins are toxic at very low concentrations, sensitive and reliable methods for their detection are therefore required.

The accredited multi-mycotoxin assessments included in the annual wheat crop quality survey for the past ten 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.

The absence of Aflatoxin B_1, B_2, G_1, G_2, Fumonisin B_1, B_2, B_3, Ochratoxin A, T2-toxin and HT-2 toxin in the wheat samples over the past ten seasons were confirmed in the 2020/21 season. Zearalenone residues were detected on a wheat crop sample for the first time during the previous season. The Deoxynivalenol prevalence this season is the highest of the past ten seasons with 43% of the samples testing positive for Deoxynivalenol residues. The average percentage of samples testing positive over the previous nine seasons is 14% and ranges from 3% to 25%. Two of the positive residue levels measured exceeded the national maximum allowable level (2 000 µg/kg) for cereals intended for further processing.

Constant monitoring and continued research on the prevention and mitigation of mycotoxin contamination are necessary. 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.

National Mycotoxin Regulations

According to the Foodstuffs, Cosmetics and Disinfectants Act (Act 54 of 1972) and regulations published under Government Notice No. R. 1145, dated 8 October 2004, all foodstuffs, ready for human consumption, may not contain more than 10 µg/kg of aflatoxin, of which Aflatoxin B_1 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 Deoxinyvalenol.
- 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 Deoxinyvalenol.

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 2020/21 season

Region	Class and Grade	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_3						
		LOQ												
		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
1	COW	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2	B3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
3	B2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
3	B1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
3	SUPER	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
3	B3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
3	COW	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4	B3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4	SUPER	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4	B2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
5	B1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
6	SUPER	ND	ND	ND	ND	ND	ND	ND	<100	ND	ND	ND	ND	ND
6	B2	ND	ND	ND	ND	ND	ND	ND	<100	ND	ND	ND	ND	ND
6	B1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
10	COW	ND	ND	ND	ND	ND	ND	ND	1 722	ND	ND	ND	ND	ND
10	B1	ND	ND	ND	ND	ND	ND	ND	533	ND	ND	ND	ND	ND
10	SUPER	ND	ND	ND	ND	ND	ND	ND	3 088	ND	ND	ND	ND	ND
11	SUPER	ND	ND	ND	ND	ND	ND	ND	2 202	ND	ND	ND	ND	ND
14	SUPER	ND	ND	ND	ND	ND	ND	ND	416	ND	ND	ND	ND	ND
19	SUPER	ND	ND	ND	ND	ND	ND	ND	125	ND	ND	ND	ND	ND
20	B1	ND	ND	ND	ND	ND	ND	ND	381	ND	ND	ND	ND	ND
23	SUPER	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
24	COW	ND	ND	ND	ND	ND	ND	ND	553	ND	ND	ND	ND	ND
25	COW	ND	ND	ND	ND	ND	ND	ND	<100	ND	ND	ND	ND	ND

Table 6: Mycotoxin results for the 2020/21 season (continue)

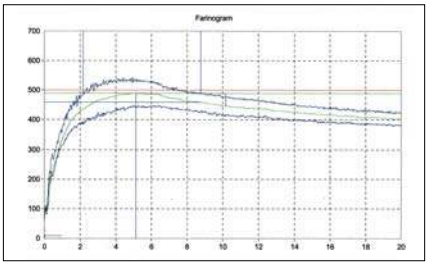
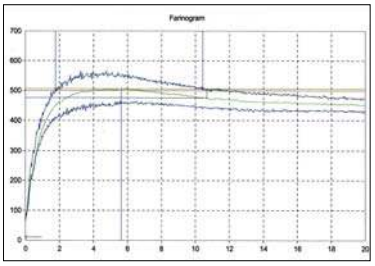
Region	Class and Grade	Aflatoxin (µg/kg)				Fumonisin (µg/kg)			Deoxynivalenol (µg/kg)	15-ADON (µg/kg)	Ochratoxin A (µg/kg)	Zearalenone (µg/kg)	HT-2 Toxin (µg/kg)	T-2 Toxin (µg/kg)
		B_1	B_2	G_1	G_2	B_1	B_2	B_3						
		LOQ												
		5 µg/kg	5 µg/kg	5 µg/kg	5 µg/kg	20 µg/kg	20 µg/kg	20 µg/kg	100 µg/kg	100 µg/kg	5 µg/kg	20 µg/kg	20 µg/kg	20 µg/kg
26	SUPER	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
28	SUPER	ND	ND	ND	ND	ND	ND	ND	304	ND	ND	ND	ND	ND
28	SUPER	ND	ND	ND	ND	ND	ND	ND	168	ND	ND	ND	ND	ND
28	COW	ND	ND	ND	ND	ND	ND	ND	646	ND	ND	ND	ND	ND
33	SUPER	ND	ND	ND	ND	ND	ND	ND	1 176	ND	ND	ND	ND	ND
36	SUPER	ND	ND	ND	ND	ND	ND	ND	274	ND	ND	ND	ND	ND
Total number of samples		30	30	30	30	30	30	30	30	30	30	30	30	30
Average of total number of samples		0	0	0	0	0	0	0	386	0	0	0	0	0
Number of positive results		0	0	0	0	0	0	0	13	0	0	0	0	0
Average of positive results		-	-	-	-	-	-	-	891	-	-	-	-	-
Maximum of positive results		-	-	-	-	-	-	-	3 088	-	-	-	-	-

Note:

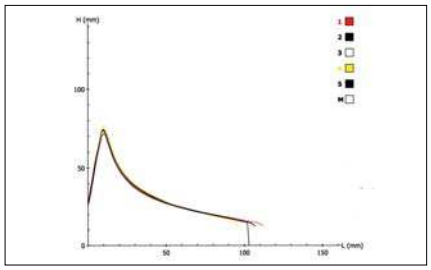
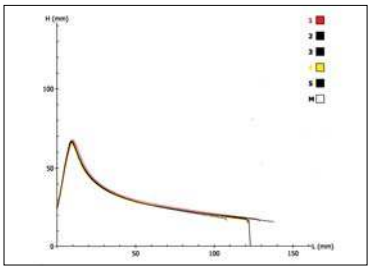
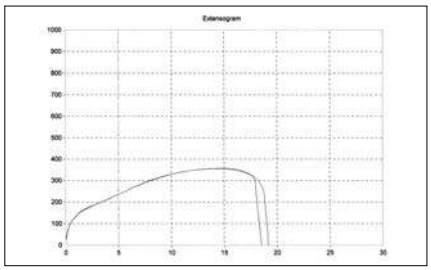
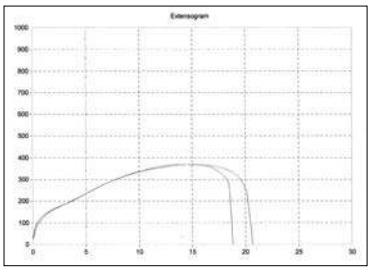
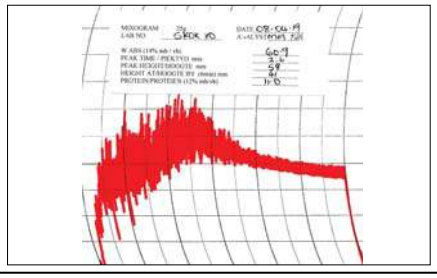
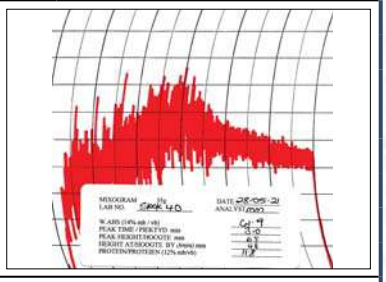
- Limit of quantitation (LOQ) means the lowest concentration level that can be quantified with acceptable presicion and accuracy by the UPLC-MS/MS. A concentration measured below the LOQ is reported as <LOQ.
- Limit of detection (LOD) is the lowest concentration level that can be detected but not quantified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

RSA Wheat Crop Quality Summary

RSA Crop Quality 2018/19 and 2020/21 Seasons

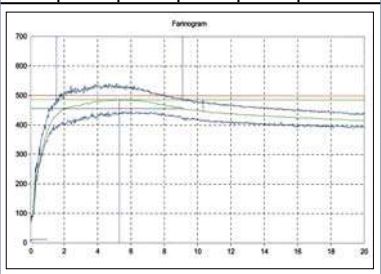
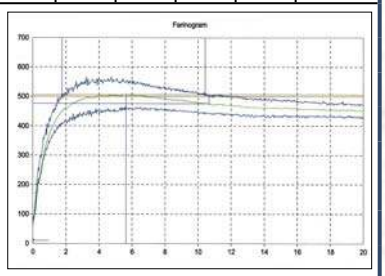
Country of origin	RSA Crop Average 2018/19							RSA Crop Average 2020/21					
Class and Grade bread wheat	B1	B2	B3	B4	UT	COW	Average	Super	B1	B2	B3	COW	Average
No. of samples	*142*	*77*	*22*	*15*	*42*	*6*	*304*	*70*	*34*	*31*	*30*	*85*	*250*
WHEAT													
GRADING													
Protein (12% mb), %	12.8	11.6	10.5	10.7	12.0	11.5	12.1	13.2	12.0	11.0	10.0	11.9	12.0
Moisture, %	9.3	9.3	9.2	9.6	9.0	9.7	9.3	11.3	11.0	11.1	11.0	11.1	11.1
Falling number, sec	402	401	378	354	400	359	397	367	389	403	399	348	372
1000 Kernel mass (13% mb), g	38.9	39.7	39.9	37.0	39.0	42.9	39.2	37.3	38.7	39.2	39.3	38.0	38.2
Hlm (dirty), kg/hl	81.7	81.7	82.0	79.9	79.5	82.3	81.3	80.8	79.8	79.3	78.0	77.0	78.9
Screenings (<1.8 mm sieve), %	1.30	1.23	1.18	2.44	2.58	0.69	1.49	1.07	1.04	1.54	1.55	2.38	1.63
Gravel, stones, turf and glass, %	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Foreign matter, %	0.14	0.13	0.11	0.14	0.27	0.12	0.15	0.03	0.05	0.04	0.03	0.13	0.07
Other grain & unthreshed ears, %	0.31	0.36	0.31	0.42	1.03	0.09	0.43	0.25	0.24	0.40	0.34	0.87	0.49
Heat damaged kernels, %	0.00	0.00	0.00	0.00	0.00	0.10	0.00	0.01	0.02	0.01	0.02	0.20	0.08
Immature kernels, %	0.09	0.07	0.06	0.09	0.04	0.18	0.08	0.09	0.04	0.01	0.01	0.06	0.05
Insect damaged kernels, %	0.49	0.47	0.53	0.49	0.81	1.50	0.55	0.31	0.43	0.47	0.59	0.98	0.61
Sprouted kernels, %	0.02	0.02	0.01	0.00	0.10	0.16	0.03	0.13	0.06	0.03	0.01	0.45	0.20
Total damaged kernels, %	0.60	0.56	0.60	0.58	0.95	1.94	0.66	0.54	0.54	0.53	0.64	1.69	0.94
Combined deviations, %	2.35	2.29	2.20	3.58	4.83	2.85	2.73	1.89	1.86	2.51	2.56	5.07	3.12
Heavily frost damaged kernels, %	0.01	0.06	0.00	0.00	0.50	8.68	0.22	0.00	0.00	0.00	0.01	0.01	0.00
Field fungi, %	0.12	0.14	0.10	0.12	0.12	0.08	0.12	0.57	0.45	0.27	0.25	1.04	0.64
Storage fungi, %	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.06	0.02
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	0.00
Poisonous seeds (*Crotalaria spp., etc.*)	0	0	0	0	0	0	0	0	0	0	0	0	0
Poisonous seeds (*Argemone mexicana, etc.*)	0	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	No
Undesirable odour	No	No	No	No	No	No	No	No	No	No	No	No	No
	B1	B2	B3	B4	UT	COW	Average	B1	B2	B3	B4	COW	Average
No. of samples	*28*	*21*	*11*	*7*	*3*	*-*	*70*	*21*	*9*	*7*	*5*	*7*	*49*
Bühler Extraction, %	71.5	71.7	71.5	69.2	70.7	-	71.3	74.3	74.2	74.3	73.9	73.6	74.1
FLOUR													
Colour, KJ (wet)	-4.5	-4.6	-4.7	-4.4	-4.5	-	-4.5	-4.7	-4.8	-5.0	-5.0	-4.7	-4.8
Colour, Konica Minolta CM5 (dry)													
L*	93.74	93.80	93.89	93.61	93.99	-	93.78	93.72	93.91	94.16	94.44	94.03	93.93
a*	0.45	0.45	0.44	0.48	0.41	-	0.45	0.48	0.46	0.40	0.35	0.39	0.44
b*	10.04	10.05	10.23	10.65	9.82	-	10.12	9.74	9.89	9.79	9.47	9.87	9.77
Ash (db), %	0.60	0.60	0.61	0.61	0.57	-	0.60	0.60	0.60	0.60	0.59	0.60	0.60
Protein (12% mb), %	11.8	10.6	9.6	10.4	11.3	-	10.9	12.3	11.0	10.0	9.6	10.6	11.2
Wet Gluten (14% mb), %	32.7	28.9	25.6	30.1	31.3	-	30.1	32.8	29.8	26.8	24.1	28.5	29.9
Dry Gluten (14% mb), %	11.0	9.7	8.5	10.1	10.6	-	10.1	11.4	10.0	8.8	7.9	9.6	10.1
Gluten Index	92	95	96	96	93	-	94	96	95	95	95	94	95
100 g BAKING TEST													
Baking water absorption, %	61.9	60.5	59.4	60.5	61.3	-	60.9	62.5	60.9	59.9	59.2	60.5	61.2
Loaf volume, cm^3	1088	1014	936	994	1085	-	1033	1189	1095	1023	958	1043	1104
Evaluation (see page 74)	0	0	0	0	0	-	0	0	0	0	0	0	0
FARINOGRAM													
Water absorption (14% mb), %	61.6	60.4	58.9	58.6	61.1	-	60.5	60.2	59.2	58.7	57.5	59.0	59.3
Development time, min	5.4	4.9	4.5	4.5	4.5	-	5.0	6.4	5.2	5.0	4.0	5.0	5.6
Stability, mm	7.4	6.8	6.4	7.1	6.8	-	7.0	9.2	8.1	7.7	7.8	7.9	8.5
Mixing tolerance index, BU	40	41	43	38	40	-	41	36	37	39	33	36	36
													

RSA Crop Quality 2018/19 and 2020/21 Seasons

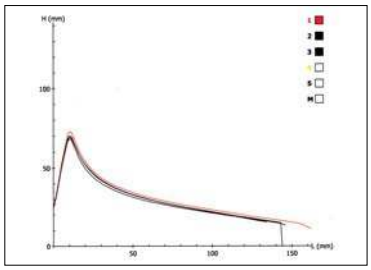
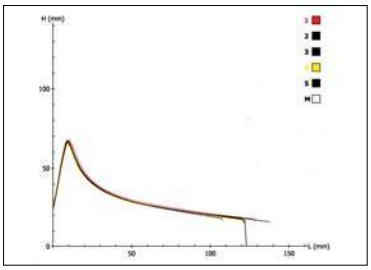
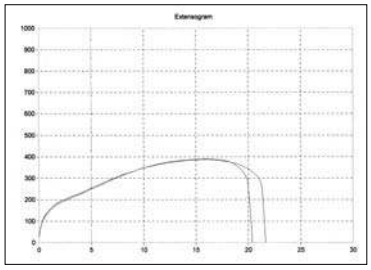
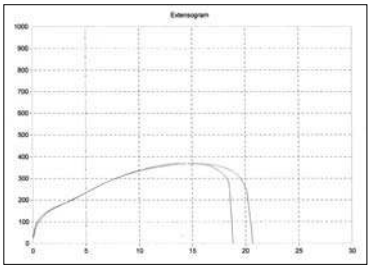
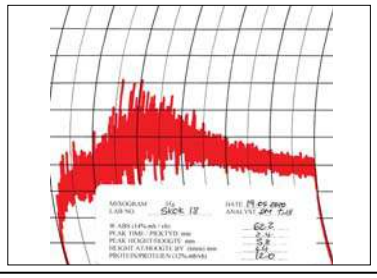
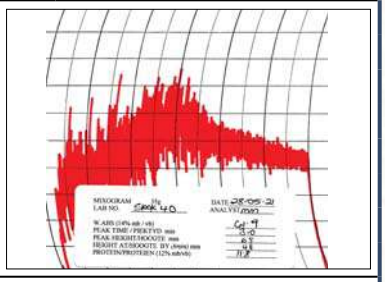
Country of origin	RSA Crop Average 2018/19							RSA Crop Average 2020/21					
Class and Grade bread wheat	**B1**	**B2**	**B3**	**B4**	**UT**	**COW**	**Average**	**Super**	**B1**	**B2**	**B3**	**COW**	**Average**
No. of samples	***28***	***21***	***11***	***7***	***3***	***-***	***70***	***21***	***9***	***7***	***5***	***7***	***49***
ALVEOGRAM													
Strength (S), cm²	38.5	33.2	29.0	31.2	36.5	-	34.6	43.2	37.1	33.4	30.9	35.2	38.3
Stability (P), mm	84	82	76	81	80	-	82	75	74	77	77	76	75
Distensibility (L), mm	114	100	95	87	118	-	104	147	126	111	97	119	129
P/L	0.75	0.85	0.83	0.96	0.68	-	0.81	0.54	0.62	0.72	0.83	0.67	0.63
													
EXTENSOGRAM													
Strength, cm²	101	90	76	85	96	-	92	115	97	82	74	91	99
Max. height, BU	364	351	323	344	348	-	350	390	366	324	315	342	362
Extensibility, mm	204	187	172	177	201	-	191	217	195	182	170	192	200
													
MIXOGRAM													
Peak time, min	2.5	2.6	2.7	3.0	2.3	-	2.6	3.0	2.8	2.8	3.2	2.9	2.9
Water absorption (14% mb), %	61.9	60.5	59.4	60.5	61.3	-	60.9	62.5	60.9	59.9	59.2	60.5	61.2
													
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 [361]							386 [3 088]					
Ochratoxin A (µg/kg)	ND							ND					
Zearalenone (µg/kg)	ND							ND					
HT-2 (µg/kg)	ND							ND					
T-2 Toxin (µg/kg)	ND							ND					
No. of samples	***40***							***30***					

RSA Wheat Crop Quality Summary

RSA Crop Quality 2019/20 and 2020/21 Seasons

Country of origin	RSA Crop Average 2019/20						RSA Crop Average 2020/21					
Class and Grade bread wheat	Super	B1	B2	B3	COW	Average	Super	B1	B2	B3	COW	Average
No. of samples	*132*	*56*	*25*	*15*	*105*	*333*	*70*	*34*	*31*	*30*	*85*	*250*
WHEAT												
GRADING												
Protein (12% mb), %	13.5	12.0	11.1	12.4	13.2	12.9	13.2	12.0	11.0	10.0	11.9	12.0
Moisture, %	10.3	10.1	10.1	10.2	10.3	10.2	11.3	11.0	11.1	11.0	11.1	11.1
Falling number, sec	382	387	355	370	295	353	367	389	403	399	348	372
1000 Kernel mass (13% mb), g	36.1	38.7	37.8	33.3	33.2	35.6	37.3	38.7	39.2	39.3	38.0	38.2
Hlm (dirty), kg/hl	80.0	81.3	80.6	77.1	75.9	78.9	80.8	79.8	79.3	78.0	77.0	78.9
Screenings (<1.8 mm sieve), %	1.31	1.27	1.21	1.56	3.26	1.92	1.07	1.04	1.54	1.55	2.38	1.63
Gravel, stones, turf and glass, %	0.01	0.01	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00
Foreign matter, %	0.10	0.09	0.08	0.06	0.25	0.14	0.03	0.05	0.04	0.03	0.13	0.07
Other grain & unthreshed ears, %	0.29	0.28	0.32	0.32	0.65	0.41	0.25	0.24	0.40	0.34	0.87	0.49
Heat damaged kernels, %	0.00	0.00	0.01	0.01	0.08	0.03	0.01	0.02	0.01	0.02	0.20	0.08
Immature kernels, %	0.07	0.05	0.05	0.01	0.09	0.07	0.09	0.04	0.01	0.01	0.06	0.05
Insect damaged kernels, %	0.27	0.27	0.18	0.14	0.44	0.31	0.31	0.43	0.47	0.59	0.98	0.61
Sprouted kernels, %	0.04	0.03	0.09	0.11	3.17	1.03	0.13	0.06	0.03	0.01	0.45	0.20
Total damaged kernels, %	0.38	0.34	0.34	0.28	3.77	1.44	0.54	0.54	0.53	0.64	1.69	0.94
Combined deviations, %	2.08	1.98	1.95	2.22	7.93	3.91	1.89	1.86	2.51	2.56	5.07	3.12
Heavily frost damaged kernels, %	0.03	0.01	0.00	0.00	0.01	0.02	0.00	0.00	0.00	0.01	0.01	0.00
Field fungi, %	0.11	0.15	0.14	0.07	0.60	0.27	0.57	0.45	0.27	0.25	1.04	0.64
Storage fungi, %	0.00	0.00	0.00	0.00	0.01	0.00	0.01	0.00	0.00	0.00	0.06	0.02
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 (*Crotalaria spp., etc.*)	0	0	0	0	0	0	0	0	0	0	0	0
Poisonous seeds (*Argemone mexicana, 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
	B1	B2	B3	B4	COW	Average	B1	B2	B3	B4	COW	Average
No. of samples	*25*	*13*	*9*	*4*	*18*	*69*	*21*	*9*	*7*	*5*	*7*	*49*
Bühler Extraction, %	74.9	75.7	75.8	74.1	73.7	74.8	74.3	74.2	74.3	73.9	73.6	74.1
FLOUR												
Colour, KJ (wet)	-4.7	-4.9	-4.9	-4.9	-4.3	-4.7	-4.7	-4.8	-5.0	-5.0	-4.7	-4.8
Colour, Konica Minolta CM5 (dry)												
L*	93.54	93.81	93.83	93.99	93.48	93.64	93.72	93.91	94.16	94.44	94.03	93.93
a*	0.50	0.46	0.46	0.40	0.44	0.47	0.48	0.46	0.40	0.35	0.39	0.44
b*	10.35	10.22	10.53	10.32	10.26	10.32	9.74	9.89	9.79	9.47	9.87	9.77
Ash (db), %	0.65	0.65	0.63	0.61	0.63	0.64	0.60	0.60	0.60	0.59	0.60	0.60
Protein (12% mb), %	12.7	11.2	10.3	11.2	12.1	11.9	12.3	11.0	10.0	9.6	10.6	11.2
Wet Gluten (14% mb), %	33.6	29.5	26.6	29.2	31.7	31.1	32.8	29.8	26.8	24.1	28.5	29.9
Dry Gluten (14% mb), %	11.5	9.9	8.8	9.9	10.7	10.6	11.4	10.0	8.8	7.9	9.6	10.1
Gluten Index	95	95	96	96	96	95	96	95	95	95	94	95
100 g BAKING TEST												
Baking water absorption, %	63.2	61.1	60.1	61.3	62.3	62.1	62.5	60.9	59.9	59.2	60.5	61.2
Loaf volume, cm^3	1185	1083	1036	1106	1140	1130	1189	1095	1023	958	1043	1104
Evaluation (see page 74)	0	0	0	0	0	0	0	0	0	0	0	0
FARINOGRAM												
Water absorption (14% mb), %	61.5	60.2	59.0	58.6	59.4	60.2	60.2	59.2	58.7	57.5	59.0	59.3
Development time, min	6.0	5.3	5.4	4.9	4.9	5.4	6.4	5.2	5.0	4.0	5.0	5.6
Stability, mm	8.7	7.5	7.8	8.7	7.7	8.1	9.2	8.1	7.7	7.8	7.9	8.5
Mixing tolerance index, BU	38	41	41	33	48	41	36	37	39	33	36	36
												

RSA Crop Quality 2019/20 and 2020/21 Seasons

Country of origin	RSA Crop Average 2019/20						RSA Crop Average 2020/21					
Class and Grade bread wheat	Super	B1	B2	B3	COW	Average	Super	B1	B2	B3	COW	Average
No. of samples	*25*	*13*	*9*	*4*	*15*	*69*	*21*	*9*	*7*	*5*	*7*	*49*
ALVEOGRAM												
Strength (S), cm²	47.3	39.8	36.8	40.2	41.3	42.6	43.2	37.1	33.4	30.9	35.2	38.3
Stability (P), mm	83	82	80	74	72	79	75	74	77	77	76	75
Distensibility (L), mm	146	127	117	148	163	143	147	126	111	97	119	129
P/L	0.59	0.68	0.73	0.56	0.50	0.60	0.54	0.62	0.72	0.83	0.67	0.63
												
EXTENSOGRAM												
Strength, cm²	121	106	98	105	114	112	115	97	82	74	91	99
Max. height, BU	387	382	375	381	383	383	390	366	324	315	342	362
Extensibility, mm	223	201	190	197	216	211	217	195	182	170	192	200
												
MIXOGRAM												
Peak time, min	2.5	2.7	2.8	2.7	2.7	2.6	3.0	2.8	2.8	3.2	2.9	2.9
Water absorption (14% mb), %	63.2	61.1	60.1	61.3	62.4	62.1	62.5	60.9	59.9	59.2	60.5	61.2
												
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 [1 017]						386 [3 088]					
Ochratoxin A (µg/kg)	ND						ND					
Zearalenone (µg/kg)	<20 [29]						ND					
HT-2 (µg/kg)	ND						ND					
T-2 Toxin (µg/kg)	ND						ND					
No. of samples	*40*						*30*					

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 106 to 118.

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

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

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

Screenings means all material that passes through a standard sieve. For the definition of a standard sieve please refer to the definitions of Regulation No. R. 1547 on page 109 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 screen.

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 gelatinization 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 the Quadromat Junior laboratory mill.

BÜHLER MILLING:

Cleaned wheat samples are conditioned to between 15.0% and 16.0% moisture according to the wheat moisture and kernel hardness and allowed to stand for a minimum of 18 hours (18 - 24 hours). Samples

are then milled on a Bühler MLU 202 mill and passed through a bran finisher.

Bühler extraction:

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

Moisture:

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

Protein:

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

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

Colour:

Colour is one of the important properties of milled grains and the colour of wheat flour often affects the colour of the finished product. In general, a bright white colour flour is more desirable for most products.

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

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

Ash:

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

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

Rapid visco analyser:

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

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

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

Gluten:

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

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

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

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

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

FARINOGRAPH:

AACCI method 54-21.02, latest edition constant flour weight procedure is followed, using 300 g of flour on a 14% moisture basis.

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

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

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

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

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

EXTENSOGRAPH:

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

The **strength**, measured in cm², 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 cm².

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. 30 of the 250 wheat crop samples were tested for Aflatoxin B_1, B_2, G_1, G_2, Fumonisin B_1, B_2, B_3, Deoxynivalenol, 15-ADON, HT2 Toxin, T-2 Toxin, Zearalenone and Ochratoxin A.

Wheat Exports and Imports

SAGIS South African Grain Information Service NPC
Suid Afrikaanse Graaninligtingsdiens NWM
Reg no. 1997/019186/08

WHEAT EXPORTS/IMPORTS PER COUNTRY

2019/20 Season (28 Sep 2019 - 25 Sep 2020)

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	4 930	Canada	51 001	Canada	7 673	Botswana	114 405	Cape Town	201 158
Eswatini (Swaziland)	12 682	Czech Republic	52 365	Germany	58 649	Eswatini (Swaziland)	36 005	Durban	1 749 246
Lesotho	2 000	Finland	21 860	Latvia	12 135	Lesotho	83 134	East London	54 990
Namibia	14 958	Germany	274 283	Lithuania	23 700	Mozambique	1 154	Port Elizabeth	64 747
Zambia	39 573	Latvia	54 803	Poland	89 763	Zimbabwe	25 741	Richards Bay	73 981
Zimbabwe	10 324	Lithuania	202 656	Russian Federation	53 585				
		Poland	543 325	Ukraine	5 250				
		Russian Federation	536 757	United States	3 499				
		Ukraine	94 726						
		United States	58 092						
Total	84 467	Total	1 889 868	Total	254 254	Total	260 439	Total	2 144 122

Includes: Imports for RSA and Other Countries

SAGIS South African Grain Information Service NPC
Suid Afrikaanse Graaninligtingsdiens NWM
Reg no. 1997/019186/08

WHEAT EXPORTS/IMPORTS PER COUNTRY

2020/21 Season (26 Sep 2020 - 16 Jul 2021)

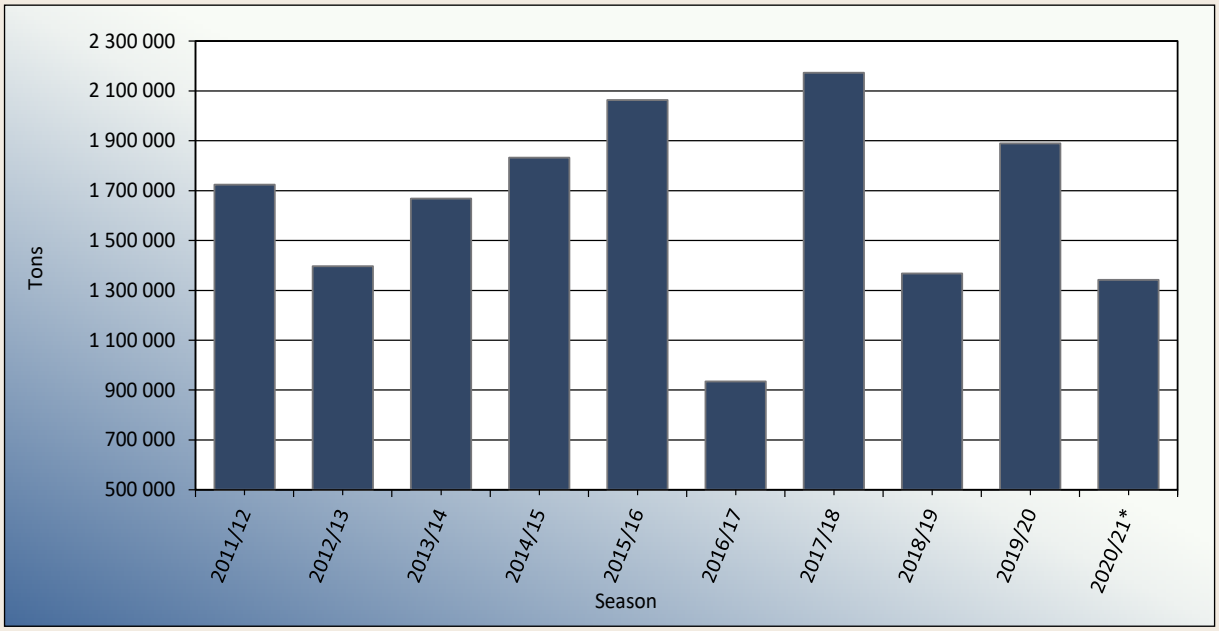
RSA EXPORTS		IMPORTS FOR RSA		IMPORTS FOR OTHER COUNTRIES		EXPORTS OF IMPORTED WHEAT		IMPORTS PER HARBOUR*	
To Country	Tons	From Country	Tons	From Country	Tons	To country	Tons	Harbour	Tons
Botswana	21 231	Australia	419 442	Australia	34 202	Botswana	84 380	Cape Town	115 258
Eswatini (Swaziland)	5 973	Canada	136 337	Canada	14 994	Eswatini (Swaziland)	33 903	Durban	1 324 318
Lesotho	8 387	Czech Republic	8 965	Czech Republic	17 539	Lesotho	62 567	East London	22 255
Mozambique	1 010	Germany	51 461	Germany	2 276	Mozambique	1 049	Port Elizabeth	26 720
Namibia	10 556	Latvia	77 997	Latvia	51 000	Zimbabwe	40 960	Richards Bay	87 521
Zambia	24 373	Lithuania	249 220	Lithuania	54 785				
Zimbabwe	4 672	Poland	223 044	Poland	23 672				
		Russian Federation	133 163	Russian Federation	29 010				
		Ukraine	7 341	Ukraine	6 867				
		United States	34 757						
Total	76 202	Total	1 341 727	Total	234 345	Total	222 859	Total	1 576 072

Includes: Imports for RSA and Other Countries

Quantity of wheat imported to the RSA

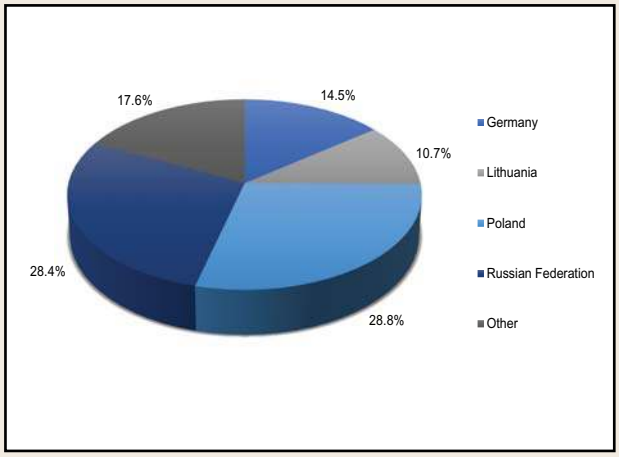
The graphs and table given below and on the next page, are based on progressive import figures per country provided by SAGIS.

Graph 30: Total wheat imports for domestic use from the 2011/12 season

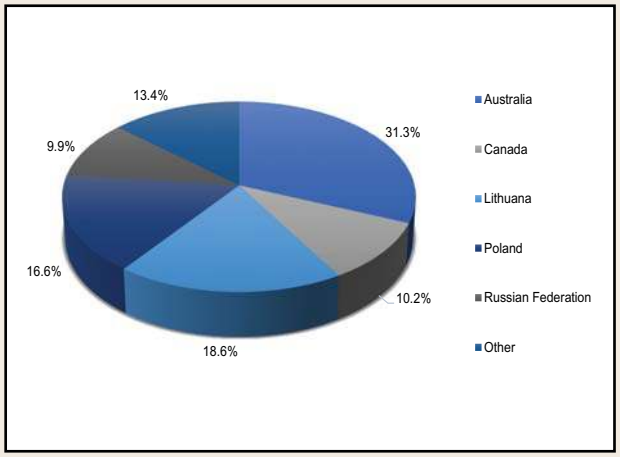


**2020/21 season figure includes imports up to 16 July 2021.*

Graph 31: Wheat imports per origin for domestic use 2019/20 season



Graph 32: Wheat imports per origin for domestic use 2020/21 season



**2020/21 season figure includes imports up to 16 July 2021.*

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

	Season										Total (Tons)
	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21*	
Argentina	652 279	98 029	-	59 607	49 516	35 613	132 433	35 519	-	-	1 062 996
Australia	247 675	189 925	49 780	95 254	38 457	24 816	-	-	-	419 442	1 065 349
Brazil	276 420	234 733	-	-	-	-	-	-	-	-	511 153
Canada	45 252	48 583	111 289	105 457	102 816	27 841	90 944	85 428	51 001	136 337	804 948
Czech Republic	-	-	-	-	-	144 402	47 904	110 636	52 365	8 965	364 272
Eswatini	-	288		-	-	-	-	-	-	-	288
Finland	-	-	25 430	-	-	-	-	-	21 860	-	47 290
Germany	105 964	95 476	179 436	348 385	283 451	237 508	282 312	358 343	274 283	51 461	2 216 619
Latvia	-	-	22 013	61 005	-	17 098	140 007	39 290	54 803	77 997	412 213
Lesotho	-	384	-	-	-	-	-	-	-	-	384
Lithuania	8 880	-	40 532	43 791	151 047	-	182 241	124 161	202 656	249 220	1 002 528
Poland	-	-	-	91 483	185 036	76 912	17 514	24 998	543 325	223 044	1 162 312
Romania	36 071	-	-	-	-	112 334	101 449	-	-	-	249 854
Russian Federation	154 129	245 228	800 964	719 784	956 705	182 993	955 697	401 385	536 757	133 163	5 086 805
Ukraine	39 016	341 976	372 500	279 364	109 350	13 568	135 669	48 210	94 726	7 341	1 441 720
Uruguay	45 250	99 033	-	-	-	-	-	-	-	-	144 283
USA	112 915	42 572	66 468	28 311	186 387	61 680	87 064	140 127	58 092	34 757	818 373
Total	1 723 851	1 396 227	1 668 412	1 832 441	2 062 765	934 765	2 173 234	1 368 097	1 889 868	1 341 727	16 391 387

**2020/21 season figures include imports up to 16 July 2021.*

Quality summary of imported wheat

(Wheat imported from 28 September 2019 to 25 September 2020) (Previous season)

The quality of all wheat imported into South Africa is monitored by the SAGL. A subsample of all samples drawn by inspectors of the South African Agricultural Food, Quarantine and Inspection Services (SAAFQIS) of the Department of Agriculture, Land Reform and Rural Development (DALRRD) formerly the Department of Agriculture, Forestry and Fisheries (DAFF) 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 (from 26 September 2020 onward) 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 84 to 101. This imported wheat quality is compared to a summary of the local crop quality of the corresponding (2019/20) season. To simplify the comparison between the quality of the different countries of import, the average quality per country was summarised in Table 8 on pages 82 and 83. 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 195 samples of wheat imported from the following ten countries were received (number of samples received in brackets): Canada (11), Finland (2), Germany (31), Latvia (8), Lithuania (28), Poland (45), Russian Federation (48), Ukraine (8) and USA (14). 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.

Please note that these imported wheat samples as well as the 2019/20 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. 4% of the samples had hectoliter mass values below 76 kg/hl (minimum requirement for South African Super Grade to Grade 2 wheat). These samples originated from mainly Poland and Latvia.

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 the Ukraine, Russian Federation, USA and Poland reported the highest levels of screenings.

None of the samples reported falling number results below 220 seconds and all the country averages were well above 300 seconds. The RSA national average for the same season was 353 seconds.

The protein content and rheological characteristics of the wheat imported from the USA varied from low and weak to average and fair. The average values are therefore not a true reflection of the overall imported USA wheat bread baking quality, since most of the wheat imported were most probably not intended for bread baking 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. As in the previous seasons, the imported Canadian wheat had the highest protein content resulting in the highest gluten content. When evaluating gluten results, it is important to take the protein content into account. The ratio of wet gluten to total protein content is normally between 2.5 – 2.8 to 1. The wet gluten content of good quality white bread flour normally ranges between 27 – 33% (14% mb). The difference between wet and dry gluten is an indication of the water-holding capacity of the gluten proteins which is in turn related to protein quality. This water-holding capacity is also one of the factors determining flour water absorption.

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

Acceptable ranges for the alveogram parameters generally are as follows: Strength 30 – 45 cm^2, 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.

Most of the imported wheat samples, 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, 2.8 to 3.5 minutes are considered acceptable in South Africa. The longer the mixing time, the larger the risk that the dough will not be mixed to optimum development, which will negatively influence the bread quality and cause lower loaf volumes. Long mixing times can also result in increased dough temperatures. Warmer doughs will proof faster and generally carry less water.

Composite samples of holds per shipment per country were tested for the presence of mycotoxin residues by means of a multi-mycotoxin analysis. The mycotoxin residue levels detected on the composite samples did not raise any major concerns. Most samples tested negative for all of the mycotoxins analysed (Aflatoxin B_1, B_2, G_1, G_2, Fumonisin B_1, B_2, B_3, Deoxynivalenol, 15-ADON, HT-2 Toxin, T-2 Toxin, Zearalenone and Ochratoxin A). Deoxynivalenol was the only mycotoxin found to be present on some of the samples. All of these positive results were well below the national maximum allowable level of 2 000 µg/kg for cereals intended for further processing.

Table 8: Summary of the quality results of imported wheat during the 2019/20 season

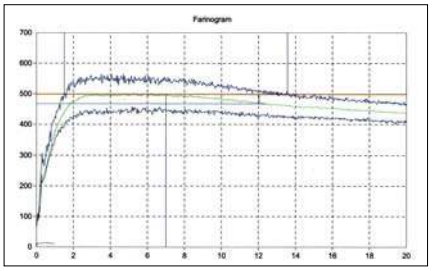
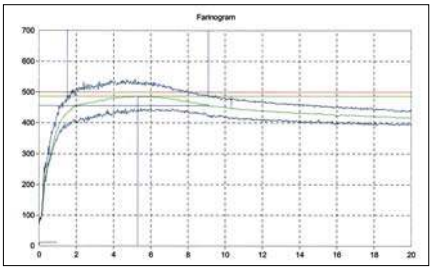
Quality parameter	Canada				Finland				Germany				Latvia				Lithuania			
	Ave	Min	Max	Stdev	Ave	Min	Max	Stdev	Ave	Min	Max	Stdev	Ave	Min	Max	Stdev	Ave	Min	Max	Stdev
Hectolitre mass, kg/hl	83.0	77.7	85.5	2.49	83.7	83.6	83.8	0.14	79.9	76.8	82.0	1.48	79.0	75.8	80.2	1.62	78.7	76.3	81.3	1.40
Screenings (<1.8mm), %	2.90	1.32	7.50	2.01	1.10	1.06	1.14	0.06	2.22	1.39	3.47	0.57	1.78	1.58	1.89	0.11	2.09	1.22	2.64	0.44
1000 Kernel mass, g (13 % mb)	37.7	34.1	43.4	2.82	45.4	45.2	45.6	0.28	41.4	37.5	44.0	1.76	42.9	41.7	44.1	0.69	40.6	36.3	42.8	1.75
WWF Protein (12% mb), %	13.3	11.0	14.7	1.31	10.9	10.7	11.1	0.30	11.5	10.4	12.9	0.62	11.8	11.1	12.1	0.45	12.2	10.8	14.6	0.98
WWF Falling number, sec	390	322	540	63.58	344	338	349	7.78	382	292	498	45.01	347	288	389	39.70	353	309	443	35.43
Number of samples	*11*				*2*				*31*				*8*				*28*			
Flour moisture, %	13.6	12.5	14.4	0.55	14.2	14.0	14.3	0.21	13.5	12.4	14.6	0.46	13.7	13.4	13.9	0.16	13.8	13.0	14.5	0.38
Flour Protein, % (12 % mb)	12.3	10.0	13.6	1.24	9.7	9.5	9.9	0.32	10.2	9.4	11.5	0.57	10.6	9.9	11.0	0.53	11.0	9.6	13.6	0.98
Ash, % (db)	0.56	0.50	0.67	0.04	0.52	0.51	0.53	0.01	0.53	0.47	0.56	0.02	0.54	0.50	0.61	0.04	0.54	0.50	0.60	0.02
Colour, KJ (wet)	-4.6	-5.0	-4.0	0.41	-4.8	-4.9	-4.7	0.14	-4.2	-4.9	-3.4	0.36	-3.9	-4.3	-2.9	0.49	-4.1	-4.9	-3.7	0.31
Konica Minolta CM-5 colour, L*	93.20	92.65	93.74	0.37	93.62	93.57	93.67	0.07	93.54	92.87	93.82	0.24	93.42	92.96	93.54	0.19	93.51	92.59	94.05	0.28
Konica Minolta CM-5 colour, b*	10.65	10.13	12.34	0.58	9.27	9.22	9.31	0.06	10.45	9.78	12.10	0.53	9.57	9.02	9.84	0.32	9.91	9.26	10.77	0.33
Wet gluten, % (14 % mb)	32.9	24.5	37.5	4.47	24.5	23.9	25.0	0.78	27.3	24.4	32.6	1.88	27.8	25.2	29.6	2.00	29.2	24.4	36.6	3.09
Dry gluten, % (14 % mb)	11.5	8.5	13.1	1.57	8.4	8.2	8.5	0.21	9.3	8.3	11.0	0.65	9.8	9.0	10.4	0.58	10.2	8.3	12.8	1.11
Gluten Index	97	92	100	2.12	100	99	100	0.71	98	95	100	1.33	98	96	99	1.04	98	96	99	1.03
Farinogram																				
Water absorption, % (14% mb)	60.8	54.2	64.7	3.82	56.9	55.7	58.1	1.70	55.8	53.7	59.1	1.28	57.1	56.4	57.4	0.43	56.6	54.5	62.7	1.92
Development time, min	6.6	2.2	9.2	2.29	1.5	1.5	1.5	0.00	3.2	1.7	6.8	1.15	2.4	1.9	3.2	0.45	3.1	1.7	6.7	1.27
Stability, mm	13.4	10.9	15.8	1.50	2.9	2.6	3.1	0.35	8.8	4.8	14.5	2.09	10.1	8.5	11.5	1.13	13.5	9.7	18.1	2.05
Alveogram																				
Strength, cm^2	49.3	32.0	56.4	9.17	32.1	31.0	33.2	1.56	34.6	26.8	44.6	4.16	37.1	32.3	41.0	2.73	40.3	34.7	51.4	4.24
Stability, mm	95	74	113	12.98	95	82	108	18.38	77	68	87	5.21	86	79	105	8.71	81	71	105	8.52
Distensibility, mm	105	87	130	12.31	66	48	83	24.75	99	77	120	12.05	94	64	118	18.97	107	84	141	14.75
P/L	0.91	0.68	1.13	0.14	1.62	0.99	2.25	0.89	0.78	0.59	0.96	0.11	0.97	0.68	1.64	0.32	0.77	0.52	1.11	0.17
Extensogram																				
Strength, cm^2	112	91	138	13.11	79	76	82	4.24	90	66	105	10.35	95	90	102	3.83	104	91	126	9.76
Max. height, BU	390	330	436	29.31	374	361	387	18.38	359	298	471	37.13	371	339	414	22.33	394	353	484	24.58
Extensibility, mm	211	168	237	25.14	156	144	167	16.26	180	153	209	12.56	186	169	200	12.67	193	170	235	15.39
Mixogram																				
Water absorption, % (14% mb)	62.6	59.8	64.4	1.55	59.5	59.3	59.7	0.28	60.1	59.2	61.5	0.63	60.5	59.7	60.9	0.59	61.1	59.4	64.4	1.17
Peak time, min	3.4	2.8	4.0	0.45	4.3	4.2	4.4	0.14	3.5	2.9	4.5	0.43	3.8	3.1	4.6	0.53	4.1	3.0	5.1	0.56
100 g Baking Test																				
Loaf volume, cm^3	1102	948	1212	73.40	922	897	946	34.65	1030	938	1125	54.13	1014	927	1070	64.12	1043	941	1258	63.66
Evaluation	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
Number of samples	*11*				*2*				*31*				*8*				*28*			

Table 8: Summary of the quality results of imported wheat during the 2019/20 season (continue)

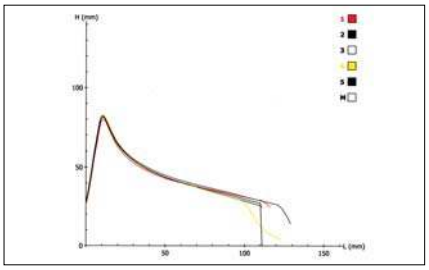
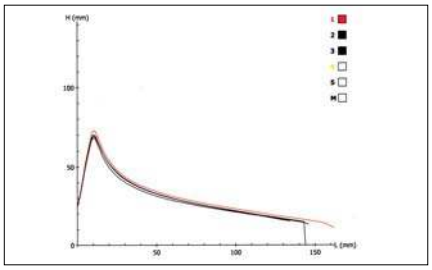
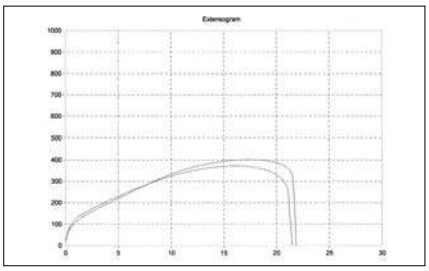
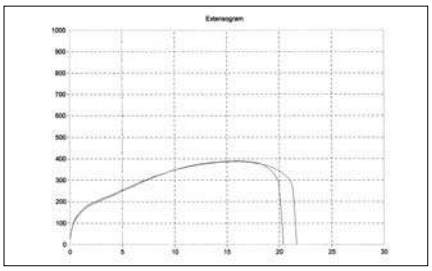
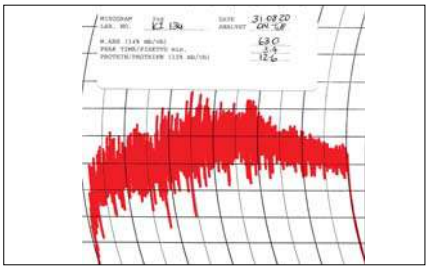
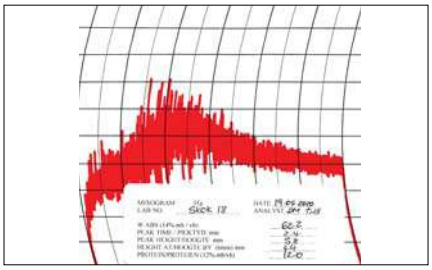
Quality parameter	Poland				Russian Federation				Ukraine				USA				RSA crop average 2019/20			
	Ave	Min	Max	Stdev	Ave	Min	Max	Stdev	Ave	Min	Max	Stdev	Ave	Min	Max	Stdev	Ave	Min	Max	Stdev
Hectolitre mass, kg/hl	77.7	75.1	80.2	1.42	78.9	77.2	80.9	1.04	80.4	78.3	82.5	1.69	78.0	76.4	80.9	1.19	78.9	58.8	85.8	3.80
Screenings (<1.8mm), %	3.59	2.23	4.89	0.67	4.01	1.44	7.52	1.52	4.88	2.16	7.27	2.13	3.87	2.42	6.13	1.21	1.92	0.05	11.87	1.61
1000 Kernel mass, g (13 % mb)	37.2	31.2	40.6	2.19	34.7	29.2	41.1	2.19	40.4	35.0	44.0	3.30	33.0	29.0	37.2	3.03	35.6	23.8	51.8	4.55
WWF Protein (12% mb), %	12.6	12.1	13.2	0.30	11.6	10.7	12.6	0.51	11.7	11.1	12.4	0.62	11.3	9.8	12.8	1.31	12.9	9.3	17.6	1.26
WWF Falling number, sec	356	261	485	52.00	401	277	527	77.89	384	315	467	46.82	429	313	718	135.79	353	46	584	95.90
Number of samples	***45***				***48***				***8***				***14***				***333***			
Flour moisture, %	13.9	12.9	14.9	0.41	13.4	11.8	14.2	0.44	13.8	13.1	14.3	0.36	13.9	13.5	14.3	0.27	13.8	12.9	14.4	0.30
Flour Protein, % (12 % mb)	11.3	10.8	12.1	0.31	10.5	9.7	11.5	0.51	10.4	9.6	11.3	0.81	9.9	7.9	11.6	1.59	11.9	9.1	14.4	1.16
Ash, % (db)	0.55	0.48	0.62	0.03	0.60	0.53	0.67	0.03	0.52	0.47	0.56	0.04	0.53	0.46	0.59	0.04	0.64	0.54	0.76	0.04
Colour, KJ (wet)	-4.1	-4.5	-3.6	0.19	-4.2	-4.5	-3.6	0.21	-4.4	-4.5	-4.2	0.08	-4.1	-4.5	-3.1	0.36	-4.7	-5.0	-2.6	0.44
Konica Minolta CM-5 colour, L*	93.33	92.87	93.74	0.22	93.34	92.78	98.32	0.76	93.47	93.17	93.71	0.20	93.79	92.76	94.81	0.76	93.64	92.14	94.30	0.41
Konica Minolta CM-5 colour, b*	10.10	9.64	10.62	0.25	11.55	9.88	12.84	0.77	10.72	10.36	12.10	0.57	9.72	8.69	10.61	0.74	10.32	8.70	12.22	0.65
Wet gluten, % (14 % mb)	29.8	28.0	33.3	1.14	26.2	22.7	30.6	1.99	26.8	24.4	29.0	1.86	24.6	17.8	30.6	5.04	31.1	23.7	39.1	3.37
Dry gluten, % (14 % mb)	10.1	9.5	10.9	0.39	8.9	7.7	10.8	0.65	9.3	8.6	10.0	0.61	8.3	6.1	10.6	1.79	10.6	7.9	13.4	1.25
Gluten Index	96	90	99	2.29	98	86	100	2.07	99	97	100	0.93	97	94	100	1.65	95	79	99	3.64
Farinogram																				
Water absorption, % (14% mb)	55.7	54.4	58.3	0.72	56.3	54.5	58.3	0.85	55.0	53.7	56.2	0.97	53.5	48.8	56.6	3.43	60.2	55.6	67.5	1.99
Development time, min	2.6	1.8	5.3	0.73	3.9	1.7	8.2	2.42	2.5	2.3	2.8	0.15	2.1	1.0	6.9	1.52	5.4	2.2	9.5	1.34
Stability, mm	8.5	6.1	11.1	1.23	10.3	3.0	16.7	3.74	11.7	9.7	13.6	1.16	5.5	1.4	11.8	4.17	8.1	3.3	17.2	2.62
Alveogram																				
Strength, cm^2	36.7	29.1	41.0	2.67	35.3	9.8	45.4	5.43	34.8	30.0	41.6	3.34	29.4	12.8	43.6	12.71	42.6	21.2	66.1	7.85
Stability, mm	72	61	87	5.89	89	48	108	9.91	78	72	89	5.32	69	33	110	29.23	79	39	110	13.57
Distensibility, mm	112	77	140	15.73	76	56	145	16.16	92	70	117	16.18	89	51	129	26.62	143	81	273	35.22
P/L	0.67	0.46	1.08	0.15	1.22	0.50	1.79	0.29	0.88	0.62	1.27	0.20	0.91	0.31	2.16	0.63	0.60	0.14	1.36	0.23
Extensogram																				
Strength, cm^2	94	81	106	5.96	88	2	113	15.35	99	88	109	6.77	87	50	124	28.32	112	69	187	22.70
Max. height, BU	368	316	418	23.91	401	41	476	60.94	422	401	458	18.05	393	281	533	95.63	383	242	552	58.04
Extensibility, mm	184	171	205	7.60	159	32	204	22.12	174	153	188	10.58	155	122	184	22.84	211	150	300	23.72
Mixogram																				
Water absorption, % (14% mb)	61.3	60.7	62.3	0.40	60.4	59.5	61.5	0.61	60.3	59.4	61.3	0.91	59.9	58.0	61.7	1.60	62.1	59.0	65.6	1.47
Peak time, min	3.9	3.1	4.8	0.39	4.5	2.8	6.3	0.63	4.3	4.1	4.6	0.17	5.2	3.8	6.8	0.98	2.6	1.4	4.5	0.44
100 g Baking Test																				
Loaf volume, cm^3	1075	970	1161	35.59	987	724	1122	72.51	1035	871	1161	104.04	969	801	1094	103.77	1130	880	1298	91.33
Evaluation	0	0	0	0.00	0	0	5	0.72	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
Number of samples	***45***				***48***				***8***				***14***				***69***			

2019/20 Imported Wheat Quality - Canada (29 Sep 2019 to 27 Sep 2020)

2019/20 Imported Wheat Quality Versus 2019/20 RSA Wheat Quality

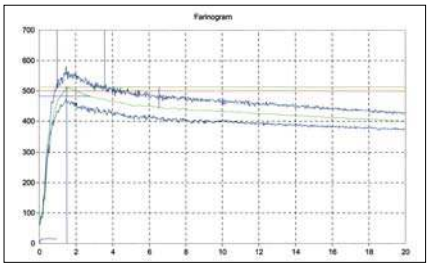
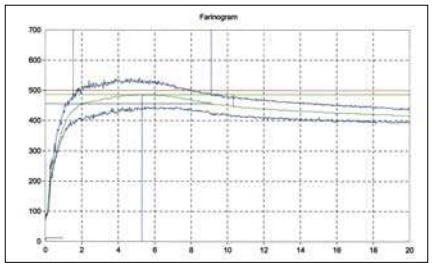
Country of origin	Canada Average						RSA Crop Average					
Class and Grade bread wheat	**Super**	**B1**	**B2**	**B3**	**COW**	**Average**	**Super**	**B1**	**B2**	**B3**	**COW**	**Average**
No. of samples	*6*	*-*	*-*	*-*	*5*	*11*	*132*	*56*	*25*	*15*	*105*	*333*
WHEAT												
GRADING												
Protein (12% mb), %	13.9	-	-	-	12.6	13.3	13.5	12.0	11.1	12.4	13.2	12.9
Moisture, %	11.5	-	-	-	12.4	11.9	10.3	10.1	10.1	10.2	10.3	10.2
Falling number, sec	414	-	-	-	361	390	382	387	355	370	295	353
1000 Kernel mass (13% mb), g	36.2	-	-	-	39.4	37.7	36.1	38.7	37.8	33.3	33.2	35.6
Hlm (dirty), kg/hl	83.6	-	-	-	82.4	83.0	80.0	81.3	80.6	77.1	75.9	78.9
Screenings (<1.8 mm sieve), %	1.96	-	-	-	4.02	2.90	1.31	1.27	1.21	1.56	3.26	1.92
Gravel, stones, turf and glass, %	0.00	-	-	-	0.00	0.00	0.01	0.01	0.00	0.00	0.01	0.01
Foreign matter, %	0.15	-	-	-	0.13	0.14	0.10	0.09	0.08	0.06	0.25	0.14
Other grain & unthreshed ears, %	0.11	-	-	-	1.13	0.57	0.29	0.28	0.32	0.32	0.65	0.41
Heat damaged kernels, %	0.01	-	-	-	0.02	0.01	0.00	0.00	0.01	0.01	0.08	0.03
Immature kernels, %	0.04	-	-	-	0.02	0.03	0.07	0.05	0.05	0.01	0.09	0.07
Insect damaged kernels, %	0.08	-	-	-	0.10	0.09	0.27	0.27	0.18	0.14	0.44	0.31
Sprouted kernels, %	0.00	-	-	-	0.19	0.09	0.04	0.03	0.09	0.11	3.17	1.03
Total damaged kernels, %	0.13	-	-	-	0.32	0.22	0.38	0.34	0.34	0.28	3.77	1.44
Combined deviations, %	2.35	-	-	-	5.60	3.83	2.08	1.98	1.95	2.22	7.93	3.91
Heavily frost damaged kernels, %	0.02	-	-	-	1.25	0.58	0.03	0.01	0.00	0.00	0.01	0.02
Field fungi, %	1.18	-	-	-	0.08	0.68	0.11	0.15	0.14	0.07	0.60	0.27
Storage fungi, %	0.10	-	-	-	0.07	0.08	0.00	0.00	0.00	0.00	0.01	0.00
Ergot, %	0.00	-	-	-	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00
Poisonous seeds (*Crotalaria spp., etc.*)	0	-	-	-	0	0	0	0	0	0	0	0
Poisonous seeds (*Argemone mexicana, etc.*)	0	-	-	-	0	0	0	0	0	0	0	0
Live insects	No	-	-	-	No	No	No	No	No	No	No	No
Undesirable odour	No	-	-	-	No	No	No	No	No	No	No	No
	Super	**B1**	**B2**	**B3**	**COW**	**Average**	**Super**	**B1**	**B2**	**B3**	**COW**	**Average**
No. of samples	*6*	*-*	*-*	*-*	*5*	*11*	*25*	*13*	*9*	*4*	*18*	*69*
Bühler Extraction, %	74.3	-	-	-	72.3	73.4	74.9	75.7	75.8	74.1	73.7	74.8
FLOUR												
Colour, KJ	-4.7	-	-	-	-4.5	-4.6	-4.7	-4.9	-4.9	-4.9	-4.3	-4.7
Colour, Konica Minolta CM5 (dry)												
L*	93.08	-	-	-	93.33	93.20	93.54	93.81	93.83	93.99	93.48	93.64
a*	0.65	-	-	-	0.52	0.59	0.50	0.46	0.46	0.40	0.44	0.47
b*	10.88	-	-	-	10.38	10.65	10.35	10.22	10.53	10.32	10.26	10.32
Ash (db), %	0.58	-	-	-	0.55	0.56	0.65	0.65	0.63	0.61	0.63	0.64
Protein (12% mb), %	12.8	-	-	-	11.6	12.3	12.7	11.2	10.3	11.2	12.1	11.9
Wet Gluten (14% mb), %	35.0	-	-	-	30.5	32.9	33.6	29.5	26.6	29.2	31.7	31.1
Dry Gluten (14% mb), %	12.1	-	-	-	10.7	11.5	11.5	9.9	8.8	9.9	10.7	10.6
Gluten Index	96	-	-	-	98	97	95	95	96	96	96	95
100 g BAKING TEST												
Baking water absorption, %	63.4	-	-	-	61.7	62.6	63.2	61.1	60.1	61.3	62.3	62.1
Loaf volume, cm³	1143	-	-	-	1053	11.02	1185	1083	1036	1106	1140	1130
Evaluation	0	-	-	-	0	0	0	0	0	0	0	0
FARINOGRAM												
Water absorption (14% mb), %	62.4	-	-	-	59.0	60.8	61.5	60.2	59.0	58.6	59.4	60.2
Development time, min	7.6	-	-	-	5.5	6.6	6.0	5.3	5.4	4.9	4.9	5.4
Stability, mm	14.0	-	-	-	12.7	13.4	8.7	7.5	7.8	8.7	7.7	8.1
Mixing tolerance index, BU	20	-	-	-	24	22	38	41	41	33	48	41
												

2019/20 Imported Wheat Quality Versus 2019/20 RSA Wheat Quality

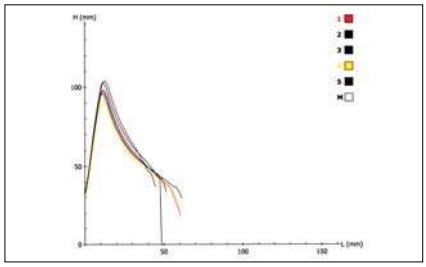
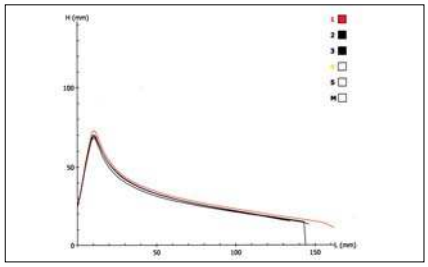
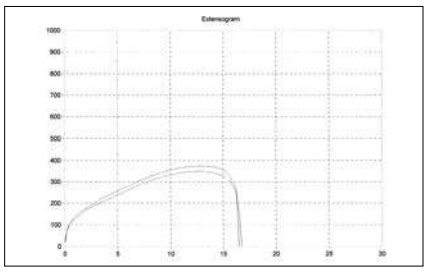
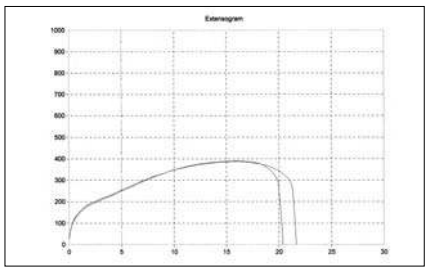
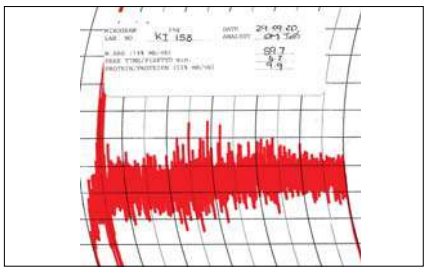
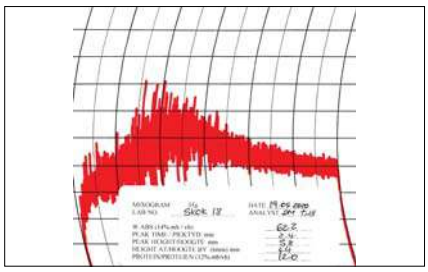
Country of origin	Canada Average						RSA Crop Average					
Class and Grade bread wheat	**Super**	**B1**	**B2**	**B3**	**COW**	**Average**	**Super**	**B1**	**B2**	**B3**	**COW**	**Average**
No. of samples	*6*	*-*	*-*	*-*	*5*	*11*	*25*	*13*	*9*	*4*	*15*	*69*
ALVEOGRAM												
Strength (S), cm²	52.6	-	-	-	45.3	49.3	47.3	39.8	36.8	40.2	41.3	42.6
Stability (P), mm	100	-	-	-	89	95	83	82	80	74	72	79
Distensibility (L), mm	107	-	-	-	103	105	146	127	117	148	163	143
P/L	0.95	-	-	-	0.86	0.91	0.59	0.68	0.73	0.56	0.50	0.60
												
EXTENSOGRAM												
Strength, cm²	118	-	-	-	104	112	121	106	98	105	114	112
Max. height, BU	399	-	-	-	379	390	387	382	375	381	383	383
Extensibility, mm	219	-	-	-	201	211	223	201	190	197	216	211
												
MIXOGRAM												
Peak time, min	3.2	-	-	-	3.6	3.4	2.5	2.7	2.8	2.7	2.7	2.6
Water absorption (14% mb), %	63.4	-	-	-	61.7	62.6	63.2	61.1	60.1	61.3	62.4	62.1
												
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 [141]						<100 [1 017]					
Ochratoxin A (µg/kg)	ND						ND					
Zearalenone (µg/kg)	ND						<20 [29]					
HT-2 (µg/kg)	ND						ND					
T-2 Toxin (µg/kg)	ND						ND					
No. of samples	*5*						*40*					

2019/20 Imported Wheat Quality - Finland (29 Sep 2019 to 27 Sep 2020)

2019/20 Imported Wheat Quality Versus 2019/20 RSA Wheat Quality

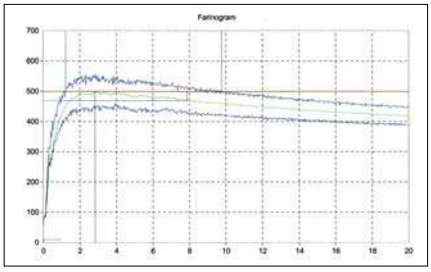
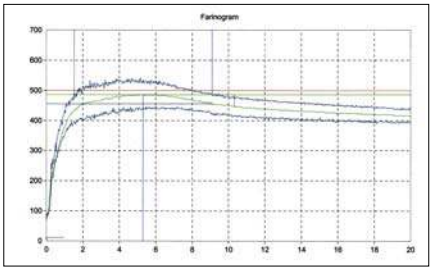
Country of origin	Finland Average						RSA Crop Average					
Class and Grade bread wheat	Super	B1	B2	B3	COW	Average	Super	B1	B2	B3	COW	Average
No. of samples	-	-	*2*	-	-	*2*	*132*	*56*	*25*	*15*	*105*	*333*
WHEAT												
GRADING												
Protein (12% mb), %	-	-	10.9	-	-	10.9	13.5	12.0	11.1	12.4	13.2	12.9
Moisture, %	-	-	11.9	-	-	11.9	10.3	10.1	10.1	10.2	10.3	10.2
Falling number, sec	-	-	344	-	-	344	382	387	355	370	295	353
1000 Kernel mass (13% mb), g	-	-	45.4	-	-	45.4	36.1	38.7	37.8	33.3	33.2	35.6
Hlm (dirty), kg/hl	-	-	83.7	-	-	83.7	80.0	81.3	80.6	77.1	75.9	78.9
Screenings (<1.8 mm sieve), %	-	-	1.10	-	-	1.10	1.31	1.27	1.21	1.56	3.26	1.92
Gravel, stones, turf and glass, %	-	-	0.00	-	-	0.00	0.01	0.01	0.00	0.00	0.01	0.01
Foreign matter, %	-	-	0.00	-	-	0.00	0.10	0.09	0.08	0.06	0.25	0.14
Other grain & unthreshed ears, %	-	-	0.33	-	-	0.33	0.29	0.28	0.32	0.32	0.65	0.41
Heat damaged kernels, %	-	-	0.00	-	-	0.00	0.00	0.00	0.01	0.01	0.08	0.03
Immature kernels, %	-	-	0.00	-	-	0.00	0.07	0.05	0.05	0.01	0.09	0.07
Insect damaged kernels, %	-	-	0.15	-	-	0.15	0.27	0.27	0.18	0.14	0.44	0.31
Sprouted kernels, %	-	-	0.00	-	-	0.00	0.04	0.03	0.09	0.11	3.17	1.03
Total damaged kernels, %	-	-	0.15	-	-	0.15	0.38	0.34	0.34	0.28	3.77	1.44
Combined deviations, %	-	-	1.58	-	-	1.58	2.08	1.98	1.95	2.22	7.93	3.91
Heavily frost damaged kernels, %	-	-	0.00	-	-	0.00	0.03	0.01	0.00	0.00	0.01	0.02
Field fungi, %	-	-	1.04	-	-	1.04	0.11	0.15	0.14	0.07	0.60	0.27
Storage fungi, %	-	-	0.16	-	-	0.16	0.00	0.00	0.00	0.00	0.01	0.00
Ergot, %	-	-	0.00	-	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Poisonous seeds (*Crotalaria spp., etc.*)	-	-	0	-	-	0	0	0	0	0	0	0
Poisonous seeds (*Argemone mexicana, 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
	Super	B1	B2	B3	COW	Average	Super	B1	B2	B3	COW	Average
No. of samples	-	-	*2*	-	-	*2*	*25*	*13*	*9*	*4*	*18*	*69*
Bühler Extraction, %	-	-	76.5	-	-	76.5	74.9	75.7	75.8	74.1	73.7	74.8
FLOUR												
Colour, KJ	-	-	-4.8	-	-	-4.8	-4.7	-4.9	-4.9	-4.9	-4.3	-4.7
Colour, Konica Minolta CM5 (dry)												
L*	-	-	93.62	-	-	93.62	93.54	93.81	93.83	93.99	93.48	93.64
a*	-	-	0.53	-	-	0.53	0.50	0.46	0.46	0.40	0.44	0.47
b*	-	-	9.27	-	-	9.27	10.35	10.22	10.53	10.32	10.26	10.32
Ash (db), %	-	-	0.52	-	-	0.52	0.65	0.65	0.63	0.61	0.63	0.64
Protein (12% mb), %	-	-	9.7	-	-	9.7	12.7	11.2	10.3	11.2	12.1	11.9
Wet Gluten (14% mb), %	-	-	24.5	-	-	24.5	33.6	29.5	26.6	29.2	31.7	31.1
Dry Gluten (14% mb), %	-	-	8.4	-	-	8.4	11.5	9.9	8.8	9.9	10.7	10.6
Gluten Index	-	-	100	-	-	100	95	95	96	96	96	95
100 g BAKING TEST												
Baking water absorption, %	-	-	59.5	-	-	59.5	63.2	61.1	60.1	61.3	62.3	62.1
Loaf volume, cm³	-	-	922	-	-	922	1185	1083	1036	1106	1140	1130
Evaluation	-	-	0	-	-	0	0	0	0	0	0	0
FARINOGRAM												
Water absorption (14% mb), %	-	-	56.9	-	-	56.9	61.5	60.2	59.0	58.6	59.4	60.2
Development time, min	-	-	1.5	-	-	1.5	6.0	5.3	5.4	4.9	4.9	5.4
Stability, mm	-	-	2.9	-	-	2.9	8.7	7.5	7.8	8.7	7.7	8.1
Mixing tolerance index, BU	-	-	62	-	-	62	38	41	41	33	48	41
												

2019/20 Imported Wheat Quality Versus 2019/20 RSA Wheat Quality

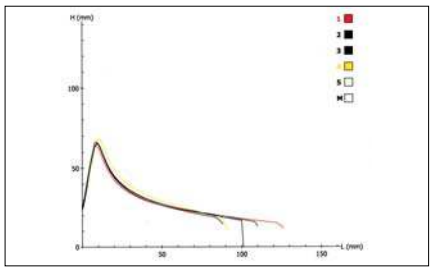
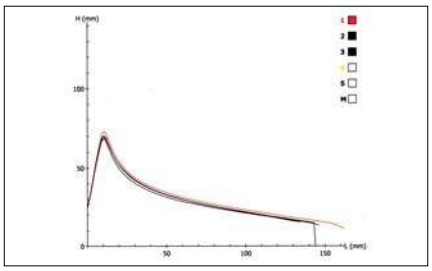
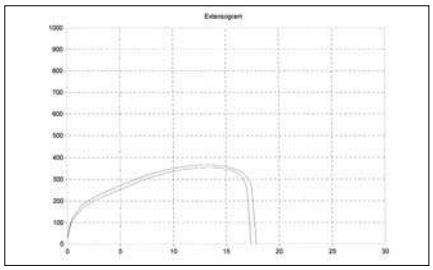
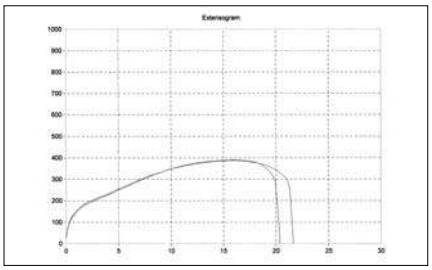
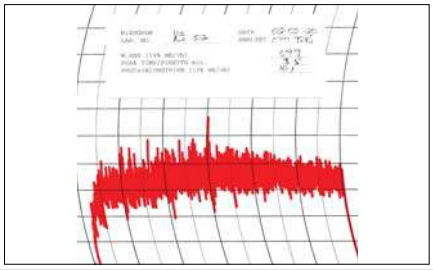
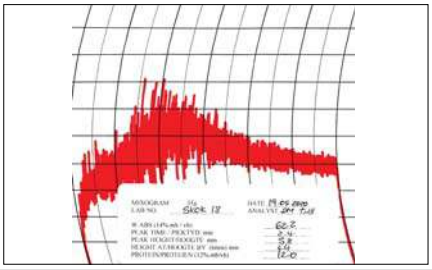
Country of origin	Finland Average						RSA Crop Average					
Class and Grade bread wheat	**Super**	**B1**	**B2**	**B3**	**COW**	**Average**	**Super**	**B1**	**B2**	**B3**	**COW**	**Average**
No. of samples	*-*	*-*	*2*	*-*	*-*	*2*	*25*	*13*	*9*	*4*	*15*	*69*
ALVEOGRAM												
Strength (S), cm²	-	-	32.1	-	-	32.1	47.3	39.8	36.8	40.2	41.3	42.6
Stability (P), mm	-	-	95	-	-	95	83	82	80	74	72	79
Distensibility (L), mm	-	-	66	-	-	66	146	127	117	148	163	143
P/L	-	-	1.62	-	-	1.62	0.59	0.68	0.73	0.56	0.50	0.60
												
EXTENSOGRAM												
Strength, cm²	-	-	79	-	-	79	121	106	98	105	114	112
Max. height, BU	-	-	374	-	-	374	387	382	375	381	383	383
Extensibility, mm	-	-	156	-	-	156	223	201	190	197	216	211
												
MIXOGRAM												
Peak time, min	-	-	4.3	-	-	4.3	2.5	2.7	2.8	2.7	2.7	2.6
Water absorption (14% mb), %	-	-	59.5	-	-	59.5	63.2	61.1	60.1	61.3	62.4	62.1
												
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						<100 [1 017]					
Ochratoxin A (µg/kg)	ND						ND					
Zearalenone (µg/kg)	ND						<20 [29]					
HT-2 (µg/kg)	ND						ND					
T-2 Toxin (µg/kg)	ND						ND					
No. of samples	*1*						*40*					

2019/20 Imported Wheat Quality - Germany (29 Sep 2019 to 27 Sep 2020)

2019/20 Imported Wheat Quality Versus 2019/20 RSA Wheat Quality

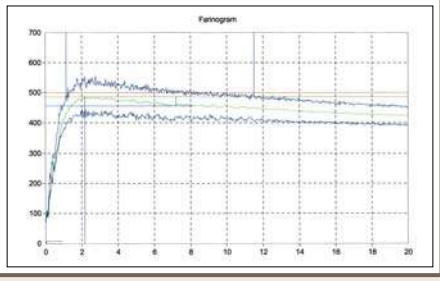
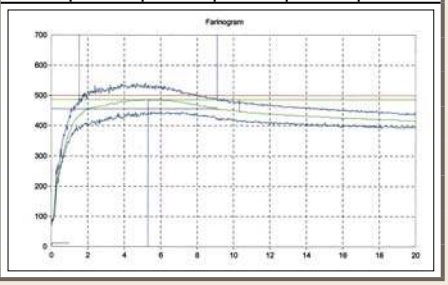
Country of origin	Germany Average						RSA Crop Average					
Class and Grade bread wheat	Super	B1	B2	B3	COW	Average	Super	B1	B2	B3	COW	Average
No. of samples	-	*7*	-	-	*24*	*31*	*132*	*56*	*25*	*15*	*105*	*333*
WHEAT												
GRADING												
Protein (12% mb), %	-	11.9	-	-	11.4	11.5	13.5	12.0	11.1	12.4	13.2	12.9
Moisture, %	-	11.4	-	-	11.6	11.5	10.3	10.1	10.1	10.2	10.3	10.2
Falling number, sec	-	364	-	-	387	382	382	387	355	370	295	353
1000 Kernel mass (13% mb), g	-	41.3	-	-	41.4	41.4	36.1	38.7	37.8	33.3	33.2	35.6
Hlm (dirty), kg/hl	-	80.7	-	-	79.7	79.9	80.0	81.3	80.6	77.1	75.9	78.9
Screenings (<1.8 mm sieve), %	-	2.34	-	-	2.18	2.22	1.31	1.27	1.21	1.56	3.26	1.92
Gravel, stones, turf and glass, %	-	0.00	-	-	0.00	0.00	0.01	0.01	0.00	0.00	0.01	0.01
Foreign matter, %	-	0.05	-	-	0.15	0.13	0.10	0.09	0.08	0.06	0.25	0.14
Other grain & unthreshed ears, %	-	0.39	-	-	1.29	1.08	0.29	0.28	0.32	0.32	0.65	0.41
Heat damaged kernels, %	-	0.16	-	-	0.07	0.09	0.00	0.00	0.01	0.01	0.08	0.03
Immature kernels, %	-	0.01	-	-	0.00	0.00	0.07	0.05	0.05	0.01	0.09	0.07
Insect damaged kernels, %	-	0.11	-	-	0.06	0.07	0.27	0.27	0.18	0.14	0.44	0.31
Sprouted kernels, %	-	0.01	-	-	0.04	0.04	0.04	0.03	0.09	0.11	3.17	1.03
Total damaged kernels, %	-	0.29	-	-	0.18	0.20	0.38	0.34	0.34	0.28	3.77	1.44
Combined deviations, %	-	3.07	-	-	3.78	3.62	2.08	1.98	1.95	2.22	7.93	3.91
Heavily frost damaged kernels, %	-	0.00	-	-	0.04	0.03	0.03	0.01	0.00	0.00	0.01	0.02
Field fungi, %	-	0.49	-	-	1.16	1.01	0.11	0.15	0.14	0.07	0.60	0.27
Storage fungi, %	-	0.00	-	-	0.08	0.06	0.00	0.00	0.00	0.00	0.01	0.00
Ergot, %	-	0.00	-	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Poisonous seeds (*Crotalaria spp., etc.*)	-	0	-	-	0	0	0	0	0	0	0	0
Poisonous seeds (*Argemone mexicana, etc.*)	-	0	-	-	0	0	0	0	0	0	0	0
Live insects	-	No	-	-	No	No	No	No	No	No	No	No
Undesirable odour	-	No	-	-	No	No	No	No	No	No	No	No
	Super	B1	B2	B3	COW	Average	Super	B1	B2	B3	COW	Average
No. of samples	-	*7*	-	-	*24*	*31*	*25*	*13*	*9*	*4*	*18*	*69*
Bühler Extraction, %	-	76.3	-	-	75.7	75.9	74.9	75.7	75.8	74.1	73.7	74.8
FLOUR												
Colour, KJ	-	-4.4	-	-	-4.2	-4.2	-4.7	-4.9	-4.9	-4.9	-4.3	-4.7
Colour, Konica Minolta CM5 (dry)												
L*	-	93.63	-	-	93.51	93.54	93.54	93.81	93.83	93.99	93.48	93.64
a*	-	0.53	-	-	0.48	0.49	0.50	0.46	0.46	0.40	0.44	0.47
b*	-	10.47	-	-	10.44	10.45	10.35	10.22	10.53	10.32	10.26	10.32
Ash (db), %	-	0.53	-	-	0.52	0.53	0.65	0.65	0.63	0.61	0.63	0.64
Protein (12% mb), %	-	10.7	-	-	10.1	10.2	12.7	11.2	10.3	11.2	12.1	11.9
Wet Gluten (14% mb), %	-	28.6	-	-	26.9	27.3	33.6	29.5	26.6	29.2	31.7	31.1
Dry Gluten (14% mb), %	-	9.7	-	-	9.2	9.3	11.5	9.9	8.8	9.9	10.7	10.6
Gluten Index	-	98	-	-	98	98	95	95	96	96	96	95
100 g BAKING TEST												
Baking water absorption, %	-	60.5	-	-	60.0	60.1	63.2	61.1	60.1	61.3	62.3	62.1
Loaf volume, cm³	-	1048	-	-	1025	1030	1185	1083	1036	1106	1140	1130
Evaluation	-	0	-	-	0	0	0	0	0	0	0	0
FARINOGRAM												
Water absorption (14% mb), %	-	56.7	-	-	55.5	55.8	61.5	60.2	59.0	58.6	59.4	60.2
Development time, min	-	3.7	-	-	3.0	3.2	6.0	5.3	5.4	4.9	4.9	5.4
Stability, mm	-	8.9	-	-	8.7	8.8	8.7	7.5	7.8	8.7	7.7	8.1
Mixing tolerance index, BU	-	27	-	-	30	30	38	41	41	33	48	41
												

2019/20 Imported Wheat Quality Versus 2019/20 RSA Wheat Quality

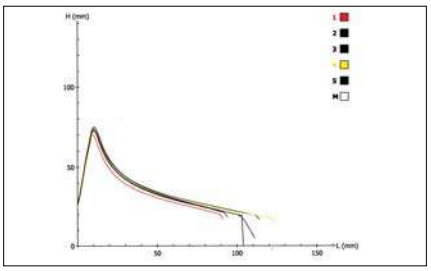
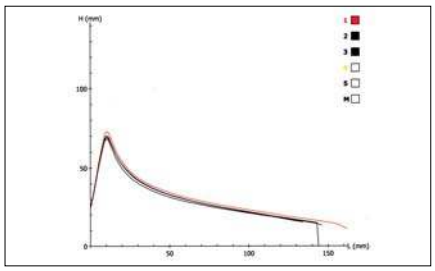
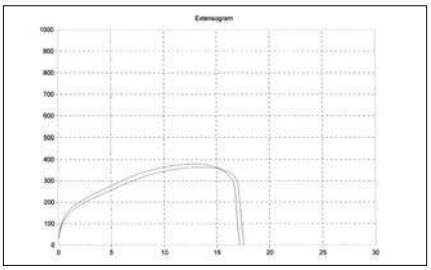
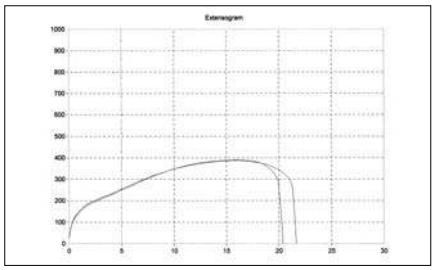
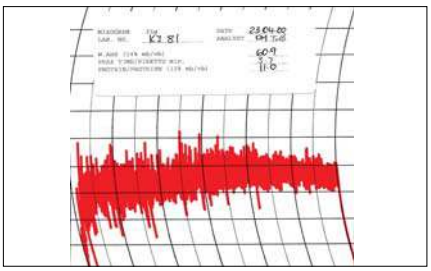
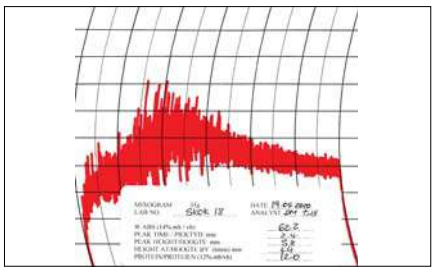
Country of origin	Germany Average						RSA Crop Average					
Class and Grade bread wheat	Super	B1	B2	B3	COW	Average	Super	B1	B2	B3	COW	Average
No. of samples	-	*7*	-	-	*24*	*31*	*25*	*13*	*9*	*4*	*15*	*69*
ALVEOGRAM												
Strength (S), cm²	-	36.4	-	-	34.0	34.6	47.3	39.8	36.8	40.2	41.3	42.6
Stability (P), mm	-	81	-	-	76	77	83	82	80	74	72	79
Distensibility (L), mm	-	97	-	-	100	99	146	127	117	148	163	143
P/L	-	0.84	-	-	0.77	0.78	0.59	0.68	0.73	0.56	0.50	0.60
												
EXTENSOGRAM												
Strength, cm²	-	91	-	-	90	90	121	106	98	105	114	112
Max. height, BU	-	357	-	-	359	359	387	382	375	381	383	383
Extensibility, mm	-	183	-	-	179	180	223	201	190	197	216	211
												
MIXOGRAM												
Peak time, min	-	3.3	-	-	3.6	3.5	2.5	2.7	2.8	2.7	2.7	2.6
Water absorption (14% mb), %	-	60.5	-	-	60.0	60.1	63.2	61.1	60.1	61.3	62.4	62.1
												
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]						<100 [1 017]					
Ochratoxin A (µg/kg)	ND						ND					
Zearalenone (µg/kg)	ND						<20 [29]					
HT-2 (µg/kg)	ND						ND					
T-2 Toxin (µg/kg)	ND						ND					
No. of samples	*9*						*40*					

2019/20 Imported Wheat Quality - Latvia (29 Sep 2019 to 27 Sep 2020)

2019/20 Imported Wheat Quality Versus 2019/20 RSA Wheat Quality

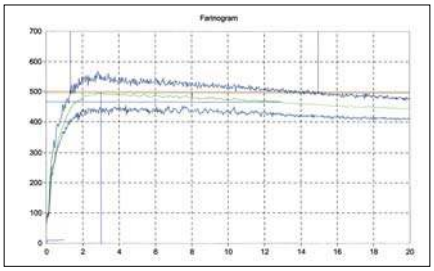
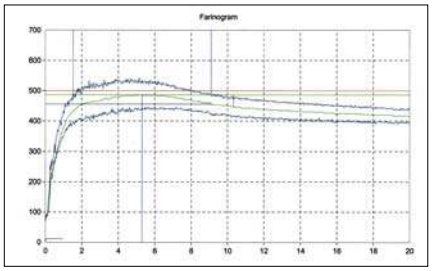
Country of origin	Latvia Average						RSA Crop Average					
Class and Grade bread wheat	**Super**	**B1**	**B2**	**B3**	**COW**	**Average**	**Super**	**B1**	**B2**	**B3**	**COW**	**Average**
No. of samples	*-*	*-*	*2*	*1*	*5*	*8*	*132*	*56*	*25*	*15*	*105*	*333*
WHEAT												
GRADING												
Protein (12% mb), %	-	-	11.1	11.5	12.1	11.8	13.5	12.0	11.1	12.4	13.2	12.9
Moisture, %	-	-	11.9	11.5	12.0	11.9	10.3	10.1	10.1	10.2	10.3	10.2
Falling number, sec	-	-	298	311	374	347	382	387	355	370	295	353
1000 Kernel mass (13% mb), g	-	-	42.2	42.7	43.3	42.9	36.1	38.7	37.8	33.3	33.2	35.6
Hlm (dirty), kg/hl	-	-	78.0	75.8	80.1	79.0	80.0	81.3	80.6	77.1	75.9	78.9
Screenings (<1.8 mm sieve), %	-	-	1.87	1.81	1.73	1.78	1.31	1.27	1.21	1.56	3.26	1.92
Gravel, stones, turf and glass, %	-	-	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.01	0.01
Foreign matter, %	-	-	0.09	0.12	0.00	0.04	0.10	0.09	0.08	0.06	0.25	0.14
Other grain & unthreshed ears, %	-	-	0.53	0.32	0.10	0.24	0.29	0.28	0.32	0.32	0.65	0.41
Heat damaged kernels, %	-	-	0.41	0.32	0.34	0.36	0.00	0.00	0.01	0.01	0.08	0.03
Immature kernels, %	-	-	0.00	0.00	0.08	0.05	0.07	0.05	0.05	0.01	0.09	0.07
Insect damaged kernels, %	-	-	0.00	0.08	0.04	0.04	0.27	0.27	0.18	0.14	0.44	0.31
Sprouted kernels, %	-	-	0.20	0.32	0.00	0.09	0.04	0.03	0.09	0.11	3.17	1.03
Total damaged kernels, %	-	-	0.61	0.72	0.47	0.53	0.38	0.34	0.34	0.28	3.77	1.44
Combined deviations, %	-	-	3.10	2.87	2.30	2.57	2.08	1.98	1.95	2.22	7.93	3.91
Heavily frost damaged kernels, %	-	-	0.04	0.00	0.00	0.01	0.03	0.01	0.00	0.00	0.01	0.02
Field fungi, %	-	-	0.20	0.42	3.16	2.08	0.11	0.15	0.14	0.07	0.60	0.27
Storage fungi, %	-	-	0.00	0.00	0.46	0.29	0.00	0.00	0.00	0.00	0.01	0.00
Ergot, %	-	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Poisonous seeds (*Crotalaria spp., etc.*)	-	-	0	0	0	0	0	0	0	0	0	0
Poisonous seeds (*Argemone mexicana, 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
	Super	**B1**	**B2**	**B3**	**COW**	**Average**	**Super**	**B1**	**B2**	**B3**	**COW**	**Average**
No. of samples	*-*	*-*	*2*	*1*	*5*	*8*	*25*	*13*	*9*	*4*	*18*	*69*
Bühler Extraction, %	-	-	74.7	73.9	76.2	75.5	74.9	75.7	75.8	74.1	73.7	74.8
FLOUR												
Colour, KJ	-	-	-3.7	-2.9	-4.2	-3.9	-4.7	-4.9	-4.9	-4.9	-4.3	-4.7
Colour, Konica Minolta CM5 (dry)												
L*	-	-	93.52	92.96	93.47	93.42	93.54	93.81	93.83	93.99	93.48	93.64
a*	-	-	0.42	0.26	0.54	0.48	0.50	0.46	0.46	0.40	0.44	0.47
b*	-	-	9.28	9.02	9.80	9.57	10.35	10.22	10.53	10.32	10.26	10.32
Ash (db), %	-	-	0.57	0.61	0.52	0.54	0.65	0.65	0.63	0.61	0.63	0.64
Protein (12% mb), %	-	-	9.9	10.1	11.0	10.6	12.7	11.2	10.3	11.2	12.1	11.9
Wet Gluten (14% mb), %	-	-	25.3	25.7	29.2	27.8	33.6	29.5	26.6	29.2	31.7	31.1
Dry Gluten (14% mb), %	-	-	9.0	9.4	10.2	9.8	11.5	9.9	8.8	9.9	10.7	10.6
Gluten Index	-	-	99	98	97	98	95	95	96	96	96	95
100 g BAKING TEST												
Baking water absorption, %	-	-	59.7	59.9	60.9	60.5	63.2	61.1	60.1	61.3	62.3	62.1
Loaf volume, cm³	-	-	929	955	1060	1014	1185	1083	1036	1106	1140	1130
Evaluation	-	-	0	0	0	0	0	0	0	0	0	0
FARINOGRAM												
Water absorption (14% mb), %	-	-	56.4	57.4	57.3	57.1	61.5	60.2	59.0	58.6	59.4	60.2
Development time, min	-	-	2.1	1.9	2.6	2.4	6.0	5.3	5.4	4.9	4.9	5.4
Stability, mm	-	-	9.9	9.4	10.3	10.1	8.7	7.5	7.8	8.7	7.7	8.1
Mixing tolerance index, BU	-	-	31	33	28	29	38	41	41	33	48	41
												

2019/20 Imported Wheat Quality Versus 2019/20 RSA Wheat Quality

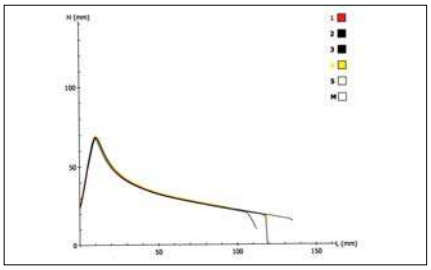
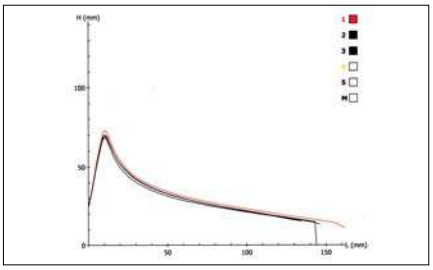
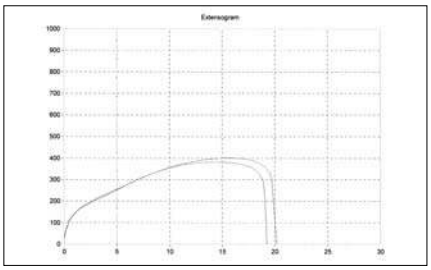
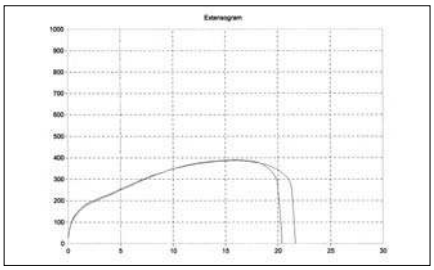
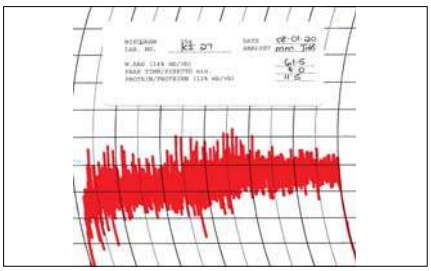
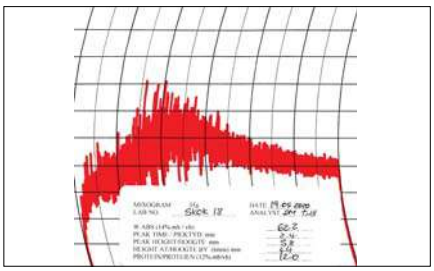
Country of origin	Latvia Average						RSA Crop Average					
Class and Grade bread wheat	Super	B1	B2	B3	COW	Average	Super	B1	B2	B3	COW	Average
No. of samples	-	-	2	1	5	8	25	13	9	4	15	69
ALVEOGRAM												
Strength (S), cm²	-	-	34.1	36.7	38.4	37.1	47.3	39.8	36.8	40.2	41.3	42.6
Stability (P), mm	-	-	89	105	81	86	83	82	80	74	72	79
Distensibility (L), mm	-	-	79	64	106	94	146	127	117	148	163	143
P/L	-	-	1.12	1.64	0.77	0.97	0.59	0.68	0.73	0.56	0.50	0.60
												
EXTENSOGRAM												
Strength, cm²	-	-	91	97	96	95	121	106	98	105	114	112
Max. height, BU	-	-	379	414	360	371	387	382	375	381	383	383
Extensibility, mm	-	-	174	169	195	186	223	201	190	197	216	211
												
MIXOGRAM												
Peak time, min	-	-	4.2	4.6	3.4	3.8	2.5	2.7	2.8	2.7	2.7	2.6
Water absorption (14% mb), %	-	-	59.7	59.9	60.9	60.5	63.2	61.1	60.1	61.3	62.4	62.1
												
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]						<100 [1 017]					
Ochratoxin A (µg/kg)	ND						ND					
Zearalenone (µg/kg)	ND						<20 [29]					
HT-2 (µg/kg)	ND						ND					
T-2 Toxin (µg/kg)	ND						ND					
No. of samples	2						40					

2019/20 Imported Wheat Quality - Lithuania (29 Sep 2019 to 27 Sep 2020)

2019/20 Imported Wheat Quality Versus 2019/20 RSA Wheat Quality

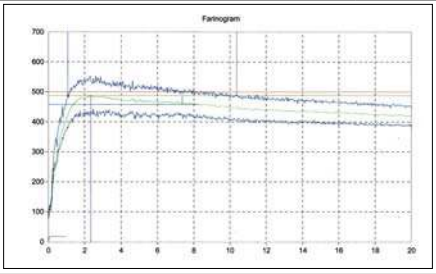
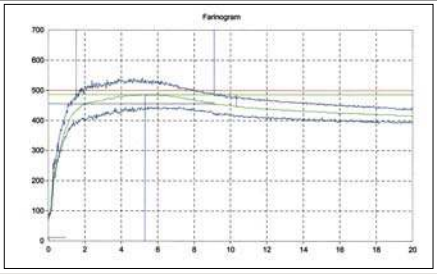
Country of origin	Lithuania Average						RSA Crop Average					
Class and Grade bread wheat	Super	B1	B2	B3	COW	Average	Super	B1	B2	B3	COW	Average
No. of samples	*11*	*8*	*6*	*-*	*3*	*28*	*132*	*56*	*25*	*15*	*105*	*333*
WHEAT												
GRADING												
Protein (12% mb), %	13.1	12.1	11.1	-	11.6	12.2	13.5	12.0	11.1	12.4	13.2	12.9
Moisture, %	12.2	11.9	11.7	-	11.6	12.0	10.3	10.1	10.1	10.2	10.3	10.2
Falling number, sec	349	343	352	-	395	353	382	387	355	370	295	353
1000 Kernel mass (13% mb), g	39.3	41.6	41.5	-	40.6	40.6	36.1	38.7	37.8	33.3	33.2	35.6
Hlm (dirty), kg/hl	78.9	78.2	79.6	-	77.8	78.7	80.0	81.3	80.6	77.1	75.9	78.9
Screenings (<1.8 mm sieve), %	2.13	2.24	1.87	-	1.93	2.09	1.31	1.27	1.21	1.56	3.26	1.92
Gravel, stones, turf and glass, %	0.00	0.00	0.00	-	0.00	0.00	0.01	0.01	0.00	0.00	0.01	0.01
Foreign matter, %	0.14	0.31	0.09	-	0.08	0.17	0.10	0.09	0.08	0.06	0.25	0.14
Other grain & unthreshed ears, %	0.61	0.38	0.32	-	1.04	0.53	0.29	0.28	0.32	0.32	0.65	0.41
Heat damaged kernels, %	0.03	0.02	0.00	-	0.00	0.02	0.00	0.00	0.01	0.01	0.08	0.03
Immature kernels, %	0.02	0.02	0.06	-	0.03	0.03	0.07	0.05	0.05	0.01	0.09	0.07
Insect damaged kernels, %	0.02	0.07	0.05	-	0.11	0.05	0.27	0.27	0.18	0.14	0.44	0.31
Sprouted kernels, %	0.06	0.08	0.03	-	0.11	0.06	0.04	0.03	0.09	0.11	3.17	1.03
Total damaged kernels, %	0.13	0.19	0.13	-	0.24	0.16	0.38	0.34	0.34	0.28	3.77	1.44
Combined deviations, %	3.02	3.11	2.42	-	3.29	2.94	2.08	1.98	1.95	2.22	7.93	3.91
Heavily frost damaged kernels, %	0.34	0.00	0.00	-	0.00	0.13	0.03	0.01	0.00	0.00	0.01	0.02
Field fungi, %	0.16	0.14	0.05	-	0.11	0.13	0.11	0.15	0.14	0.07	0.60	0.27
Storage fungi, %	0.06	0.08	0.03	-	0.03	0.05	0.00	0.00	0.00	0.00	0.01	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 (*Crotalaria spp., etc.*)	0	0	0	-	0	0	0	0	0	0	0	0
Poisonous seeds (*Argemone mexicana, 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	-	Yes	No	No	No	No	No	No	No
	Super	B1	B2	B3	COW	Average	Super	B1	B2	B3	COW	Average
No. of samples	*11*	*8*	*6*	*-*	*3*	*28*	*25*	*13*	*9*	*4*	*18*	*69*
Bühler Extraction, %	74.7	73.4	76.0	-	75.8	74.7	74.9	75.7	75.8	74.1	73.7	74.8
FLOUR												
Colour, KJ	-4.2	-4.0	-4.1	-	-4.0	-4.1	-4.7	-4.9	-4.9	-4.9	-4.3	-4.7
Colour, Konica Minolta CM5 (dry)												
L*	93.45	93.45	93.68	-	93.61	93.51	93.54	93.81	93.83	93.99	93.48	93.64
a*	0.50	0.46	0.42	-	0.38	0.46	0.50	0.46	0.46	0.40	0.44	0.47
b*	9.89	10.08	9.80	-	9.74	9.91	10.35	10.22	10.53	10.32	10.26	10.32
Ash (db), %	0.54	0.54	0.53	-	0.54	0.54	0.65	0.65	0.63	0.61	0.63	0.64
Protein (12% mb), %	11.9	10.9	10.0	-	10.4	11.0	12.7	11.2	10.3	11.2	12.1	11.9
Wet Gluten (14% mb), %	32.0	28.9	25.7	-	26.7	29.2	33.6	29.5	26.6	29.2	31.7	31.1
Dry Gluten (14% mb), %	11.2	10.1	9.0	-	9.4	10.2	11.5	9.9	8.8	9.9	10.7	10.6
Gluten Index	97	98	99	-	98	98	95	95	96	96	96	95
100 g BAKING TEST												
Baking water absorption, %	62.1	60.9	59.9	-	60.3	61.1	63.2	61.1	60.1	61.3	62.3	62.1
Loaf volume, cm³	1092	1040	986	-	987	1043	1185	1083	1036	1106	1140	1130
Evaluation	0	0	0	-	0	0	0	0	0	0	0	0
FARINOGRAM												
Water absorption (14% mb), %	57.4	56.9	55.5	-	55.4	56.6	61.5	60.2	59.0	58.6	59.4	60.2
Development time, min	4.1	2.6	2.2	-	2.5	3.1	6.0	5.3	5.4	4.9	4.9	5.4
Stability, mm	14.3	13.4	12.0	-	14.1	13.5	8.7	7.5	7.8	8.7	7.7	8.1
Mixing tolerance index, BU	16	19	25	-	17	19	38	41	41	33	48	41
												

2019/20 Imported Wheat Quality Versus 2019/20 RSA Wheat Quality

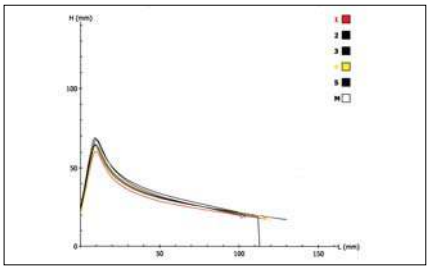
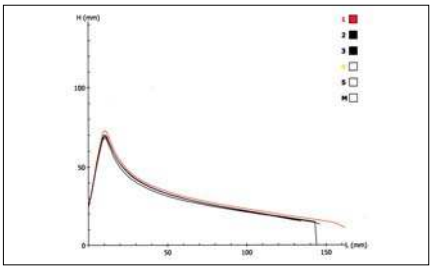
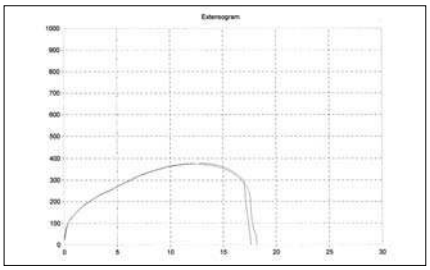
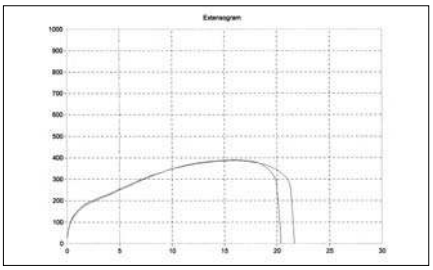
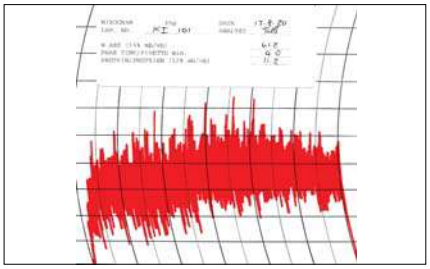
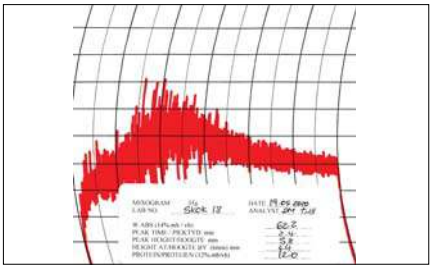
Country of origin	Lithuania Average						RSA Crop Average					
Class and Grade bread wheat	**Super**	**B1**	**B2**	**B3**	**COW**	**Average**	**Super**	**B1**	**B2**	**B3**	**COW**	**Average**
No. of samples	*11*	*8*	*6*	*-*	*3*	*28*	*25*	*13*	*9*	*4*	*15*	*69*
ALVEOGRAM												
Strength (S), cm²	42.6	41.1	37.2	-	36.1	40.3	47.3	39.8	36.8	40.2	41.3	42.6
Stability (P), mm	78	86	81	-	81	81	83	82	80	74	72	79
Distensibility (L), mm	120	100	98	-	95	107	146	127	117	148	163	143
P/L	0.66	0.86	0.83	-	0.87	0.77	0.59	0.68	0.73	0.56	0.50	0.60
												
EXTENSOGRAM												
Strength, cm²	110	100	98	-	101	104	121	106	98	105	114	112
Max. height, BU	398	387	398	-	392	394	387	382	375	381	383	383
Extensibility, mm	204	188	179	-	186	193	223	201	190	197	216	211
												
MIXOGRAM												
Peak time, min	3.8	4.1	4.5	-	4.7	4.1	2.5	2.7	2.8	2.7	2.7	2.6
Water absorption (14% mb), %	62.1	60.8	59.9	-	60.3	61.1	63.2	61.1	60.1	61.3	62.4	62.1
												
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 [279]						<100 [1 017]					
Ochratoxin A (µg/kg)	ND						ND					
Zearalenone (µg/kg)	ND						<20 [29]					
HT-2 (µg/kg)	ND						ND					
T-2 Toxin (µg/kg)	ND						ND					
No. of samples	*9*						*40*					

2019/20 Imported Wheat Quality - Poland (29 Sep 2019 to 27 Sep 2020)

2019/20 Imported Wheat Quality Versus 2019/20 RSA Wheat Quality

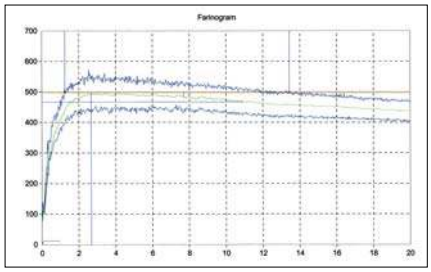
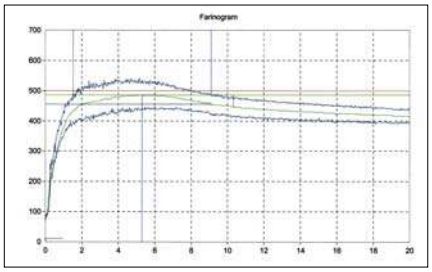
Country of origin	Poland Average						RSA Crop Average					
Class and Grade bread wheat	**Super**	**B1**	**B2**	**B3**	**COW**	**Average**	**Super**	**B1**	**B2**	**B3**	**COW**	**Average**
No. of samples	*4*	*4*	*-*	*1*	*36*	*45*	*132*	*56*	*25*	*15*	*105*	*333*
WHEAT												
GRADING												
Protein (12% mb), %	12.7	12.2	-	12.9	12.6	12.6	13.5	12.0	11.1	12.4	13.2	12.9
Moisture, %	11.8	12.0	-	11.6	11.5	11.6	10.3	10.1	10.1	10.2	10.3	10.2
Falling number, sec	289	384	-	292	362	356	382	387	355	370	295	353
1000 Kernel mass (13% mb), g	39.8	38.9	-	39.6	36.7	37.2	36.1	38.7	37.8	33.3	33.2	35.6
Hlm (dirty), kg/hl	76.9	79.7	-	75.2	77.6	77.7	80.0	81.3	80.6	77.1	75.9	78.9
Screenings (<1.8 mm sieve), %	2.63	2.71	-	2.72	3.81	3.59	1.31	1.27	1.21	1.56	3.26	1.92
Gravel, stones, turf and glass, %	0.00	0.00	-	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.01	0.01
Foreign matter, %	0.12	0.06	-	0.08	0.11	0.10	0.10	0.09	0.08	0.06	0.25	0.14
Other grain & unthreshed ears, %	0.50	0.40	-	0.44	0.52	0.50	0.29	0.28	0.32	0.32	0.65	0.41
Heat damaged kernels, %	0.00	0.00	-	0.00	0.06	0.05	0.00	0.00	0.01	0.01	0.08	0.03
Immature kernels, %	0.02	0.06	-	0.00	0.00	0.01	0.07	0.05	0.05	0.01	0.09	0.07
Insect damaged kernels, %	0.18	0.08	-	0.72	0.10	0.12	0.27	0.27	0.18	0.14	0.44	0.31
Sprouted kernels, %	0.15	0.00	-	0.24	0.07	0.07	0.04	0.03	0.09	0.11	3.17	1.03
Total damaged kernels, %	0.35	0.14	-	0.96	0.23	0.25	0.38	0.34	0.34	0.28	3.77	1.44
Combined deviations, %	3.59	3.31	-	4.20	4.67	4.44	2.08	1.98	1.95	2.22	7.93	3.91
Heavily frost damaged kernels, %	0.10	0.00	-	0.00	0.00	0.01	0.03	0.01	0.00	0.00	0.01	0.02
Field fungi, %	0.10	0.59	-	0.08	0.55	0.50	0.11	0.15	0.14	0.07	0.60	0.27
Storage fungi, %	0.02	0.11	-	0.08	0.02	0.03	0.00	0.00	0.00	0.00	0.01	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 (*Crotalaria spp., etc.*)	0	0	-	0	0	0	0	0	0	0	0	0
Poisonous seeds (*Argemone mexicana, etc.*)	0	0	-	0	0	0	0	0	0	0	0	0
Live insects	No	No	-	No	No	No	No	No	No	No	No	No
Undesirable odour	No	No	-	No	No	No	No	No	No	No	No	No
	Super	**B1**	**B2**	**B3**	**COW**	**Average**	**Super**	**B1**	**B2**	**B3**	**COW**	**Average**
No. of samples	*4*	*4*	*-*	*1*	*36*	*45*	*25*	*13*	*9*	*4*	*18*	*69*
Bühler Extraction, %	75.4	76.4	-	74.7	74.7	74.9	74.9	75.7	75.8	74.1	73.7	74.8
FLOUR												
Colour, KJ	-4.0	-4.3	-	-4.0	-4.2	-4.1	-4.7	-4.9	-4.9	-4.9	-4.3	-4.7
Colour, Konica Minolta CM5 (dry)												
L*	93.14	93.27	-	93.14	93.36	93.33	93.54	93.81	93.83	93.99	93.48	93.64
a*	0.51	0.54	-	0.49	0.53	0.52	0.50	0.46	0.46	0.40	0.44	0.47
b*	9.83	10.3	-	9.71	10.12	10.10	10.35	10.22	10.53	10.32	10.26	10.32
Ash (db), %	0.58	0.54	-	0.57	0.55	0.55	0.65	0.65	0.63	0.61	0.63	0.64
Protein (12% mb), %	11.4	11.1	-	11.2	11.3	11.3	12.7	11.2	10.3	11.2	12.1	11.9
Wet Gluten (14% mb), %	29.8	28.6	-	29.0	29.9	29.8	33.6	29.5	26.6	29.2	31.7	31.1
Dry Gluten (14% mb), %	10.2	9.7	-	10.1	10.2	10.1	11.5	9.9	8.8	9.9	10.7	10.6
Gluten Index	98	98	-	98	96	96	95	95	96	96	96	95
100 g BAKING TEST												
Baking water absorption, %	61.4	61.0	-	61.2	61.2	61.2	63.2	61.1	60.1	61.3	62.3	62.1
Loaf volume, cm^3	1081	1045	-	1068	1078	1075	1185	1083	1036	1106	1140	1130
Evaluation	0	0	-	0	0	0	0	0	0	0	0	0
FARINOGRAM												
Water absorption (14% mb), %	55.5	55.6	-	55.7	55.7	55.7	61.5	60.2	59.0	58.6	59.4	60.2
Development time, min	2.5	2.3	-	2.5	2.7	2.6	6.0	5.3	5.4	4.9	4.9	5.4
Stability, mm	8.2	7.7	-	8.1	8.6	8.5	8.7	7.5	7.8	8.7	7.7	8.1
Mixing tolerance index, BU	30	36	-	31	30	30	38	41	41	33	48	41
												

2019/20 Imported Wheat Quality Versus 2019/20 RSA Wheat Quality

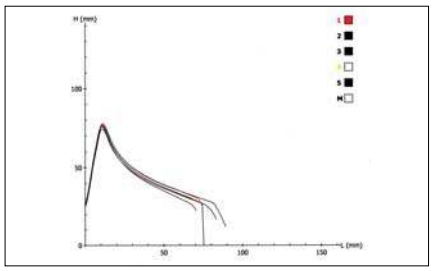
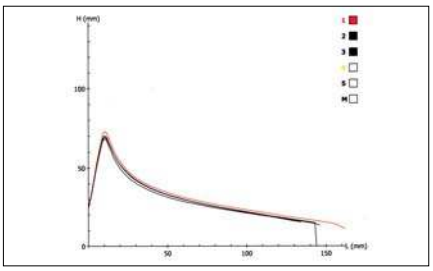
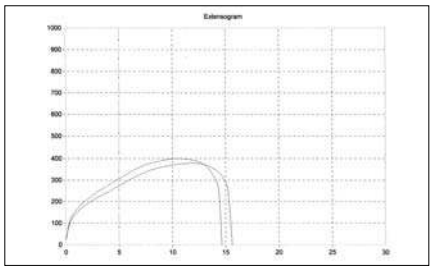
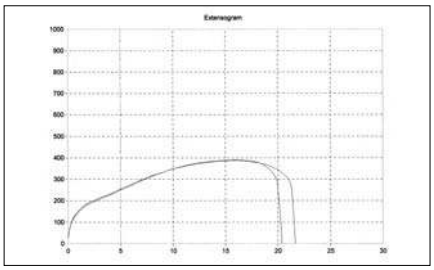
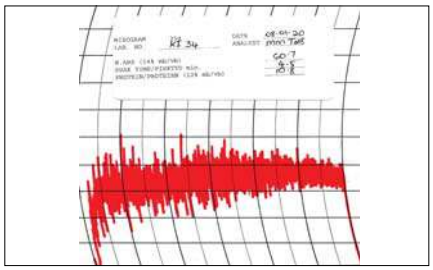
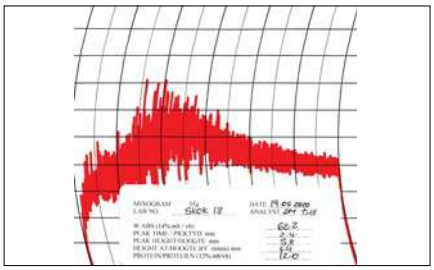
Country of origin	Poland Average						RSA Crop Average					
Class and Grade bread wheat	Super	B1	B2	B3	COW	Average	Super	B1	B2	B3	COW	Average
No. of samples	*4*	*4*	*-*	*1*	*36*	*45*	*25*	*13*	*9*	*4*	*15*	*69*
ALVEOGRAM												
Strength (S), cm²	34.3	37.9	-	39.6	36.7	36.7	47.3	39.8	36.8	40.2	41.3	42.6
Stability (P), mm	70	77	-	70	72	72	83	82	80	74	72	79
Distensibility (L), mm	107	105	-	134	113	112	146	127	117	148	163	143
P/L	0.67	0.75	-	0.52	0.66	0.67	0.59	0.68	0.73	0.56	0.50	0.60
												
EXTENSOGRAM												
Strength, cm²	95	95	-	94	94	94	121	106	98	105	114	112
Max. height, BU	368	373	-	369	368	368	387	382	375	381	383	383
Extensibility, mm	188	184	-	187	184	184	223	201	190	197	216	211
												
MIXOGRAM												
Peak time, min	4.0	4.1	-	4.1	3.9	3.9	2.5	2.7	2.8	2.7	2.7	2.6
Water absorption (14% mb), %	61.4	61.0	-	61.2	61.3	61.3	63.2	61.1	60.1	61.3	62.4	62.1
												
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]	156 [488]						<100 [1 017]					
Ochratoxin A (µg/kg)	ND						ND					
Zearalenone (µg/kg)	ND						<20 [29]					
HT-2 (µg/kg)	ND						ND					
T-2 Toxin (µg/kg)	ND						ND					
No. of samples	*13*						*40*					

2019/20 Imported Wheat Quality - Russia (29 Sep 2019 to 27 Sep 2020)

2019/20 Imported Wheat Quality Versus 2019/20 RSA Wheat Quality

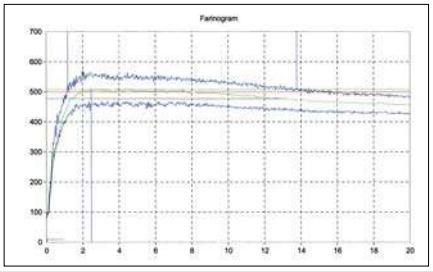
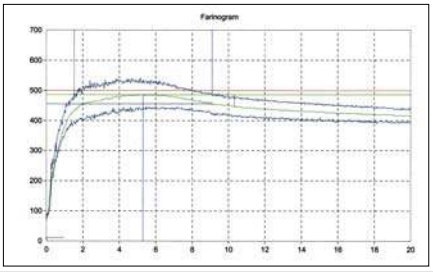
Country of origin	Russian Federation Average						RSA Crop Average					
Class and Grade bread wheat	Super	B1	B2	B3	COW	Average	Super	B1	B2	B3	COW	Average
No. of samples	*2*	*5*	*7*	*-*	*34*	*48*	*132*	*56*	*25*	*15*	*105*	*333*
WHEAT												
GRADING												
Protein (12% mb), %	12.6	11.6	11.0	-	11.6	11.6	13.5	12.0	11.1	12.4	13.2	12.9
Moisture, %	11.6	11.3	10.9	-	10.7	10.8	10.3	10.1	10.1	10.2	10.3	10.2
Falling number, sec	411	417	367	-	405	401	382	387	355	370	295	353
1000 Kernel mass (13% mb), g	39.3	36.3	35.8	-	33.9	34.7	36.1	38.7	37.8	33.3	33.2	35.6
Hlm (dirty), kg/hl	79.9	79.6	79.2	-	78.7	78.9	80.0	81.3	80.6	77.1	75.9	78.9
Screenings (<1.8 mm sieve), %	1.89	2.69	2.34	-	4.67	4.01	1.31	1.27	1.21	1.56	3.26	1.92
Gravel, stones, turf and glass, %	0.00	0.00	0.00	-	0.00	0.00	0.01	0.01	0.00	0.00	0.01	0.01
Foreign matter, %	0.07	0.17	0.27	-	0.23	0.22	0.10	0.09	0.08	0.06	0.25	0.14
Other grain & unthreshed ears, %	0.19	0.38	0.46	-	0.37	0.37	0.29	0.28	0.32	0.32	0.65	0.41
Heat damaged kernels, %	0.22	0.04	0.22	-	0.04	0.08	0.00	0.00	0.01	0.01	0.08	0.03
Immature kernels, %	0.03	0.00	0.00	-	0.02	0.01	0.07	0.05	0.05	0.01	0.09	0.07
Insect damaged kernels, %	0.08	0.06	0.22	-	0.23	0.21	0.27	0.27	0.18	0.14	0.44	0.31
Sprouted kernels, %	0.04	0.00	0.03	-	0.07	0.05	0.04	0.03	0.09	0.11	3.17	1.03
Total damaged kernels, %	0.37	0.09	0.47	-	0.36	0.35	0.38	0.34	0.34	0.28	3.77	1.44
Combined deviations, %	2.52	3.33	3.54	-	5.62	4.95	2.08	1.98	1.95	2.22	7.93	3.91
Heavily frost damaged kernels, %	0.00	0.17	0.00	-	0.07	0.07	0.03	0.01	0.00	0.00	0.01	0.02
Field fungi, %	0.56	0.59	1.14	-	0.35	0.50	0.11	0.15	0.14	0.07	0.60	0.27
Storage fungi, %	0.01	0.00	0.13	-	0.01	0.03	0.00	0.00	0.00	0.00	0.01	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 (*Crotalaria spp., etc.*)	0	0	0	-	0	0	0	0	0	0	0	0
Poisonous seeds (*Argemone mexicana, etc.*)	0	1	2	-	8	6	0	0	0	0	0	0
Live insects	No	No	No	-	No	No	No	No	No	No	No	No
Undesirable odour	No	No	No	-	No	No	No	No	No	No	No	No
	Super	B1	B2	B3	COW	Average	Super	B1	B2	B3	COW	Average
No. of samples	*2*	*5*	*7*	*-*	*34*	*48*	*25*	*13*	*9*	*4*	*18*	*69*
Bühler Extraction, %	76.1	74.4	73.0	-	73.8	73.8	74.9	75.7	75.8	74.1	73.7	74.8
FLOUR												
Colour, KJ	-4.4	-4.2	-4.3	-	-4.1	-4.2	-4.7	-4.9	-4.9	-4.9	-4.3	-4.7
Colour, Konica Minolta CM5 (dry)												
L*	93.47	93.22	94.05	-	93.20	93.34	93.54	93.81	93.83	93.99	93.48	93.64
a*	0.55	0.51	0.49	-	0.50	0.50	0.50	0.46	0.46	0.40	0.44	0.47
b*	10.12	11.73	11.56	-	11.61	11.55	10.35	10.22	10.53	10.32	10.26	10.32
Ash (db), %	0.53	0.60	0.60	-	0.60	0.60	0.65	0.65	0.63	0.61	0.63	0.64
Protein (12% mb), %	11.4	10.6	9.9	-	10.6	10.5	12.7	11.2	10.3	11.2	12.1	11.9
Wet Gluten (14% mb), %	30.5	25.5	24.2	-	26.4	26.2	33.6	29.5	26.6	29.2	31.7	31.1
Dry Gluten (14% mb), %	10.7	8.5	8.3	-	9.0	8.9	11.5	9.9	8.8	9.9	10.7	10.6
Gluten Index	98	98	98	-	98	98	95	95	96	96	96	95
100 g BAKING TEST												
Baking water absorption, %	61.4	60.5	59.7	-	60.5	60.4	63.2	61.1	60.1	61.3	62.3	62.1
Loaf volume, cm^3	1114	1034	968	-	976	987	1185	1083	1036	1106	1140	1130
Evaluation	0	0	0	-	0	0	0	0	0	0	0	0
FARINOGRAM												
Water absorption (14% mb), %	56.3	57.1	56.1	-	56.2	56.3	61.5	60.2	59.0	58.6	59.4	60.2
Development time, min	4.1	3.9	2.1	-	4.3	3.9	6.0	5.3	5.4	4.9	4.9	5.4
Stability, mm	11.6	12.6	8.3	-	10.3	10.3	8.7	7.5	7.8	8.7	7.7	8.1
Mixing tolerance index, BU	22	17	29	-	27	26	38	41	41	33	48	41
												

2019/20 Imported Wheat Quality Versus 2019/20 RSA Wheat Quality

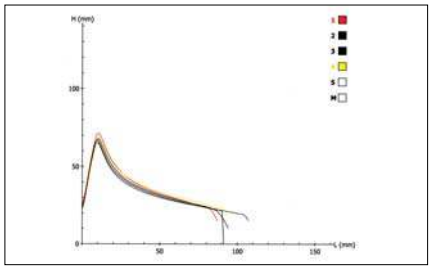
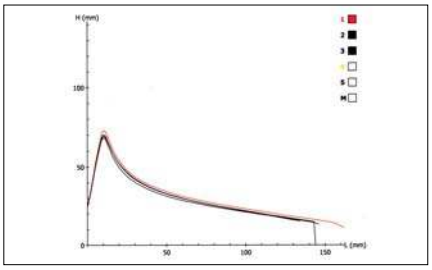
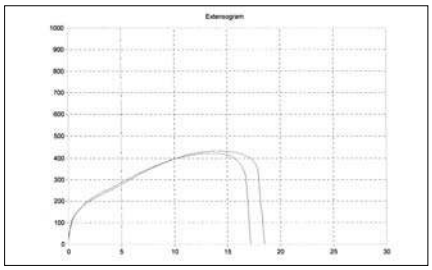
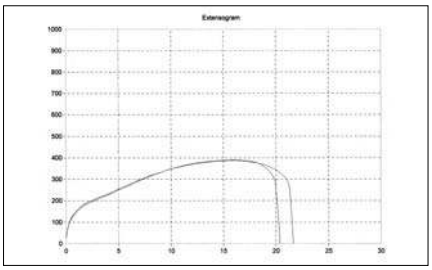
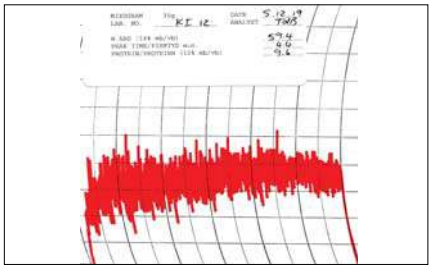
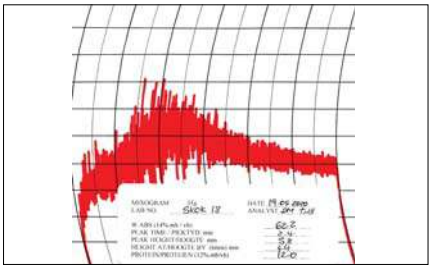
Country of origin	Russian Federation Average						RSA Crop Average					
Class and Grade bread wheat	Super	B1	B2	B3	COW	Average	Super	B1	B2	B3	COW	Average
No. of samples	*2*	*5*	*7*	*-*	*34*	*48*	*25*	*13*	*9*	*4*	*15*	*69*
ALVEOGRAM												
Strength (S), cm²	41.2	38.0	33.0	-	35.0	35.3	47.3	39.8	36.8	40.2	41.3	42.6
Stability (P), mm	75	101	93	-	87	89	83	82	80	74	72	79
Distensibility (L), mm	125	69	64	-	76	76	146	127	117	148	163	143
P/L	0.61	1.46	1.46	-	1.18	1.22	0.59	0.68	0.73	0.56	0.50	0.60
												
EXTENSOGRAM												
Strength, cm²	107	89	85	-	87	88	121	106	98	105	114	112
Max. height, BU	380	421	411	-	398	401	387	382	375	381	383	383
Extensibility, mm	203	155	152	-	158	159	223	201	190	197	216	211
												
MIXOGRAM												
Peak time, min	3.6	4.5	4.6	-	4.5	4.5	2.5	2.7	2.8	2.7	2.7	2.6
Water absorption (14% mb), %	61.4	60.5	59.7	-	60.5	60.4	63.2	61.1	60.1	61.3	62.4	62.1
												
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 [1 017]						<100 [1 017]					
Ochratoxin A (µg/kg)	ND						ND					
Zearalenone (µg/kg)	ND						<20 [29]					
HT-2 (µg/kg)	ND						ND					
T-2 Toxin (µg/kg)	ND						ND					
No. of samples	*15*						*40*					

2019/20 Imported Wheat Quality - Ukraine (29 Sep 2019 to 27 Sep 2020)

2019/20 Imported Wheat Quality Versus 2019/20 RSA Wheat Quality

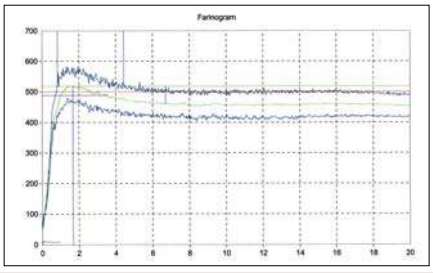
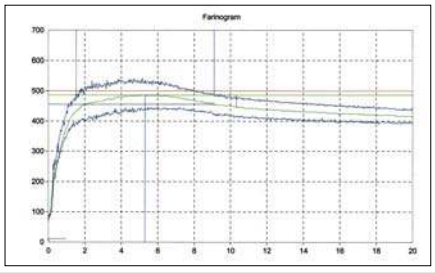
Country of origin	Ukraine Average						RSA Crop Average					
Class and Grade bread wheat	Super	B1	B2	B3	COW	Average	Super	B1	B2	B3	COW	Average
No. of samples	-	*3*	-	-	*5*	*8*	*132*	*56*	*25*	*15*	*105*	*333*
WHEAT												
GRADING												
Protein (12% mb), %	-	12.4	-	-	11.3	11.7	13.5	12.0	11.1	12.4	13.2	12.9
Moisture, %	-	12.1	-	-	11.4	11.7	10.3	10.1	10.1	10.2	10.3	10.2
Falling number, sec	-	348	-	-	406	384	382	387	355	370	295	353
1000 Kernel mass (13% mb), g	-	38.3	-	-	41.6	40.4	36.1	38.7	37.8	33.3	33.2	35.6
Hlm (dirty), kg/hl	-	79.6	-	-	80.9	80.4	80.0	81.3	80.6	77.1	75.9	78.9
Screenings (<1.8 mm sieve), %	-	2.39	-	-	6.37	4.88	1.31	1.27	1.21	1.56	3.26	1.92
Gravel, stones, turf and glass, %	-	0.00	-	-	0.00	0.00	0.01	0.01	0.00	0.00	0.01	0.01
Foreign matter, %	-	0.14	-	-	0.14	0.14	0.10	0.09	0.08	0.06	0.25	0.14
Other grain & unthreshed ears, %	-	0.41	-	-	1.28	0.95	0.29	0.28	0.32	0.32	0.65	0.41
Heat damaged kernels, %	-	0.05	-	-	0.05	0.05	0.00	0.00	0.01	0.01	0.08	0.03
Immature kernels, %	-	0.07	-	-	0.00	0.03	0.07	0.05	0.05	0.01	0.09	0.07
Insect damaged kernels, %	-	0.15	-	-	0.00	0.06	0.27	0.27	0.18	0.14	0.44	0.31
Sprouted kernels, %	-	0.00	-	-	0.00	0.00	0.04	0.03	0.09	0.11	3.17	1.03
Total damaged kernels, %	-	0.27	-	-	0.05	0.13	0.38	0.34	0.34	0.28	3.77	1.44
Combined deviations, %	-	3.21	-	-	7.84	6.10	2.08	1.98	1.95	2.22	7.93	3.91
Heavily frost damaged kernels, %	-	0.00	-	-	0.00	0.00	0.03	0.01	0.00	0.00	0.01	0.02
Field fungi, %	-	0.27	-	-	0.06	0.14	0.11	0.15	0.14	0.07	0.60	0.27
Storage fungi, %	-	0.03	-	-	0.00	0.01	0.00	0.00	0.00	0.00	0.01	0.00
Ergot, %	-	0.00	-	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Poisonous seeds (*Crotalaria spp., etc.*)	-	0	-	-	0	0	0	0	0	0	0	0
Poisonous seeds (*Argemone mexicana, etc.*)	-	0	-	-	0	0	0	0	0	0	0	0
Live insects	-	No	-	-	No	No	No	No	No	No	No	No
Undesirable odour	-	No	-	-	No	No	No	No	No	No	No	No
	Super	B1	B2	B3	COW	Average	Super	B1	B2	B3	COW	Average
No. of samples	-	*3*	-	-	*5*	*8*	*25*	*13*	*9*	*4*	*18*	*69*
Bühler Extraction, %	-	74.9	-	-	71.9	73.0	74.9	75.7	75.8	74.1	73.7	74.8
FLOUR												
Colour, KJ	-	-4.4	-	-	-4.4	-4.4	-4.7	-4.9	-4.9	-4.9	-4.3	-4.7
Colour, Konica Minolta CM5 (dry)												
L*	-	93.34	-	-	93.55	93.47	93.54	93.81	93.83	93.99	93.48	93.64
a*	-	0.56	-	-	0.47	0.50	0.50	0.46	0.46	0.40	0.44	0.47
b*	-	10.45	-	-	10.88	10.72	10.35	10.22	10.53	10.32	10.26	10.32
Ash (db), %	-	0.56	-	-	0.50	0.52	0.65	0.65	0.63	0.61	0.63	0.64
Protein (12% mb), %	-	11.3	-	-	9.9	10.4	12.7	11.2	10.3	11.2	12.1	11.9
Wet Gluten (14% mb), %	-	28.8	-	-	25.6	26.8	33.6	29.5	26.6	29.2	31.7	31.1
Dry Gluten (14% mb), %	-	10.0	-	-	8.8	9.3	11.5	9.9	8.8	9.9	10.7	10.6
Gluten Index	-	98	-	-	99	99	95	95	96	96	96	95
100 g BAKING TEST												
Baking water absorption, %	-	61.3	-	-	59.7	60.3	63.2	61.1	60.1	61.3	62.3	62.1
Loaf volume, cm³	-	1146	-	-	968	1035	1185	1083	1036	1106	1140	1130
Evaluation	-	0	-	-	0	0	0	0	0	0	0	0
FARINOGRAM												
Water absorption (14% mb), %	-	55.9	-	-	54.4	55.0	61.5	60.2	59.0	58.6	59.4	60.2
Development time, min	-	2.7	-	-	2.5	2.5	6.0	5.3	5.4	4.9	4.9	5.4
Stability, mm	-	12.5	-	-	11.2	11.7	8.7	7.5	7.8	8.7	7.7	8.1
Mixing tolerance index, BU	-	11	-	-	24	19	38	41	41	33	48	41
												

2019/20 Imported Wheat Quality Versus 2019/20 RSA Wheat Quality

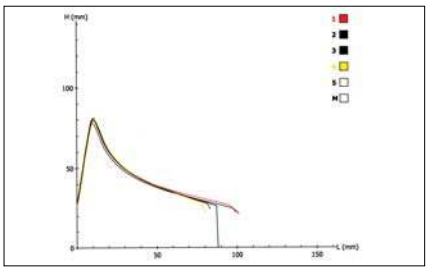
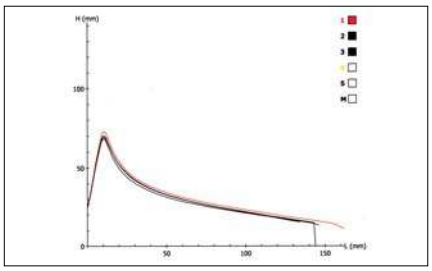
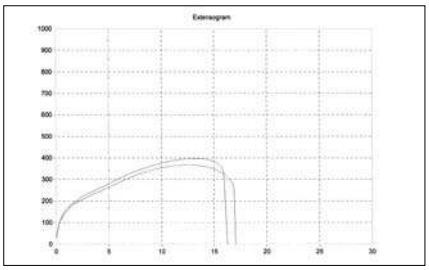
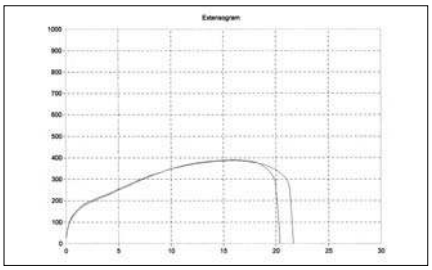
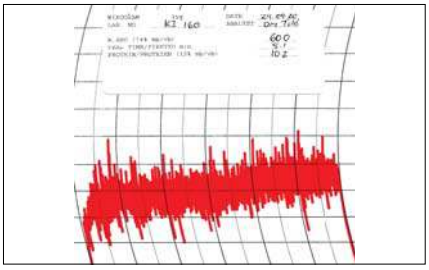
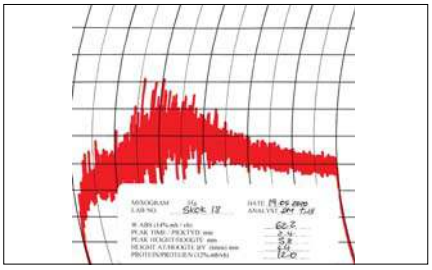
Country of origin	Ukraine Average						RSA Crop Average					
Class and Grade bread wheat	Super	B1	B2	B3	COW	Average	Super	B1	B2	B3	COW	Average
No. of samples	-	*3*	-	-	*5*	*8*	*25*	*13*	*9*	*4*	*15*	*69*
ALVEOGRAM												
Strength (S), cm²	-	36.5	-	-	33.8	34.8	47.3	39.8	36.8	40.2	41.3	42.6
Stability (P), mm	-	78	-	-	77	78	83	82	80	74	72	79
Distensibility (L), mm	-	92	-	-	91	92	146	127	117	148	163	143
P/L	-	0.87	-	-	0.88	0.88	0.59	0.68	0.73	0.56	0.50	0.60
												
EXTENSOGRAM												
Strength, cm²	-	102	-	-	97	99	121	106	98	105	114	112
Max. height, BU	-	424	-	-	420	422	387	382	375	381	383	383
Extensibility, mm	-	180	-	-	170	174	223	201	190	197	216	211
												
MIXOGRAM												
Peak time, min	-	4.3	-	-	4.3	4.3	2.5	2.7	2.8	2.7	2.7	2.6
Water absorption (14% mb), %	-	61.3	-	-	59.7	60.3	63.2	61.1	60.1	61.3	62.4	62.1
												
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]						<100 [1 017]					
Ochratoxin A (µg/kg)	ND						ND					
Zearalenone (µg/kg)	ND						<20 [29]					
HT-2 (µg/kg)	ND						ND					
T-2 Toxin (µg/kg)	ND						ND					
No. of samples	*2*						*40*					

2019/20 Imported Wheat Quality - USA (29 Sep 2019 to 27 Sep 2020)

2019/20 Imported Wheat Quality Versus 2019/20 RSA Wheat Quality

Country of origin	USA Average						RSA Crop Average					
Class and Grade bread wheat	Super	B1	B2	B3	COW	Average	Super	B1	B2	B3	COW	Average
No. of samples	-	-	-	*5*	*9*	*14*	*132*	*56*	*25*	*15*	*105*	*333*
WHEAT												
GRADING												
Protein (12% mb), %	-	-	-	9.8	12.2	11.3	13.5	12.0	11.1	12.4	13.2	12.9
Moisture, %	-	-	-	10.4	11.3	11.0	10.3	10.1	10.1	10.2	10.3	10.2
Falling number, sec	-	-	-	329	484	429	382	387	355	370	295	353
1000 Kernel mass (13% mb), g	-	-	-	30.8	34.2	33.0	36.1	38.7	37.8	33.3	33.2	35.6
Hlm (dirty), kg/hl	-	-	-	77.9	78.1	78.0	80.0	81.3	80.6	77.1	75.9	78.9
Screenings (<1.8 mm sieve), %	-	-	-	2.58	4.58	3.87	1.31	1.27	1.21	1.56	3.26	1.92
Gravel, stones, turf and glass, %	-	-	-	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.01	0.01
Foreign matter, %	-	-	-	0.22	0.18	0.20	0.10	0.09	0.08	0.06	0.25	0.14
Other grain & unthreshed ears, %	-	-	-	0.31	0.84	0.65	0.29	0.28	0.32	0.32	0.65	0.41
Heat damaged kernels, %	-	-	-	0.14	0.04	0.07	0.00	0.00	0.01	0.01	0.08	0.03
Immature kernels, %	-	-	-	0.00	0.02	0.01	0.07	0.05	0.05	0.01	0.09	0.07
Insect damaged kernels, %	-	-	-	0.23	0.86	0.64	0.27	0.27	0.18	0.14	0.44	0.31
Sprouted kernels, %	-	-	-	0.21	0.04	0.10	0.04	0.03	0.09	0.11	3.17	1.03
Total damaged kernels, %	-	-	-	0.58	0.96	0.83	0.38	0.34	0.34	0.28	3.77	1.44
Combined deviations, %	-	-	-	3.70	6.57	5.54	2.08	1.98	1.95	2.22	7.93	3.91
Heavily frost damaged kernels, %	-	-	-	0.00	0.00	0.00	0.03	0.01	0.00	0.00	0.01	0.02
Field fungi, %	-	-	-	0.30	0.79	0.62	0.11	0.15	0.14	0.07	0.60	0.27
Storage fungi, %	-	-	-	0.08	0.00	0.03	0.00	0.00	0.00	0.00	0.01	0.00
Ergot, %	-	-	-	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Poisonous seeds (*Crotalaria spp., etc.*)	-	-	-	0	0	0	0	0	0	0	0	0
Poisonous seeds (*Argemone mexicana, etc.*)	-	-	-	0	1	1	0	0	0	0	0	0
Live insects	-	-	-	No	No	No	No	No	No	No	No	No
Undesirable odour	-	-	-	No	No	No	No	No	No	No	No	No
	Super	B1	B2	B3	COW	Average	Super	B1	B2	B3	COW	Average
No. of samples	-	-	-	*5*	*9*	*14*	*25*	*13*	*9*	*4*	*18*	*69*
Bühler Extraction, %	-	-	-	73.0	74.3	73.9	74.9	75.7	75.8	74.1	73.7	74.8
FLOUR												
Colour, KJ	-	-	-	-4.4	-3.9	-4.1	-4.7	-4.9	-4.9	-4.9	-4.3	-4.7
Colour, Konica Minolta CM5 (dry)												
L*	-	-	-	94.75	93.25	93.79	93.54	93.81	93.83	93.99	93.48	93.64
a*	-	-	-	0.30	0.53	0.45	0.50	0.46	0.46	0.40	0.44	0.47
b*	-	-	-	8.81	10.22	9.72	10.35	10.22	10.53	10.32	10.26	10.32
Ash (db), %	-	-	-	0.48	0.56	0.53	0.65	0.65	0.63	0.61	0.63	0.64
Protein (12% mb), %	-	-	-	8.0	11.0	9.9	12.7	11.2	10.3	11.2	12.1	11.9
Wet Gluten (14% mb), %	-	-	-	19.4	27.9	24.6	33.6	29.5	26.6	29.2	31.7	31.1
Dry Gluten (14% mb), %	-	-	-	6.4	9.6	8.3	11.5	9.9	8.8	9.9	10.7	10.6
Gluten Index	-	-	-	97	97	97	95	95	96	96	96	95
100 g BAKING TEST												
Baking water absorption, %	-	-	-	56.5	61.0	59.4	63.2	61.1	60.1	61.3	62.3	62.1
Loaf volume, cm³	-	-	-	854	1033	969	1185	1083	1036	1106	1140	1130
Evaluation	-	-	-	0	0	0	0	0	0	0	0	0
FARINOGRAM												
Water absorption (14% mb), %	-	-	-	49.1	55.9	53.5	61.5	60.2	59.0	58.6	59.4	60.2
Development time, min	-	-	-	1.0	2.7	2.1	6.0	5.3	5.4	4.9	4.9	5.4
Stability, mm	-	-	-	1.6	7.6	5.5	8.7	7.5	7.8	8.7	7.7	8.1
Mixing tolerance index, BU	-	-	-	99	41	62	38	41	41	33	48	41
												

2019/20 Imported Wheat Quality Versus 2019/20 RSA Wheat Quality

Country of origin	USA Average						RSA Crop Average					
Class and Grade bread wheat	Super	B1	B2	B3	COW	Average	Super	B1	B2	B3	COW	Average
No. of samples	-	-	-	5	9	14	25	13	9	4	15	69
ALVEOGRAM												
Strength (S), cm²	-	-	-	13.6	38.1	29.4	47.3	39.8	36.8	40.2	41.3	42.6
Stability (P), mm	-	-	-	34	89	69	83	82	80	74	72	79
Distensibility (L), mm	-	-	-	91	89	89	146	127	117	148	163	143
P/L	-	-	-	0.38	1.20	0.91	0.59	0.68	0.73	0.56	0.50	0.60
												
EXTENSOGRAM												
Strength, cm²	-	-	-	52	106	87	121	106	98	105	114	112
Max. height, BU	-	-	-	286	452	393	387	382	375	381	383	383
Extensibility, mm	-	-	-	127	170	155	223	201	190	197	216	211
												
MIXOGRAM												
Peak time, min	-	-	-	6.3	4.6	5.2	2.5	2.7	2.8	2.7	2.7	2.6
Water absorption (14% mb), %	-	-	-	58.1	61.0	59.9	63.2	61.1	60.1	61.3	62.4	62.1
												
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]	385 [1 750]						<100 [1 017]					
Ochratoxin A (µg/kg)	ND						ND					
Zearalenone (µg/kg)	<20 [44]						<20 [29]					
HT-2 (µg/kg)	ND						ND					
T-2 Toxin (µg/kg)	ND						ND					
No. of samples	5						40					

CERTIFICATE OF ACCREDITATION

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

SOUTHERN AFRICAN GRAIN LABORATORY NPC

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

Facility Accreditation Number: **T0116**

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

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

CHEMICAL AND PHYSICAL ANALYSIS

The facility is accredited in accordance with the recognised International Standard

ISO/IEC 17025:2017

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

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

Mr R Josias
Chief Executive Officer

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

ANNEXURE A

SCHEDULE OF ACCREDITATION

Facility Number: **T0116**

Permanent Address of Laboratory:

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

Technical Signatories:

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

Postal Address:

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Private Bag X1
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0041

Tel: (012) 807-4019
Fax: N/A
E-mail: hannalien.meyer@sagl.co.za

Nominated Representative:

Mrs H Meyer

Issue No.: 31
Date of Issue: 18 August 2021
Expiry Date: 31 October 2024

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˚C) (2 hour; 130˚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˚C) (72 hour; 103˚C)
Maize Grits	Moisture (Oven Method)	Analytical EBC Method 6.2.2, latest edition (4 hours, 130^0C)
Animal feed, Plant tissue and Sunflower (Milled)	Moisture (Oven Method)	AgriLASA 2.1, Latest Edition (5 hours, 105^0C)
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

Grain based food and feed products (fortified and unfortified) and fortification mixes	Total Sodium (Na) Total Iron (Fe) Total Zinc (Zn)	In-house method 010
Yeast and Bread	Vitamin D_2 (HPLC)	In-House method 029
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)

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Accreditation Manager

Government Gazette, No. 42862 29 November 2019

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