South African Wheat Crop

QUALITY REPORT
2018/2019 SEASON

Compiled and issued by:
The Southern African Grain Laboratory NPC

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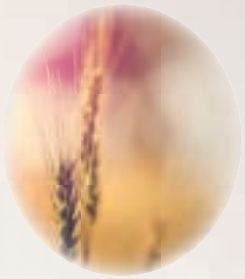
South African
COMMERCIAL WHEAT QUALITY FOR THE 2018/2019 SEASON



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, Forestry and Fisheries (DAFF) 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 2018/2019 season's commercial wheat crop was set at 1 868 000 tons, which is 333 000 tons (21.7%) higher than the previous season's crop. A total area of 503 350 hectares was utilized for wheat production and the average yield was 3.71 tons per hectare (Figures obtained from the CEC).

The whole wheat protein average of 12.1% decreased by 0.5% compared to the previous season. The percentage samples with a protein content exceeding 12.0%, decreased from 63.5% in 2017/2018 to 53.7% this season. This decrease can be attributed to the severe drought conditions experienced in the Western Cape last season that lead to above average protein values being observed. During the 2016/2017 season this percentage was 47.8%. The average hectoliter mass of 81.3 kg/hl was higher than the 80.7 kg/hl of the 2017/2018 season, with only 2% of the samples below the minimum Grade 1 requirement of 77 kg/hl.

The average falling number this season was 397 seconds. Five of the samples analysed gave falling number values below 250 seconds and of these only one was below 220 seconds. The average mixogram peak time of 2.8 minutes compared well with the 2.7 minutes of the previous three seasons. The ten-year average is 2.9 minutes.

Introduction

This report provides the results of the twenty-first 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 at each depot. This composite sample was then divided and a 3 kg sample was forwarded to SAGL for the annual wheat crop quality survey. SAGL received and analysed 337 samples 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. 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 40 samples randomly selected to represent the different production regions. The amino acid profiles of a selection of samples were also determined.

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. Hard copy reports are distributed to all Directly Affected Groups and interested parties and are also available for download in a PDF format from the website.

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 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 2017/2018 (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 January 2016 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.

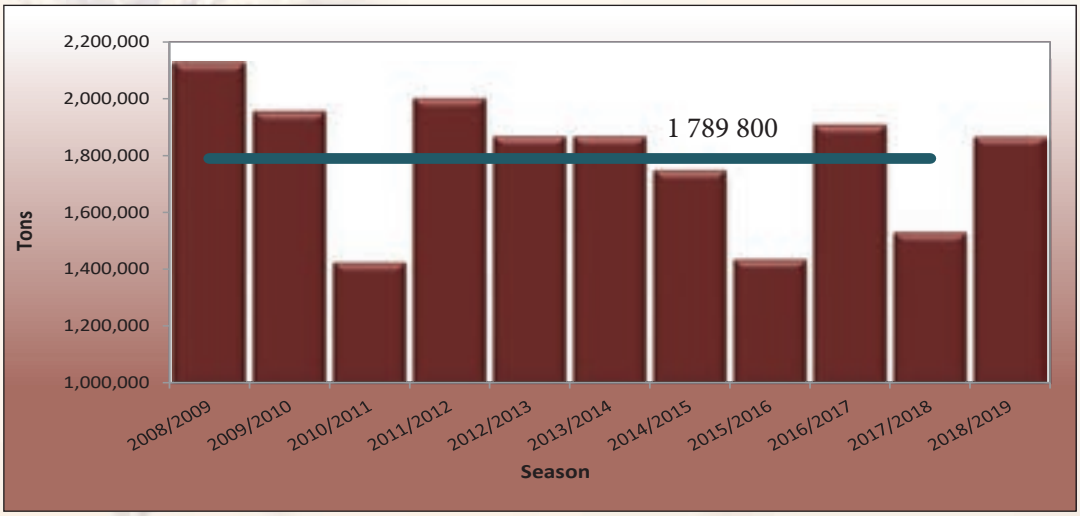
Production

Wheat contributed 78% to the total winter cereal crop production in South Africa this season. Other winter crops produced are malting barley and canola.

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 Provincial map) and Figure 2 (RSA Crop Production Regional map) on pages 30 and 31.

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

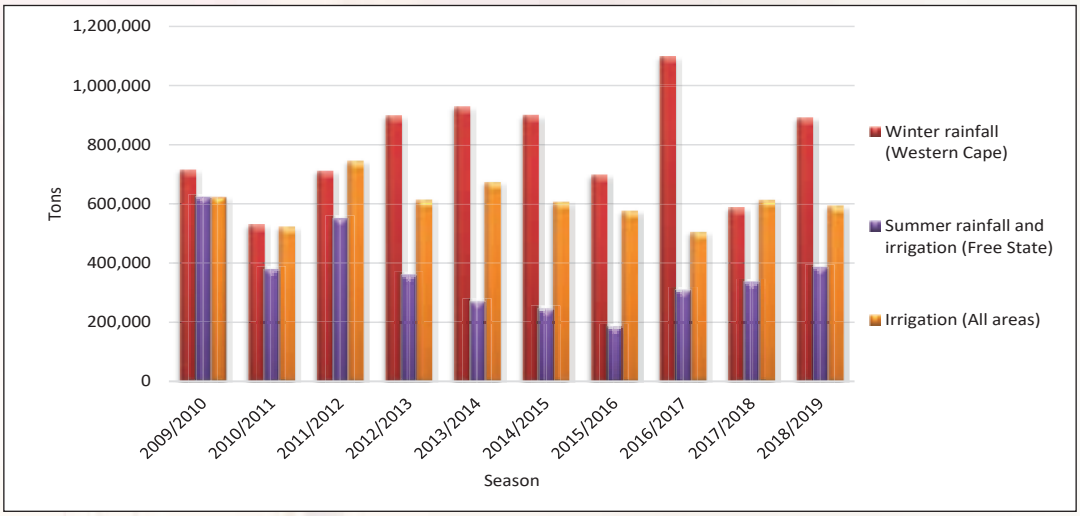
Graph 1: Wheat production in the RSA from the 2008/2009 to 2018/2019 seasons



Figures provided by the CEC.

The final production figure of 1 868 000 tons is 4% higher than the ten-year production average of 1 789 800 tons (2008/2009 to 2017/2018 seasons). The Western Cape produced 890 500 tons of wheat this season, contributing 47.7% of the total crop, compared to the 38.2% of the drought stricken previous season. The Free State's wheat production (385 000 tons) was the highest of the last seven seasons. This figure was also the second highest nationally. The irrigation areas of the Northern Cape, the third largest wheat producing area this season, produced 294 500 tons, 17 150 tons less than last season. The remainder of the wheat was produced mainly in Limpopo with 128 000 tons, representing a decrease of 3% compared to the 2017/2018 season and North West, where production increased by 2% to 85 330 tons. Please see Graphs 1 and 2.

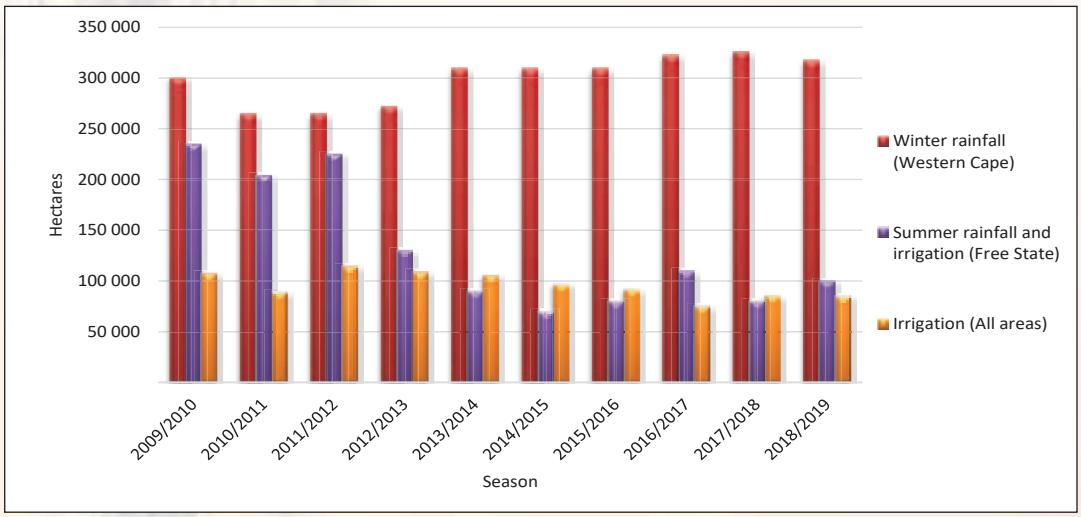
Graph 2: Wheat production figures per production area over ten seasons



Figures provided by the CEC.

The area utilized for wheat production increased by 2.4% to 503 350 hectares from 491 600 hectares in the previous season. Hectares cultivated under wheat in the Western Cape declined by 2.5%, while a 25% increase was observed in the Free State. Nationally, dry land area increased by 2.9% year on year and irrigation area showed a slight increase of almost 1%. Please see Graph 3.

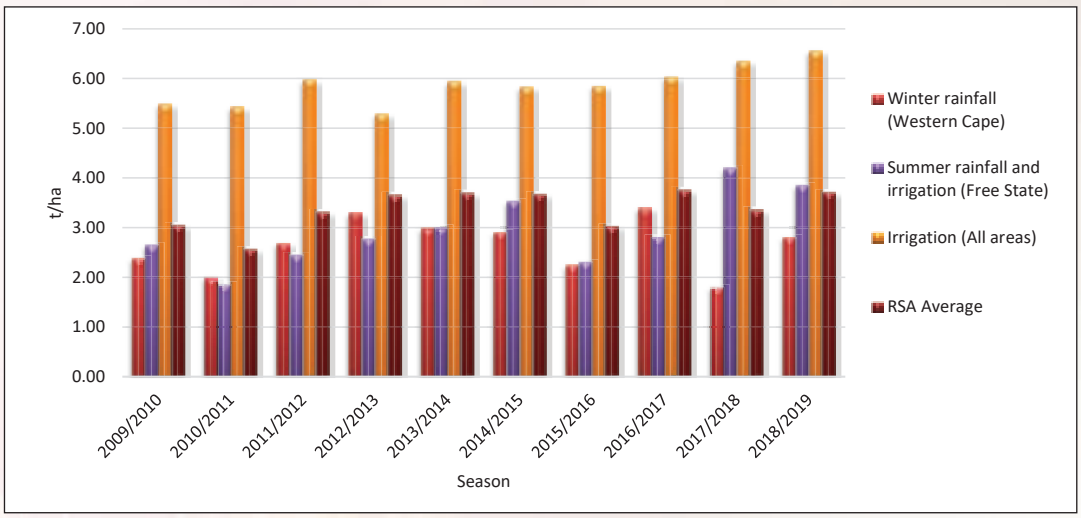
Graph 3: Area planted per production area over ten seasons



Figures provided by the CEC.

The yield in the main production areas ranged from 2.80 tons per hectare (t/ha) in the winter rainfall area of the Western Cape to 3.85 t/ha in the Free State (summer rainfall and irrigation) to 7.75 t/ha for irrigation wheat produced in the Northern Cape. The national yield average increased from 3.12 t/ha in the previous season to 3.71 t/ha. Please see Graph 4 as well as Table 1 on the next page.

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 in the 2018/2019 season, compared to the 2017/2018 season.

Table1: Wheat production overview over two seasons

Province	Type of production	2017/2018			2018/2019		
		Hectares planted, ha	Production, tons	Yield, t/ha	Hectares planted, ha	Production, tons	Yield, t/ha
Western Cape	Dryland	320 000	562 800	1.76	315 700	880 600	2.79
	Irrigation	6 000	24 000	4.00	2 300	9 900	4.30
	Total	326 000	586 800	1.80	318 000	890 500	2.80
Northern Cape	Dryland	-	-	-	150	90	0.60
	Irrigation	38 000	311 650	8.20	37 850	294 410	7.78
	Total	38 000	311 650	8.20	38 000	294 500	7.75
Free State	Dryland	42 500	74 000	1.74	58 000	124 500	2.15
	Irrigation	37 500	262 000	6.99	42 000	260 500	6.20
	Total	80 000	336 000	4.20	100 000	385 000	3.85
Eastern Cape	Dryland	600	1 400	2.33	400	1 000	2.50
	Irrigation	1 300	8 100	6.23	1 250	9 730	7.78
	Total	1 900	9 500	5.00	1 650	10 730	6.50
KwaZulu-Natal	Dryland	-	-	-	-	-	-
	Irrigation	7 500	45 750	6.10	7 000	43 400	6.20
	Total	7 500	45 750	6.10	7 000	43 400	6.20
Mpumalanga	Dryland	500	1 500	3.00	-	-	-
	Irrigation	3 500	23 900	6.83	3 500	22 740	6.50
	Total	4 000	25 400	6.35	3 500	22 740	6.50
Limpopo	Dryland	1 000	3 600	3.60	1 000	2 500	2.50
	Irrigation	19 000	128 400	6.76	19 000	125 500	6.61
	Total	20 000	132 000	6.60	20 000	128 000	6.40
Gauteng	Dryland	-	-	-	-	-	-
	Irrigation	700	4 200	6.00	1 200	7 800	6.50
	Total	700	4 200	6.00	1 200	7 800	6.50
North West	Dryland	80	200	2.50	-	-	-
	Irrigation	13 420	83 500	6.22	14 000	85 330	6.10
	Total	13 500	83 700	6.20	14 000	85 330	6.10
RSA	Dryland	364 680	643 500	1.76	375 250	1 008 690	2.69
	Irrigation	126 920	891 500	7.02	128 100	859 310	6.71
	Total	491 600	1 535 000	3.12	503 350	1 868 000	3.71

Figures provided by the CEC.

Supply and Demand

World wheat production for the 2018/2019 season is estimated at 730.90 million metric tons according to the *World Agricultural Supply and Demand Estimates (WASDE) report 590 of 11 July 2019*, world production for 2019/2020 is projected to be 780.83 million metric tons.

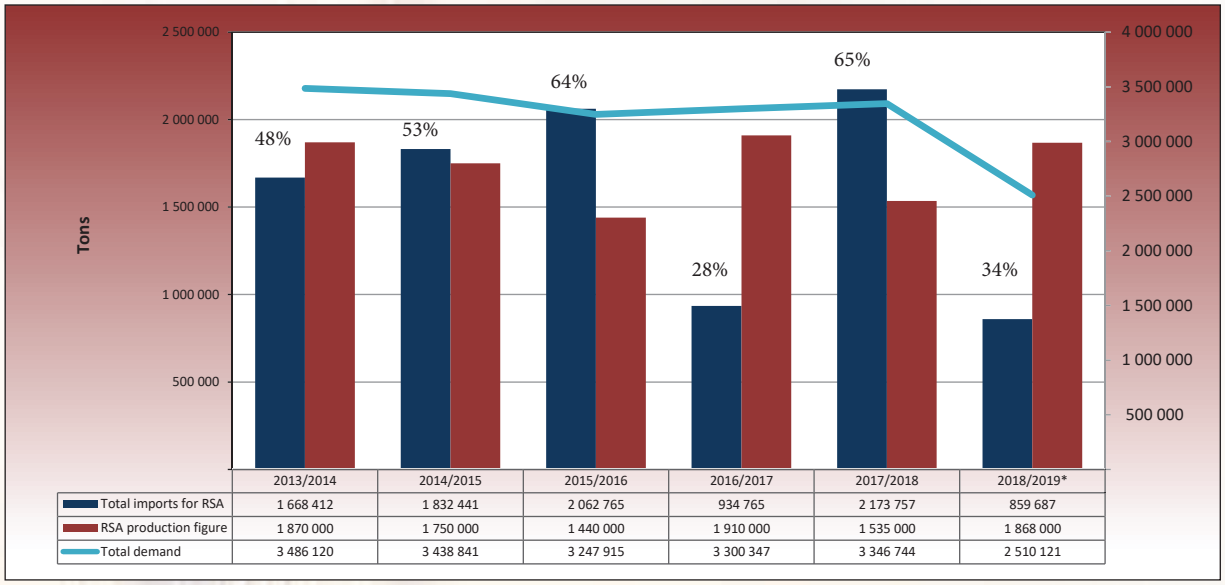
South Africa is a net importer of wheat and relies on imports to supply local demand. Demand for wheat processing (human, animal and gristing) in 2017/2018 was the highest of the past 20 seasons (3 229 861 tons). Nine months into the 2018/2019 season, this figure stands at 2 409 539 tons, 75% of the previous season's figure.

During the 2017/2018 season, 2 173 757 tons of wheat were imported. This figure is 132% higher than the amount of wheat imported during 2016/2017 and 5% lower than the amount imported during the severe drought stricken 2015/2016 season. 44% (955 697 tons) of the wheat imported during the 2017/2018 season, originated in the Russian Federation. Please see pages 88 to 109 for the quality of the wheat imported during 2017/2018. 90 780 tons of local wheat were exported to countries such as Zambia, Botswana, Namibia and Swaziland during the corresponding period.

The amount of wheat imported for local consumption during the current marketing season (up to 26 July 2019), amounts to 945 668 tons according to SAGIS. Almost 33% of this wheat originated in Germany.

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

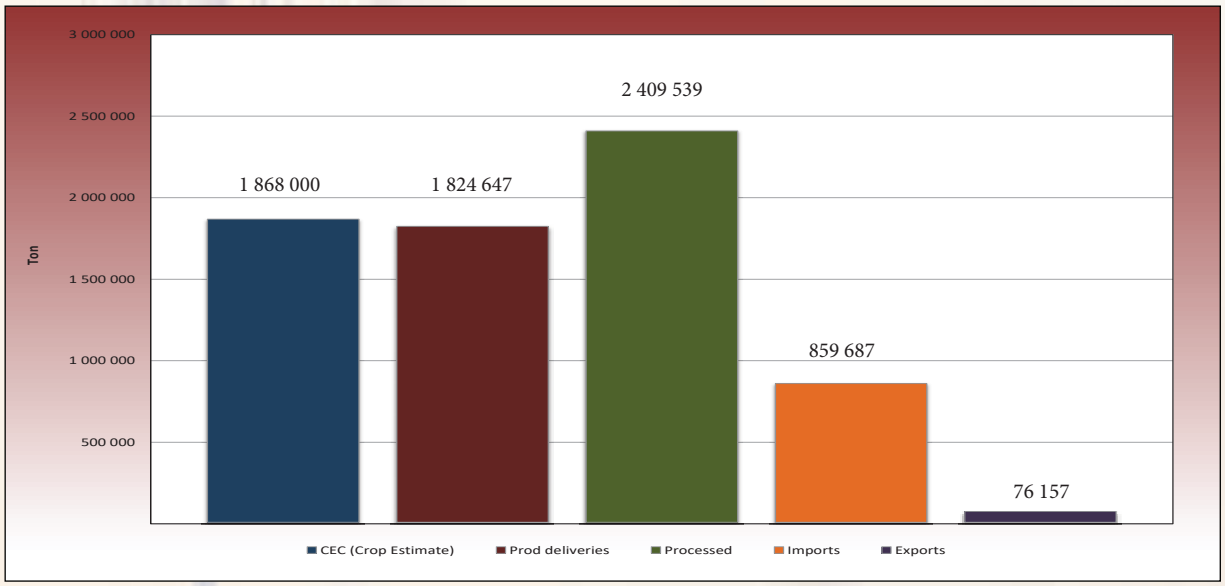
Graph 5: Wheat import figures as a percentage of the total demand over six seasons



	2013/2014	2014/2015	2015/2016	2016/2017	2017/2018	2018/2019*
Total imports for RSA	1 668 412	1 832 441	2 062 765	934 765	2 173 757	859 687
RSA production figure	1 870 000	1 750 000	1 440 000	1 910 000	1 535 000	1 868 000
Total demand	3 486 120	3 438 841	3 247 915	3 300 347	3 346 744	2 510 121

*2018/2019 season figure includes imports and total demand from October to June.

Graph 6: Wheat supply and demand overview 2018/2019 season (Oct - June)

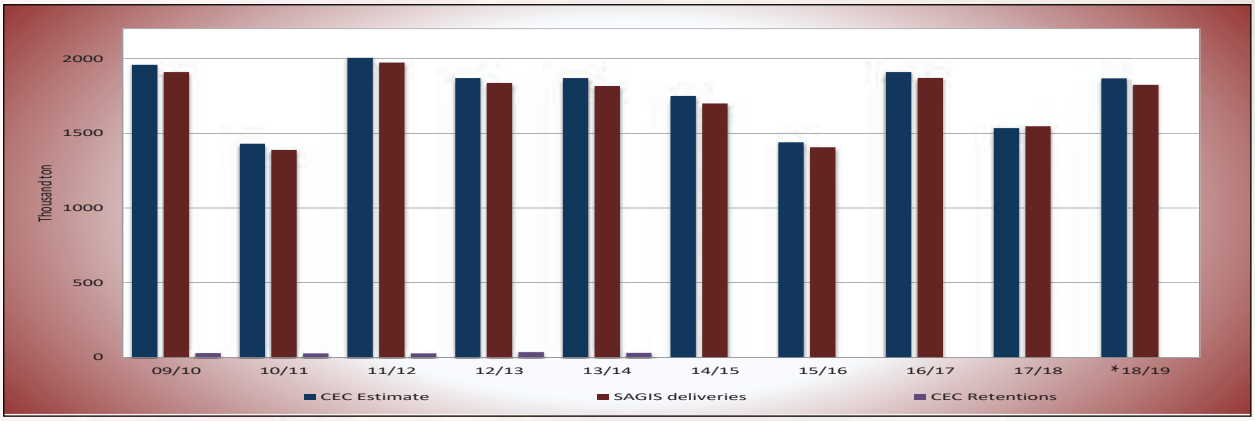


Figures provided by SAGIS, (Publication date: 2019-07-25)

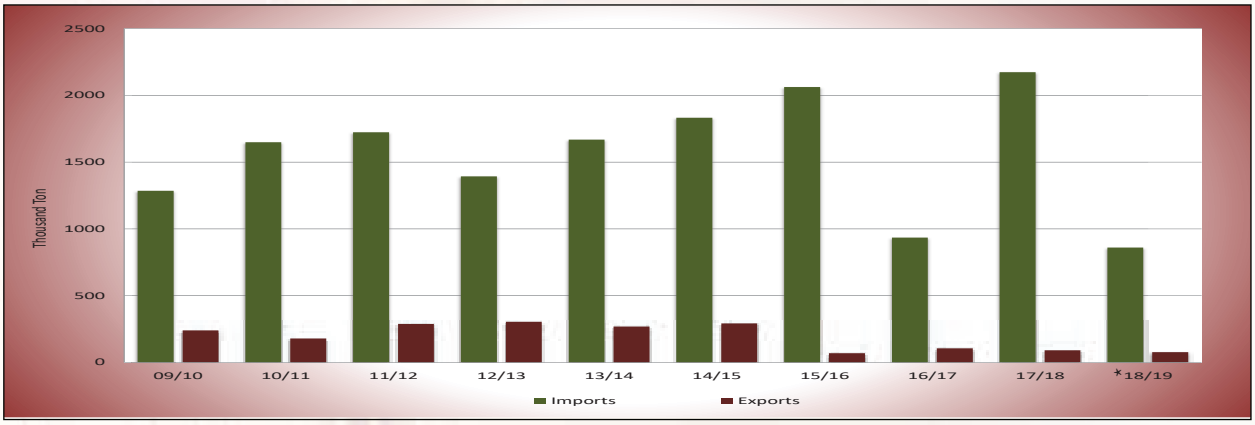
SAGIS South African Grain Information Service NPC
Suid Afrikaanse Graaninligtingsdiens NWM
Reg no. 1997/019186/08

WHEAT: SUPPLY AND DEMAND TABLE BASED ON SAGIS' INFO											Publication date: 2019-07-25							
	Season (Oct - Sep)																Current Season Oct - Jun	10 YEAR AVERAGE 2008/9-2017/18
	02/03	03/04	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	
																	9	
CEC (Crop Estimate)	2 321 000	1 540 000	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	**1 789 800**
CEC (Retention)	33 000	40 000	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	**19 050**
SUPPLY																		
Opening stock (1 Oct)	580 000	897 000	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	**565 444**
Prod deliveries	2 387 000	1 512 000	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	1 824 647	**1 758 043**
Imports	747 000	1 042 000	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	859 687	**1 591 536**
Surplus	0	6 000	6 000	9 000	32 000	0	13 000	0	23 000	14 000	0	0	15 151	8 807	9 249	5 611	7 515	**8 882**
Total supply	3 714 000	3 457 000	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	3 413 383	**3 923 904**
DEMAND																		
Processed	2 577 000	2 653 000	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	2 409 539	**3 088 711**
-human	2 575 000	2 652 000	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	2 406 973	**3 061 892**
-animal	2 000	1 000	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	2 566	**26 817**
-gristing	0	0	0	0	0	0	0	0	0	0	14	5	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	24 000	13 000	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	926	**4 898**
Released to end-consumers	5 000	2 000	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	2 088	**3 937**
Seed for planting purposes	20 000	21 000	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	18 889	**19 201**
Net receipts(-)/disp(+)	11 000	12 000	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	2 522	**13 216**
Deficit	1 000	0	0	0	0	9 000	0	4 000	0	0	713	1 243	0	0	0	0	0	**596**
Exports	179 000	158 000	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	76 157	**206 667**
Total Demand	2 817 000	2 859 000	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	2 510 121	**3 337 225**
Ending Stock (30 Sep)	897 000	598 000	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	903 262	**586 679**
- processed p/month	214 800	221 100	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	267 727	**257 388**
- months' stock	4.2	2.7	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	3.4	**2**
Note: ***Figures for current season up to date																		

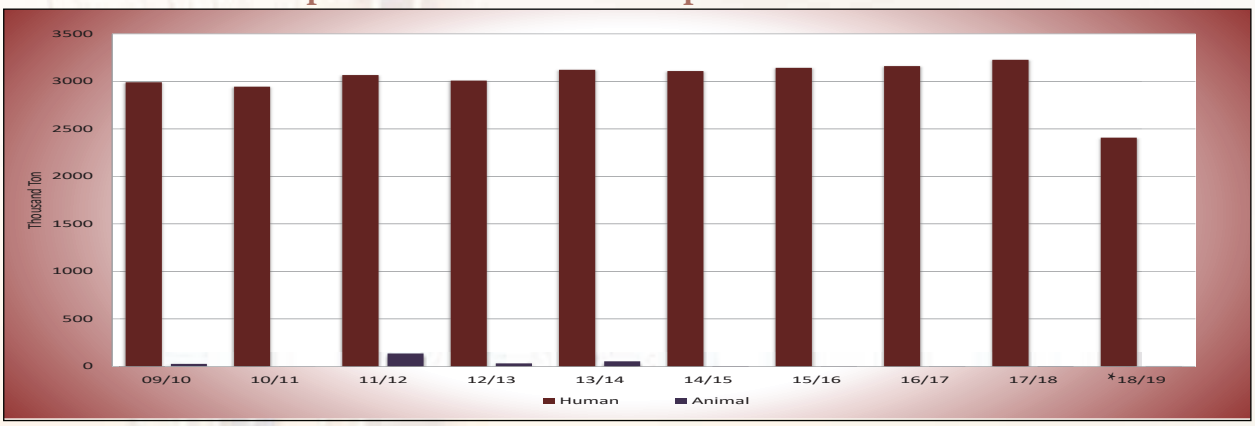
Graph 7: Wheat: CEC Estimate, Retentions and SAGIS deliveries over ten seasons



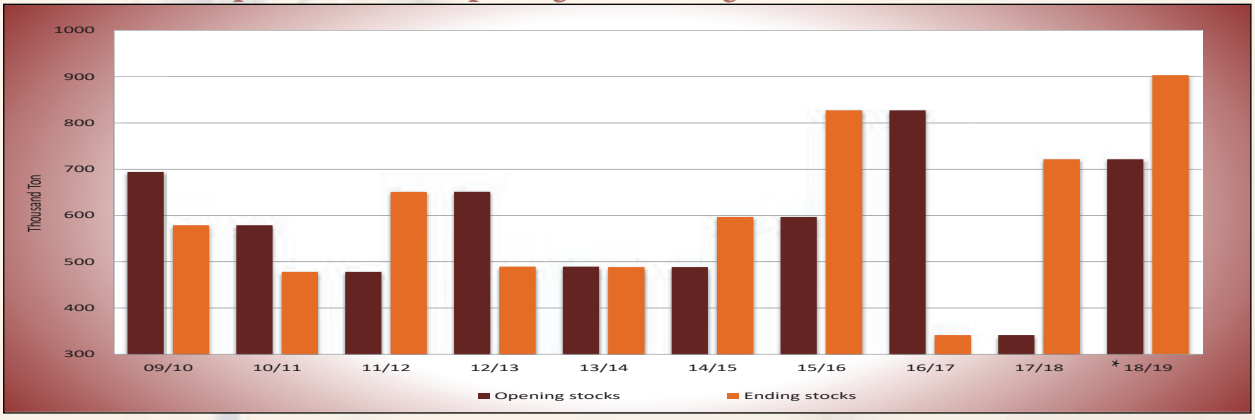
Graph 8: Wheat: Imports and exports over ten seasons



Graph 9: Wheat: RSA consumption over ten seasons



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



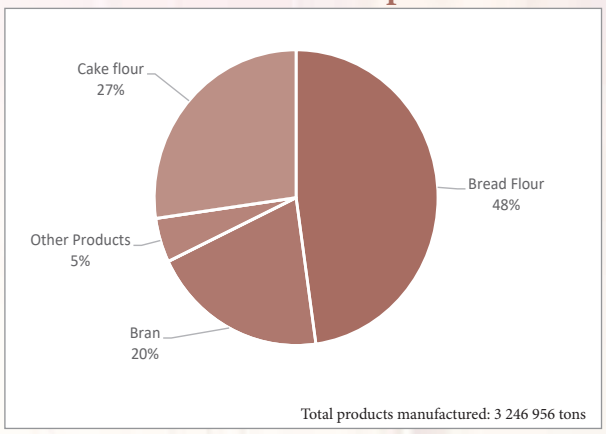
Figures provided by SAGIS, *18/19 figures (Oct - Jun)

Wheat Product Information

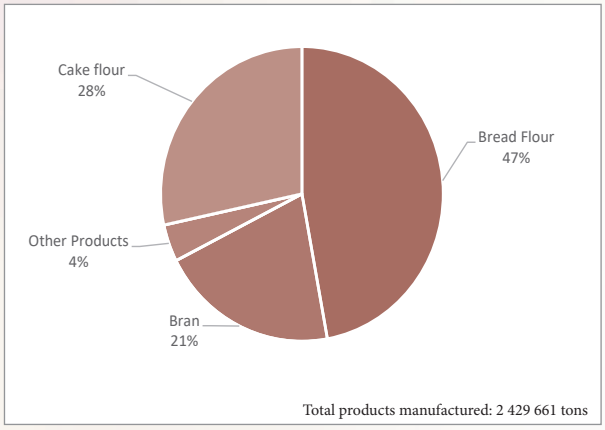
The Minister of Agriculture, Forestry and Fisheries approved the proposed continuation and amendment of statutory measures, namely registration and the keeping of information and submitting monthly returns in respect of maize products and wheaten products manufactured, processed, imported and/or exported, 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 9 and 10 for wheat product and pan baked product progressive figures received by SAGIS. Figures for pan baked products manufactured per bakery group, are provided on pages 11 and 12.

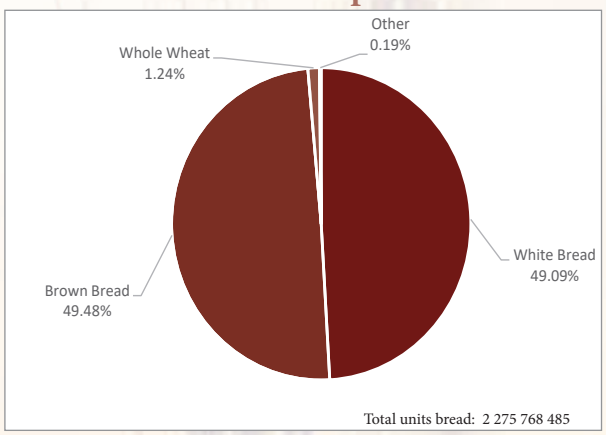
Graph 11: Wheat products manufactured from Oct 2017 - Sept 2018



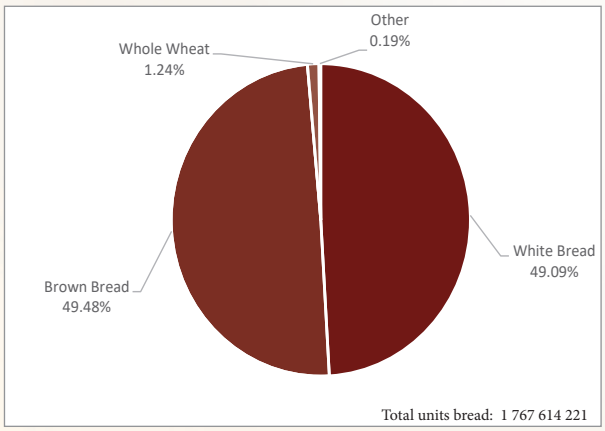
Graph 12: Wheat products manufactured from Oct 2018 - June 2019



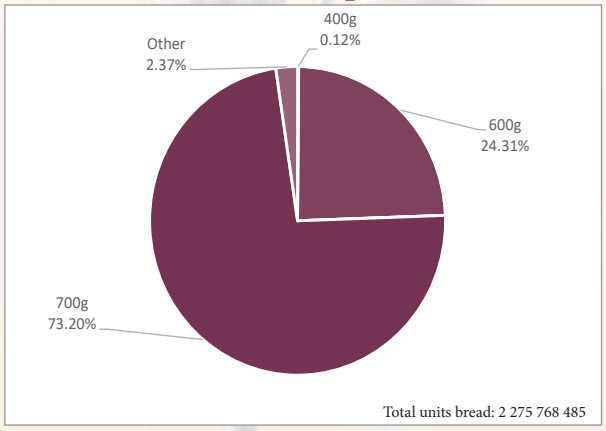
Graph 13: Pan baked bread per type from Oct 2017 - Sept 2018



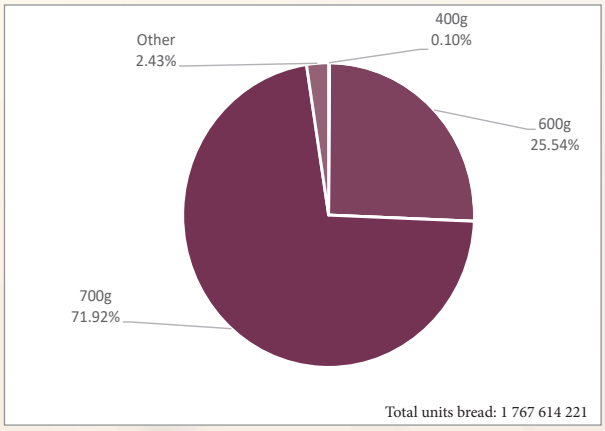
Graph 14: Pan baked bread per type from Oct 2018 - June 2019



Graph 15: Pan baked bread per mass Oct 2017 - Sept 2018



Graph 16: Pan baked bread per mass Oct 2018 - June 2019



WHEATEN PRODUCTS MANUFACTURED PER MARKETING YEAR				
	Marketing year: Oct 2015 - Sep 2016 Manufactured Tons Progressive: 12 Months	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: 9 Months (Oct - Jun)
Cake Flour	821 935	859 666	884 754	689 834
Self-Raising Flour	16 210	17 845	17 169	12 956
White Bread Flour	1 114 696	1 086 256	1 139 270	843 547
Brown Bread Flour	402 431	427 996	408 574	297 652
Other Flour (Industrial)	141 380	143 889	121 959	80 828
Whole Wheat Meal	3 027	3 566	3 196	3 533
Bran	629 298	630 287	653 359	495 711
Semolina	16 334	18 782	18 675	5 600
Total (Tons)	**3 145 311**	**3 188 287**	**3 246 956**	**2 429 661**

WHEATEN PRODUCTS IMPORTED PER MARKETING YEAR				
	Marketing year: Oct 2015 - Sep 2016 Imported Tons Progressive: 12 Months	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: 9 Months (Oct - Jun)
Cake Flour	40	0	4 998	4 224
Self-Raising Flour	0	0	30	32
White Bread Flour	840	0	9 740	8 538
Brown Bread Flour	40	0	8 589	6 196
Other Flour (Industrial)	0	0	0	0
Whole Wheat Meal	0	0	0	0
Bran	450	243	915	4 980
Semolina	0	0	0	0
Total	**1 370**	**243**	**24 272**	**23 970**

WHEATEN PRODUCTS EXPORTED PER MARKETING YEAR				
	Marketing year: Oct 2015 - Sep 2016 Exported Tons Progressive: 12 Months	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: 9 Months (Oct - Jun)
Cake Flour	2 125	1 714	2 396	343
Self-Raising Flour	0	29	35	8
White Bread Flour	7 274	1 966	8 662	3 109
Brown Bread Flour	1 853	3 796	19 130	4 207
Other Flour (Industrial)	1 976	86	115	8
Whole Wheat Meal	0	0	24	11
Bran	393	223	612	620
Semolina	0	0	0	0
Total	**13 621**	**7 814**	**30 974**	**8 306**

PAN BAKED PRODUCTS MANUFACTURED PER YEAR				
	Marketing year: Oct 2015 - Sep 2016 Manufactured Units Progressive: 12 Months	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: 9 Months (Oct - Jun)
WHITE BREAD				
400g (Units)	2 536 957	2 772 734	1 828 673	1 172 117
600g (Units)	184 045 416	192 408 295	249 818 607	200 146 845
700g (Units)	830 681 443	839 930 529	854 936 392	656 587 878
Other (Units)	9 294 235	7 153 230	9 648 404	9 773 322
White Bread (Total Units)	**1 026 558 051**	**1 042 264 788**	**1 116 232 076**	**867 680 162**
BROWN BREAD				
400g (Units)	1 064 964	1 131 378	859 906	594 050
600g (Units)	213 511 631	235 801 836	302 612 906	250 594 326
700g (Units)	771 863 722	805 745 291	804 768 160	610 231 703
Other (Units)	20 137 121	16 638 015	17 726 350	13 256 895
Brown Bread (Total Units)	**1 006 577 438**	**1 059 316 520**	**1 125 967 322**	**874 676 974**
WHOLE WHEAT				
400g (Units)	27 137	16 565	14 648	10 005
600g (Units)	507 374	617 299	576 869	456 230
700g (Units)	8 707 512	7 397 611	6 032 062	4 437 131
Other (Units)	22 726 394	22 364 064	23 390 073	16 941 528
Whole Wheat (Total Units)	**31 968 417**	**30 395 539**	**30 013 652**	**21 844 894**
OTHER				
400g (Units)	61 892	56 236	62 396	34 066
600g (Units)	385 483	431 695	290 477	279 645
700g (Units)	487 173	399 645	136 163	80 197
Other (Units)	1 946 688	2 833 618	3 066 399	3 018 283
Other (Total Units)	**2 881 236**	**3 721 194**	**3 555 435**	**3 412 191**
Total	**2 067 985 142**	**2 135 698 041**	**2 275 768 485**	**1 767 614 221**

PAN BAKED PRODUCTS MANUFACTURED PER BAKERY GROUP PER MARKETING YEAR				
SUPERMARKET GROUPS	**Oct 2015 - Sept 2016**	**Oct 2016 - Sept 2017**	**Oct 2017 - Sept 2018**	**Total**
WHITE BREAD				
400g (Units)	2 011 263	1 708 887	980 345	4 700 495
600g (Units)	60 157 529	67 867 486	105 739 976	233 764 991
700g (Units)	8 383 998	9 082 503	6 494 600	23 961 101
Other (Units)	1 123 384	739 982	1 478 805	3 342 171
White Bread (Total Units)	**71 676 174**	**79 398 858**	**114 693 726**	**265 768 758**
BROWN BREAD				
400g (Units)	797 794	567 628	507 773	1 873 195
600g (Units)	56 002 004	80 174 746	127 508 240	263 684 990
700g (Units)	7 645 208	7 007 442	5 442 190	20 094 840
Other (Units)	1 024 276	1 214 836	1 863 458	4 102 570
Brown Bread (Total Units)	**65 469 282**	**88 964 652**	**135 321 661**	**289 755 595**
WHOLE WHEAT				
400g (Units)	6 065	-	-	6 065
600g (Units)	454 351	540 024	500 022	1 494 397
700g (Units)	1 369 478	1 589 267	1 594 414	4 553 159
Other (Units)	-	-	-	-
Whole Wheat (Total Units)	**1 829 894**	**2 129 291**	**2 094 436**	**6 053 621**
OTHER				
400g (Units)	-	-	-	-
600g (Units)	-	-	-	-
700g (Units)	-	-	-	-
Other (Units)	1 665 871	2 622 203	2 889 186	7 177 260
Other (Total Units)	**1 665 871**	**2 622 203**	**2 889 186**	**7 177 260**
Total	**140 641 221**	**173 115 004**	**254 999 009**	**568 755 234**

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

BAKERY GROUPS	**Oct 2015 - Sept 2016**	**Oct 2016 - Sept 2017**	**Oct 2017 - Sept 2018**	**Total**
WHITE BREAD				
400g (Units)	-	-	-	-
600g (Units)	88 644 328	80 324 523	84 504 991	253 473 842
700g (Units)	792 037 806	795 030 558	811 564 534	2398 632 898
Other (Units)	5 718 231	2 889 156	2 420 401	11 027 788
White Bread (Total Units)	**886 400 365**	**878 244 237**	**898 489 926**	**2663 134 528**
BROWN BREAD				
400g (Units)	-	-	-	-
600g (Units)	123 959 197	112 110 830	109 838 873	345 908 900
700g (Units)	743 180 683	770 418 129	766 277 755	2279 876 567
Other (Units)	16 341 886	12 412 987	12 702 186	41 457 059
Brown Bread (Total Units)	**883 481 766**	**894 941 946**	**888 818 814**	**2667 242 526**
WHOLE WHEAT				
400g (Units)	-	-	-	-
600g (Units)	-	-	-	-
700g (Units)	7 038 456	5 425 364	4 086 745	16 550 565
Other (Units)	22 711 060	22 347 510	23 373 606	68 432 176
Whole Wheat (Total Units)	**29 749 516**	**27 772 874**	**27 460 351**	**84 982 741**
OTHER				
400g (Units)	-	-	-	-
600g (Units)	-	-	-	-
700g (Units)	-	-	-	-
Other (Units)	-	-	-	-
Other (Total Units)	**-**	**-**	**-**	**-**
Total	**1799 631 647**	**1800 959 057**	**1814 769 091**	**5415 359 795**

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

PAN BAKED PRODUCTS MANUFACTURED PER BAKERY GROUP PER MARKETING YEAR				
INDEPENDENT BAKERIES	**Oct 2015 - Sept 2016**	**Oct 2016 - Sept 2017**	**Oct 2017 - Sept 2018**	**Total**
WHITE BREAD				
400g (Units)	-	66 090	148 214	214 304
600g (Units)	3 113 968	8 543 599	26 082 469	37 740 036
700g (Units)	17 366 674	18 074 488	19 319 718	54 760 880
Other (Units)	119 134	421 944	2 546 092	3 087 170
White Bread (Total Units)	**20 599 776**	**27 106 121**	**48 096 493**	**95 802 390**
BROWN BREAD				
400g (Units)	-	724	1 808	2 532
600g (Units)	3 463 775	7 459 079	28 544 450	39 467 304
700g (Units)	9 731 886	10 695 586	17 383 098	37 810 570
Other (Units)	232 042	374 945	806 675	1 413 662
Brown Bread (Total Units)	**13 427 703**	**18 530 334**	**46 736 031**	**78 694 068**
WHOLE WHEAT				
400g (Units)	-	-	-	-
600g (Units)	1 019	1 440	1 235	3 694
700g (Units)	80 140	93 640	104 694	278 474
Other (Units)	8 400	7 248	5 640	21 288
Whole Wheat (Total Units)	**89 559**	**102 328**	**111 569**	**303 456**
OTHER				
400g (Units)	-	-	-	-
600g (Units)	-	-	-	-
700g (Units)	-	1 265	2 408	3 673
Other (Units)	-	-	-	-
Other (Total Units)	**-**	**1 265**	**2 408**	**3 673**
Total	**34 117 038**	**45 740 048**	**94 946 501**	**174 803 587**

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

INDEPENDENT SUPERMARKETS	**Oct 2015 - Sept 2016**	**Oct 2016 - Sept 2017**	**Oct 2017 - Sept 2018**	**Total**
WHITE BREAD				
400g (Units)	525 694	997 757	730 464	2 253 915
600g (Units)	32 129 591	35 672 687	33 770 423	101 572 701
700g (Units)	12 892 965	17 742 980	19 162 517	49 798 462
Other (Units)	2 333 486	3 102 148	3 195 367	8 631 001
White Bread (Total Units)	**47 881 736**	**57 515 572**	**56 858 771**	**162 256 079**
BROWN BREAD				
400g (Units)	267 170	563 026	347 836	1 178 032
600g (Units)	30 086 655	36 057 181	37 103 999	103 247 835
700g (Units)	11 305 945	17 624 134	16 303 093	45 233 172
Other (Units)	2 538 917	2 635 247	2 353 988	7 528 152
Brown Bread (Total Units)	**44 198 687**	**56 879 588**	**56 108 916**	**157 187 191**
WHOLE WHEAT				
400g (Units)	21 072	16 565	14 460	52 097
600g (Units)	52 004	75 835	107 734	235 573
700g (Units)	219 438	289 340	268 201	776 979
Other (Units)	6 934	9 306	10 827	27 067
Whole Wheat (Total Units)	**299 448**	**391 046**	**401 222**	**1 091 716**
OTHER				
400g (Units)	61 892	56 236	68 805	186 933
600g (Units)	385 483	431 695	292 276	1 109 454
700g (Units)	487 173	398 380	133 755	1 019 308
Other (Units)	280 817	211 415	204 399	696 631
Other (Total Units)	**1 215 365**	**1 097 726**	**699 235**	**3 012 326**
Total	**93 595 236**	**115 883 932**	**114 068 144**	**323 547 312**

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, Cambridge foods, 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 better agronomical as well as better flour quality characteristics than 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 April 2019 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.

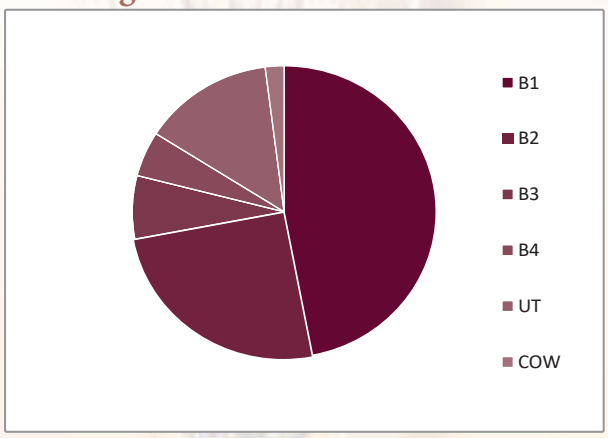
After meetings and consultations with stakeholders and various experts, the South African Cultivar & Technology Agency NPC (SACTA) was established in June 2016. SACTA has been recommended by role-players in the different industries as the body to administer the breeding and technology levy and will make 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 337 representative crop samples were graded as follows: 45% was graded B1, 26% was graded B2, 9% was graded B3, 4% was graded B4, 14% UT (Utility Grade) and 2% COW (Class Other Wheat). The majority of the samples (75%) downgraded to Utility Grade was as a result of either the percentage screenings or mainly the percentage other grain and unthreshed ears, individually, or in combination with the combined deviations, exceeding the maximum allowable level for grades B1 to B4. Most of these downgraded samples originated from the Western Cape.

Grade B1 wheat in the Free State province amounted to 68% (51% in the previous season). In the Irrigation areas 50% (43% in the previous season) of the wheat was graded as B1 and in the Western Cape Province 37% was graded as B1 (48% in the previous season).

Graph 17: Percentage of samples per class and grade in the 2017/2018 season



Graph 18: Percentage of samples per class and grade in the 2018/2019 season

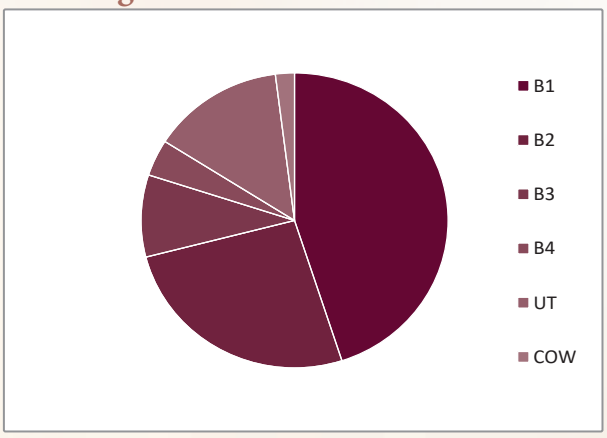


Table 2: Bread Wheat Grading Table

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 andunthreshed ears	Gravel, stones and turf	Foreign matter plus F	Heat damaged kernels	Damaged kernels plus H	Combined deviations (D+E+G+I)
Grade 1	77	220	12	5	2	0.5	3	1	0.5	1	0.5	2	5
Grade 2	76	220	11	5	2	0.5	3	1	0.5	1	0.5	2	5
Grade 3	74	220	10	5	2	0.5	3	1	0.5	1	0.5	2	5
Grade 4	72	200	9	5	2	0.5	4	1	0.5	1	0.5	2	5
Utility grade	70	150	8	10	2	0.5	10	4	0.5	3	0.5	5	10
Other Wheat	<70	<150	<8	>10	>2	>0.5	>10	>4	>0.5	>3	>0.5	>5	>10
Minimum size of working samples	1 kg	300 g clean	Apparatus instructions	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	-

Government Notice No. R. 64 of 29 January 2016.

WHEAT SEED SOLD BY COMMERCIAL GRAIN STORAGE COMPANIES TO WHEAT PRODUCERS FOR THE 2018 PLANTING SEASON

Cultivar	%	Cultivar	%
SST 056	14.08	SST 843	1.15
SST 0117	11.12	SST 374	1.12
SST 0127	8.71	SST 316	0.85
SST 0147	8.25	PAN 3400	0.64
SST 0166	6.27	PAN 3111	0.43
SST 884	6.23	SST 317	0.42
SST 087	5.93	PAN 3379	0.38
SST 015	4.64	SST 027	0.33
SST 895	3.83	Elands	0.29
SST 835	3.49	SST 387	0.25
SST 88	2.77	SST 877	0.19
SST 806	2.48	PAN 3368	0.188
PAN 3471	2.03	SST 866	0.184
SST 822	1.70	PAN 3195	0.105
SST 875	1.69	CRN 826	0.098
PAN 3497	1.68	SST 8154	0.077
SST 356	1.65	Senqu	0.075
SST 347	1.44	Duzi	0.047
PAN 3161	1.41	Koonap	0.045
Matlabas	1.32	SST 876	0.044
SST 096	1.18	Kariega	0.020
SST 8135	1.16		
			100

Most popular cultivars according to cultivar identification

Farmers in the Western Cape preferred SST 0117 (26.1%), SST 0127 (22.7%) and SST 087 (19.0%). SST 056 (15.0%) and SST 88 (8.7%) were also popular cultivars.

In the Vaal and Orange River areas SST 884 (17.3%), PAN 3471 (16.7%), SST 8135 (11.3%) and SST 8154 (10.7%) were the most popular cultivars.

The most preferred cultivars in North West province were SST 884 (20.7%), followed by SST 8135 (14.0%) and PAN 3471 (8.5%).

In regions 21 to 24 of the Free State the most planted cultivar was PAN 3471 (16.7%), followed by PAN 3111 (13.3%), PAN 3497 (10.4%) and SST 884 (10.3%). PAN 3161 was the preferred cultivar in regions 25 to 28 and represented 20.5%. SST 374 (16.1%), PAN 3368 (15.1%), Elands (11.6%) and PAN 3111 (11.2%), were also popular cultivars.

In Mpumalanga, Gauteng, Limpopo and KwaZulu-Natal, SST 884 (25.5%) was the preferred cultivar, followed by SST 8154 (12.5%) and SST 895 (9.2%).

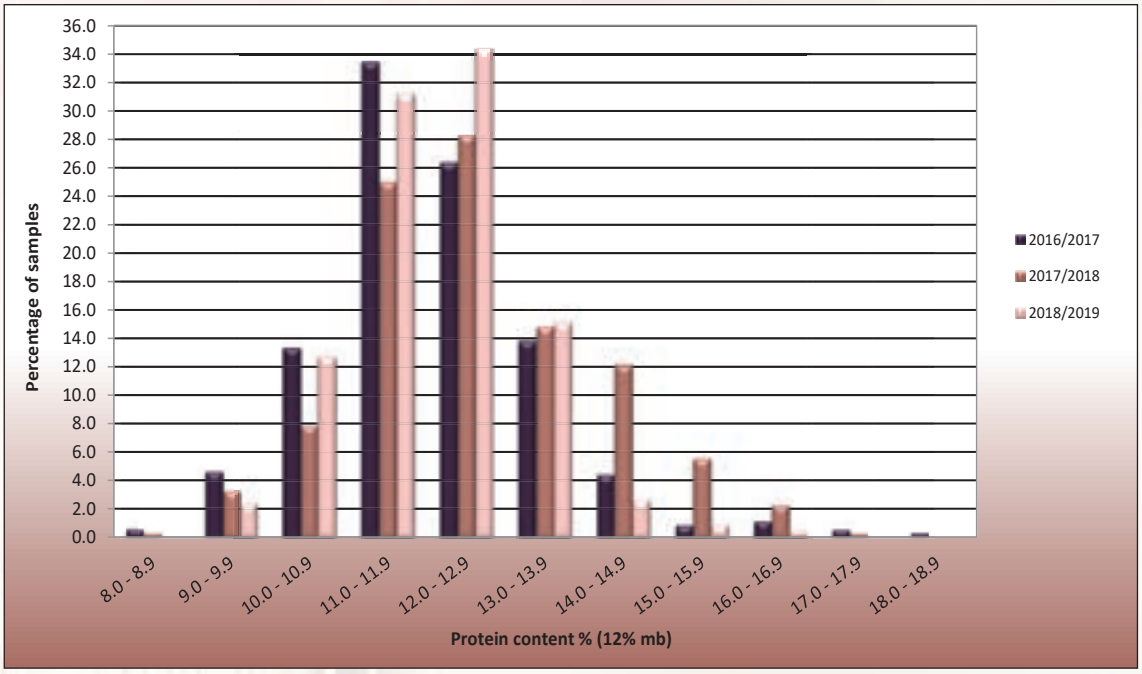
The above-mentioned percentages are weighted averages based on the top five cultivars per region provided on pages 36 to 62. The top five cultivars per region were calculated from the cultivar identification done on each of the 337 crop samples.

Crop quality of the 2018/2019 season

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

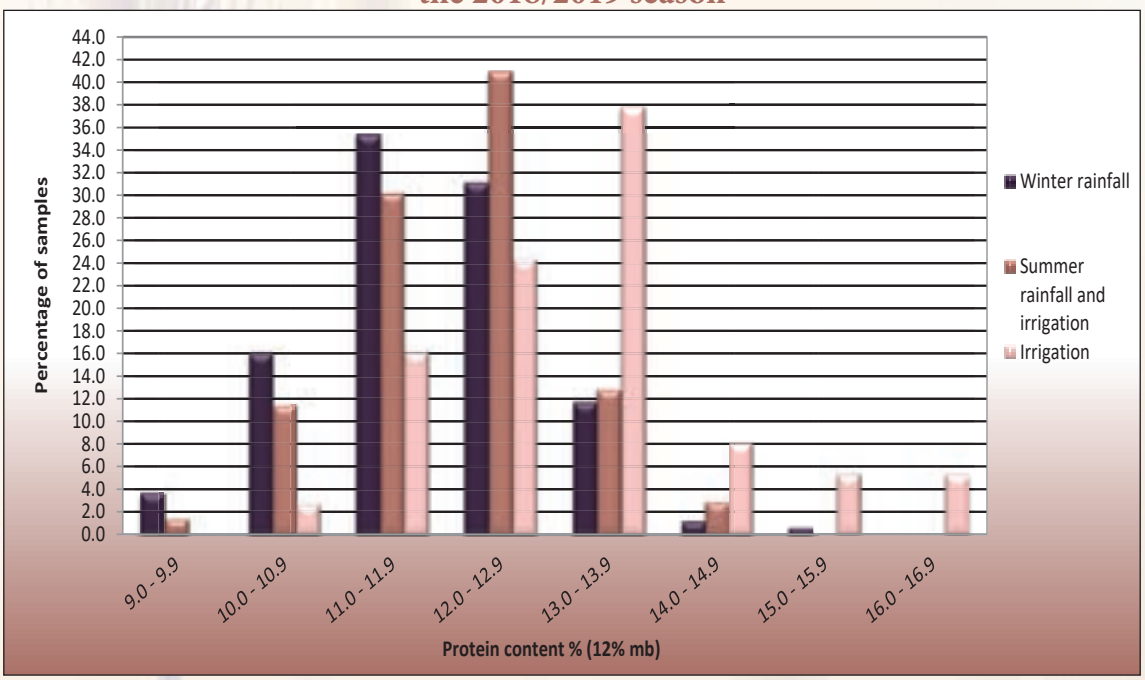
The national whole wheat protein average decreased from 12.6% in the previous season to 12.1%. The ten- year national average is 11.9%. Protein content is generally a function of the growing environment (soil and climatic conditions) as well as fertilizer application. Please see Graphs 19 and 20 for the protein content distribution over the last three seasons and between the three major production areas.

Graph 19: 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 13.1%. The Irrigation areas averaged 12.1% and the production regions in the Winter rainfall area of the Western Cape 11.8%.

Graph 20: Protein content distribution between the three production areas during the 2018/2019 season



Flour protein content is on average 0.5 to 1.2% lower than that of whole wheat and averaged 10.9% this 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 increased by 0.6 kg/hl to 81.3 kg/hl compared to the previous season. The nine-year average for determinations done by means of the Kern 222 instrument is 80.7 kg/hl. Eight samples reported values below the 77 kg/hl minimum level for grade B1 wheat, of these four samples originated in the Western Cape (Winter rainfall area) and two each in the Free State and Mpumalanga. The regional averages ranged from 79.9 kg/hl in the Western Cape to 83.1 kg/hl in the Irrigation areas.

The 1000 kernel mass, reported on a 13% moisture basis, increased from 37.7 g last season to 39.2 g this season. The 2016/2017 season's average was 38.6 g. Averages over production areas varied from 36.1 g in the Free State to 40.2 g in the Irrigation areas. The weighted average percentage screenings obtained with a 1.8 mm slotted sieve was 1.49%, slightly lower than the previous season's 1.51% and also the lowest value of the last six seasons. The Winter rainfall areas reported the highest average percentage, namely 1.80% and the Irrigation areas the lowest of 1.07%. 24 (7%) of the 337 samples exceeded the 3% maximum permissible screenings level for grade B3 and of these, nine exceeded the 4% maximum permissible level for grade B4. Most of these samples originated in the Western Cape.

The national weighted average falling number value was 397 seconds, higher than last season's average as well as the ten-year weighted average value, both 371 seconds. Five of the samples analysed for this survey reported falling number values below 250 seconds and one of these were below 220 seconds. The samples originated from North West (N=2), Mpumalanga (N=2) and Limpopo (N=1). The highest average falling number value of 410 seconds, was reported for the Free State areas. All falling number values reported, are corrected for the altitude at which the test is performed. The results of this, as well as previous surveys, provide evidence that low falling number values are not a significant problem in South Africa.

The weighted mixogram peak time on flour milled on the Quadromat Junior mill averaged 2.8 minutes compared to the 2.7 minutes of the previous three seasons and slightly shorter than the ten-year average of 2.9 minutes. The weighted mixogram peak time of the flour from the Bühler mill was 2.6 minutes, equal to the previous three seasons. Mixing time, in general, decreases as protein content increases to about 12.0%, thereafter remaining approximately constant with flour protein increases.

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 optimize 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 70 composite samples was 71.3%, lower than the 73.1% of the previous season.

From the 2012/2013 survey, a dry colour determination by means of a Konica Minolta CM-5 spectrophotometer is done on the composite flour samples. Please see the comparison of the CIE L*a*b* values obtained below. The average and range (in brackets) are provided to assist with interpretation of these parameters:
2018/2019 season: L* 93.78 (92.82 – 94.43), a* 0.45 (0.32 – 0.64) and b* 10.12 (9.12 – 11.43)
2017/2018 season: L* 93.78 (93.44 – 94.24), a* 0.43 (0.30 – 0.57) and b* 9.84 (8.36 – 11.24)
2016/2017 season: L* 93.71 (92.17 – 94.30), a* 0.46 (0.34 – 0.63) and b* 10.12 (9.03 – 11.65)
2015/2016 season: L* 93.78 (92.99 – 94.40), a* 0.47 (0.06 – 0.59) and b* 9.75 (8.51 – 11.39)
2014/2015 season: L* 93.77 (92.98 – 94.30), a* 0.44 (0.22 – 0.59) and b* 9.72 (8.21 – 11.11)
2013/2014 season: L* 93.99 (93.11 – 94.59), a* 0.40 (0.29 – 0.57) and b* 9.50 (8.49 – 10.63)
2012/2013 season: L* 93.85 (93.14 – 94.39), a* 0.41 (0.26 – 0.54) and b* 9.92 (8.65 – 11.35)
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 average ash content was calculated to be 0.60 % on a dry basis (moisture free basis), equal to the previous season. According to the Wheat product regulations (Government Notice No. R. 405 of 5 May 2017), cake flour's ash content should not exceed 0.65%, white bread flour's ash content should be between 0.60 to 1.00% and that of all-purpose wheat flour between 0.55 and 0.75%.

The Rapid Visco Analyser (RVA) average peak viscosity of the samples analysed was 2218 cP (centipoise), the minimum viscosity 1675 cP and the final viscosity 2516 cP. Last season the values were 2269 cP, 1715 cP and 2548 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 30.1% and the dry gluten, also on a 14% moisture basis, 10.1%. The previous season, these values averaged 30.7% and 10.4% respectively. The average gluten index value was 94 (93 last season), ranging between 71 and 99. The gluten index provides an indication of the gluten strength (higher being better) and is not influenced by the protein content. A value between 70 and 100 is generally accepted as good quality for pan bread baking purposes.

The farinograph analysis resulted in an average water absorption of 60.5% (60.3% the previous season) and an average development time of 5.0 minutes (5.5 minutes the previous season). The stability value of 7.0 minutes was one minute shorter than the previous average, but still within the acceptable range. There was also no significant difference between the mixing tolerance indexes of these two seasons, namely 41 BU and 40 BU respectively.

The average alveogram strength was 34.6 cm^2 and the average P/L value 0.81 (39.2 cm^2 and 0.81 the previous season). The distensibility of the dough as determined by the Alveograph decreased compared to the previous season, indicating a more elastic dough. The stability value was equal to last season.

The average extensogram strength was 92 cm^2 (106 cm^2 previous season), confirming the weaker dough strength trend observed with the Alveograph. The maximum height in Brabender Units were also lower than last season (350 BU in 2018/2019 and 382 BU in 2017/2018). The extensibility values compared well, 191 mm now and 198 mm previously.

The 100 g loaves baked using the straight-dough optimized 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.

This is the third season that amino acid profiles of local wheat were determined as part of this survey. Total amino acid analyses that included 18 amino acids namely Aspartic acid, Glutamic acid, Serine, Glycine, Histidine, Arginine, Threonine, Alanine, Proline, Tyrosine, Valine, Isoleucine, Leucine, Phenylalanine, Lysine, Tryptophan, Cystine and Methionine were performed on forty samples, randomly selected to represent different regions as well as grades. Please see Table 7 on pages 70 and 71 for the results and page 79 for information on the methods followed.

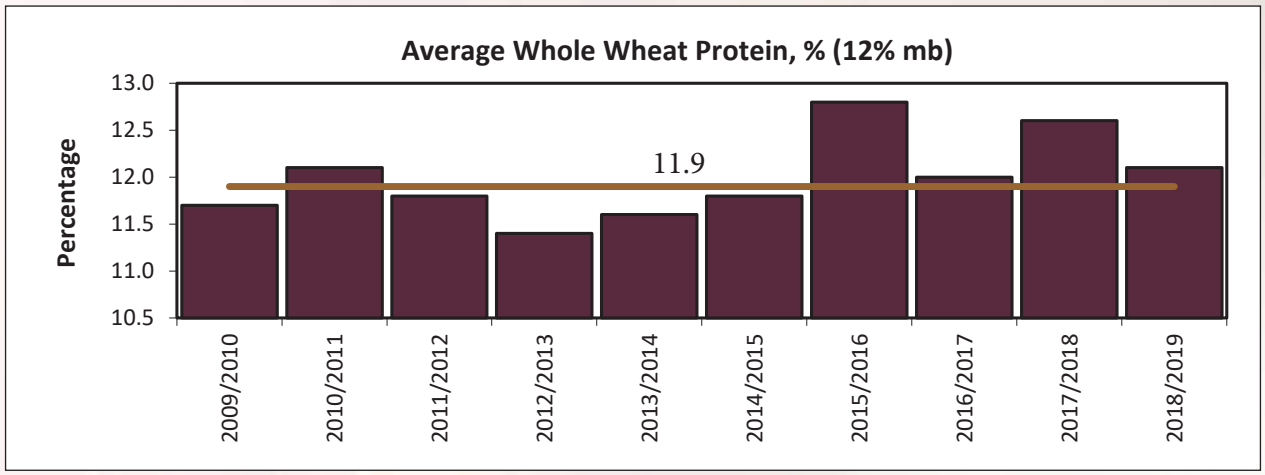
Mycotoxin analyses were performed on 40 wheat samples, randomly selected to represent different regions as well as grades. The samples were tested by means of a SANAS ISO/IEC 17025 accredited multi-mycotoxin screening method using UPLC-MS/MS. With this technique simultaneous quantification and confirmation 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 is possible in one run.

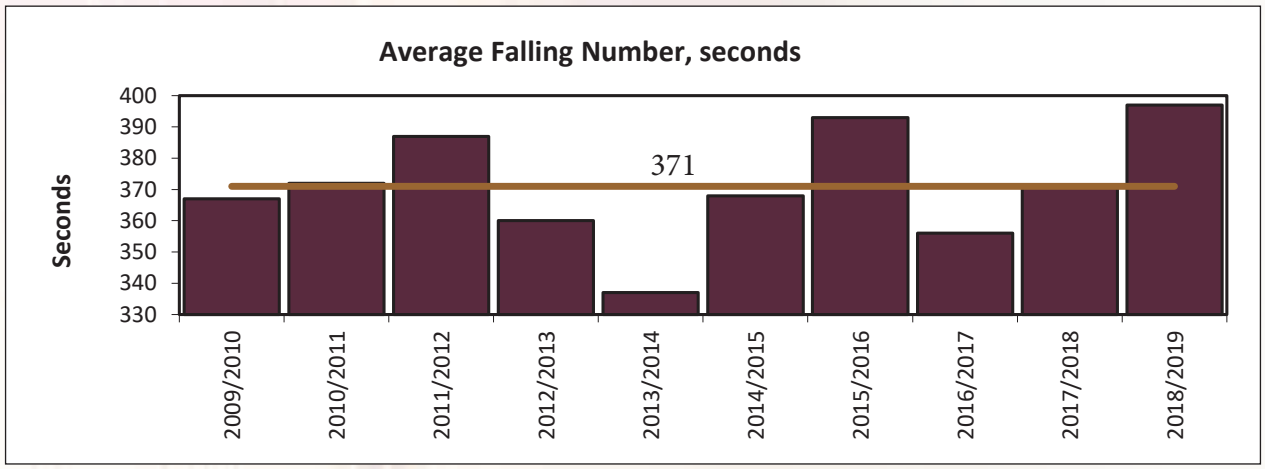
Five samples tested positive for deoxynivalenol (DON) residues. The average value of the five positive results was 217 µg/kg (ppb) and the highest value obtained 361 µg/kg, which is well below national and international maximum allowable levels. Please see the mycotoxin results in Table 6 on pages 66 and 67. Last season, seven samples tested positive for DON residues with an average value of 202 µg/kg (ppb), the highest value measured was 570 µg/kg.

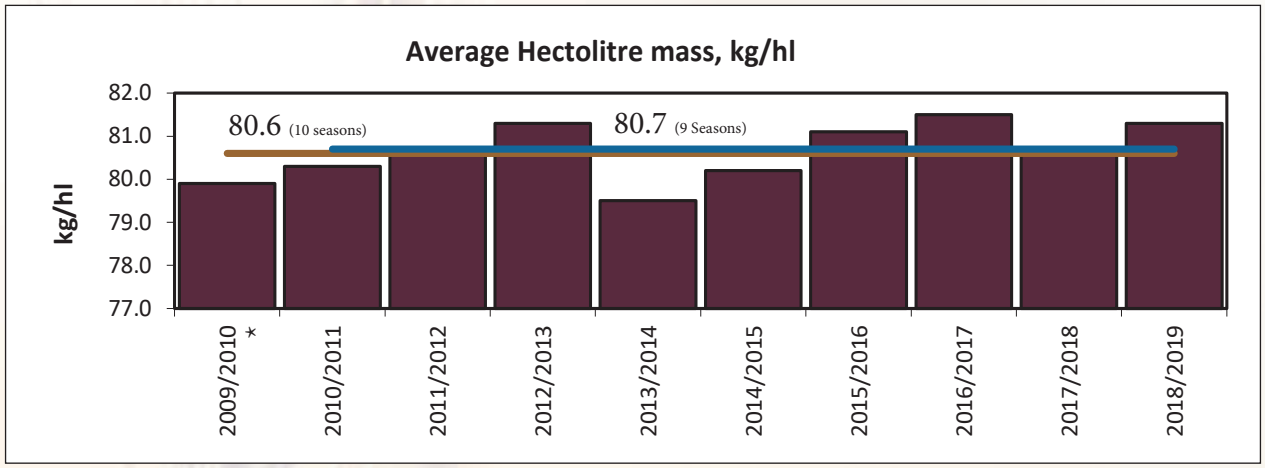
Table 3: Weighted average results for the last three seasons

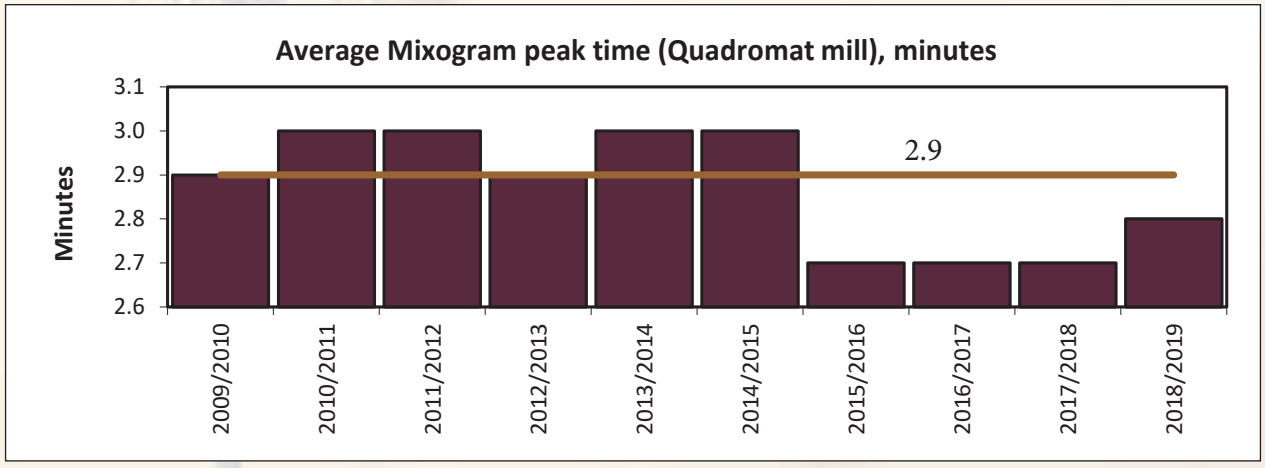
	2018/2019					2017/2018					2016/2017				
Region	Protein (12% mb), %	FN, sec	Hlm, kg/hl	Mixo PT, min	*n*	Protein (12% mb), %	FN, sec	Hlm, kg/hl	Mixo PT, min	*n*	Protein (12% mb), %	FN, sec	Hlm, kg/hl	Mixo PT, min	*n*
1	11.9	444	79.2	2.8	*3*	12.5	391	76.3	2.5	*3*	11.9	377	80.5	2.8	*3*
2	11.6	409	79.3	3.1	*10*	14.3	343	75.9	2.6	*13*	11.6	351	79.4	2.7	*20*
3	12.1	411	79.8	2.7	*78*	14.6	392	78.1	2.6	*52*	11.4	359	81.8	2.4	*77*
4	11.1	378	80.9	2.8	*22*	13.1	373	79.7	2.8	*17*	11.2	352	82.1	2.5	*30*
5	11.1	386	80.3	2.9	*21*	11.9	361	80.7	2.6	*42*	11.2	359	80.6	2.5	*20*
6	12.0	341	79.3	2.8	*27*	11.8	349	80.2	2.6	*24*	11.3	343	80.8	2.3	*24*
7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10	12.1	377	84.5	2.7	*30*	11.6	365	84.8	2.3	*30*	12.0	361	84.3	2.7	*38*
11	12.0	446	83.5	2.8	*14*	11.8	397	82.6	2.6	*14*	12.6	397	81.2	2.7	*6*
12	12.7	439	84.3	2.4	*3*	12.6	403	81.0	3.3	*4*	12.8	360	82.1	3.1	*4*
13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
14	13.5	440	80.2	2.8	*3*	13.0	432	82.3	4.1	*3*	13.0	371	82.9	2.6	*8*
15	11.5	368	80.8	3.0	*8*	12.4	455	82.2	2.9	*7*	-	-	-	-	-
16	12.0	399	83.0	2.4	*4*	11.9	380	81.8	2.8	*1*	-	-	-	-	-
17	13.0	390	81.8	2.4	*2*	12.9	378	81.9	3.3	*4*	11.4	373	81.4	2.5	*4*
18	11.9	418	81.8	2.5	*2*	12.2	393	81.5	3.0	*1*	-	-	-	-	-
19	12.1	403	82.4	3.1	*7*	11.7	382	81.8	3.6	*11*	12.3	388	81.9	3.2	*13*
20	12.1	424	82.6	2.7	*18*	11.7	372	82.5	2.9	*8*	12.2	373	81.7	3.4	*15*
21	12.2	456	83.3	2.9	*2*	12.5	297	81.9	2.8	*1*	-	-	-	-	-
22	11.7	387	82.0	2.5	*3*	11.6	352	80.0	3.0	*3*	15.8	349	78.7	2.7	*3*
23	12.9	504	83.1	2.6	*2*	13.9	388	80.8	2.5	*6*	15.9	309	77.1	2.8	*9*
24	12.8	473	81.4	2.8	*9*	12.4	400	80.3	2.8	*11*	13.7	347	82.0	2.7	*8*
25	13.5	405	81.5	3.0	*8*	-	-	-	-	-	14.0	293	78.9	3.3	*11*
26	13.5	356	78.5	3.0	*4*	12.4	290	79.1	3.4	*5*	-	-	-	-	-
27	-	-	-	-	-	12.2	358	79.4	3.3	*3*	-	-	-	-	-
28	13.4	353	80.2	3.1	*9*	12.7	272	79.3	3.0	*12*	13.0	327	80.1	3.4	*10*
29	11.9	379	84.5	3.0	*2*	-	-	-	-	-	12.7	291	80.8	3.1	*1*
30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
32	-	-	-	-	-	-	-	-	-	-	13.5	372	81.2	3.1	*3*
33	12.5	338	80.1	3.5	*6*	11.8	368	83.7	2.9	*11*	12.2	399	81.6	3.7	*13*
34	11.4	373	83.1	3.2	*7*	12.4	363	81.5	2.9	*1*	13.2	319	81.2	3.5	*3*
35	12.0	380	83.2	3.1	*23*	11.3	366	83.5	3.1	*8*	11.7	354	82.2	3.0	*11*
36	12.6	450	84.0	2.6	*10*	12.4	410	83.4	2.7	*9*	13.2	379	81.8	3.1	*3*
Ave.	**12.1**	**397**	**81.3**	**2.8**	***337***	**12.6**	**371**	**80.7**	**2.7**	***304***	**12.0**	**356**	**81.5**	**2.7**	***337***

Graph 21: Weighted average quality over ten seasons









*** Includes addition of 2 kg/hl according to Hectolitre mass Dispensation.**

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

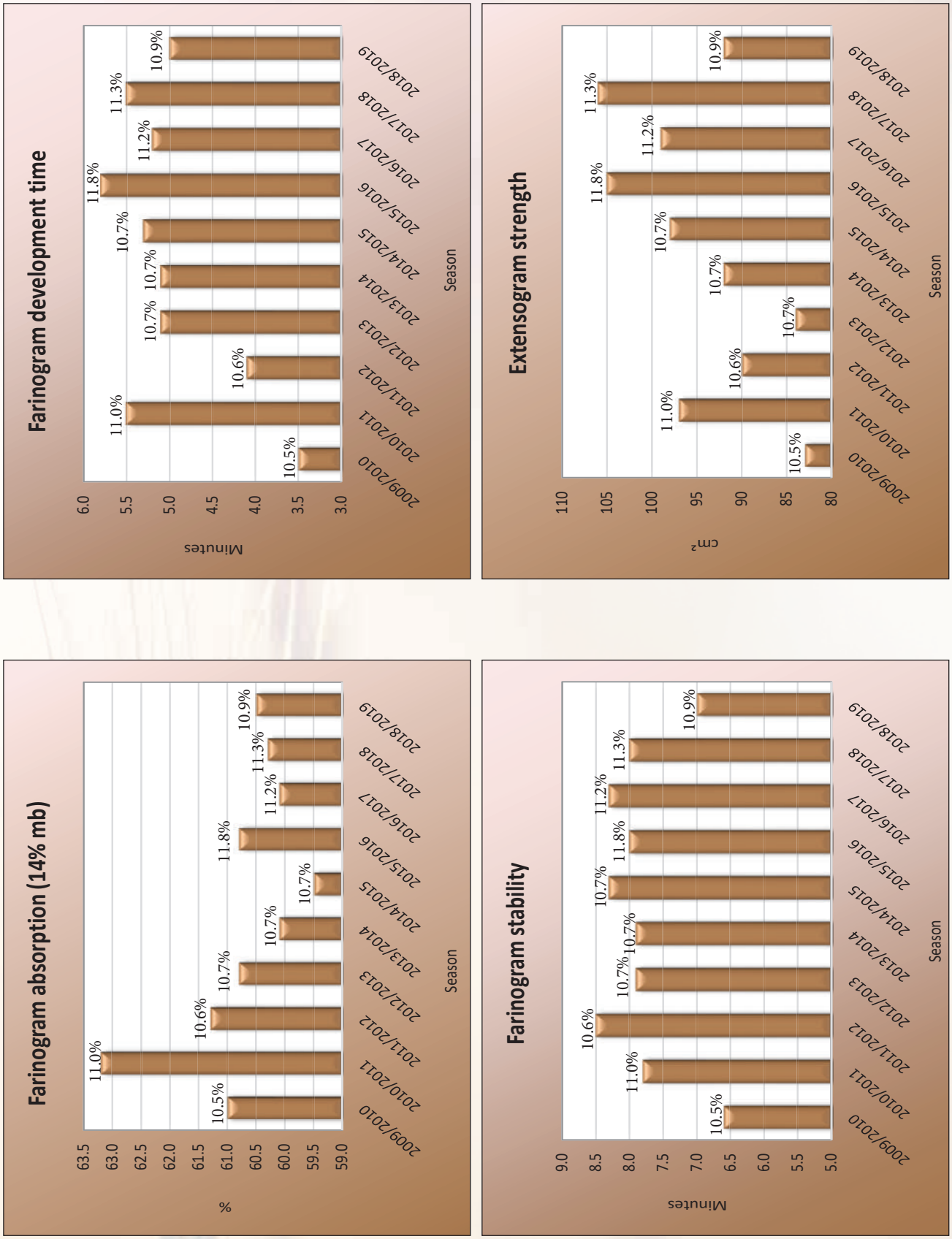
Flour Quality 2018/2019 season			
Flour protein (12% mb) (%)	10.9	Farinogram abs. (14% mb) (%)	60.5
Bread volume 100g (cm^3)	1033	Farinogram dev. time (min)	5.0
Mixogram (Bühler) peak time (min)	2.6	Alveogram strength (cm^2)	34.6
Wet gluten (14% mb) (%)	30.1	Alveogram P/L	0.81
Dry gluten (14% mb) (%)	10.1	Extensogram strength (cm^2)	92

Flour Quality 2017/2018 season			
Flour protein (12% mb) (%)	11.3	Farinogram abs. (14% mb) (%)	60.3
Bread volume 100g (cm^3)	1096	Farinogram dev. time (min)	5.5
Mixogram (Bühler) peak time (min)	2.6	Alveogram strength (cm^2)	39.2
Wet gluten (14% mb) (%)	30.7	Alveogram P/L	0.81
Dry gluten (14% mb) (%)	10.4	Extensogram strength (cm^2)	106

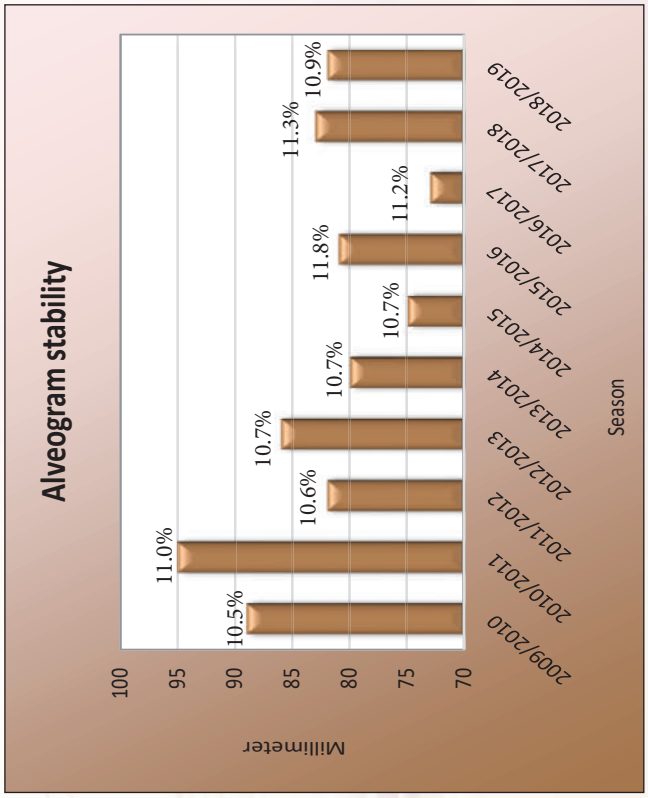
Flour Quality 2016/2017 season			
Flour protein (12% mb) (%)	11.2	Farinogram abs. (14% mb) (%)	60.1
Bread volume 100g (cm^3)	1040	Farinogram dev. time (min)	5.2
Mixogram (Bühler) peak time (min)	2.6	Alveogram strength (cm^2)	37.0
Wet gluten (14% mb) (%)	30.7	Alveogram P/L	0.57
Dry gluten (14% mb) (%)	10.5	Extensogram strength (cm^2)	99

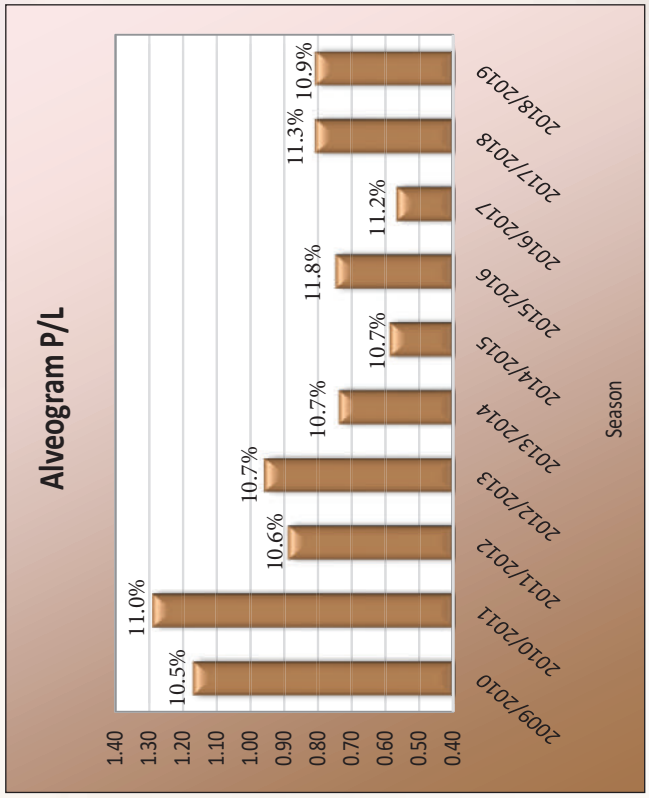
Flour Quality 2015/2016 season			
Flour protein (12% mb) (%)	11.8	Farinogram abs. (14% mb) (%)	60.8
Bread volume 100g (cm^3)	1047	Farinogram dev. time (min)	5.8
Mixogram (Bühler) peak time (min)	2.6	Alveogram strength (cm^2)	38.3
Wet gluten (14% mb) (%)	31.9	Alveogram P/L	0.75
Dry gluten (14% mb) (%)	11.0	Extensogram strength (cm^2)	105

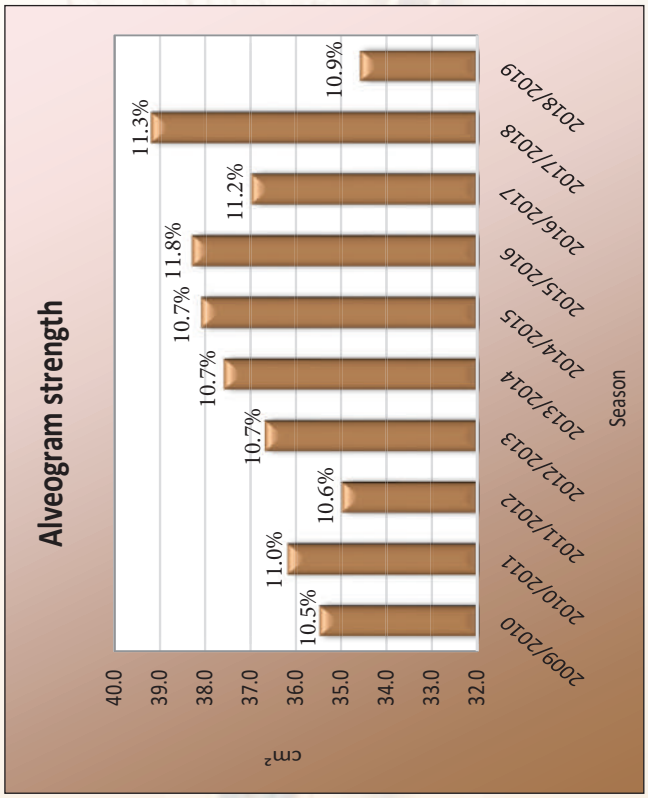
Graph 22: Comparison of rheological quality over ten seasons (Flour protein content (12% mb) is indicated above each bar)

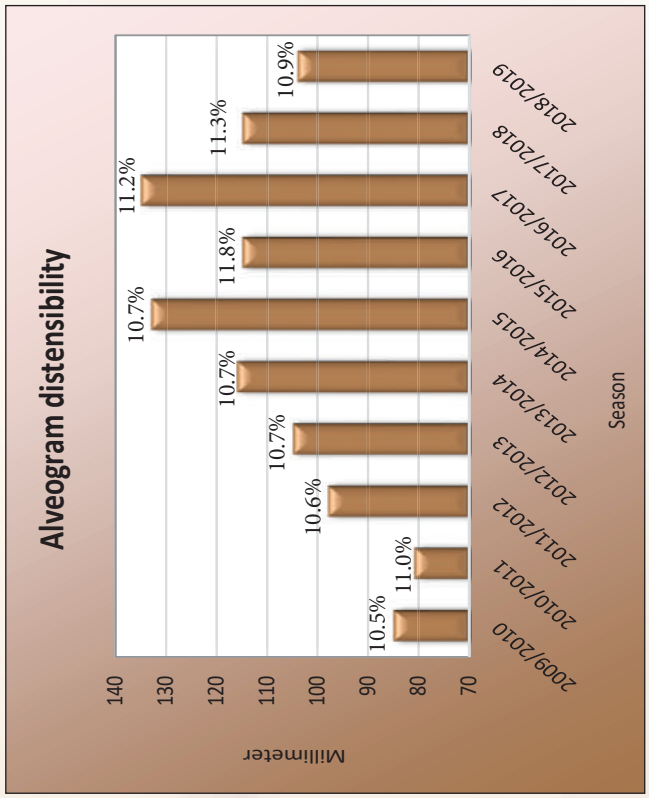


Graph 22: Comparison of rheological quality over ten seasons (Flour protein content (12% mb) is indicated above each bar) (continue)









REGIONAL QUALITY SUMMARY

WINTER RAINFALL AREA
(Western Cape)

The Western Cape Province has a Mediterranean climate, characterized 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. 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 the following sub regions: High Rainfall Area, Middle Swartland, Koringberg and Sandveld. The Rûens region is divided into 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 to December.

The climatic conditions in the Swartland region showed better prospects prior to planting, compared to the previous season. Soil moisture was sufficient in 2018, in contrast to 2017 when there was very little to no soil moisture during planting. This can be attributed to higher rainfall during April and May 2018.

Climatic conditions in the Rûens (apart from the Western Rûens) leading up to planting, showed bleak prospects for the year ahead. As was the case in 2017, the Eastern Rûens region was the hardest hit by dry conditions pre and post planting. Although good rains were recorded during June and July, the yield potential was already lower than normal. Rainfall for 2018 was only about 10% more than that of 2017. Most of the rain occurred in the later part of the growing season and that had a negative impact on growth and yield. Excessively warm temperatures in October also played a part in lower yields.

The hectolitre mass averaged 79.9 kg/hl compared to the previous season's 79.1 kg/hl. The thousand kernel mass averaged 39.0 g, 2.8 g higher than the previous season and compared well with the national average of 39.2 g. The average falling number was 392 seconds, while the whole wheat protein content averaged 11.8% (12% mb).

The percentage screenings of 1.80% was similar to the previous season's 1.79% and still the highest average of the three areas, as in previous seasons. The mixogram peak time (Quadromat Junior mill) averaged 2.8 minutes, equal to the national average. The Bühler extraction averaged 70.2% (average of wheat grades B1 to B4 and UT), lower than the 71.5% in 2017/2018. The average wet colour of the flour was -4.5 KJ units and the dry colour L* value (indicating lightness) 93.93, previously 93.77. These colour values indicate a white/light flour that is preferred by millers and bakers and compare well to previous seasons. The average ash content was 0.60%.

The flour protein content averaged 10.6%, lower than the 12.0% of the drought stricken previous season. The average wet and dry gluten values of 28.7% and 9.9% (14% mb) were in line with values obtained in seasons with normal rainfall. The gluten index was 95. The average farinogram absorption was 59.5% and the development time 4.4 minutes, the stability averaged 6.8 minutes. The average alveogram strength was 32.8 cm^2 and the P/L value averaged 0.81. The average strength on the extensogram was 84 cm^2. The rheological tests' values this season were more in line with long term averages, compared to the previous season, where high protein contents due to the drought conditions resulted in increased rheological strength. The mixogram peak time on the Bühler milled flour averaged 2.6 minutes, similar to last season. The 100-gram baking test showed on average an excellent relationship between protein content and bread volume.

SUMMER RAINFALL AND IRRIGATION AREA
(Free State)

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

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

Climatic conditions before and during the growing season were very similar to the 2017/2018 season. Good rains occurred in the fallow period from January to March in all regions. During January the rainfall was close to the long-term average, in February and March however the precipitation was almost three times more than the average figures. In the months leading up to planting time (April to June), low rainfall figures were recorded in all regions. This lead to sub-optimum conditions during planting time and the early stages of development, unless soil moisture conservation practices was at an optimum level. Rain was recorded monthly from the middle of August to November, but unfortunately extremely high temperatures during these months neutralized the possible positive effect of these rainfall events.

The average hectolitre mass was 81.1 kg/hl, 1.2 kg/hl higher than in 2017/2018. The thousand kernel mass of 36.1 g, was 1.8 g lower than the previous season. The average percentage screenings was 1.46%, similar to the national average of 1.49%. The average whole wheat protein content increased from 12.6% the previous season to 13.1% (12% mb) this season. The falling number of 410 seconds was the highest average of the three areas.

The mixogram (Quadromat Junior) peak time was 2.9 minutes, equal to the previous season and slightly higher than the national average. The average Bühler extraction percentage in the Free State was 71.4% and compared well with the national average of 71.3%. The Kent Jones flour colour was -4.4 KJ units and the Konica Minolta CM-5 L* value 93.53, compared to the -4.1 KJ and 93.69 of the previous season. The average ash content was 0.60% and the average flour protein content 0.7% higher than the previous season at 11.6%. The wet gluten content (14% mb) was 31.9% and the dry gluten 10.6%, an increase of 2.0% and 0.6% respectively compared to the previous season. The gluten index averaged 91.

The average farinogram water absorption of 61.3% was higher than the previous season's 59.8% and also the highest of the three areas this season. The development time averaged 5.5 and the stability 7.7 minutes, both 0.5 minutes longer than in 2017/2018. The average alveogram strength of 36.8 cm^2 was 1.2 cm^2 higher than the previous season, while the extensogram strength equaled the 96 cm^2 of last season. The Bühler milled flour had an average mixograph peak time of 2.6 minutes, slightly shorther than last season's 2.8 minutes. 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 areas 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 late 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 higher than the long-term average.

The irrigation wheat had the highest weighted average hectolitre mass of 83.1 kg/hl, as in the previous season. The thousand kernel mass increased by 0.6 g to 40.2 g. The average falling number was 399 seconds. The screenings averaged 1.07%, comparing very well with the 1.05% of the previous season and was also the lowest of the three areas as in 2017/2018.

The whole wheat protein content was on average 12.1%, 0.2% higher than last season and equal to this season's national average. The flour's protein content of 11.0%, equaled that of the previous two seasons. The mixogram (Quadromat Junior) peak time averaged 2.9 minutes. The average Bühler extraction was 71.9%, 2.1% lower than last season's average.

The dry colour L* value was 93.79 and the Kent Jones wet colour value -4.7 KJ units. The ash content averaged 0.60%. The wet and dry gluten contents were 30.2% and 10.1% respectively and the gluten index 94, all three these values were slightly higher than in the previous season. The average farinogram water absorption was 60.8% (60.1% during the previous season), the development time and stability averaged 6.6 minutes and 6.8 minutes respectively.

Alveogram strength averaged 34.8 cm^2 and the P/L 0.79 (38.9 cm^2 and 0.80 respectively the previous season). A P/L value of 0.79 is very well situated within the general acceptable range of P/L values for bread baking purposes. The average extensogram strength was 94 cm^2, compared to 106 cm^2 last season. Lower strength values compared to the previous season, at equal flour protein content, indicate lower rheologial quality this season. The mixogram peak time averaged 2.6 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 36 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	**161**			**37**			**139**			**337**		
Regions	**1 - 6**			**21 - 28**			**10 - 11, 12 - 20, 33, 34, 35, 36**			**All**		
Hectolitre mass dirty, kg/hl	79.9			81.1			83.1			81.3		
1000 kernel mass (13% mb), g	39.0			36.1			40.2			39.2		
Falling number, sec	392			410			399			397		
Screenings (1.8 mm sieve), %	1.80			1.46			1.07			1.49		
Protein (12% mb), % (WWF)	11.8			13.1			12.1			12.1		
Mixogram peak time, min (Quadromat Junior)	2.8			2.9			2.9			2.8		
Composite samples per class and grade	***B1***	***B2***	***B3***	***B1***	***B2***	***B3***	***B1***	***B2***	***B3***	***B1***	***B2***	***B3***
	B4	***UT***	***COW***	***B4***	***UT***	***COW***	***B4***	***UT***	***COW***	***B4***	***UT***	***COW***
Composite samples, n = 70	***6***	***5***	***4***	***7***	***5***	***1***	***15***	***11***	***6***	***28***	***21***	***11***
	3	***2***	***-***	***1***	***-***	***-***	***3***	***1***	***-***	***7***	***3***	***-***
Bühler extraction, %	70.2	70.3	70.2	71.3	71.7	74.7	72.1	72.3	71.9	71.5	71.7	71.5
	70.3	70.0	-	67.2	-	-	68.7	72.1	-	69.2	70.7	-
Flour colour, KJ (wet)	-4.4	-4.4	-4.6	-4.3	-4.5	-4.9	-4.6	-4.7	-4.7	-4.5	-4.6	-4.7
	-4.4	-4.6	-	-3.8	-	-	-4.5	-4.4	-	-4.4	-4.5	-
Colour, Konica Minolta CM5 (dry)												
L*	93.89	93.93	94.03	93.52	93.56	93.82	93.78	93.86	93.80	93.74	93.80	93.89
	93.74	94.14	-	93.13	-	-	93.63	93.68	-	93.61	93.99	-
b*	10.07	10.33	10.32	10.21	10.19	11.35	9.94	9.85	9.98	10.04	10.05	10.23
	10.74	9.82	-	10.86	-	-	10.49	9.82	-	10.65	9.82	-
Ash (db), %	0.59	0.60	0.60	0.59	0.62	0.62	0.60	0.60	0.61	0.60	0.60	0.61
	0.61	0.58	-	0.57	-	-	0.63	0.56	-	0.61	0.57	-
Flour protein (12% mb), %	11.6	10.7	9.6	12.0	10.9	9.7	11.8	10.8	9.6	11.8	10.6	9.6
	9.1	11.4	-	13.8	-	-	10.4	11.1	-	10.4	11.3	-

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	161			37			139			337		
Composite samples per class and grade	*B1*	*B2*	*B3*	*B1*	*B2*	*B3*	*B1*	*B2*	*B3*	*B1*	*B2*	*B3*
	B4	*UT*	*COW*	*B4*	*UT*	*COW*	*B4*	*UT*	*COW*	*B4*	*UT*	*COW*
Composite samples, n = 70	*6*	*5*	*4*	*7*	*5*	*1*	*15*	*11*	*6*	*28*	*21*	*11*
	3	*2*	-	*1*	-	-	*3*	*1*	-	*7*	*3*	-
Wet gluten (14% mb), %	31.9	28.3	25.0	33.3	29.8	26.8	32.7	28.8	25.9	32.7	28.9	25.6
	24.9	31.6	-	36.9	-	-	31.9	30.8	-	30.1	31.3	-
Dry gluten (14% mb), %	11.0	9.8	8.5	11.2	9.8	8.6	11.0	9.6	8.6	11.0	9.7	8.5
	8.6	10.7	-	12.5	-	-	10.5	10.5	-	10.1	10.6	-
Gluten Index	93	96	97	90	93	90	92	95	96	92	95	96
	98	92	-	96	-	-	94	96	-	96	93	-
Farinogram: Water absorption (14% mb), %	61.1	59.7	58.3	61.9	60.6	58.9	61.8	60.7	59.4	61.6	60.4	58.9
	57.0	60.6	-	63.5	-	-	58.6	62.2	-	58.6	61.1	-
Farinogram: Development time, min	5.0	4.5	4.0	6.0	4.7	4.5	8.8	5.3	4.8	5.4	4.9	4.5
	3.6	4.6	-	6.9	-	-	4.6	4.5	-	4.5	4.5	-
Farinogram: Stability, min	7.6	6.9	6.2	8.3	6.9	5.2	6.8	6.8	6.7	7.4	6.8	6.4
	5.9	7.1	-	10.6	-	-	7.0	6.3	-	7.1	6.8	-
Alveogram: Strength (S), cm²	38.2	33.1	28.0	41.3	31.8	23.1	37.2	34.0	30.7	38.5	33.2	29.0
	25.3	36.6	-	43.4	-	-	33.1	36.4	-	31.2	36.5	-
Alveogram: P/L	0.80	0.82	0.80	0.84	0.91	0.62	0.69	0.83	0.88	0.75	0.85	0.83
	0.92	0.64	-	0.96	-	-	0.99	0.78	-	0.96	0.68	-
Extensogram: Strength, cm²	98	83	74	104	89	75	101	93	79	101	90	76
	66	98	-	94	-	-	101	93	-	85	96	-
Mixogram peak time, min	2.5	2.5	2.7	2.6	2.5	2.4	2.5	2.6	2.8	2.5	2.6	2.7
	2.6	2.3	-	2.8	-	-	3.3	2.4	-	3.0	2.3	-
Relationship between protein and bread volume	EX	EX	EX	EX	EX	EX	EX	EX	EX	EX	EX	EX
	EX	EX	-	EX	-	-	EX	EX	-	EX	EX	-

EX = Excellent

RSA Production Regions

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

Figure 1: RSA Provinces map

Provincial map with gratitude to SiQ.

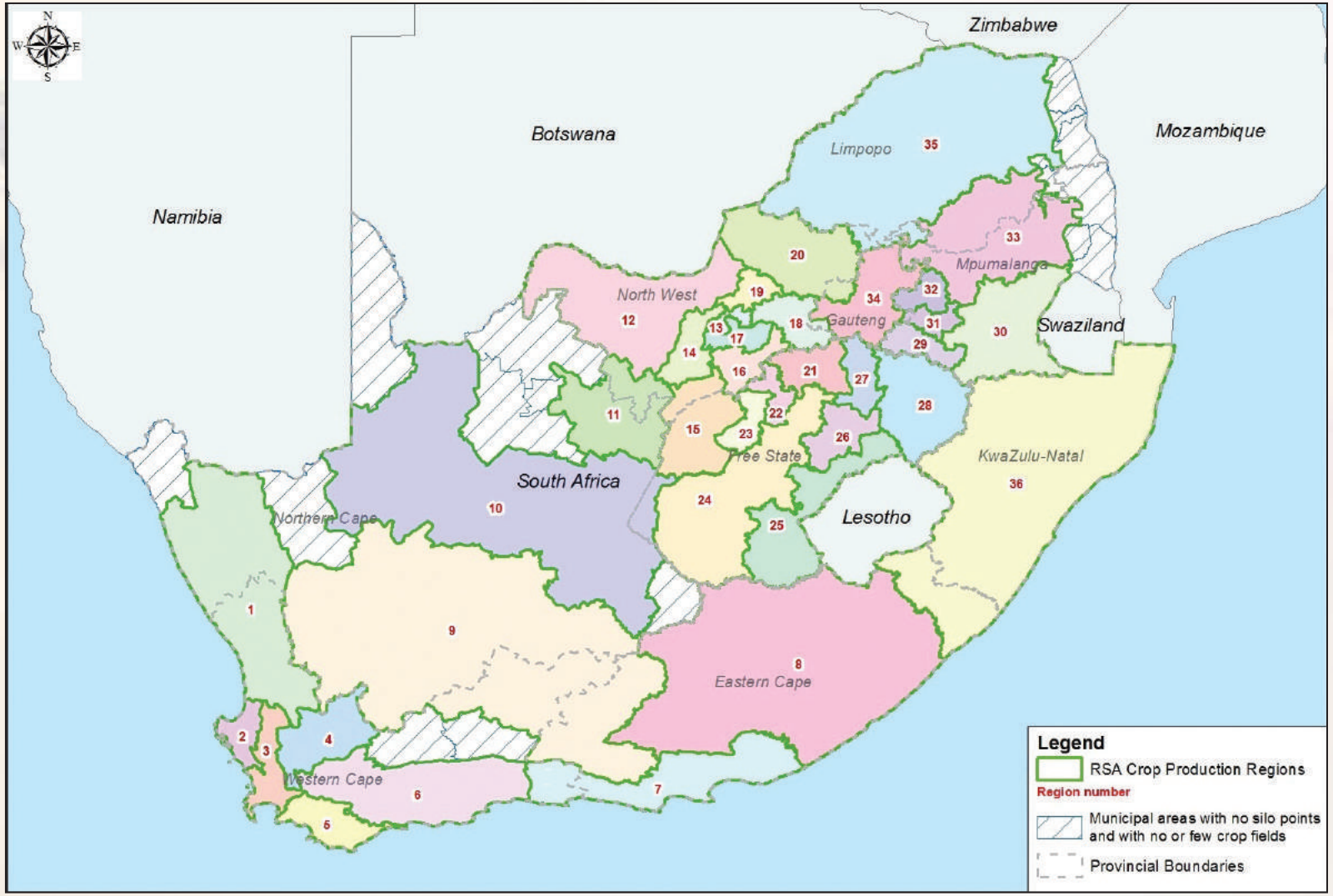
The 9 provinces are divided into 36 grain production regions.

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

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

The production regions from which wheat samples were received for the crop quality survey of the 2018/2019 production season, are named and described on pages 32 to 35. 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	Klipfontein *(Bunkers)*
Kaap Agri	Piketberg *(Bins)*	Afgri	Malandam *(Bunkers)*
Kaap Agri	Pools *(Bins)*	BKB Grainco	Eenboom *(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 Eastern Region

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

Region 10: Griqualand-West Region

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

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)*

Grain Production Regions

Silo/Intake stands per region indicating type of storage structure

Region 12: North West Western Region			
NWK	Blaauwbank *(Bins)*	NWK	Mareetsane *(Bins)*
NWK	Bührmannsdrif *(Bins)*	Suidwes Landbou	Kameel *(Bins)*
NWK	Kameel *(Bins)*	Suidwes Landbou	Vryburg *(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 15: North West South-Eastern Region			
Suidwes Landbou	Bloemhof *(Bins)*	Suidwes Landbou	Kingswood *(Bins)*
Suidwes Landbou	Christiana *(Bins)*	Suidwes Landbou	Kruising *(Bunkers)*
Suidwes Landbou	Hertzogville *(Bins)*	Suidwes Landbou	Poppieland *(Bunkers)*
Suidwes Landbou	Hoopstad *(Bins)*	GWK	Christiana *(Bins)*

Region 16: North West Central-Eastern Region			
Senwes	Regina *(Bins)*	Suidwes Landbou	Makwassie *(Bins)*
Suidwes Landbou	Bamboesspruit *(Bins)*	Suidwes Landbou	Strydpoort *(Bins)*
Suidwes Landbou	Leeudoringstad *(Bins)*	Suidwes Landbou	Wolmaranstad*(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)*

Grain Production Regions

Silo/Intake stands per region indicating type of storage structure

Region 21: Free State North-Western Region (Viljoenskroon)			
Senwes	Attie *(Bins)*	Senwes	Vierfontein *(Bins)*
Senwes	Groenebloem *(Bins)*	Senwes	Viljoenskroon *(Bins)*
Senwes	Heuningspruit *(Bins)*	Senwes	Vredefort *(Bins)*
Senwes	Koppies *(Bins)*	Senwes	Weiveld *(Bins)*
Senwes	Rooiwal *(Bins)*		

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)*

Grain Production Regions

Silo/Intake stands per region indicating type of storage structure

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)*		

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 35: Limpopo Region			
Afgri	Northam *(Bins)*	VKB (NTK)	Nylstroom (Modimolle) *(Bins)*
VKB (NTK)	Alma *(Bins)*	VKB (NTK)	Potgietersrus (Mokopane) *(Bins)*
VKB (NTK)	Lehau *(Bins)*	VKB (NTK)	Roedtan *(Bins)*
VKB (NTK)	Naboomspruit (Mookgophong) *(Bins)*	VKB (NTK)	Settlers *(Bins)*
VKB (NTK)	Nutfield *(Bins)*	VKB (NTK)	Warmbad (Bela-Bela) *(Bins)*

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

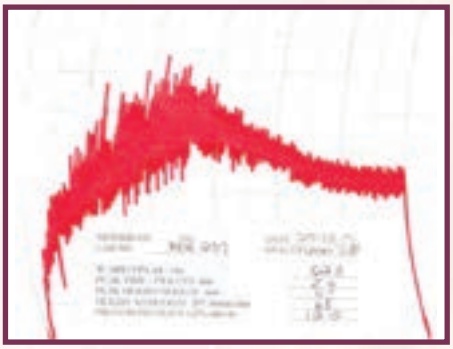
PRODUCTION REGION	(1) Namakwaland Region				(2) Swartland Western Region			
WHEAT	**ave**	**min**	**max**	**stdev**	**ave**	**min**	**max**	**stdev**
Protein (12% mb), %	11.9	10.8	13.3	1.27	11.6	10.7	12.5	0.50
Falling number, sec	444	437	447	5.77	409	351	443	29.02
1000 Kernel mass (13% mb), g	37.5	37.1	37.8	0.36	37.4	33.4	39.6	1.99
Hectolitre mass (dirty), kg/hl	79.2	77.8	80.0	1.22	79.3	76.9	81.1	1.19
Screenings (<1.8 mm sieve), %	3.17	2.56	3.55	0.53	3.16	1.74	7.81	2.08
Total damaged kernels, %	1.25	1.10	1.40	0.15	0.39	0.18	0.72	0.16
Combined deviations, %	5.22	4.16	6.01	0.95	4.28	2.48	9.19	2.27
Number of samples	***3***				***10***			
CULTIVARS								
cultivars with highest % occurrence	SST 0117	30.3			SST 0117	27.2		
	SST 0127	23.3			SST 0127	22.4		
	SST 056	23.3			SST 056	18.5		
	SST 087	15.3			SST 087	13.8		
	SST 015	7.7			SST 88	13.7		
Number of samples	***3***				***10***			
MIXOGRAM (Quadromat Junior)	**ave**	**min**	**max**	**stdev**	**ave**	**min**	**max**	**stdev**
Peak time, min	2.8	2.6	2.9	0.15	3.1	2.8	3.5	0.26
Tail height (6 min), mm	46	44	48	2.00	47	45	50	1.57
Number of samples	***3***				***10***			

	COMPOSITE SAMPLES											
CLASS AND GRADE	**B1**	**B2**	**B3**	**B4**	**UT**	**COW**	**B1**	**B2**	**B3**	**B4**	**UT**	**COW**
Bühler Extraction, %	72.8	-	-	-	-	-	69.6	69.9	-	-	-	-
FLOUR												
Protein (12% mb), %	11.3	-	-	-	-	-	11.3	10.4	-	-	-	-
Ash (db), %	0.61	-	-	-	-	-	0.59	0.62	-	-	-	-
Colour, KJ (wet)	-4.5	-	-	-	-	-	-4.5	-4.6	-	-	-	-
Colour, Konica Minolta CM5 (dry)												
L*	93.72	-	-	-	-	-	93.74	94.14	-	-	-	-
a*	0.40	-	-	-	-	-	0.36	0.40	-	-	-	-
b*	9.84	-	-	-	-	-	9.79	10.33	-	-	-	-
RVA												
Peak Viscosity, cP	2390	-	-	-	-	-	1956	2051	-	-	-	-
Minimum viscosity (Trough), cP	1807	-	-	-	-	-	1377	1465	-	-	-	-
Final Viscosity, cP	2534	-	-	-	-	-	2248	2361	-	-	-	-
Peak Time, min	7.00	-	-	-	-	-	7.00	7.00	-	-	-	-
GLUTEN												
Wet gluten (14% mb), %	31.8	-	-	-	-	-	30.3	25.7	-	-	-	-
Dry gluten (14% mb), %	10.4	-	-	-	-	-	10.4	8.6	-	-	-	-
Gluten Index	89	-	-	-	-	-	93	96	-	-	-	-
FARINOGRAM												
Water absorption (14% mb), %	61.1	-	-	-	-	-	60.3	59.7	-	-	-	-
Development time, min	6.0	-	-	-	-	-	4.8	4.7	-	-	-	-
Stability, min	6.9	-	-	-	-	-	8.4	8.9	-	-	-	-
Mixing tolerance index, BU	41	-	-	-	-	-	28	23	-	-	-	-
EXTENSOGRAM (45 min pull)												
Area, cm^2	105	-	-	-	-	-	99	79	-	-	-	-
Maximum height, BU	395	-	-	-	-	-	402	355	-	-	-	-
Extensibility, mm	191	-	-	-	-	-	177	165	-	-	-	-
ALVEOGRAM												
Strength (S), cm^2	37.5	-	-	-	-	-	37.2	33.8	-	-	-	-
Stability (P), mm	87	-	-	-	-	-	93	95	-	-	-	-
Distensibility (L), mm	102	-	-	-	-	-	97	78	-	-	-	-
Configuration ratio (P/L)	0.85	-	-	-	-	-	0.96	1.22	-	-	-	-
MIXOGRAM												
Peak time, min	2.6	-	-	-	-	-	2.8	3.0	-	-	-	-
100g BAKING TEST												
Loaf volume, cm^3	1054	-	-	-	-	-	1021	908	-	-	-	-
Evaluation (see page 79)	0	-	-	-	-	-	0	0	-	-	-	-

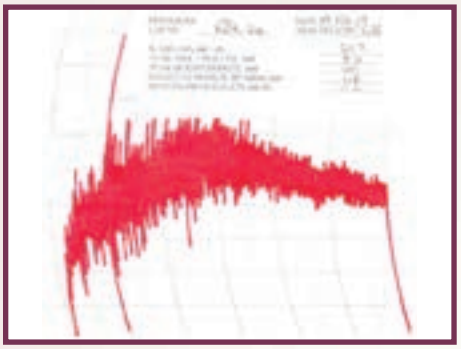
RHEOLOGICAL GRAPHS PER PRODUCTION REGION

MIXOGRAM

1

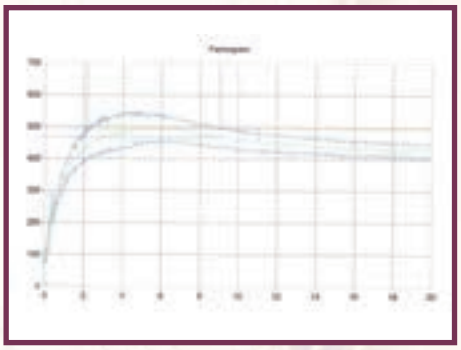


2

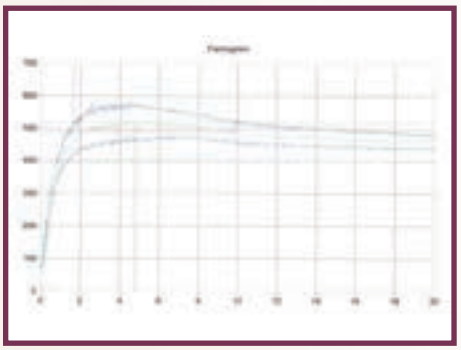


FARINOGRAM

1

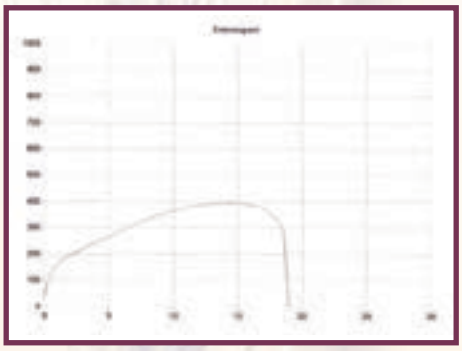


2



EXTENSOGRAM

1



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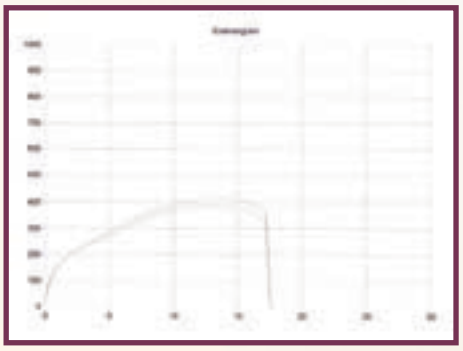
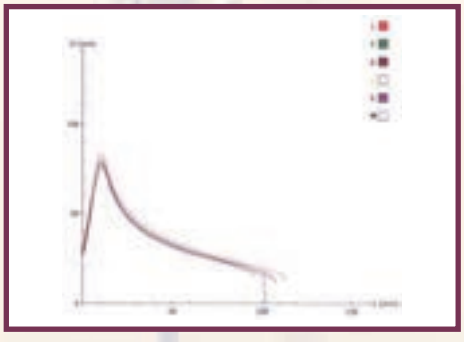


ALVEOGRAM

1



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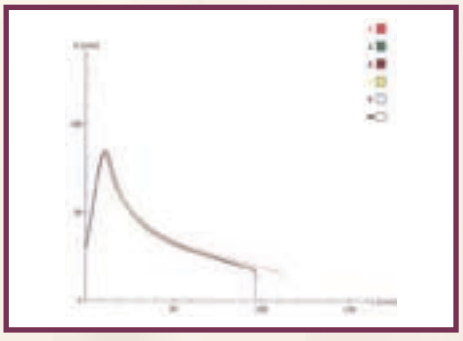


South African Quality data per production region
WINTER RAINFALL WHEAT

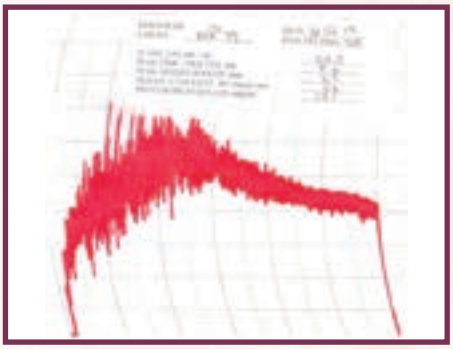
PRODUCTION REGION	(3) Swartland Central Region				(4) Swartland Eastern Region			
WHEAT	**ave**	**min**	**max**	**stdev**	**ave**	**min**	**max**	**stdev**
Protein (12% mb), %	12.1	10.2	15.4	1.00	11.1	9.4	12.9	0.91
Falling number, sec	411	295	618	42.66	378	333	432	28.23
1000 Kernel mass (13% mb), g	39.1	28.3	46.5	3.24	40.5	32.2	45.7	2.96
Hectolitre mass (dirty), kg/hl	79.8	76.0	83.5	1.42	80.9	78.2	82.3	1.14
Screenings (<1.8 mm sieve), %	1.66	0.18	5.05	0.85	1.76	0.17	4.10	1.17
Total damaged kernels, %	0.80	0.12	3.60	0.57	0.91	0.56	1.46	0.24
Combined deviations, %	3.31	0.88	7.32	1.31	3.40	1.61	7.18	1.40
Number of samples	***78***				***22***			
CULTIVARS								
	SST 0117	26.8			SST 0127	24.4		
cultivars	SST 0127	23.0			SST 0117	24.2		
with highest %	SST 087	18.6			SST 087	16.9		
occurrence	SST 056	14.7			SST 056	14.6		
	SST 88	8.2			SST 88	8.3		
Number of samples	***78***				***22***			
MIXOGRAM (Quadromat Junior)	**ave**	**min**	**max**	**stdev**	**ave**	**min**	**max**	**stdev**
Peak time, min	2.7	2.1	3.3	0.23	2.8	2.3	3.8	0.35
Tail height (6 min), mm	46	40	52	2.45	45	41	49	2.61
Number of samples	***78***				***22***			

	COMPOSITE SAMPLES											
CLASS AND GRADE	**B1**	**B2**	**B3**	**B4**	**UT**	**COW**	**B1**	**B2**	**B3**	**B4**	**UT**	**COW**
Bühler Extraction, %	68.9	69.9	70.4	-	70.1	-	69.7	70.4	70.9	70.3	-	-
FLOUR												
Protein (12% mb), %	11.9	10.7	9.6	-	11.0	-	11.5	10.6	9.5	8.7	-	-
Ash (db), %	0.56	0.55	0.55	-	0.54	-	0.56	0.59	0.55	0.56	-	-
Colour, KJ (wet)	-4.4	-4.5	-4.8	-	-4.7	-	-4.6	-4.5	-4.7	-4.9	-	-
Colour, Konica Minolta CM5 (dry)												
L*	94.02	94.27	94.24	-	94.43	-	94.31	94.05	94.27	94.15	-	-
a*	0.43	0.42	0.35	-	0.34	-	0.39	0.42	0.37	0.39	-	-
b*	10.23	10.37	10.68	-	9.39	-	9.52	9.79	9.69	10.57	-	-
RVA												
Peak Viscosity, cP	2075	2094	1991	-	2088	-	1987	2145	2319	2381	-	-
Minimum viscosity (Trough), cP	1463	1508	1358	-	1481	-	1426	1559	1765	1809	-	-
Final Viscosity, cP	2387	2444	2313	-	2431	-	2331	2540	2760	2838	-	-
Peak Time, min	7.00	7.00	7.00	-	7.00	-	7.00	7.00	7.00	7.00	-	-
GLUTEN												
Wet gluten (14% mb), %	32.0	28.6	24.8	-	30.7	-	32.0	28.9	25.8	-	-	-
Dry gluten (14% mb), %	11.0	9.6	8.1	-	10.7	-	10.6	10.2	8.8	-	-	-
Gluten Index	94	94	97	-	93	-	93	96	95	-	-	-
FARINOGRAM												
Water absorption (14% mb), %	62.0	59.7	58.3	-	60.2	-	61.0	60.0	58.2	56.1	-	-
Development time, min	4.7	5.3	4.2	-	4.3	-	5.1	4.3	4.4	2.8	-	-
Stability, min	8.0	7.2	6.7	-	7.8	-	7.5	6.5	6.5	7.3	-	-
Mixing tolerance index, BU	29	40	37	-	27	-	36	35	43	25	-	-
EXTENSOGRAM (45 min pull)												
Area, cm^2	105	93	87	-	94	-	99	81	70	73	-	-
Maximum height, BU	395	380	373	-	365	-	360	329	310	348	-	-
Extensibility, mm	192	182	167	-	190	-	199	181	160	153	-	-
ALVEOGRAM												
Strength (S), cm^2	43.1	36.9	30.7	-	36.1	-	36.7	30.9	26.6	24.2	-	-
Stability (P), mm	92	81	77	-	80	-	80	77	70	70	-	-
Distensibility (L), mm	122	120	102	-	119	-	118	101	98	79	-	-
Configuration ratio (P/L)	0.75	0.68	0.75	-	0.67	-	0.68	0.76	0.71	0.89	-	-
MIXOGRAM												
Peak time, min	2.3	2.3	2.3	-	2.4	-	2.4	2.3	2.9	2.9	-	-
100g BAKING TEST												
Loaf volume, cm^3	991	976	889	-	979	-	1014	1000	869	857	-	-
Evaluation (see page 79)	0	0	0	-	0	-	0	0	0	0	-	-

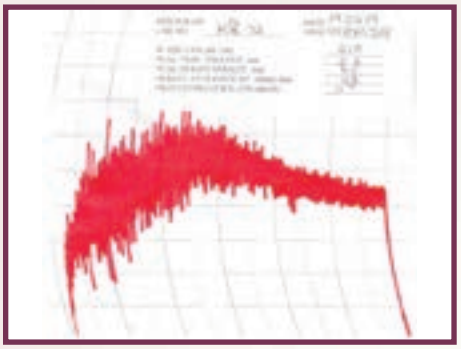
RHEOLOGICAL GRAPHS PER PRODUCTION REGION

MIXOGRAM

3

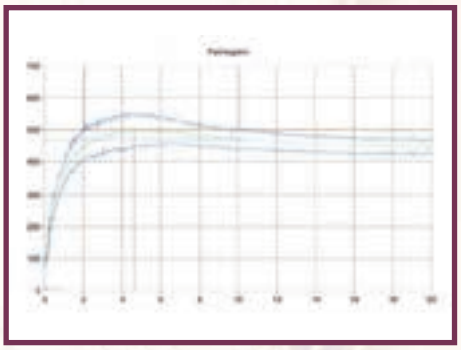


4



FARINOGRAM

3



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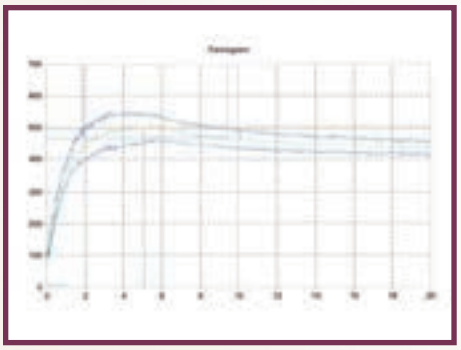
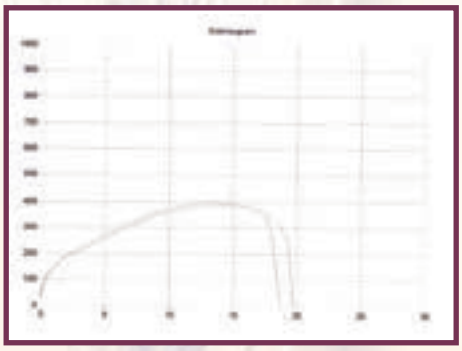


EXTENSOGRAM

3



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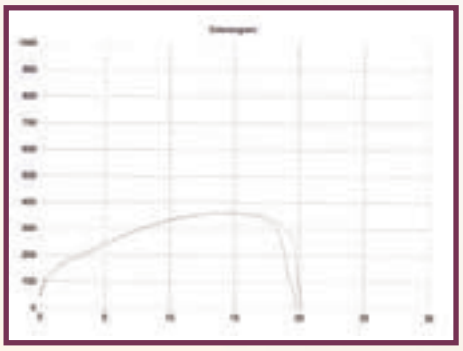
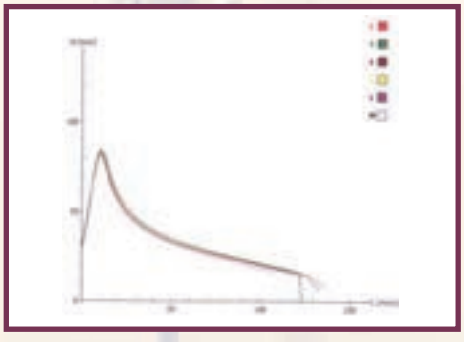
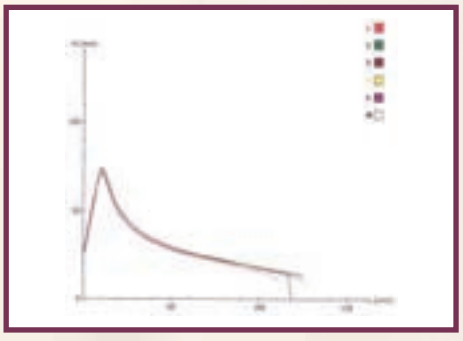


ALVEOGRAM

3



4



South African Quality data per production region
WINTER RAINFALL WHEAT

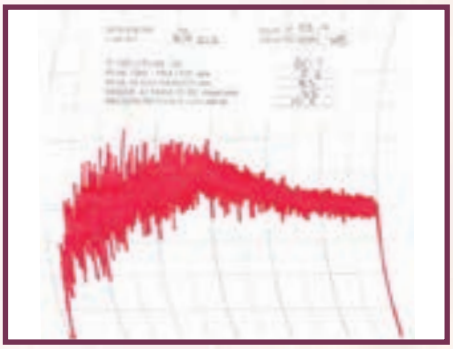
PRODUCTION REGION	(5) Rûens Western Region				(6) Rûens Eastern Region			
WHEAT	**ave**	**min**	**max**	**stdev**	**ave**	**min**	**max**	**stdev**
Protein (12% mb), %	11.1	9.0	12.7	1.15	12.0	9.5	13.9	1.03
Falling number, sec	386	340	437	26.41	341	284	410	25.45
1000 Kernel mass (13% mb), g	38.7	32.6	44.1	3.08	38.5	33.4	43.2	2.41
Hectolitre mass (dirty), kg/hl	80.3	77.5	82.2	1.51	79.3	76.6	81.8	1.31
Screenings (<1.8 mm sieve), %	1.12	0.28	3.96	1.11	2.13	1.03	3.65	0.68
Total damaged kernels, %	0.62	0.16	1.76	0.48	0.57	0.18	1.70	0.31
Combined deviations, %	2.28	0.83	5.28	1.24	3.59	1.99	7.29	1.11
Number of samples	***21***				***27***			
CULTIVARS								
cultivars with highest % occurrence	SST 0117	28.9			SST 087	25.6		
	SST 0127	25.8			SST 0117	22.3		
	SST 087	17.3			SST 0127	18.2		
	SST 056	11.2			SST 056	17.0		
	SST 88	10.4			SST 88	8.5		
Number of samples	***21***				***27***			
MIXOGRAM (Quadromat Junior)	**ave**	**min**	**max**	**stdev**	**ave**	**min**	**max**	**stdev**
Peak time, min	2.9	2.3	3.8	0.35	2.8	2.3	3.3	0.25
Tail height (6 min), mm	46	39	52	3.43	48	38	56	4.04
Number of samples	***21***				***27***			

	COMPOSITE SAMPLES											
CLASS AND GRADE	**B1**	**B2**	**B3**	**B4**	**UT**	**COW**	**B1**	**B2**	**B3**	**B4**	**UT**	**COW**
Bühler Extraction, %	69.8	70.6	69.1	70.5	-	-	70.4	70.6	70.4	70.0	69.9	-
FLOUR												
Protein (12% mb), %	11.9	10.9	9.4	8.9	-	-	11.7	10.7	9.9	9.8	11.8	-
Ash (db), %	0.60	0.62	0.64	0.63	-	-	0.63	0.60	0.66	0.65	0.62	-
Colour, KJ (wet)	-4.2	-4.2	-4.4	-4.1	-	-	-4.3	-4.2	-4.3	-4.2	-4.4	-
Colour, Konica Minolta CM5 (dry)												
L*	93.65	93.65	93.97	93.46	-	-	93.87	93.56	93.65	93.62	93.85	-
a*	0.52	0.48	0.40	0.64	-	-	0.48	0.55	0.49	0.51	0.48	-
b*	11.06	10.60	10.17	10.82	-	-	9.98	10.54	10.74	10.82	10.25	-
RVA												
Peak Viscosity, cP	2468	2420	2225	2433	-	-	2297	2378	2265	2312	2418	-
Minimum viscosity (Trough), cP	1813	1803	1703	1907	-	-	1735	1841	1927	1837	1857	-
Final Viscosity, cP	2883	2840	2561	2863	-	-	2656	2745	2580	2611	2743	-
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), %	33.3	30.1	24.9	23.1	-	-	31.8	28.2	24.6	26.6	32.5	-
Dry gluten (14% mb), %	12.4	10.9	8.6	8.1	-	-	11.3	9.6	8.4	9.0	10.7	-
Gluten Index	95	96	97	99	-	-	96	96	98	97	91	-
FARINOGRAM												
Water absorption (14% mb), %	60.9	60.0	58.9	57.2	-	-	61.0	59.3	57.7	57.8	60.9	-
Development time, min	4.3	3.9	3.3	4.3	-	-	5.2	4.1	4.2	3.8	4.8	-
Stability, min	6.9	5.5	6.0	5.5	-	-	7.6	6.2	5.7	5.0	6.4	-
Mixing tolerance index, BU	39	44	38	50	-	-	39	40	47	52	50	-
EXTENSOGRAM (45 min pull)												
Area, cm^2	83	78	60	58	-	-	97	82	77	67	102	-
Maximum height, BU	309	309	256	252	-	-	346	291	301	251	342	-
Extensibility, mm	191	183	167	160	-	-	200	201	186	186	212	-
ALVEOGRAM												
Strength (S), cm^2	38.5	33.2	27.1	21.9	-	-	36.2	30.9	27.5	29.8	37.0	-
Stability (P), mm	86	81	81	74	-	-	86	74	73	81	77	-
Distensibility (L), mm	113	103	81	69	-	-	105	110	97	101	129	-
Configuration ratio (P/L)	0.76	0.79	1.00	1.07	-	-	0.82	0.67	0.75	0.80	0.60	-
MIXOGRAM												
Peak time, min	2.5	2.7	2.7	2.7	-	-	2.6	2.4	2.8	2.3	2.2	-
100g BAKING TEST												
Loaf volume, cm^3	1032	1031	861	841	-	-	1066	982	929	989	1128	-
Evaluation (see page 79)	0	0	0	0	-	-	0	0	0	0	0	-

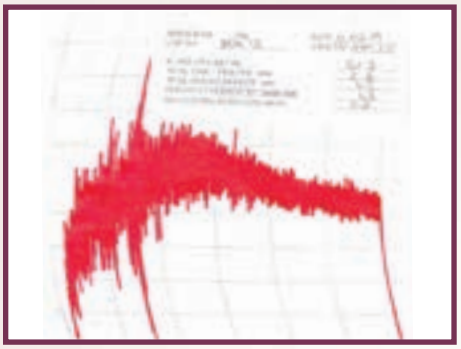
RHEOLOGICAL GRAPHS PER PRODUCTION REGION

MIXOGRAM

5

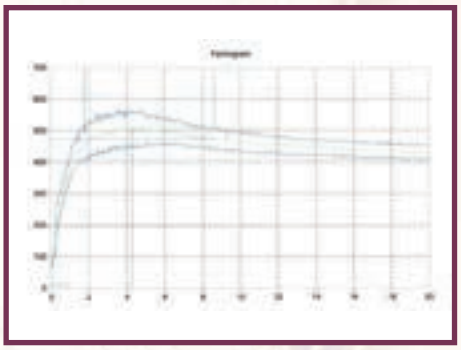


6



FARINOGRAM

5



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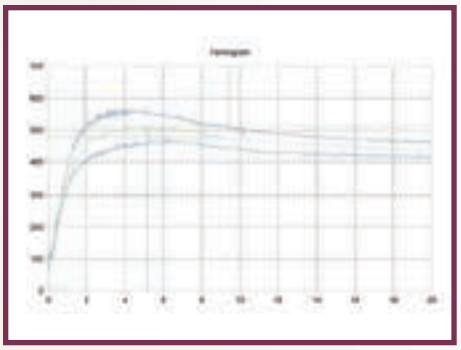
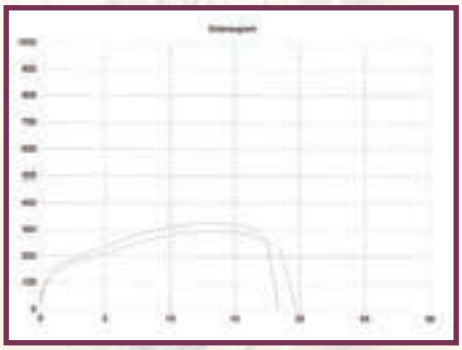


EXTENSOGRAM

5



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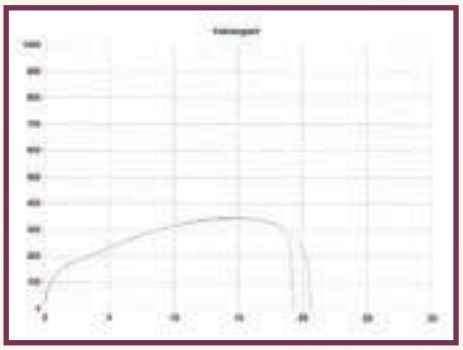
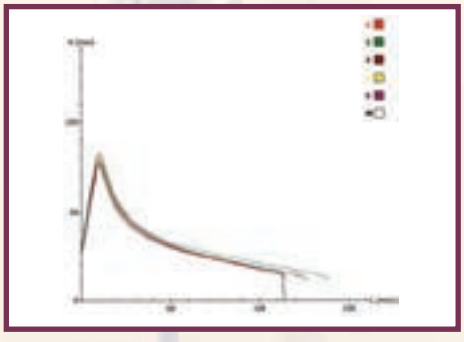
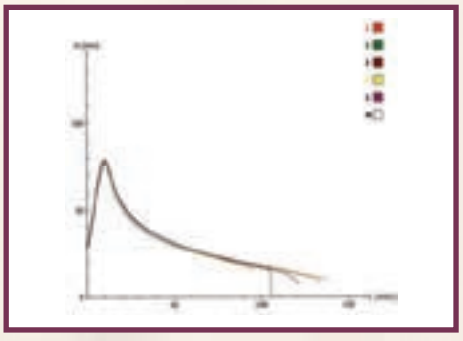


ALVEOGRAM

5



6



South African Quality data per production region
IRRIGATION WHEAT

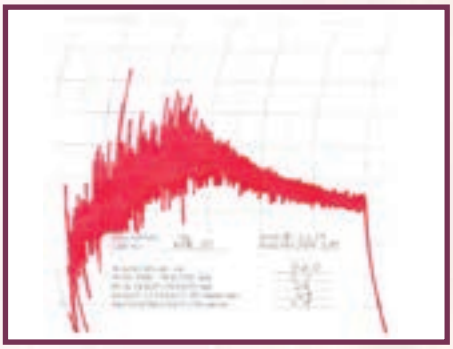
PRODUCTION REGION	(10) Griqualand West Region				(11) Vaalharts Region			
WHEAT								
Protein (12% mb), %	12.1	10.2	13.6	0.76	12.0	10.7	13.0	0.75
Falling number, sec	377	279	528	51.07	446	366	639	99.03
1000 Kernel mass (13% mb), g	39.8	33.4	44.7	2.30	40.0	34.1	46.0	3.63
Hectolitre mass (dirty), kg/hl	84.5	79.4	86.5	1.92	83.5	80.8	86.0	1.88
Screenings (<1.8 mm sieve), %	0.93	0.25	3.36	0.87	1.59	0.21	4.76	1.34
Total damaged kernels, %	0.41	0.16	1.06	0.22	0.57	0.00	1.56	0.42
Combined deviations, %	1.65	0.65	4.98	1.15	2.87	0.52	5.94	1.79
Number of samples	***30***				***14***			
CULTIVARS								
cultivars with highest % occurrence	SST 884	19.2			PAN 3471	20.4		
	PAN 3471	15.0			SST 884	13.1		
	SST 895	11.1			SST 8135	13.0		
	SST 8154	10.8			SST 8154	10.1		
	SST 8135	10.5			PAN 3400	9.3		
Number of samples	***30***				***14***			
MIXOGRAM (Quadromat Junior)	**ave**	**min**	**max**	**stdev**	**ave**	**min**	**max**	**stdev**
Peak time, min	2.7	2.4	3.2	0.23	2.8	2.4	3.6	0.30
Tail height (6 min), mm	47	41	53	3.13	46	40	53	3.41
Number of samples	***30***				***14***			

	COMPOSITE SAMPLES											
CLASS AND GRADE	**B1**	**B2**	**B3**	**B4**	**UT**	**COW**	**B1**	**B2**	**B3**	**B4**	**UT**	**COW**
Bühler Extraction, %	72.7	73.6	73.5	69.0	-	-	73.1	73.4	73.6	70.6	-	-
FLOUR												
Protein (12% mb), %	11.4	10.7	10.0	12.2	-	-	11.7	10.4	9.7	11.2	-	-
Ash (db), %	0.60	0.61	0.64	0.71	-	-	0.60	0.62	0.63	0.62	-	-
Colour, KJ (wet)	-4.8	-5.0	-5.0	-4.3	-	-	-4.6	-4.6	-4.8	-4.5	-	-
Colour, Konica Minolta CM5 (dry)												
L*	93.74	93.89	93.96	93.63	-	-	93.83	93.60	93.75	93.37	-	-
a*	0.55	0.53	0.49	0.52	-	-	0.43	0.51	0.52	0.49	-	-
b*	10.63	10.53	9.97	9.95	-	-	9.47	10.32	10.27	10.78	-	-
RVA												
Peak Viscosity, cP	2159	2152	2170	2240	-	-	2313	2234	2255	2221	-	-
Minimum viscosity (Trough), cP	1622	1632	1579	1648	-	-	1741	1730	1756	1712	-	-
Final Viscosity, cP	2413	2402	2491	2461	-	-	2483	2557	2565	2551	-	-
Peak Time, min	7.00	7.00	7.00	7.00	-	-	7.00	7.00	7.00	7.00	-	-
GLUTEN												
Wet gluten (14% mb), %	32.6	30.1	27.7	34.0	-	-	33.5	29.8	27.3	29.8	-	-
Dry gluten (14% mb), %	11.0	9.7	9.1	11.0	-	-	11.1	9.4	9.1	9.9	-	-
Gluten Index	95	97	96	91	-	-	93	89	91	97	-	-
FARINOGRAM												
Water absorption (14% mb), %	62.4	61.7	61.0	60.8	-	-	61.9	60.4	59.2	61.2	-	-
Development time, min	6.3	6.3	4.8	6.4	-	-	4.5	4.0	4.0	6.0	-	-
Stability, min	8.1	7.7	5.8	10.3	-	-	5.7	4.6	5.5	7.8	-	-
Mixing tolerance index, BU	37	42	48	24	-	-	50	54	50	39	-	-
EXTENSOGRAM (45 min pull)												
Area, cm^2	104	111	82	132	-	-	107	80	72	101	-	-
Maximum height, BU	390	383	320	491	-	-	373	287	294	347	-	-
Extensibility, mm	197	211	187	202	-	-	205	198	177	209	-	-
ALVEOGRAM												
Strength (S), cm^2	40.2	37.3	33.5	43.7	-	-	38.1	27.2	28.4	33.9	-	-
Stability (P), mm	88	87	85	92	-	-	80	72	70	83	-	-
Distensibility (L), mm	107	98	102	102	-	-	117	95	107	97	-	-
Configuration ratio (P/L)	0.82	0.89	0.83	0.90	-	-	0.68	0.76	0.65	0.86	-	-
MIXOGRAM												
Peak time, min	2.5	2.6	2.3	2.8	-	-	2.3	2.4	2.6	2.7	-	-
100g BAKING TEST												
Loaf volume, cm^3	1099	1014	1001	1083	-	-	1127	1072	993	1139	-	-
Evaluation (see page 79)	0	0	0	0	-	-	0	0	0	0	-	-

RHEOLOGICAL GRAPHS PER PRODUCTION REGION

MIXOGRAM

10



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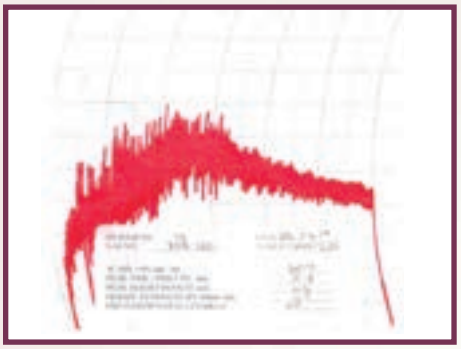
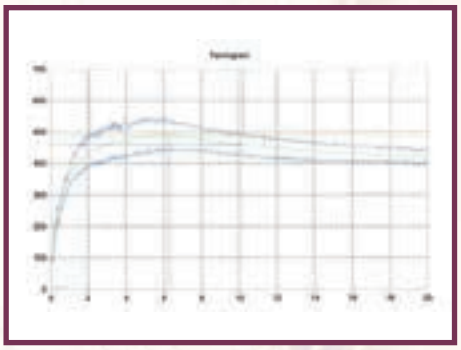


FARINOGRAM

10



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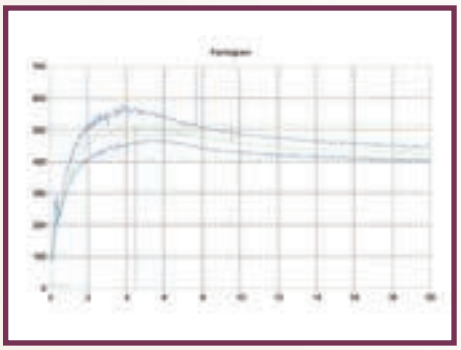
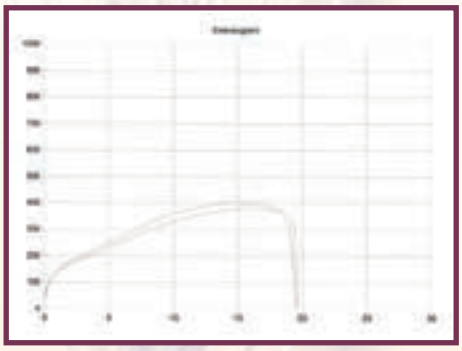


EXTENSOGRAM

10



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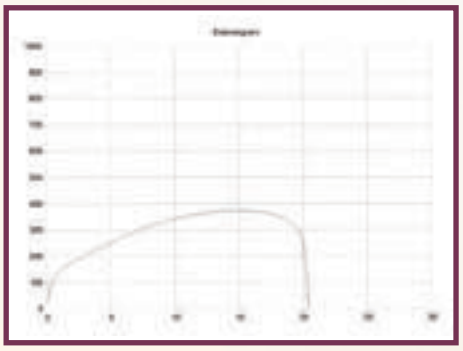
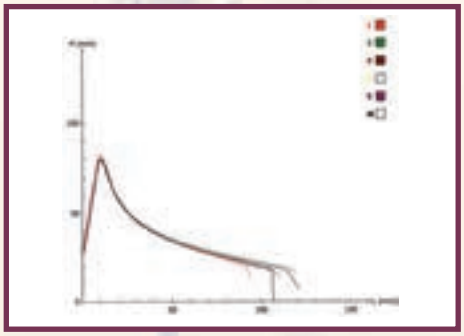


ALVEOGRAM

10



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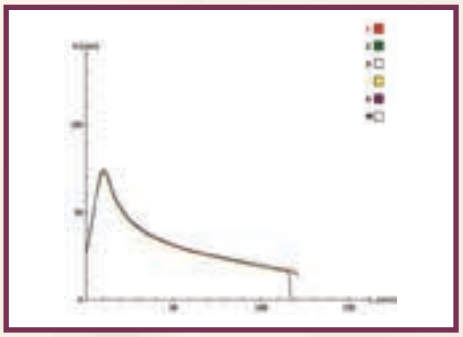


South African Quality data per production region
IRRIGATION WHEAT

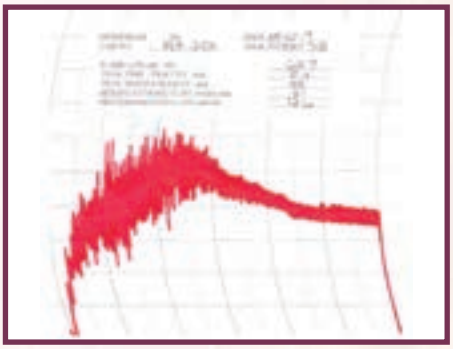
PRODUCTION REGION	(12) North West Western Region				(14) North West Southern Region			
WHEAT								
	ave	**min**	**max**	**stdev**	**ave**	**min**	**max**	**stdev**
Protein (12% mb), %	12.7	11.2	14.2	1.50	13.5	13.1	13.7	0.32
Falling number, sec	439	397	461	36.12	440	424	449	13.65
1000 Kernel mass (13% mb), g	42.9	41.1	44.8	1.85	32.8	30.9	35.6	2.48
Hectolitre mass (dirty), kg/hl	84.3	84.1	84.4	0.15	80.2	78.0	84.2	3.47
Screenings (<1.8 mm sieve), %	0.23	0.18	0.27	0.05	0.60	0.36	1.00	0.35
Total damaged kernels, %	0.87	0.64	1.10	0.23	0.60	0.40	0.80	0.20
Combined deviations, %	1.21	0.94	1.43	0.25	1.63	1.31	2.08	0.40
Number of samples		***3***				***3***		
CULTIVARS								
		SST 8135	19.7			SST 8135	63.7	
cultivars		SST 806	16.0			SST 843	14.0	
with highest %		SST 843	15.7			SST 895	11.7	
occurrence		PAN 3471	14.7			PAN 3471	6.0	
		SST 835	14.3			PAN 3497	4.7	
Number of samples		***3***				***3***		
MIXOGRAM (Quadromat Junior)								
	ave	**min**	**max**	**stdev**	**ave**	**min**	**max**	**stdev**
Peak time, min	2.4	2.0	2.9	0.45	2.8	2.5	2.9	0.23
Tail height (6 min), mm	45	41	47	3.21	50	49	51	1.00
Number of samples		***3***				***3***		

	COMPOSITE SAMPLES											
CLASS AND GRADE	**B1**	**B2**	**B3**	**B4**	**UT**	**COW**	**B1**	**B2**	**B3**	**B4**	**UT**	**COW**
Bühler Extraction, %	71.8	-	-	-	-	-	69.3	-	-	-	-	-
FLOUR												
Protein (12% mb), %	12.7	-	-	-	-	-	12.3	-	-	-	-	-
Ash (db), %	0.62	-	-	-	-	-	0.67	-	-	-	-	-
Colour, KJ (wet)	-4.8	-	-	-	-	-	-4.5	-	-	-	-	-
Colour, Konica Minolta CM5 (dry)												
L*	93.83	-	-	-	-	-	93.66	-	-	-	-	-
a*	0.49	-	-	-	-	-	0.48	-	-	-	-	-
b*	9.50	-	-	-	-	-	10.14	-	-	-	-	-
RVA												
Peak Viscosity, cP	2446	-	-	-	-	-	2288	-	-	-	-	-
Minimum viscosity (Trough), cP	1774	-	-	-	-	-	1645	-	-	-	-	-
Final Viscosity, cP	2602	-	-	-	-	-	2585	-	-	-	-	-
Peak Time, min	7.00	-	-	-	-	-	7.00	-	-	-	-	-
GLUTEN												
Wet gluten (14% mb), %	36.6	-	-	-	-	-	33.5	-	-	-	-	-
Dry gluten (14% mb), %	12.1	-	-	-	-	-	11.3	-	-	-	-	-
Gluten Index	84	-	-	-	-	-	94	-	-	-	-	-
FARINOGRAM												
Water absorption (14% mb), %	64.7	-	-	-	-	-	63.6	-	-	-	-	-
Development time, min	4.7	-	-	-	-	-	5.9	-	-	-	-	-
Stability, min	4.9	-	-	-	-	-	8.4	-	-	-	-	-
Mixing tolerance index, BU	42	-	-	-	-	-	26	-	-	-	-	-
EXTENSOGRAM (45 min pull)												
Area, cm^2	88	-	-	-	-	-	100	-	-	-	-	-
Maximum height, BU	290	-	-	-	-	-	352	-	-	-	-	-
Extensibility, mm	219	-	-	-	-	-	205	-	-	-	-	-
ALVEOGRAM												
Strength (S), cm^2	37.2	-	-	-	-	-	39.1	-	-	-	-	-
Stability (P), mm	86	-	-	-	-	-	93	-	-	-	-	-
Distensibility (L), mm	112	-	-	-	-	-	95	-	-	-	-	-
Configuration ratio (P/L)	0.77	-	-	-	-	-	0.98	-	-	-	-	-
MIXOGRAM												
Peak time, min	1.9	-	-	-	-	-	2.7	-	-	-	-	-
100g BAKING TEST												
Loaf volume, cm^3	1187	-	-	-	-	-	1205	-	-	-	-	-
Evaluation (see page 79)	0	-	-	-	-	-	0	-	-	-	-	-

RHEOLOGICAL GRAPHS PER PRODUCTION REGION

MIXOGRAM

12



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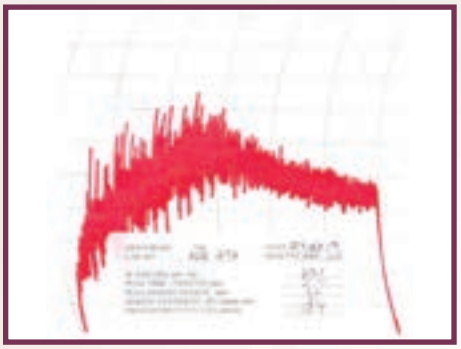
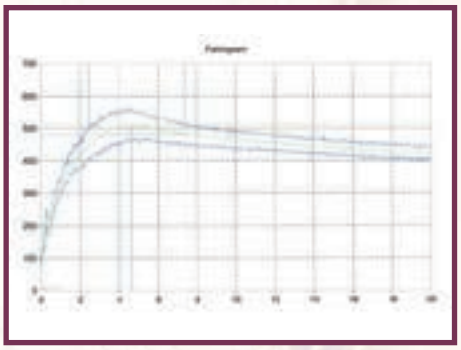


FARINOGRAM

12



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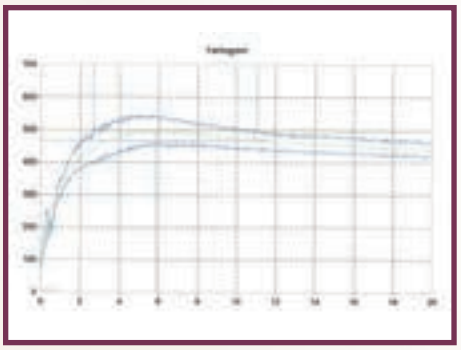
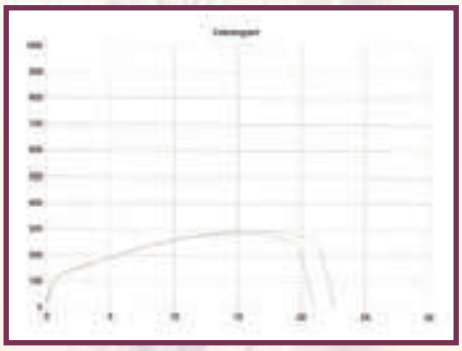


EXTENSOGRAM

12



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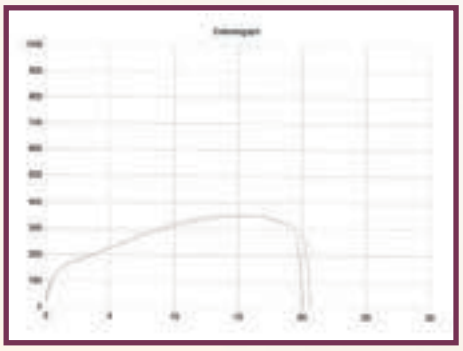
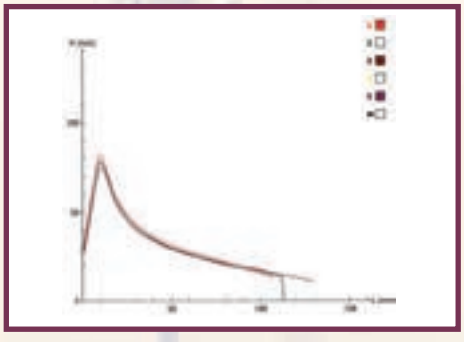


ALVEOGRAM

12



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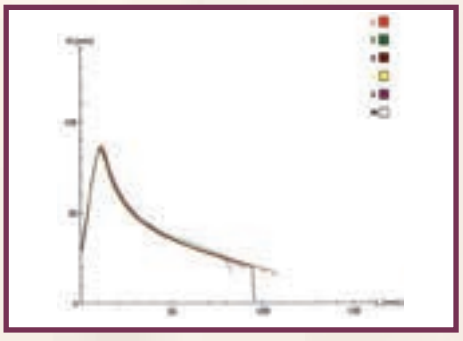


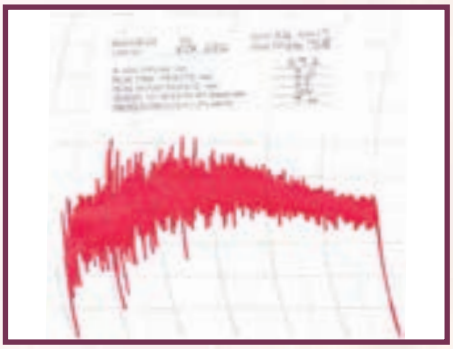
South African Quality data per production region
IRRIGATION WHEAT

PRODUCTION REGION	(15) North West South-Eastern Region						(16) North West Central-Eastern Region					
WHEAT												
	ave	**min**	**max**	**stdev**			**ave**	**min**	**max**	**stdev**		
Protein (12% mb), %	11.5	9.2	14.5	1.67			12.0	11.5	12.7	0.62		
Falling number, sec	368	236	460	87.24			399	381	431	21.97		
1000 Kernel mass (13% mb), g	36.5	31.2	40.6	4.27			40.2	37.6	43.1	2.55		
Hectolitre mass (dirty), kg/hl	80.8	77.3	85.0	2.58			83.0	82.1	83.7	0.76		
Screenings (<1.8 mm sieve), %	1.12	0.21	2.50	1.09			1.27	0.20	2.20	0.85		
Total damaged kernels, %	0.25	0.08	0.50	0.14			0.51	0.36	0.56	0.10		
Combined deviations, %	1.72	0.55	3.46	1.39			2.07	0.56	3.32	1.17		
Number of samples	***8***						***4***					
CULTIVARS												
	PAN 3400	33.9					SST 884	27.3				
cultivars	PAN 3368	14.4					SST 8135	20.3				
with highest %	SST 884	13.6					SST 8154	14.3				
occurrence	PAN 3111	9.5					SST 895	11.0				
	PAN 3471	8.0					PAN 3471	7.5				
Number of samples	***8***						***4***					
MIXOGRAM (Quadromat Junior)												
	ave	**min**	**max**	**stdev**			**ave**	**min**	**max**	**stdev**		
Peak time, min	3.0	2.3	4.2	0.59			2.4	2.3	2.7	0.19		
Tail height (6 min), mm	43	34	48	4.80			47	45	48	1.50		
Number of samples	***8***						***4***					
	COMPOSITE SAMPLES											
CLASS AND GRADE	**B1**	**B2**	**B3**	**B4**	**UT**	**COW**	**B1**	**B2**	**B3**	**B4**	**UT**	**COW**
Bühler Extraction, %	69.7	71.9	69.0	66.6	-	-	73.2	72.5	-	-	-	-
FLOUR												
Protein (12% mb), %	11.9	10.5	9.2	7.8	-	-	11.9	10.8	-	-	-	-
Ash (db), %	0.53	0.61	0.57	0.56	-	-	0.60	0.61	-	-	-	-
Colour, KJ (wet)	-4.6	-4.7	-4.7	-4.8	-	-	-4.8	-4.9	-	-	-	-
Colour, Konica Minolta CM5 (dry)												
L*	94.02	93.80	93.93	93.88	-	-	93.84	94.06	-	-	-	-
a*	0.45	0.47	0.44	0.37	-	-	0.50	0.44	-	-	-	-
b*	11.00	10.13	10.76	10.75	-	-	10.92	10.34	-	-	-	-
RVA												
Peak Viscosity, cP	2102	2256	1633	1254	-	-	2244	2373	-	-	-	-
Minimum viscosity (Trough), cP	1565	1622	1499	993	-	-	1815	1802	-	-	-	-
Final Viscosity, cP	2490	2538	1909	1480	-	-	2585	2701	-	-	-	-
Peak Time, min	7.00	7.00	6.67	5.93	-	-	7.00	7.00	-	-	-	-
GLUTEN												
Wet gluten (14% mb), %	32.6	29.3	23.2	-	-	-	32.8	29.1	-	-	-	-
Dry gluten (14% mb), %	10.8	9.9	7.7	-	-	-	11.2	9.7	-	-	-	-
Gluten Index	92	96	99	-	-	-	96	97	-	-	-	-
FARINOGRAM												
Water absorption (14% mb), %	62.6	61.8	57.3	53.8	-	-	60.7	60.6	-	-	-	-
Development time, min	6.0	5.9	4.3	1.4	-	-	5.0	4.9	-	-	-	-
Stability, min	8.8	7.0	7.9	3.0	-	-	6.8	6.2	-	-	-	-
Mixing tolerance index, BU	29	44	33	50	-	-	43	45	-	-	-	-
EXTENSOGRAM (45 min pull)												
Area, cm^2	92	100	75	69	-	-	102	93	-	-	-	-
Maximum height, BU	327	396	339	374	-	-	340	356	-	-	-	-
Extensibility, mm	207	187	159	132	-	-	220	190	-	-	-	-
ALVEOGRAM												
Strength (S), cm^2	39.8	35.3	32.0	21.7	-	-	30.4	36.5	-	-	-	-
Stability (P), mm	91	90	76	72	-	-	75	67	-	-	-	-
Distensibility (L), mm	102	91	101	59	-	-	108	157	-	-	-	-
Configuration ratio (P/L)	0.89	0.99	0.75	1.22	-	-	0.69	0.43	-	-	-	-
MIXOGRAM												
Peak time, min	2.4	2.6	3.3	4.5	-	-	2.3	2.4	-	-	-	-
100g BAKING TEST												
Loaf volume, cm^3	1054	984	911	815	-	-	1217	1045	-	-	-	-
Evaluation (see page 79)	0	0	0	0	-	-	0	0	-	-	-	-

RHEOLOGICAL GRAPHS PER PRODUCTION REGION

MIXOGRAM

15



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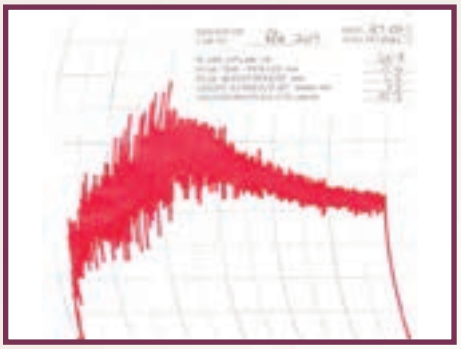
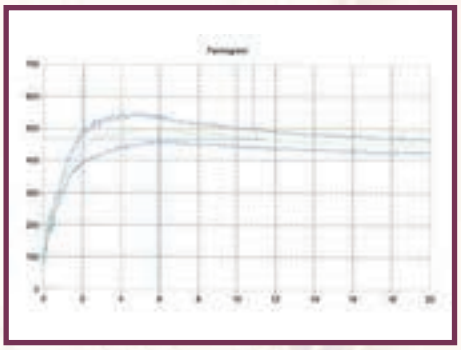


FARINOGRAM

15



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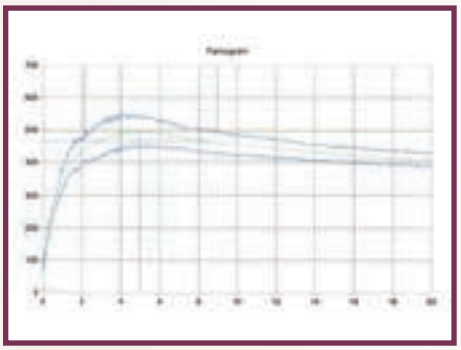
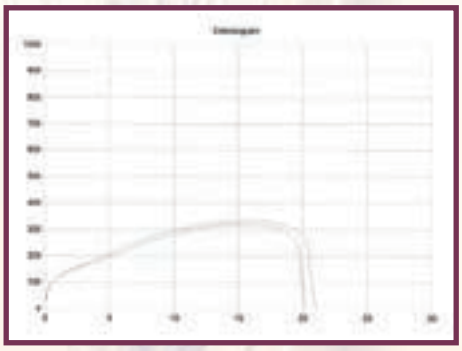


EXTENSOGRAM

15



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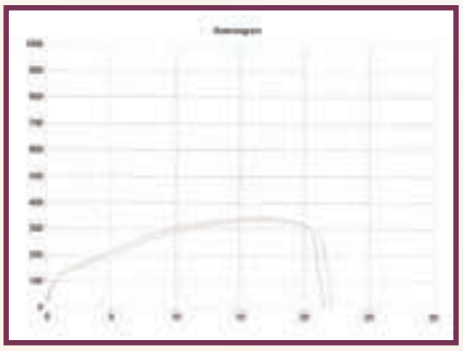
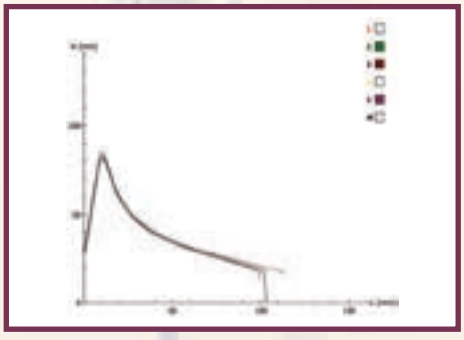


ALVEOGRAM

15



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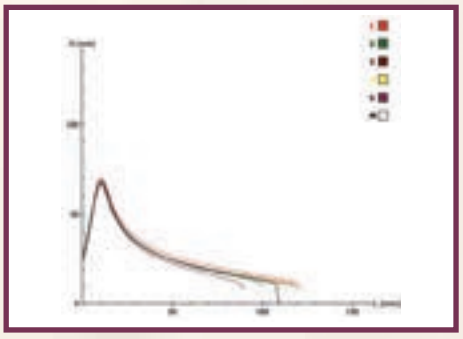


South African Quality data per production region
IRRIGATION WHEAT

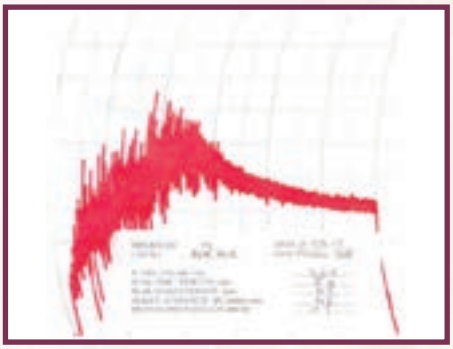
PRODUCTION REGION	(17) North West Central-Northern Region (Ottosdal)				(18) North West Central Region (Ventersdorp)			
WHEAT	**ave**	**min**	**max**	**stdev**	**ave**	**min**	**max**	**stdev**
Protein (12% mb), %	13.0	12.8	13.1	0.21	11.9	11.7	12.0	0.21
Falling number, sec	390	367	413	32.53	418	405	431	18.38
1000 Kernel mass (13% mb), g	39.3	38.5	40.0	1.06	40.8	40.5	41.0	0.35
Hectolitre mass (dirty), kg/hl	81.8	81.5	82.1	0.42	81.8	81.7	81.9	0.14
Screenings (<1.8 mm sieve), %	1.23	1.03	1.43	0.28	0.70	0.66	0.74	0.06
Total damaged kernels, %	0.74	0.58	0.90	0.23	0.41	0.38	0.44	0.04
Combined deviations, %	2.53	2.51	2.55	0.03	1.80	1.70	1.90	0.14
Number of samples	***2***				***2***			
CULTIVARS								
cultivars with highest % occurrence	SST 884 39.0 SST 8135 24.5 SST 835 18.5 PAN 3400 7.5 SST 895 7.0				SST 884 35.5 SST 895 27.5 SST 8154 21.5 SST 8135 8.0 PAN 3471 7.5			
Number of samples	***2***				***2***			
MIXOGRAM (Quadromat Junior)	**ave**	**min**	**max**	**stdev**	**ave**	**min**	**max**	**stdev**
Peak time, min	2.4	2.4	2.4	0.00	2.5	2.3	2.6	0.21
Tail height (6 min), mm	45	44	45	0.71	42	41	42	0.71
Number of samples	***2***				***2***			

	COMPOSITE SAMPLES											
CLASS AND GRADE	**B1**	**B2**	**B3**	**B4**	**UT**	**COW**	**B1**	**B2**	**B3**	**B4**	**UT**	**COW**
Bühler Extraction, %	72.3	-	-	-	-	-	71.5	-	-	-	-	-
FLOUR												
Protein (12% mb), %	11.8	-	-	-	-	-	11.3	-	-	-	-	-
Ash (db), %	0.66	-	-	-	-	-	0.63	-	-	-	-	-
Colour, KJ (wet)	-4.8	-	-	-	-	-	-4.7	-	-	-	-	-
Colour, Konica Minolta CM5 (dry)												
L*	94.06	-	-	-	-	-	94.00	-	-	-	-	-
a*	0.49	-	-	-	-	-	0.48	-	-	-	-	-
b*	9.85	-	-	-	-	-	9.49	-	-	-	-	-
RVA												
Peak Viscosity, cP	2264	-	-	-	-	-	2116	-	-	-	-	-
Minimum viscosity (Trough), cP	1648	-	-	-	-	-	1569	-	-	-	-	-
Final Viscosity, cP	2599	-	-	-	-	-	2345	-	-	-	-	-
Peak Time, min	7.00	-	-	-	-	-	7.00	-	-	-	-	-
GLUTEN												
Wet gluten (14% mb), %	32.9	-	-	-	-	-	30.1	-	-	-	-	-
Dry gluten (14% mb), %	11.0	-	-	-	-	-	10.4	-	-	-	-	-
Gluten Index	92	-	-	-	-	-	97	-	-	-	-	-
FARINOGRAM												
Water absorption (14% mb), %	60.4	-	-	-	-	-	60.4	-	-	-	-	-
Development time, min	4.1	-	-	-	-	-	3.8	-	-	-	-	-
Stability, min	5.2	-	-	-	-	-	4.3	-	-	-	-	-
Mixing tolerance index, BU	54	-	-	-	-	-	52	-	-	-	-	-
EXTENSOGRAM (45 min pull)												
Area, cm^2	93	-	-	-	-	-	-	-	-	-	-	-
Maximum height, BU	318	-	-	-	-	-	-	-	-	-	-	-
Extensibility, mm	213	-	-	-	-	-	-	-	-	-	-	-
ALVEOGRAM												
Strength (S), cm^2	34.0	-	-	-	-	-	27.8	-	-	-	-	-
Stability (P), mm	69	-	-	-	-	-	68	-	-	-	-	-
Distensibility (L), mm	143	-	-	-	-	-	115	-	-	-	-	-
Configuration ratio (P/L)	0.48	-	-	-	-	-	0.59	-	-	-	-	-
MIXOGRAM												
Peak time, min	2.3	-	-	-	-	-	2.1	-	-	-	-	-
100g BAKING TEST												
Loaf volume, cm^3	1176	-	-	-	-	-	1085	-	-	-	-	-
Evaluation (see page 79)	0	-	-	-	-	-	0	-	-	-	-	-

RHEOLOGICAL GRAPHS PER PRODUCTION REGION

MIXOGRAM

17



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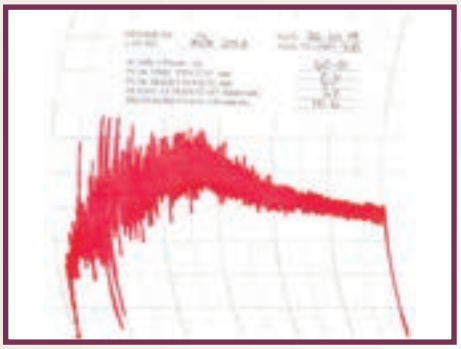

FARINOGRAM

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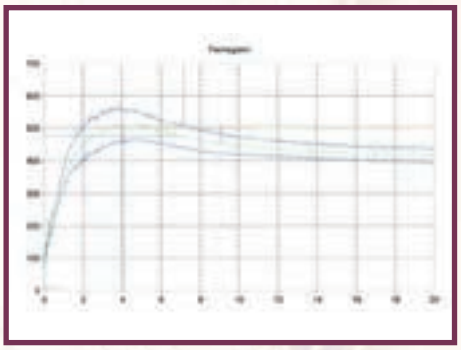

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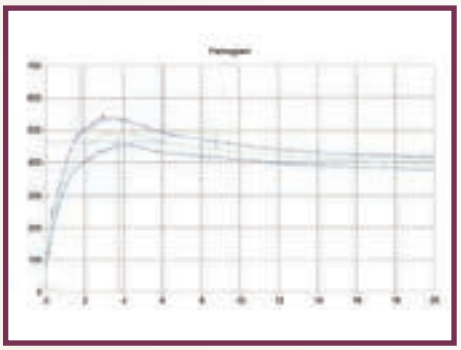
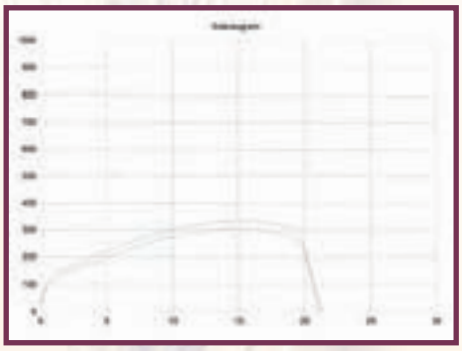


EXTENSOGRAM

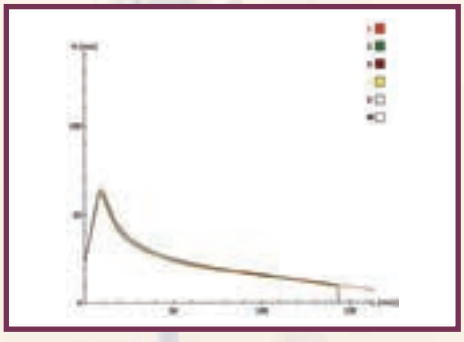
17



18

ALVEOGRAM

17



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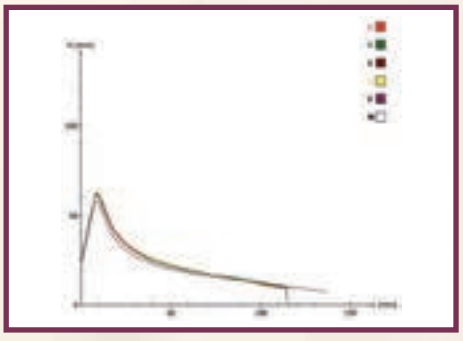


South African Quality data per production region
IRRIGATION WHEAT

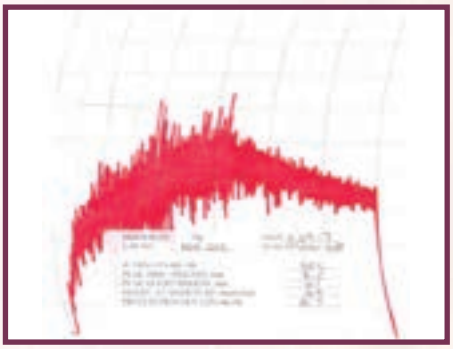
PRODUCTION REGION	(19) North West Central Region (Lichtenburg)				(20) North West Eastern Region			
WHEAT	**ave**	**min**	**max**	**stdev**	**ave**	**min**	**max**	**stdev**
Protein (12% mb), %	12.1	10.8	12.7	0.67	12.1	10.7	14.4	0.97
Falling number, sec	403	372	437	20.57	424	345	568	52.00
1000 Kernel mass (13% mb), g	38.0	36.1	40.1	1.52	43.4	38.7	54.3	3.73
Hectolitre mass (dirty), kg/hl	82.4	81.2	83.5	0.75	82.6	79.1	86.3	1.90
Screenings (<1.8 mm sieve), %	1.45	0.61	3.00	1.02	1.20	0.12	2.38	0.80
Total damaged kernels, %	0.51	0.08	0.98	0.33	0.85	0.12	4.12	0.97
Combined deviations, %	2.34	1.16	4.38	1.31	2.32	0.44	4.32	1.22
Number of samples	***7***				***18***			
CULTIVARS								
cultivars with highest % occurrence	SST 843 25.6 SST 884 15.1 SST 895 13.3 SST 8154 10.7 PAN 3471 9.3				SST 884 27.9 SST 8135 14.5 DUZI 12.8 SST 8154 9.9 PAN 3471 9.2			
Number of samples	***7***				***18***			
MIXOGRAM (Quadromat Junior)	**ave**	**min**	**max**	**stdev**	**ave**	**min**	**max**	**stdev**
Peak time, min	3.1	2.7	3.8	0.37	2.7	1.9	3.5	0.33
Tail height (6 min), mm	49	47	52	1.60	45	43	48	1.50
Number of samples	***7***				***18***			

	COMPOSITE SAMPLES											
CLASS AND GRADE	**B1**	**B2**	**B3**	**B4**	**UT**	**COW**	**B1**	**B2**	**B3**	**B4**	**UT**	**COW**
Bühler Extraction, %	71.9	72.4	-	-	-	-	72.2	72.9	72.8	-	-	-
FLOUR												
Protein (12% mb), %	11.4	10.7	-	-	-	-	11.6	10.4	9.6	-	-	-
Ash (db), %	0.59	0.59	-	-	-	-	0.58	0.61	0.61	-	-	-
Colour, KJ (wet)	-4.6	-4.9	-	-	-	-	-4.5	-4.7	-4.5	-	-	-
Colour, Konica Minolta CM5 (dry)												
L*	93.68	93.93	-	-	-	-	93.88	93.85	93.80	-	-	-
a*	0.49	0.45	-	-	-	-	0.44	0.44	0.42	-	-	-
b*	10.13	9.57	-	-	-	-	9.65	9.77	9.70	-	-	-
RVA												
Peak Viscosity, cP	2335	2304	-	-	-	-	2260	2382	2591	-	-	-
Minimum viscosity (Trough), cP	1691	1704	-	-	-	-	1805	1761	1957	-	-	-
Final Viscosity, cP	2684	2650	-	-	-	-	2494	2685	2855	-	-	-
Peak Time, min	7.00	7.00	-	-	-	-	7.00	7.00	7.00	-	-	-
GLUTEN												
Wet gluten (14% mb), %	31.3	28.0	-	-	-	-	33.1	29.2	26.6	-	-	-
Dry gluten (14% mb), %	10.4	9.5	-	-	-	-	10.9	9.5	8.8	-	-	-
Gluten Index	93	97	-	-	-	-	86	88	95	-	-	-
FARINOGRAM												
Water absorption (14% mb), %	61.0	61.2	-	-	-	-	61.3	60.7	59.8	-	-	-
Development time, min	5.8	5.5	-	-	-	-	4.6	4.2	4.8	-	-	-
Stability, min	7.3	7.7	-	-	-	-	5.9	5.0	5.6	-	-	-
Mixing tolerance index, BU	42	41	-	-	-	-	43	49	50	-	-	-
EXTENSOGRAM (45 min pull)												
Area, cm^2	106	101	-	-	-	-	91	75	71	-	-	-
Maximum height, BU	403	396	-	-	-	-	321	296	333	-	-	-
Extensibility, mm	198	190	-	-	-	-	207	180	158	-	-	-
ALVEOGRAM												
Strength (S), cm^2	39.8	36.4	-	-	-	-	34.4	32.4	28.0	-	-	-
Stability (P), mm	82	89	-	-	-	-	74	76	81	-	-	-
Distensibility (L), mm	119	91	-	-	-	-	129	115	84	-	-	-
Configuration ratio (P/L)	0.69	0.98	-	-	-	-	0.57	0.66	0.96	-	-	-
MIXOGRAM												
Peak time, min	2.8	2.9	-	-	-	-	2.2	2.3	2.6	-	-	-
100g BAKING TEST												
Loaf volume, cm^3	1136	1026	-	-	-	-	1114	972	929	-	-	-
Evaluation (see page 79)	0	0	-	-	-	-	0	0	0	-	-	-

RHEOLOGICAL GRAPHS PER PRODUCTION REGION

MIXOGRAM

19



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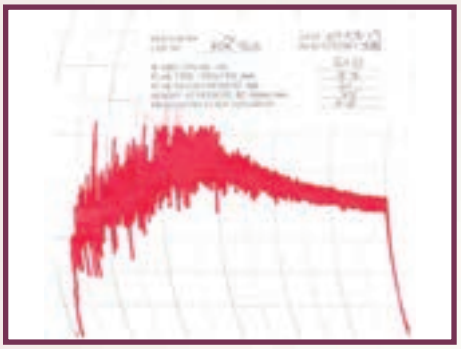
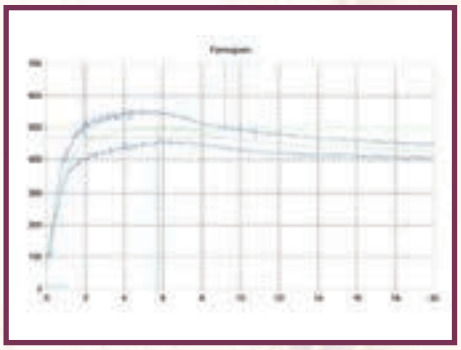


FARINOGRAM

19



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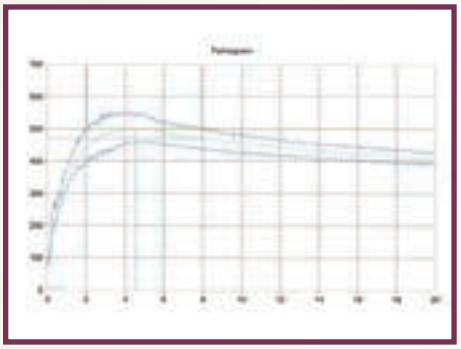
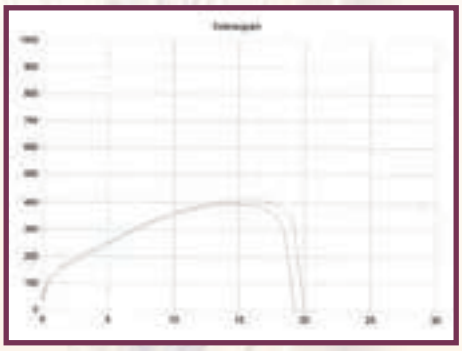


EXTENSOGRAM

19



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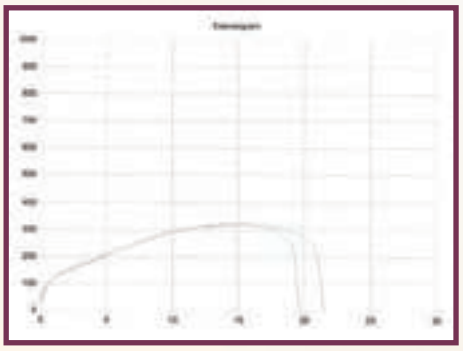
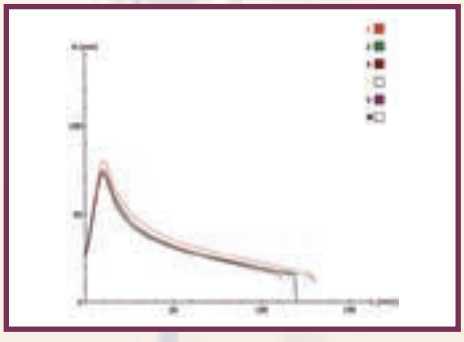


ALVEOGRAM

19



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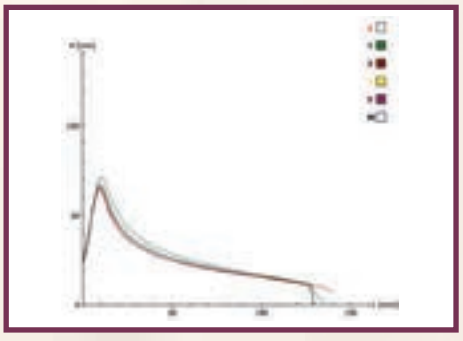


South African Quality data per production region
SUMMER RAINFALL AND IRRIGATION WHEAT

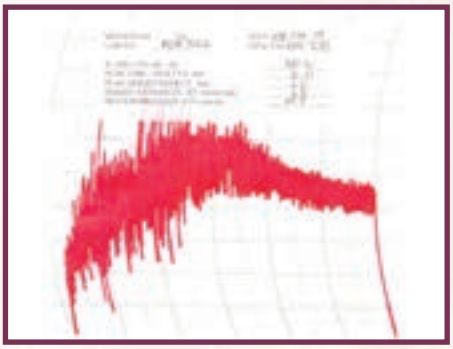
PRODUCTION REGION	(21) Free State North-Western Region (Viljoenskroon)				(22) Free State North-Western Region (Bothaville)			
WHEAT	**ave**	**min**	**max**	**stdev**	**ave**	**min**	**max**	**stdev**
Protein (12% mb), %	12.2	11.8	12.5	0.49	11.7	10.7	12.6	0.95
Falling number, sec	456	452	460	5.66	387	380	396	8.08
1000 Kernel mass (13% mb), g	38.8	38.2	39.4	0.85	40.1	38.8	41.0	1.15
Hectolitre mass (dirty), kg/hl	83.3	82.9	83.7	0.57	82.0	81.8	82.2	0.20
Screenings (<1.8 mm sieve), %	2.18	2.12	2.24	0.08	1.75	1.66	1.84	0.09
Total damaged kernels, %	0.91	0.84	0.98	0.10	0.59	0.44	0.78	0.17
Combined deviations, %	3.35	3.34	3.36	0.01	3.05	2.98	3.20	0.13
Number of samples	***2***				***3***			
CULTIVARS								
cultivars with highest % occurrence	SST 884	32.5			PAN 3497	29.0		
	SST 835	21.0			SST 8135	19.0		
	SST 8154	16.5			SST 8154	19.0		
	PAN 3471	11.5			PAN 3471	13.0		
	PAN 3497	11.0			SST 835	9.3		
Number of samples	***2***				***3***			
MIXOGRAM (Quadromat Junior)	**ave**	**min**	**max**	**stdev**	**ave**	**min**	**max**	**stdev**
Peak time, min	2.9	2.7	3.0	0.21	2.5	2.4	2.7	0.15
Tail height (6 min), mm	48	48	48	0.00	48	46	50	2.00
Number of samples	***2***				***3***			

	COMPOSITE SAMPLES											
CLASS AND GRADE	**B1**	**B2**	**B3**	**B4**	**UT**	**COW**	**B1**	**B2**	**B3**	**B4**	**UT**	**COW**
Bühler Extraction, %	73.0	72.6	-	-	-	-	74.3	74.7	74.7	-	-	-
FLOUR												
Protein (12% mb), %	11.5	10.7	-	-	-	-	11.4	10.8	9.7	-	-	-
Ash (db), %	0.61	0.60	-	-	-	-	0.60	0.61	0.62	-	-	-
Colour, KJ (wet)	-4.6	-4.7	-	-	-	-	-4.8	-4.8	-4.9	-	-	-
Colour, Konica Minolta CM5 (dry)												
L*	93.80	93.75	-	-	-	-	93.73	93.70	93.82	-	-	-
a*	0.44	0.43	-	-	-	-	0.46	0.50	0.52	-	-	-
b*	9.55	9.55	-	-	-	-	11.39	11.43	11.35	-	-	-
RVA												
Peak Viscosity, cP	2322	2403	-	-	-	-	2095	2116	1996	-	-	-
Minimum viscosity (Trough), cP	1695	1787	-	-	-	-	1624	1650	1604	-	-	-
Final Viscosity, cP	2587	2750	-	-	-	-	2395	2439	2270	-	-	-
Peak Time, min	7.00	7.00	-	-	-	-	7.00	7.00	7.00	-	-	-
GLUTEN												
Wet gluten (14% mb), %	32.2	29.0	-	-	-	-	31.6	29.1	26.8	-	-	-
Dry gluten (14% mb), %	10.8	9.4	-	-	-	-	10.1	9.6	8.6	-	-	-
Gluten Index	90	96	-	-	-	-	95	95	90	-	-	-
FARINOGRAM												
Water absorption (14% mb), %	60.6	60.6	-	-	-	-	61.2	60.6	58.9	-	-	-
Development time, min	5.3	4.7	-	-	-	-	5.8	5.2	4.5	-	-	-
Stability, min	6.1	6.6	-	-	-	-	7.8	6.6	5.2	-	-	-
Mixing tolerance index, BU	51	42	-	-	-	-	38	43	51	-	-	-
EXTENSOGRAM (45 min pull)												
Area, cm^2	110	100	-	-	-	-	103	98	75	-	-	-
Maximum height, BU	364	376	-	-	-	-	348	338	288	-	-	-
Extensibility, mm	219	196	-	-	-	-	215	214	185	-	-	-
ALVEOGRAM												
Strength (S), cm^2	34.6	34.9	-	-	-	-	38.5	31.7	23.1	-	-	-
Stability (P), mm	78	86	-	-	-	-	74	70	62	-	-	-
Distensibility (L), mm	111	94	-	-	-	-	131	118	100	-	-	-
Configuration ratio (P/L)	0.70	0.91	-	-	-	-	0.56	0.59	0.62	-	-	-
MIXOGRAM												
Peak time, min	2.5	2.8	-	-	-	-	2.4	2.4	2.4	-	-	-
100g BAKING TEST												
Loaf volume, cm^3	1102	1054	-	-	-	-	1166	1113	1085	-	-	-
Evaluation (see page 79)	0	0	-	-	-	-	0	0	0	-	-	-

RHEOLOGICAL GRAPHS PER PRODUCTION REGION

MIXOGRAM

21



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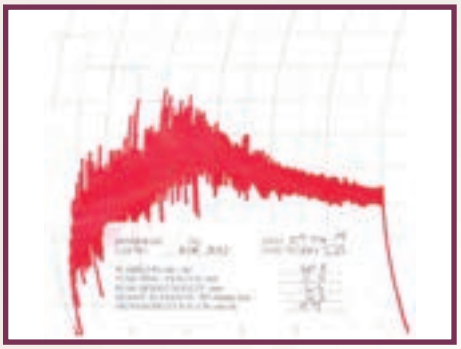
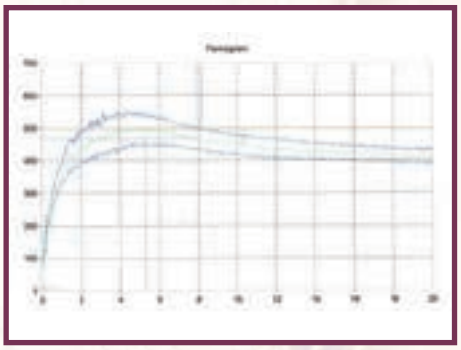


FARINOGRAM

21



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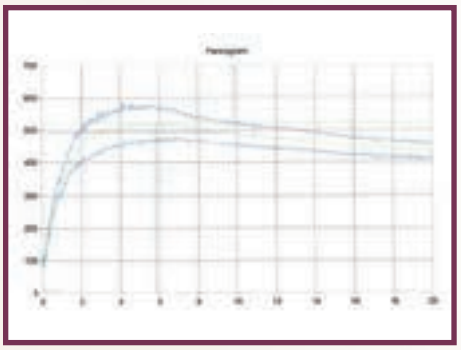
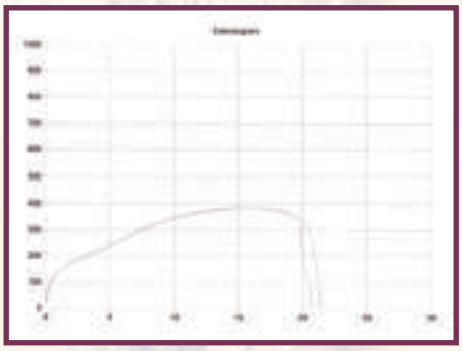


EXTENSOGRAM

21



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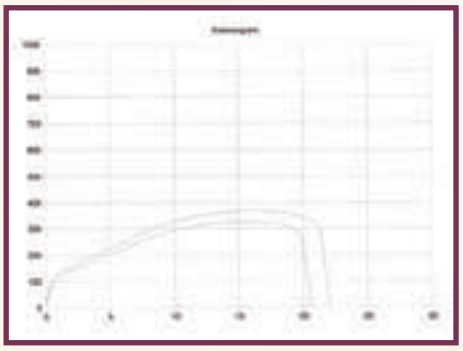
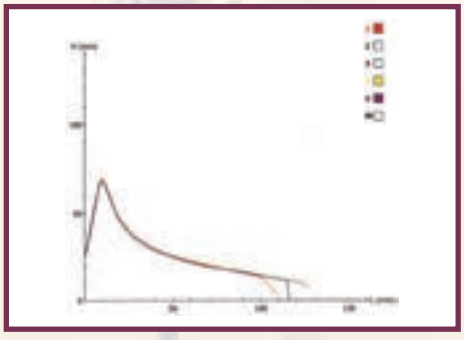


ALVEOGRAM

21



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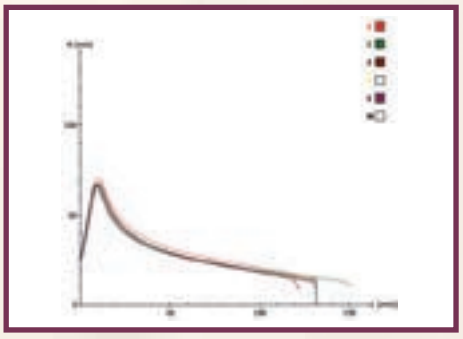


South African Quality data per production region
SUMMER RAINFALL AND IRRIGATION WHEAT

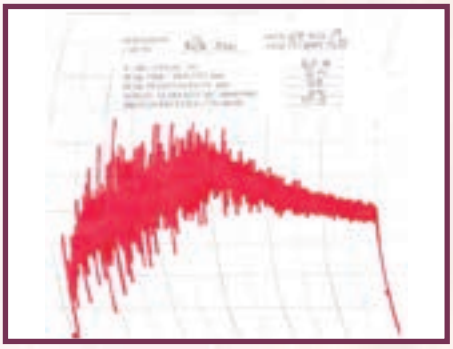
PRODUCTION REGION	(23) Free State North-Western Region (Bultfontein)				(24) Free State Central Region			
WHEAT	**ave**	**min**	**max**	**stdev**	**ave**	**min**	**max**	**stdev**
Protein (12% mb), %	12.9	11.4	14.3	2.05	12.8	11.0	16.0	1.42
Falling number, sec	504	499	509	7.07	473	310	565	80.46
1000 Kernel mass (13% mb), g	39.2	38.2	40.2	1.41	35.2	28.7	45.4	5.02
Hectolitre mass (dirty), kg/hl	83.1	82.3	83.8	1.06	81.4	76.6	83.8	2.09
Screenings (<1.8 mm sieve), %	1.61	0.52	2.70	1.54	2.26	0.17	7.61	2.61
Total damaged kernels, %	0.95	0.18	1.72	1.09	0.42	0.08	1.18	0.36
Combined deviations, %	2.81	0.70	4.92	2.98	3.30	0.46	8.83	3.19
Number of samples	***2***				***9***			
CULTIVARS								
cultivars with highest % occurrence	SST 884 50.0 PAN 3111 45.0 PAN 3471 5.0				PAN 3471 21.6 PAN 3111 13.6 SCHEEPERS 69 13.1 PAN 3400 12.7 PAN 3497 6.4			
Number of samples	***2***				***9***			
MIXOGRAM (Quadromat Junior)	**ave**	**min**	**max**	**stdev**	**ave**	**min**	**max**	**stdev**
Peak time, min	2.6	2.3	2.9	0.42	2.8	1.2	3.9	0.72
Tail height (6 min), mm	46	44	48	2.83	46	38	56	4.97
Number of samples	***2***				***9***			

	COMPOSITE SAMPLES											
CLASS AND GRADE	**B1**	**B2**	**B3**	**B4**	**UT**	**COW**	**B1**	**B2**	**B3**	**B4**	**UT**	**COW**
Bühler Extraction, %	70.6	71.6	-	-	-	-	69.8	71.9	-	-	-	-
FLOUR												
Protein (12% mb), %	13.1	10.3	-	-	-	-	11.5	10.2	-	-	-	-
Ash (db), %	0.61	0.62	-	-	-	-	0.60	0.64	-	-	-	-
Colour, KJ (wet)	-4.1	-4.6	-	-	-	-	-4.3	-4.5	-	-	-	-
Colour, Konica Minolta CM5 (dry)												
L*	93.42	93.79	-	-	-	-	93.55	93.75	-	-	-	-
a*	0.49	0.48	-	-	-	-	0.43	0.39	-	-	-	-
b*	9.62	9.69	-	-	-	-	10.17	9.77	-	-	-	-
RVA												
Peak Viscosity, cP	2090	2416	-	-	-	-	2196	2298	-	-	-	-
Minimum viscosity (Trough), cP	1545	1816	-	-	-	-	1652	1711	-	-	-	-
Final Viscosity, cP	2227	2635	-	-	-	-	2417	2612	-	-	-	-
Peak Time, min	7.00	7.00	-	-	-	-	7.00	7.00	-	-	-	-
GLUTEN												
Wet gluten (14% mb), %	38.9	28.6	-	-	-	-	31.1	27.7	-	-	-	-
Dry gluten (14% mb), %	13.1	9.3	-	-	-	-	10.5	9.0	-	-	-	-
Gluten Index	71	93	-	-	-	-	92	90	-	-	-	-
FARINOGRAM												
Water absorption (14% mb), %	63.9	59.9	-	-	-	-	60.9	60.1	-	-	-	-
Development time, min	4.8	4.9	-	-	-	-	5.5	3.5	-	-	-	-
Stability, min	4.8	6.5	-	-	-	-	7.1	4.5	-	-	-	-
Mixing tolerance index, BU	47	44	-	-	-	-	43	59	-	-	-	-
EXTENSOGRAM (45 min pull)												
Area, cm^2	89	99	-	-	-	-	95	72	-	-	-	-
Maximum height, BU	301	403	-	-	-	-	373	296	-	-	-	-
Extensibility, mm	211	178	-	-	-	-	182	171	-	-	-	-
ALVEOGRAM												
Strength (S), cm^2	37.8	30.3	-	-	-	-	36.9	26.5	-	-	-	-
Stability (P), mm	88	88	-	-	-	-	90	77	-	-	-	-
Distensibility (L), mm	107	77	-	-	-	-	95	89	-	-	-	-
Configuration ratio (P/L)	0.82	1.14	-	-	-	-	0.95	0.87	-	-	-	-
MIXOGRAM												
Peak time, min	2.0	2.8	-	-	-	-	2.6	2.3	-	-	-	-
100g BAKING TEST												
Loaf volume, cm^3	1090	1026	-	-	-	-	991	1064	-	-	-	-
Evaluation (see page 79)	0	0	-	-	-	-	0	0	-	-	-	-

RHEOLOGICAL GRAPHS PER PRODUCTION REGION

MIXOGRAM

23



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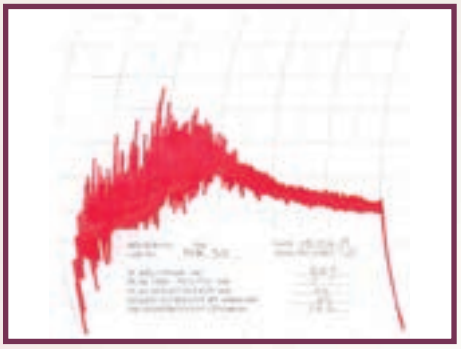
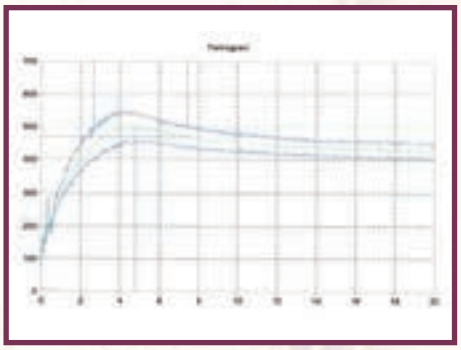


FARINOGRAM

23



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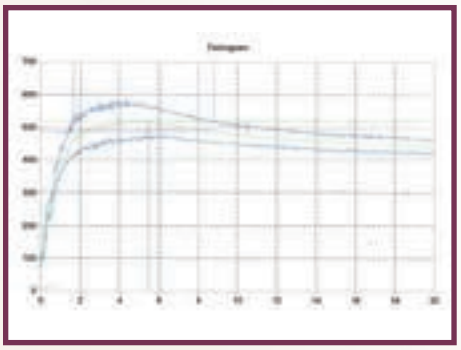
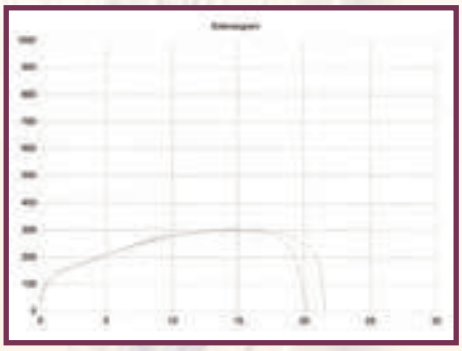


EXTENSOGRAM

23



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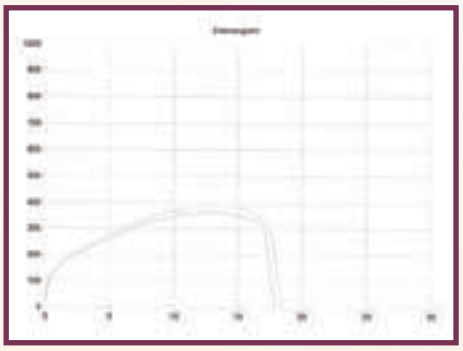
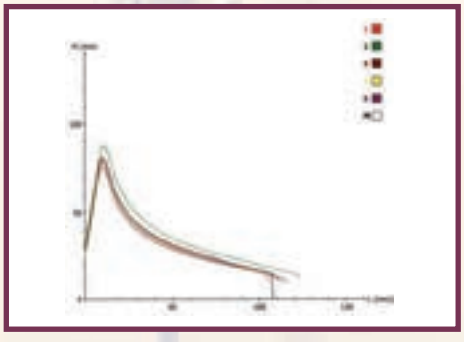


ALVEOGRAM

23



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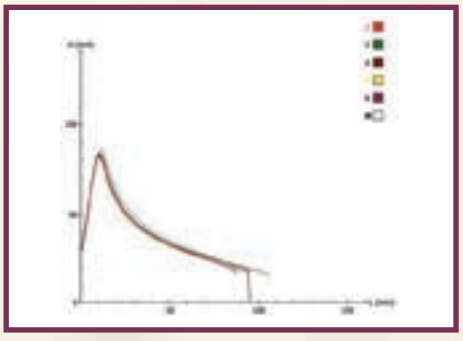


South African Quality data per production region
SUMMER RAINFALL AND IRRIGATION WHEAT

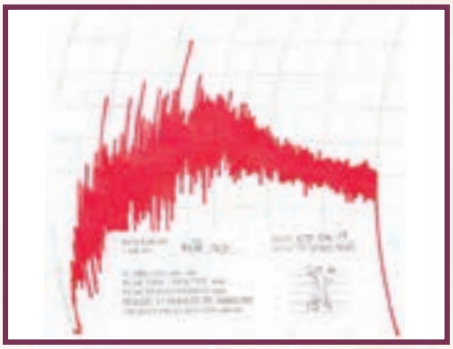
PRODUCTION REGION	(25) Free State South-Western Region				(26) Free State South-Eastern Region			
WHEAT	**ave**	**min**	**max**	**stdev**	**ave**	**min**	**max**	**stdev**
Protein (12% mb), %	13.5	13.0	14.3	0.45	13.5	11.0	16.4	2.22
Falling number, sec	405	360	433	25.48	356	304	415	46.45
1000 Kernel mass (13% mb), g	35.9	29.0	39.2	3.06	34.0	28.0	38.9	4.55
Hectolitre mass (dirty), kg/hl	81.5	80.3	82.5	0.73	78.5	76.3	79.9	1.55
Screenings (<1.8 mm sieve), %	2.02	1.79	2.40	0.19	1.18	0.19	2.56	1.15
Total damaged kernels, %	0.29	0.12	0.46	0.11	0.19	0.08	0.30	0.10
Combined deviations, %	2.80	2.47	3.42	0.32	1.97	0.83	3.40	1.20
Number of samples	***8***				***4***			
CULTIVARS								
cultivars with highest % occurrence	PAN 3368 22.4 SST 374 20.3 PAN 3161 15.5 PAN 3111 12.6 ELANDS 10.5				PAN 3161 35.0 SST 374 25.3 ELANDS 13.5 SST 356 8.3 PAN 3368 7.3			
Number of samples	***8***				***4***			
MIXOGRAM (Quadromat Junior)	**ave**	**min**	**max**	**stdev**	**ave**	**min**	**max**	**stdev**
Peak time, min	3.0	2.7	3.8	0.37	3.0	2.0	3.3	0.65
Tail height (6 min), mm	54	52	61	3.01	50	44	55	5.32
Number of samples	***8***				***4***			

	COMPOSITE SAMPLES											
CLASS AND GRADE	**B1**	**B2**	**B3**	**B4**	**UT**	**COW**	**B1**	**B2**	**B3**	**B4**	**UT**	**COW**
Bühler Extraction, %	70.2	-	-	-	-	-	70.6	67.6	-	-	-	-
FLOUR												
Protein (12% mb), %	12.4	-	-	-	-	-	12.2	12.5	-	-	-	-
Ash (db), %	0.57	-	-	-	-	-	0.55	0.65	-	-	-	-
Colour, KJ (wet)	-4.3	-	-	-	-	-	-4.1	-3.7	-	-	-	-
Colour, Konica Minolta CM5 (dry)												
L*	93.40	-	-	-	-	-	93.57	92.82	-	-	-	-
a*	0.44	-	-	-	-	-	0.32	0.46	-	-	-	-
b*	10.65	-	-	-	-	-	10.03	10.52	-	-	-	-
RVA												
Peak Viscosity, cP	2172	-	-	-	-	-	2301	2470	-	-	-	-
Minimum viscosity (Trough), cP	1537	-	-	-	-	-	1723	1696	-	-	-	-
Final Viscosity, cP	2491	-	-	-	-	-	2564	2895	-	-	-	-
Peak Time, min	7.00	-	-	-	-	-	7.00	7.00	-	-	-	-
GLUTEN												
Wet gluten (14% mb), %	34.2	-	-	-	-	-	33.2	34.5	-	-	-	-
Dry gluten (14% mb), %	11.7	-	-	-	-	-	11.3	11.5	-	-	-	-
Gluten Index	96	-	-	-	-	-	97	90	-	-	-	-
FARINOGRAM												
Water absorption (14% mb), %	63.2	-	-	-	-	-	61.7	61.6	-	-	-	-
Development time, min	7.0	-	-	-	-	-	8.0	5.3	-	-	-	-
Stability, min	10.2	-	-	-	-	-	12.6	10.2	-	-	-	-
Mixing tolerance index, BU	30	-	-	-	-	-	27	17	-	-	-	-
EXTENSOGRAM (45 min pull)												
Area, cm^2	109	-	-	-	-	-	121	77	-	-	-	-
Maximum height, BU	379	-	-	-	-	-	443	301	-	-	-	-
Extensibility, mm	210	-	-	-	-	-	204	182	-	-	-	-
ALVEOGRAM												
Strength (S), cm^2	46.2	-	-	-	-	-	50.8	35.5	-	-	-	-
Stability (P), mm	102	-	-	-	-	-	99	88	-	-	-	-
Distensibility (L), mm	98	-	-	-	-	-	110	86	-	-	-	-
Configuration ratio (P/L)	1.04	-	-	-	-	-	0.90	1.02	-	-	-	-
MIXOGRAM												
Peak time, min	2.8	-	-	-	-	-	3.1	2.3	-	-	-	-
100g BAKING TEST												
Loaf volume, cm^3	1071	-	-	-	-	-	1073	1105	-	-	-	-
Evaluation (see page 79)	0	-	-	-	-	-	0	0	-	-	-	-

RHEOLOGICAL GRAPHS PER PRODUCTION REGION

MIXOGRAM

25



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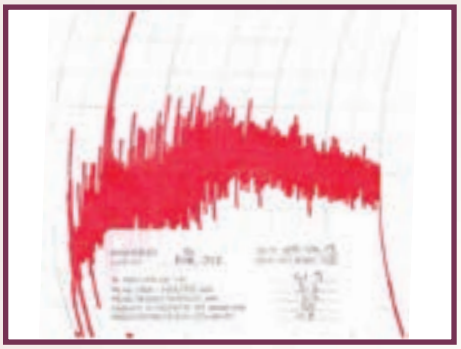
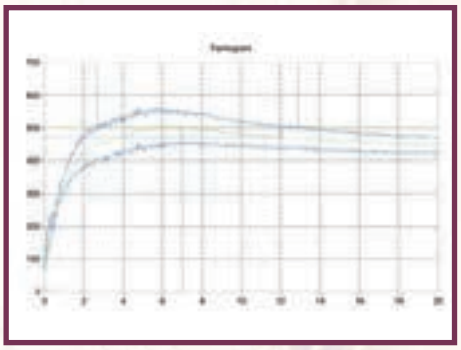
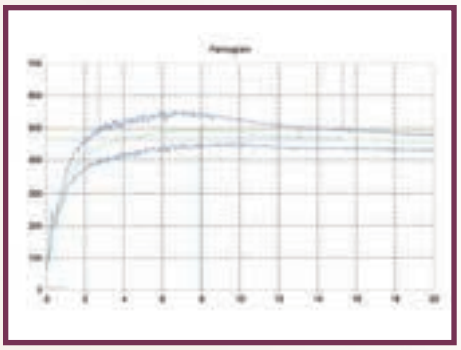


FARINOGRAM

25

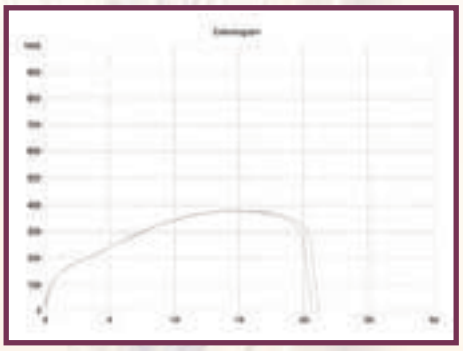


26



EXTENSOGRAM

25



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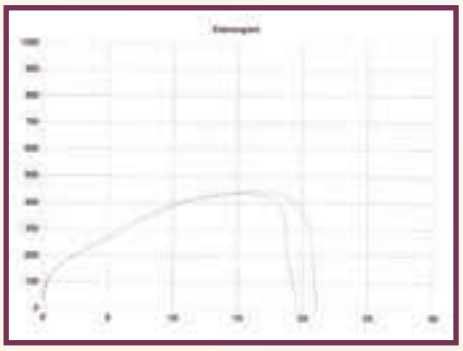
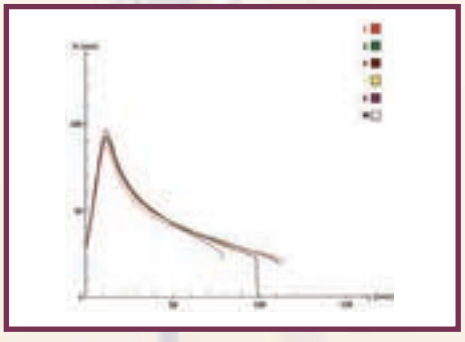
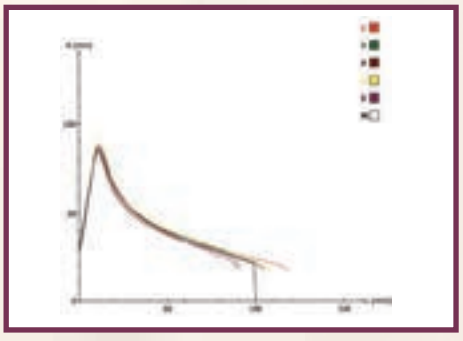


ALVEOGRAM

25



26



South African Quality data per production region
SUMMER RAINFALL AND IRRIGATION WHEAT

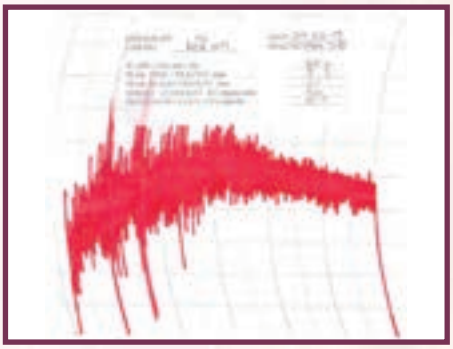
PRODUCTION REGION	(28) Free State Eastern Region				(29) Mpumalanga Southern Region			
WHEAT	**ave**	**min**	**max**	**stdev**	**ave**	**min**	**max**	**stdev**
Protein (12% mb), %	13.4	12.1	15.3	1.26	11.9	11.7	12.0	0.21
Falling number, sec	353	271	425	46.03	379	376	381	3.54
1000 Kernel mass (13% mb), g	35.3	27.9	42.1	4.34	43.3	41.8	44.7	2.05
Hectolitre mass (dirty), kg/hl	80.2	78.4	82.1	1.18	84.5	84.2	84.8	0.42
Screenings (<1.8 mm sieve), %	1.10	0.08	3.05	0.98	1.40	1.36	1.44	0.06
Total damaged kernels, %	0.68	0.14	1.32	0.43	0.55	0.54	0.56	0.01
Combined deviations, %	2.30	0.55	4.81	1.65	2.24	2.14	2.34	0.14
Number of samples	***9***				***2***			
CULTIVARS								
cultivars with highest % occurrence	PAN 3161	18.6			SST 884	37.0		
	PAN 3111	14.9			SST 8154	22.5		
	PAN 3368	12.1			SST 8135	13.0		
	ELANDS	11.7			PAN 3471	12.0		
	SST 374	8.3			SST 835	10.5		
Number of samples	***9***				***2***			
MIXOGRAM (Quadromat Junior)	**ave**	**min**	**max**	**stdev**	**ave**	**min**	**max**	**stdev**
Peak time, min	3.1	2.6	4.6	0.61	3.0	2.8	3.1	0.21
Tail height (6 min), mm	51	48	59	3.24	45	44	46	1.41
Number of samples	***9***				***2***			

	COMPOSITE SAMPLES											
CLASS AND GRADE	**B1**	**B2**	**B3**	**B4**	**UT**	**COW**	**B1**	**B2**	**B3**	**B4**	**UT**	**COW**
Bühler Extraction, %	70.5	-	-	67.2	-	-	72.8	72.3	-	-	-	-
FLOUR												
Protein (12% mb), %	11.8	-	-	13.8	-	-	11.0	10.6	-	-	-	-
Ash (db), %	0.59	-	-	0.57	-	-	0.57	0.60	-	-	-	-
Colour, KJ (wet)	-3.9	-	-	-3.8	-	-	-4.8	-4.7	-	-	-	-
Colour, Konica Minolta CM5 (dry)												
L*	93.18	-	-	93.13	-	-	94.08	93.96	-	-	-	-
a*	0.46	-	-	0.47	-	-	0.43	0.42	-	-	-	-
b*	10.07	-	-	10.86	-	-	9.30	9.41	-	-	-	-
RVA												
Peak Viscosity, cP	2161	-	-	2199	-	-	2334	2245	-	-	-	-
Minimum viscosity (Trough), cP	1619	-	-	1565	-	-	1772	1682	-	-	-	-
Final Viscosity, cP	2342	-	-	2635	-	-	2625	2519	-	-	-	-
Peak Time, min	7.00	-	-	7.00	-	-	7.00	7.00	-	-	-	-
GLUTEN												
Wet gluten (14% mb), %	32.2	-	-	36.9	-	-	30.3	28.1	-	-	-	-
Dry gluten (14% mb), %	10.7	-	-	12.5	-	-	10.1	9.8	-	-	-	-
Gluten Index	89	-	-	96	-	-	88	94	-	-	-	-
FARINOGRAM												
Water absorption (14% mb), %	62.0	-	-	63.5	-	-	60.1	59.4	-	-	-	-
Development time, min	5.7	-	-	6.9	-	-	4.4	4.7	-	-	-	-
Stability, min	9.5	-	-	10.6	-	-	5.7	6.0	-	-	-	-
Mixing tolerance index, BU	26	-	-	25	-	-	50	50	-	-	-	-
EXTENSOGRAM (45 min pull)												
Area, cm^2	103	-	-	94	-	-	95	97	-	-	-	-
Maximum height, BU	441	-	-	343	-	-	340	375	-	-	-	-
Extensibility, mm	173	-	-	199	-	-	212	196	-	-	-	-
ALVEOGRAM												
Strength (S), cm^2	44.3	-	-	43.4	-	-	33.6	29.5	-	-	-	-
Stability (P), mm	96	-	-	95	-	-	68	72	-	-	-	-
Distensibility (L), mm	105	-	-	99	-	-	141	101	-	-	-	-
Configuration ratio (P/L)	0.91	-	-	0.96	-	-	0.48	0.71	-	-	-	-
MIXOGRAM												
Peak time, min	2.9	-	-	2.8	-	-	2.6	2.7	-	-	-	-
100g BAKING TEST												
Loaf volume, cm^3	1033	-	-	1237	-	-	995	992	-	-	-	-
Evaluation (see page 79)	0	-	-	0	-	-	0	0	-	-	-	-

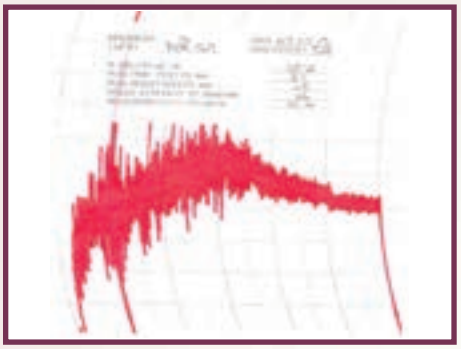
RHEOLOGICAL GRAPHS PER PRODUCTION REGION

MIXOGRAM

28

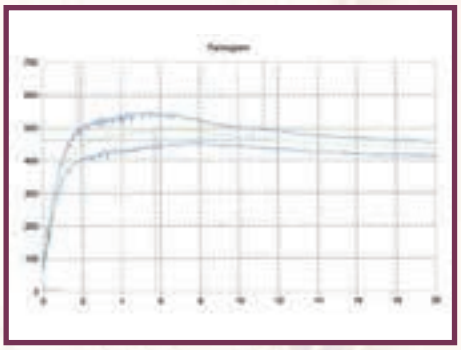


29



FARINOGRAM

28



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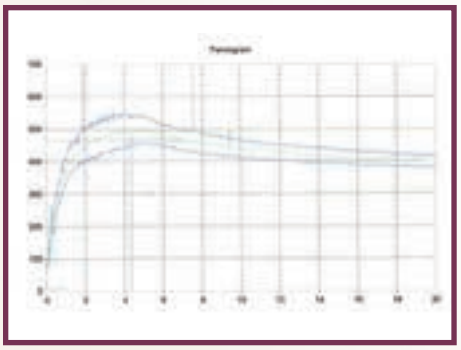
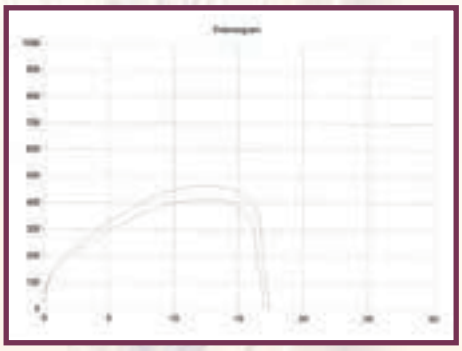


EXTENSOGRAM

28



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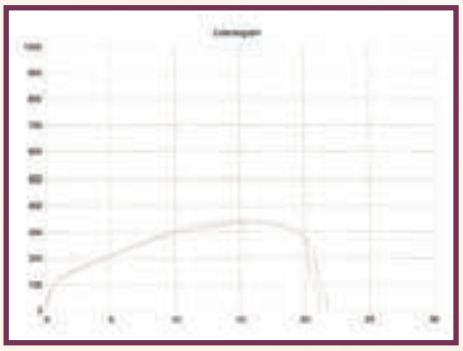
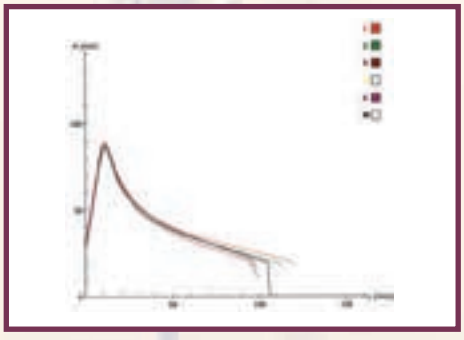


ALVEOGRAM

28



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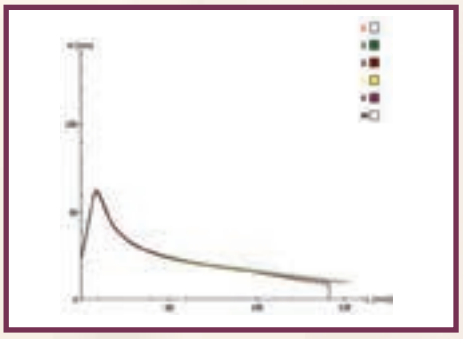


South African Quality data per production region
IRRIGATION WHEAT

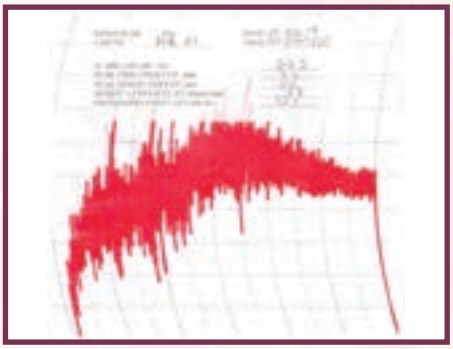
PRODUCTION REGION	(33) Mpumalanga Northern Region				(34) Gauteng Region			
WHEAT	**ave**	**min**	**max**	**stdev**	**ave**	**min**	**max**	**stdev**
Protein (12% mb), %	12.5	11.4	14.0	0.95	11.4	10.1	12.5	0.88
Falling number, sec	338	203	474	100.34	373	299	425	41.80
1000 Kernel mass (13% mb), g	38.9	36.9	42.3	1.98	39.7	37.9	43.7	1.98
Hectolitre mass (dirty), kg/hl	80.1	75.4	83.9	3.46	83.1	81.0	84.3	1.18
Screenings (<1.8 mm sieve), %	0.94	0.54	1.42	0.35	0.94	0.48	1.53	0.44
Total damaged kernels, %	0.68	0.08	2.20	0.79	0.79	0.32	1.40	0.43
Combined deviations, %	1.83	1.24	3.04	0.64	1.94	1.49	2.81	0.43
Number of samples	***6***				***7***			
CULTIVARS								
cultivars with highest % occurrence	SST 895 28.2 SST 884 17.7 PAN 3471 15.0 SST 835 14.5 SST 843 7.2				SST 884 36.3 SST 8135 21.9 SST 895 12.1 SST 8154 10.7 SST 835 9.3			
Number of samples	***6***				***7***			
MIXOGRAM (Quadromat Junior)	**ave**	**min**	**max**	**stdev**	**ave**	**min**	**max**	**stdev**
Peak time, min	3.5	3.0	4.0	0.36	3.2	2.5	3.7	0.43
Tail height (6 min), mm	52	48	55	2.42	49	47	55	2.88
Number of samples	***6***				***7***			

	COMPOSITE SAMPLES											
CLASS AND GRADE	**B1**	**B2**	**B3**	**B4**	**UT**	**COW**	**B1**	**B2**	**B3**	**B4**	**UT**	**COW**
Bühler Extraction, %	73.0	72.1	-	-	-	-	73.2	72.3	71.6	-	-	-
FLOUR												
Protein (12% mb), %	11.8	10.1	-	-	-	-	11.5	10.5	9.6	-	-	-
Ash (db), %	0.59	0.61	-	-	-	-	0.62	0.60	0.61	-	-	-
Colour, KJ (wet)	-4.3	-4.8	-	-	-	-	-4.6	-4.4	-4.8	-	-	-
Colour, Konica Minolta CM5 (dry)												
L*	93.43	93.95	-	-	-	-	93.66	93.54	93.78	-	-	-
a*	0.48	0.47	-	-	-	-	0.45	0.42	0.39	-	-	-
b*	10.03	9.33	-	-	-	-	9.26	9.28	9.12	-	-	-
RVA												
Peak Viscosity, cP	1810	2462	-	-	-	-	2317	2273	1731	-	-	-
Minimum viscosity (Trough), cP	1616	1789	-	-	-	-	1796	1802	1497	-	-	-
Final Viscosity, cP	1976	2765	-	-	-	-	2601	2473	1870	-	-	-
Peak Time, min	6.80	7.00	-	-	-	-	7.00	7.00	6.60	-	-	-
GLUTEN												
Wet gluten (14% mb), %	31.6	26.6	-	-	-	-	32.1	28.7	25.4	-	-	-
Dry gluten (14% mb), %	10.5	9.0	-	-	-	-	10.8	9.6	8.5	-	-	-
Gluten Index	98	97	-	-	-	-	91	95	98	-	-	-
FARINOGRAM												
Water absorption (14% mb), %	60.3	58.7	-	-	-	-	61.9	59.1	58.8	-	-	-
Development time, min	6.5	5.3	-	-	-	-	4.8	5.5	5.0	-	-	-
Stability, min	9.9	9.1	-	-	-	-	5.9	6.9	7.3	-	-	-
Mixing tolerance index, BU	35	30	-	-	-	-	51	46	48	-	-	-
EXTENSOGRAM (45 min pull)												
Area, cm^2	126	101	-	-	-	-	89	90	81	-	-	-
Maximum height, BU	451	406	-	-	-	-	316	378	339	-	-	-
Extensibility, mm	215	188	-	-	-	-	207	174	172	-	-	-
ALVEOGRAM												
Strength (S), cm^2	47.2	36.2	-	-	-	-	35.9	32.4	30.7	-	-	-
Stability (P), mm	80	85	-	-	-	-	74	75	72	-	-	-
Distensibility (L), mm	139	92	-	-	-	-	131	102	100	-	-	-
Configuration ratio (P/L)	0.58	0.92	-	-	-	-	0.56	0.74	0.72	-	-	-
MIXOGRAM												
Peak time, min	3.2	3.2	-	-	-	-	2.4	2.9	3.0	-	-	-
100g BAKING TEST												
Loaf volume, cm^3	1144	980	-	-	-	-	1064	1030	963	-	-	-
Evaluation (see page 79)	0	0	-	-	-	-	0	0	0	-	-	-

RHEOLOGICAL GRAPHS PER PRODUCTION REGION

MIXOGRAM

33



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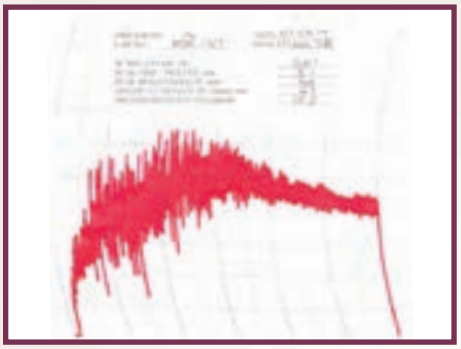

FARINOGRAM

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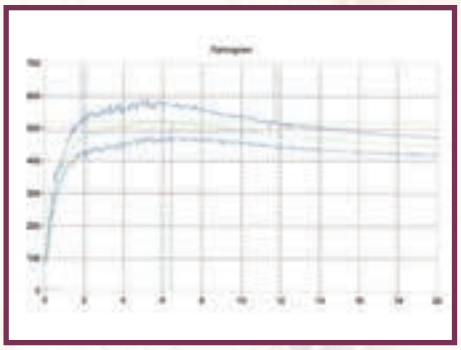

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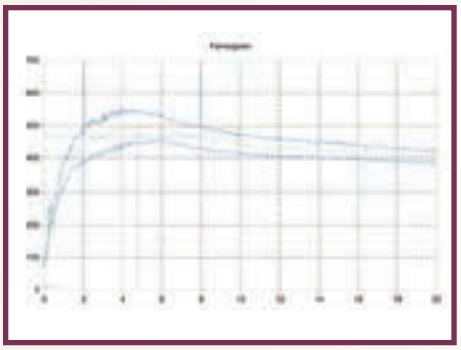
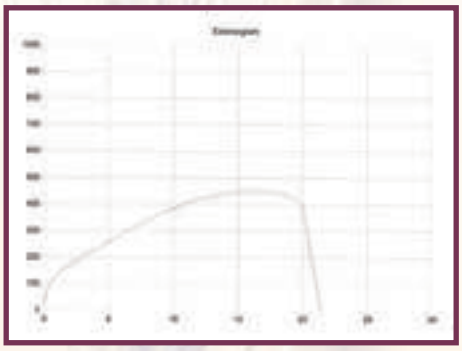


EXTENSOGRAM

33



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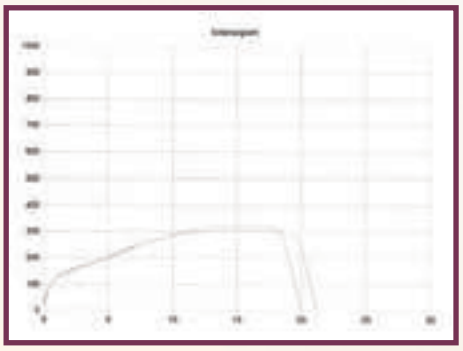
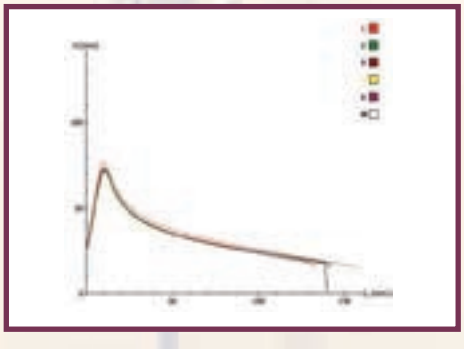


ALVEOGRAM

33



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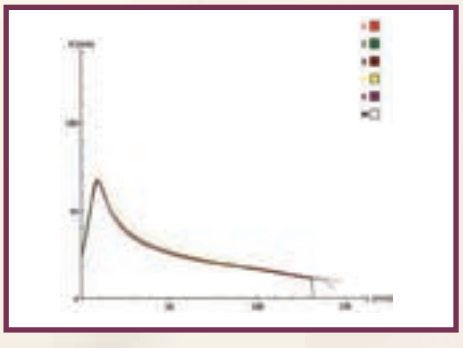


South African Quality data per production region
IRRIGATION WHEAT

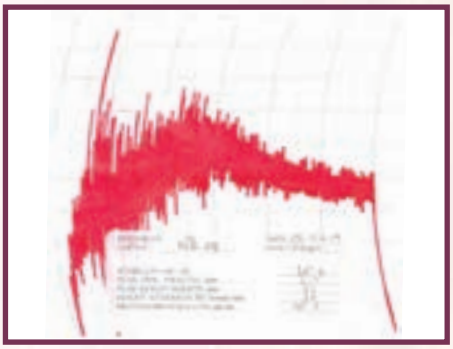
PRODUCTION REGION	(35) Limpopo Region				(36) KwaZulu-Natas			
WHEAT	**ave**	**min**	**max**	**stdev**	**ave**	**min**	**max**	**stdev**
Protein (12% mb), %	12.0	9.9	13.8	1.09	12.6	11.8	13.5	0.66
Falling number, sec	380	233	474	58.85	450	397	547	53.16
1000 Kernel mass (13% mb), g	41.0	31.1	52.6	4.88	41.2	36.3	44.7	2.78
Hectolitre mass (dirty), kg/hl	83.2	80.3	85.1	1.17	84.0	80.9	85.8	1.51
Screenings (<1.8 mm sieve), %	0.82	0.14	2.25	0.55	1.25	0.56	2.41	0.69
Total damaged kernels, %	0.79	0.14	5.14	1.03	0.62	0.16	1.44	0.49
Combined deviations, %	1.81	0.83	5.36	1.03	2.42	0.90	4.51	1.21
Number of samples	***23***				***10***			
CULTIVARS								
cultivars with highest % occurrence	SST 884	27.4			SST 806	26.6		
	DUZI	15.2			SST 8154	17.2		
	SST 8154	13.4			SST 884	15.8		
	SST 895	8.1			SST 8135	13.4		
	PAN 3471	8.0			SST 843	11.3		
Number of samples	***23***				***10***			
MIXOGRAM (Quadromat Junior)	**ave**	**min**	**max**	**stdev**	**ave**	**min**	**max**	**stdev**
Peak time, min	3.1	2.3	3.8	0.49	2.6	2.2	3.2	0.37
Tail height (6 min), mm	51	44	62	4.82	48	45	51	2.10
Number of samples	***23***				***10***			

	COMPOSITE SAMPLES											
CLASS AND GRADE	**B1**	**B2**	**B3**	**B4**	**UT**	**COW**	**B1**	**B2**	**B3**	**B4**	**UT**	**COW**
Bühler Extraction, %	71.6	69.8	70.9	-	72.1	-	73.1	72.3	-	-	-	-
FLOUR												
Protein (12% mb), %	11.9	10.5	9.4	-	11.1	-	12.0	10.6	-	-	-	-
Ash (db), %	0.57	0.55	0.59	-	0.56	-	0.55	0.56	-	-	-	-
Colour, KJ (wet)	-4.3	-4.6	-4.6	-	-4.4	-	-4.7	-4.6	-	-	-	-
Colour, Konica Minolta CM5 (dry)												
L*	93.42	94.22	93.57	-	93.68	-	93.64	93.62	-	-	-	-
a*	0.49	0.35	0.43	-	0.40	-	0.44	0.44	-	-	-	-
b*	10.36	9.59	10.07	-	9.82	-	9.44	10.11	-	-	-	-
RVA												
Peak Viscosity, cP	2368	2338	2380	-	1877	-	2291	2302	-	-	-	-
Minimum viscosity (Trough), cP	1809	1803	1724	-	1613	-	1712	1700	-	-	-	-
Final Viscosity, cP	2598	2618	2753	-	2077	-	2559	2607	-	-	-	-
Peak Time, min	7.00	7.00	7.00	-	6.53	-	7.00	7.00	-	-	-	-
GLUTEN												
Wet gluten (14% mb), %	33.3	29.1	25.0	-	30.8	-	34.4	29.1	-	-	-	-
Dry gluten (14% mb), %	11.5	9.8	8.1	-	10.5	-	11.5	9.6	-	-	-	-
Gluten Index	96	96	96	-	96	-	86	97	-	-	-	-
FARINOGRAM												
Water absorption (14% mb), %	62.0	60.7	60.2	-	62.2	-	63.0	62.9	-	-	-	-
Development time, min	6.2	6.2	6.0	-	4.5	-	6.0	5.5	-	-	-	-
Stability, min	8.7	9.3	8.1	-	6.3	-	6.8	5.6	-	-	-	-
Mixing tolerance index, BU	36	33	33	-	44	-	47	39	-	-	-	-
EXTENSOGRAM (45 min pull)												
Area, cm^2	129	112	91	-	93	-	90	68	-	-	-	-
Maximum height, BU	411	443	396	-	338	-	328	272	-	-	-	-
Extensibility, mm	229	189	169	-	201	-	204	176	-	-	-	-
ALVEOGRAM												
Strength (S), cm^2	44.5	39.1	31.5	-	36.4	-	36.7	31.3	-	-	-	-
Stability (P), mm	82	94	94	-	83	-	87	90	-	-	-	-
Distensibility (L), mm	132	96	69	-	107	-	98	85	-	-	-	-
Configuration ratio (P/L)	0.62	0.98	1.36	-	0.78	-	0.89	1.06	-	-	-	-
MIXOGRAM												
Peak time, min	2.8	2.7	2.9	-	2.4	-	2.3	2.3	-	-	-	-
100g BAKING TEST												
Loaf volume, cm^3	1099	982	869	-	1147	-	1061	946	-	-	-	-
Evaluation (see page 79)	0	0	0	-	0	-	0	0	-	-	-	-

RHEOLOGICAL GRAPHS PER PRODUCTION REGION

MIXOGRAM

35



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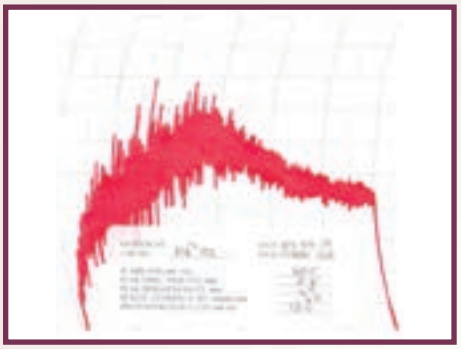
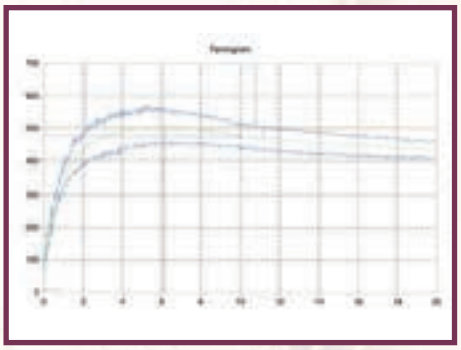


FARINOGRAM

35



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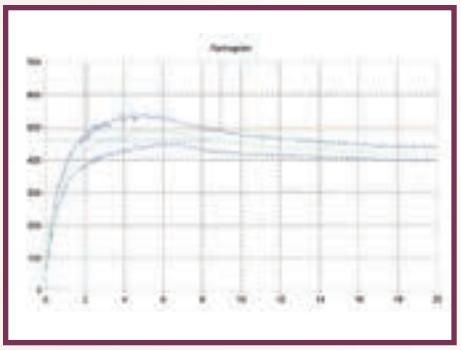
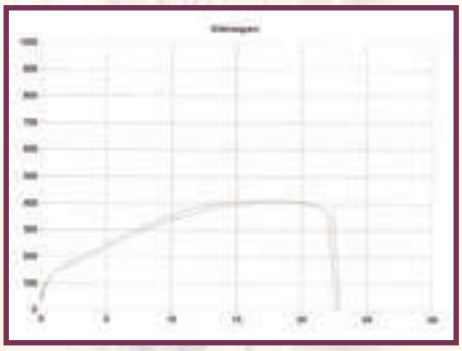


EXTENSOGRAM

35



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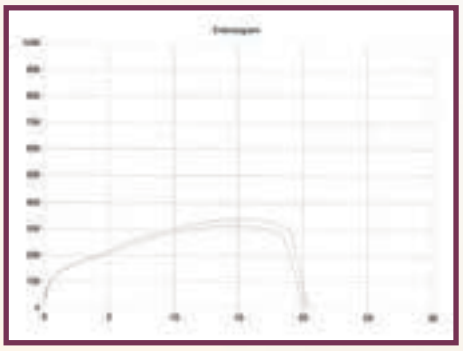
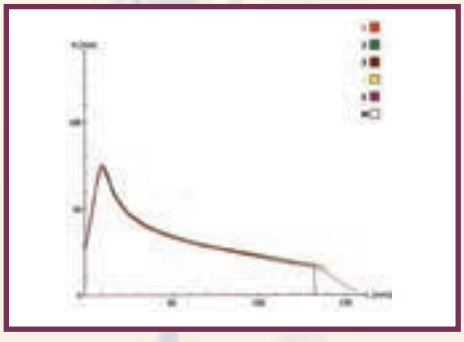


ALVEOGRAM

35



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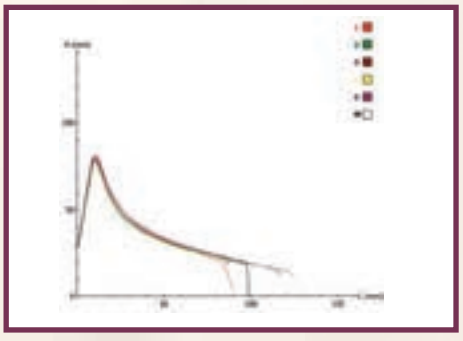

Mycotoxins

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 nine 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, Zearalenone, T2-toxin and HT-2 toxin in the wheat samples over the past eight seasons were confirmed in the 2018/2019 season. The Deoxynivalenol residue levels measured, were all well below national and international maximum allowable levels.

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 B1 may not exceed 5 µg/kg.

Amendments to Government Notice No. R. 1145, dated 8 October 2004, published in Government Notice No. 987 of 05 September 2016, specify that:

- Cereal grains (wheat, maize and barley) intended for further processing, may not contain more than 2 000 µg/kg of 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.

International Mycotoxin Regulations

The Maximum and guidance levels for mycotoxins on cereals from the European Union, USA, China and Codex are provided below for comparison purposes.

The European Union specifies the following maximum levels for mycotoxins on cereals and specifically wheat:

Aflatoxins

- All cereals, including maize and rice, intended for direct human consumption, $B_1 \leq 2$ µg/kg.
- All cereals, including maize and rice, intended for direct human consumption, Total ≤ 4 µg/kg.

Ochratoxin A

- Unprocessed cereals, ≤ 5 µg/kg.
- All products derived from unprocessed cereals (including processed cereal products and cereals intended for direct human consumption), ≤ 3 µg/kg.
- Wheat gluten not sold directly to the consumer, ≤ 8 µg/kg.

Deoxynivalenol

- Unprocessed cereals (excluding durum wheat, oats and maize), ≤ 1 250 µg/kg.
- Cereal flour, maize flour, grits and maize meal, ≤ 750 µg/kg.
- Bread, biscuits, pastries, cereal snacks and breakfast cereals, ≤ 500 µg/kg.

Zearalenone

- Unprocessed cereals other than maize, ≤ 100 µg/kg.
- Cereals intended for direct human consumption, cereal flour, bran as end product marketed for direct human consumption, ≤ 75 µg/kg.
- Bread, pastries, biscuits, cereal snacks and breakfast cereals, ≤ 50 µg/kg.

T-2 and HT-2 toxin

- Unprocessed cereals – wheat, rye and other cereal, guidance level 100 µg/kg.
- Cereal grains for direct human consumption – cereals other than oats and maize, guidance level 50 µg/kg.
- Cereal products for human consumption – cereal milling products other than oat and maize, guidance level 50 µg/kg.
- Cereal products for human consumption – breakfast cereals including formed cereal flakes, guidance level 75 µg/kg.
- Cereal products for human consumption – bread (including small bakery wares), pastries, biscuits, cereal snacks, pasta, guidance level 25 µg/kg.
- Cereal products for human consumption – cereal-based foods for infants and young children, guidance level 15 µg/kg.[1]

In the USA, the Food and Drug Administration (FDA) actions levels for Aflatoxin for all commodities intended for human consumption is 20 µg/kg (excluding Aflatoxin M_1 in milk where the maximum level is 0.5 µg/kg). Maximum levels for DON in finished wheat products intended for human consumption is 1 000 µg/kg.[1]

In China the maximum level for Aflatoxin B_1 in wheat and wheat flour is 5.0 µg/kg. The maximum level for DON in wheat and wheat flour is 1 000 µg/kg. Ochratoxin A in grains and milled grain products may not exceed 5.0 µg/kg and Zearalenone in wheat and wheat flour may not exceed 60 µg/kg.[1]

According to Codex, Ochratoxin A in raw wheat may not exceed 5 µg/kg. The maximum DON level for cereal grains (wheat, maize and barley) destined for further processing is 2 000 µg/kg and the maximum level for DON in flour, meal, semolina and flakes derived from wheat, maize or barley is 1 000 µg/kg. [2]

References:

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2. CODEX General Standard for contaminants and toxins in food and feed, CODEX STAN 193-1995, Revised in 1997, 2006, 2008, 2009 and Amended in 2010, 2012, 2013, 2014, 2015, 2016, 2017, 2018

Table 6: Mycotoxin results for the 2018/2019 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	UT	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2	B2	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	B3	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	UT	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
3	B4	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
4	B3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
5	B4	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	B1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
6	B2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
10	B1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
10	B2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
10	B3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
11	B1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
11	B2	ND	ND	ND	ND	ND	ND	ND	230	ND	ND	ND	ND	ND
12	B2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
14	B1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
15	B3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
16	B2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
17	B1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
18	B2	ND	ND	ND	ND	ND	ND	ND	361	ND	ND	ND	ND	ND
19	B1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
20	B1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
20	B2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
21	B1	ND	ND	ND	ND	ND	ND	ND	127	ND	ND	ND	ND	ND
22	B2	ND	ND	ND	ND	ND	ND	ND	226	ND	ND	ND	ND	ND
23	B1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Table 6: Mycotoxin results for the 2018/2019 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
24	COW	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
25	B1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
26	B2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
28	B1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
29	B1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
33	B1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
34	B2	ND	ND	ND	ND	ND	ND	ND	140	ND	ND	ND	ND	ND
35	B1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
35	B3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
36	B1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Total number of samples		40	40	40	40	40	40	40	40	40	40	40	40	40
Average of total number of samples		0	0	0	0	0	0	0	27	0	0	0	0	0
Number of positive results		0	0	0	0	0	0	0	5	0	0	0	0	0
Average of positive results		-	-	-	-	-	-	-	217	-	-	-	-	-
Maximum of positive results		-	-	-	-	-	-	-	361	-	-	-	-	-

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)

Amino Acid Profile

Amino acids are the building blocks of proteins and approximately 22 amino acids are commonly distributed among the proteins of all biological materials. Of these, 18 can be found in cereal grain proteins. Amino acids are organic compounds containing basic amine (-NH2) and acidic carboxyl (-COOH) functional groups, in addition to a side chain (R group) specific to each amino acid.

Amino acid composition is an important feature in determining the nutritional value of wheat for human and animal diets. Amino acids are considered crucial to good health, contributing considerably to the health of the human nervous system, hormone production as well as muscular structure and are needed by vital organs and for cellular structure.

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

Whole meal and white flours from different classes and varieties of wheat grown in three different countries (USA, USSR and Australia) show generally similar amino acid compositions, with high contents of glutamic acid (including glutamine) and proline, very low tryptophan, and relatively low contents of lysine and threonine. Compared with the range of variation in the protein contents of these samples, the variation in their amino acid compositions resulting either from genetic differences or growing conditions such as fertilizer level is rather limited. The reason being that the amino acid compositions of the major endosperm proteins, representing close to 80% of the total wheat proteins, are very similar. Differences in the expression of levels of individual protein genes therefore do not usually result in significant differences in the amino acid compositions of the samples.

Significant variation in amino acid composition may however occur in extreme cases. Research showed that lysine and threonine were for example higher in yellow-berry kernels compared to normal kernels, while glutamic acid (including glutamine) was significantly lower. Extreme differences in fertilization conditions may also result in significant variation in the compositions of whole grain flour or specific protein fractions. It has been found that the proportions of glutamine, proline and phenylalanine in wheat grain and flour all increased with increased levels of nitrogen fertilization, whereas threonine, serine, glycine, alanine, valine and sulphur amino acids decreased.

In a study where wheat was grown under even more extreme fertilization conditions, with variation in nitrogen and sulphur, the grain amino acid composition changed significantly. Less than half of the amounts of cysteine and methionine were present in grain grown with no sulphur and high nitrogen levels compared to grain grown with adequate levels of sulphur.

Proteins are not distributed uniformly throughout a wheat kernel with variation occurring in both the protein content and composition. Even though the starchy endosperm's protein concentration is only a third of that in the germ and less than half of that in the aleurone layer, the starchy endosperm proteins still represent close to three quarters of the total grain protein. The starchy endosperm is characterized by high levels of glutamine and proline and low levels of basic amino acids, while the aleurone and germ contain significantly less proline and glutamine, with high levels of arginine and asparagine in the aleurone layer and germ, respectively. Since the various morphological parts of the wheat kernel differ in protein content and composition, milling extraction rates affect the content and composition of flour.

A large number of flour fractions or mill streams are produced during commercial flour milling which are recombined to provide flours with specific processing characteristics. As a result of the irregular distribution of components within the wheat kernel, these flour streams also vary in their composition and functional properties.

The amino acid compositions of flours differ from those of the grains from which they were milled in containing less lysine, arginine, aspartate (+ asparagine), glycine and alanine but more glutamate (+ glutamine) and proline. Analyses of manually dissected pericarp, testa, aleurone, starchy endosperm and germ suggest that these differences in composition result from differences in the distribution of protein classes throughout the wheat kernel, for example the proportions of basic amino acids increase and the nitrogen content decreases from the outside towards the centre of the endosperm.[3]

Due to the fact that cystine consists of two cysteine molecules, joined by a disulfide (S-S) bond, cysteine and cystine are interchangeable in wheat. The ratio of cysteine to cystine is dependent on the degree of oxidation in a dough. Addition of an oxidizing agent, such as ascorbic acid, will increase the amount of cystine at the expense of cysteine. This has a "strengthening" effect on the gluten by increasing its elasticity.[2]

The results of the samples analysed by SAGL and reported as g amino acid/100 g sample, are provided in Table 7 on pages 70 and 71. The values obtained for all amino acids on these samples, were within the normal range reported for wheat in literature, deficient in certain essential amino acids, such as tryptophan, lysine, threonine, methionine and histidine, but high in glutamic acid and proline, which is not essential.

Due to the fact that protein and amino acid composition of wheat varies with crop varieties, application of fertilizers, irrigation practices, soil composition and climatic conditions, the amino acid content showed a wide variation between samples. The only exception being tryptophan, ranging from 0.12 to 0.19 g/100 g this season and between 0.14 to 0.17 g/100 g and 0.13 to 0.19 g/100 g for the previous two seasons respectively. Tryptophan is nutritionally important since it is a precursor for important metabolites such as serotonin and nicotinamide. The World Health Organisation's (WHO) recommended daily dose for tryptohan is 4 mg/kg/day.[4]

Lysine values varied between 0.31 and 0.45 g/100 g, comprising ± 2.4 – 3.2 % of the total amino acid content. Lysine is the precursor for carnitine and is required for the structural modification of collagen together with the amino acids glycine and proline.[1] The WHO recommended daily dose for lysine is 30 mg/kg/day. Threonine's WHO recommended daily dose is 15 mg/kg/day [4] and ranged from 0.33 to 0.50 g/100 g this season and from 0.35 to 0.52 g/100 g the previous season. Threonine supports digestive function, the immune system, liver and cardiovascular function as well as the central nervous system.[5]

Methionine values were lower this season than during the previous season, ranging from 0.17 to 0.30 g/100 g and comparing to the 0.18 and 0.26 g/100 g of the 2016/2017 season. The WHO daily recommendation is 15 mg/kg/day for the sulphur containing amino acids in total.[4] The main functions of methionine include building of various protein molecules and the synthesis of the equally important sulphurous amino acid, cysteine.[5]

The values for histidine varied between 0.23 and 0.40 g/100 g and comprises ± 2.1 – 2.3 % of the total amino acid content. Histidine is involved in the formation of proteins, it influences several of the metabolic reactions in the body and assists in regulating blood pH values. The results also showed that the samples were high in the essential amino acid leucine, with values ranging from 0.72 to 1.21 g/100 g. Phenylalanine values varied between 0.50 and 0.86 g/100 g.

The results showed that the samples were rich in glutamic acid and proline, together contributing ± 42% of the total amino acid content. Glutamic acid contributes to the health of the immune and digestive systems, as well as energy production. Proline is a non-essential amino acid manufactured mainly from ornithine, glutamine and glutamate in the liver and is one of the principal amino acids required by the body for building collagen.[5]

References:

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4. World Health Organization. Protein and amino acids requirements in human nutrition: report of a joint FAO/WHO/UNU expert consultation, Teck. Rep. Series no 935, World Health Organization, Geneva, Switzerland 2007.
5. http://aminoacidstudies.org

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

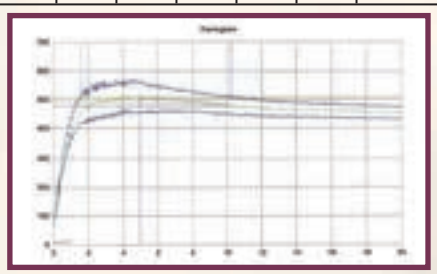
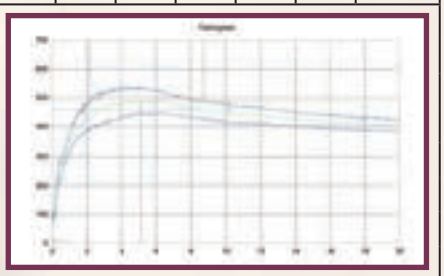
Region	Grade	Amino Acid																	
		Tryptophan	Methionine	Cystine	Histidine	Serine	Arginine	Glycine	Asparticacid	Glutamic acid	Threonine	Alanine	Proline	Lysine	Tyrosine	Valine	Isoleucine	Leucine	Phenyl-alanine
		g/100g (as is)																	
1	UT	0.16	0.28	0.47	0.30	0.67	0.59	0.57	0.68	4.23	0.39	0.45	1.39	0.35	0.39	0.57	0.45	0.91	0.61
2	B2	0.14	0.21	0.44	0.28	0.63	0.57	0.54	0.71	3.96	0.38	0.44	1.29	0.35	0.33	0.56	0.44	0.87	0.62
3	B2	0.13	0.23	0.48	0.27	0.61	0.55	0.51	0.62	3.74	0.36	0.42	1.22	0.32	0.31	0.52	0.41	0.81	0.57
3	B3	0.12	0.21	0.44	0.27	0.59	0.55	0.51	0.61	3.55	0.36	0.42	1.17	0.34	0.33	0.53	0.40	0.81	0.56
3	B1	0.14	0.26	0.49	0.32	0.71	0.64	0.59	0.73	4.38	0.42	0.48	1.43	0.37	0.36	0.62	0.51	0.96	0.66
3	UT	0.13	0.22	0.42	0.26	0.58	0.54	0.49	0.62	3.44	0.36	0.42	1.14	0.33	0.29	0.54	0.40	0.82	0.52
3	B4	0.14	0.25	0.43	0.28	0.63	0.57	0.54	0.71	3.76	0.38	0.45	1.23	0.36	0.32	0.59	0.42	0.86	0.57
4	B2	0.14	0.24	0.49	0.28	0.60	0.56	0.50	0.62	3.62	0.36	0.41	1.18	0.31	0.30	0.53	0.42	0.80	0.56
4	B3	0.14	0.26	0.44	0.26	0.58	0.54	0.50	0.61	3.46	0.35	0.41	1.13	0.33	0.32	0.53	0.40	0.79	0.51
5	B4	0.14	0.21	0.39	0.23	0.56	0.50	0.48	0.63	3.35	0.33	0.40	1.11	0.32	0.33	0.43	0.32	0.72	0.50
5	B1	0.15	0.24	0.45	0.29	0.66	0.60	0.55	0.68	4.17	0.40	0.45	1.39	0.37	0.37	0.58	0.45	0.90	0.62
6	B1	0.15	0.22	0.38	0.30	0.69	0.62	0.57	0.68	4.13	0.41	0.47	1.39	0.36	0.38	0.58	0.46	0.90	0.64
6	B2	0.14	0.21	0.35	0.27	0.60	0.57	0.50	0.63	3.64	0.36	0.43	1.18	0.33	0.31	0.51	0.40	0.81	0.54
10	B1	0.15	0.23	0.46	0.30	0.65	0.58	0.57	0.67	4.23	0.38	0.45	1.38	0.36	0.38	0.58	0.46	0.91	0.64
10	B2	0.15	0.20	0.39	0.27	0.60	0.56	0.54	0.63	3.77	0.36	0.42	1.23	0.34	0.35	0.54	0.40	0.82	0.56
10	B3	0.15	0.17	0.38	0.26	0.58	0.53	0.50	0.59	3.56	0.34	0.41	1.15	0.32	0.33	0.50	0.38	0.78	0.54
11	B1	0.16	0.21	0.38	0.32	0.70	0.66	0.60	0.70	4.48	0.41	0.49	1.46	0.38	0.39	0.60	0.50	0.98	0.66
11	B2	0.16	0.26	0.44	0.29	0.62	0.58	0.54	0.69	3.82	0.37	0.44	1.28	0.36	0.36	0.57	0.42	0.86	0.57
12	B2	0.16	0.19	0.39	0.26	0.60	0.55	0.52	0.63	3.71	0.35	0.41	1.22	0.33	0.35	0.49	0.37	0.79	0.55
14	B1	0.16	0.21	0.41	0.31	0.69	0.63	0.60	0.74	4.40	0.41	0.48	1.45	0.38	0.38	0.60	0.46	0.92	0.63
15	B3	0.15	0.23	0.42	0.27	0.58	0.57	0.51	0.65	3.46	0.36	0.43	1.15	0.34	0.32	0.55	0.40	0.83	0.53
16	B2	0.16	0.23	0.47	0.29	0.64	0.58	0.56	0.66	4.05	0.37	0.45	1.35	0.34	0.37	0.58	0.43	0.89	0.58
17	B1	0.16	0.22	0.45	0.32	0.69	0.64	0.60	0.74	4.43	0.41	0.49	1.44	0.38	0.40	0.60	0.46	0.93	0.65

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

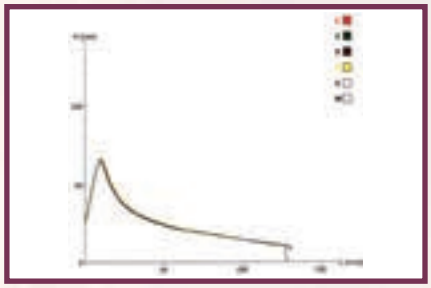
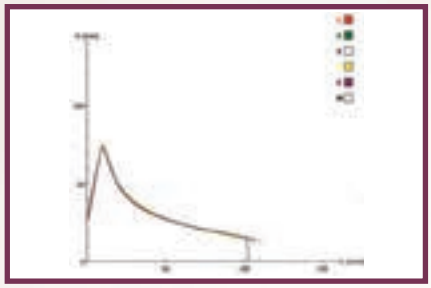
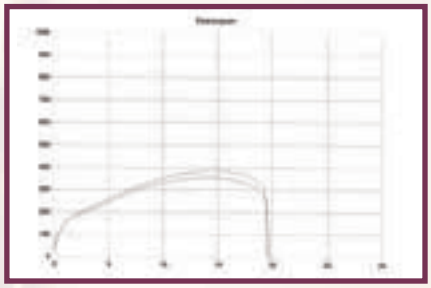
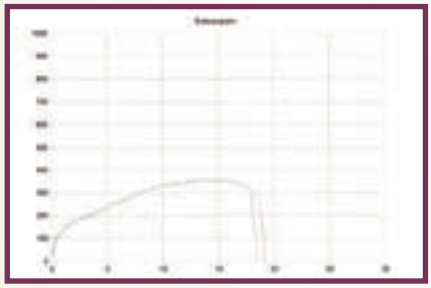
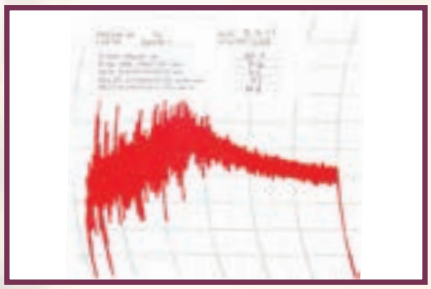
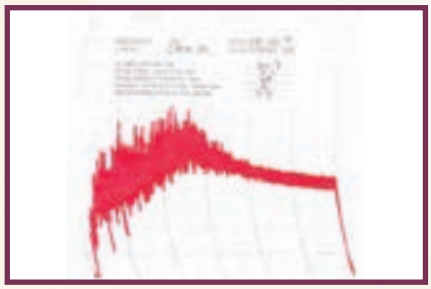
Region	Grade	Amino Acid																
		Tryptophan	Methionine	Cystine	Histidine	Serine	Arginine	Glycine	Asparticacid	Glutamic acid	Threonine	Alanine	Proline	Lysine	Tyrosine	Valine	Isoleucine	Leucine	Phenyl-alanine
		g/100g (as is)																	
18	B2	0.15	0.27	0.44	0.29	0.63	0.59	0.55	0.71	4.02	0.37	0.44	1.33	0.35	0.37	0.57	0.43	0.87	0.59
19	B1	0.16	0.20	0.43	0.29	0.65	0.57	0.56	0.73	4.22	0.38	0.46	1.40	0.35	0.38	0.54	0.42	0.87	0.62
20	B1	0.14	0.25	0.46	0.28	0.61	0.55	0.53	0.65	3.95	0.35	0.42	1.28	0.32	0.32	0.51	0.41	0.81	0.59
20	B2	0.15	0.21	0.41	0.29	0.64	0.61	0.54	0.69	3.90	0.38	0.45	1.30	0.37	0.37	0.58	0.43	0.89	0.59
21	B1	0.16	0.25	0.48	0.29	0.63	0.58	0.55	0.67	4.06	0.38	0.44	1.32	0.35	0.35	0.55	0.44	0.88	0.62
22	B2	0.16	0.23	0.42	0.28	0.62	0.57	0.55	0.66	3.87	0.37	0.44	1.28	0.35	0.34	0.55	0.43	0.85	0.60
23	B1	0.16	0.23	0.38	0.33	0.70	0.64	0.60	0.70	4.72	0.41	0.49	1.57	0.38	0.42	0.65	0.59	0.94	0.76
24	COW	0.15	0.22	0.45	0.30	0.67	0.59	0.57	0.70	4.24	0.39	0.46	1.41	0.37	0.37	0.60	0.47	0.92	0.65
25	B1	0.17	0.26	0.48	0.33	0.73	0.67	0.63	0.74	4.77	0.43	0.50	1.63	0.39	0.41	0.66	0.49	1.01	0.72
26	B2	0.19	0.30	0.62	0.40	0.86	0.79	0.73	0.87	5.76	0.50	0.58	2.02	0.45	0.49	0.76	0.63	1.21	0.86
28	B1	0.16	0.22	0.35	0.33	0.73	0.67	0.61	0.73	4.86	0.42	0.51	1.65	0.38	0.40	0.64	0.52	0.99	0.74
29	B1	0.14	0.23	0.45	0.29	0.64	0.59	0.54	0.69	4.07	0.38	0.45	1.33	0.35	0.35	0.57	0.43	0.87	0.61
33	B1	0.17	0.22	0.39	0.31	0.70	0.65	0.60	0.70	4.45	0.41	0.48	1.47	0.38	0.40	0.59	0.46	0.95	0.65
34	B2	0.15	0.22	0.41	0.28	0.62	0.57	0.53	0.63	3.82	0.37	0.43	1.28	0.33	0.35	0.54	0.42	0.84	0.58
35	B1	0.16	0.21	0.35	0.28	0.66	0.55	0.56	0.63	4.36	0.37	0.44	1.46	0.33	0.38	0.50	0.42	0.86	0.65
35	B3	0.16	0.21	0.45	0.26	0.55	0.52	0.49	0.60	3.45	0.34	0.40	1.14	0.31	0.29	0.49	0.38	0.76	0.53
36	B1	0.15	0.29	0.42	0.33	0.74	0.66	0.63	0.76	4.89	0.42	0.49	1.62	0.37	0.44	0.65	0.48	1.00	0.71
2018/2018 Minimum		**0.12**	**0.17**	**0.35**	**0.23**	**0.55**	**0.50**	**0.48**	**0.59**	**3.35**	**0.33**	**0.40**	**1.11**	**0.31**	**0.29**	**0.43**	**0.32**	**0.72**	**0.50**
2018/2019 Maximum		**0.19**	**0.30**	**0.62**	**0.40**	**0.86**	**0.79**	**0.73**	**0.87**	**5.76**	**0.50**	**0.58**	**2.02**	**0.45**	**0.49**	**0.76**	**0.63**	**1.21**	**0.86**
2017/2018 Minimum		**0.14**	**0.22**	**0.29**	**0.26**	**0.57**	**0.50**	**0.39**	**0.60**	**3.64**	**0.35**	**0.42**	**1.17**	**0.33**	**0.22**	**0.51**	**0.39**	**0.43**	**0.53**
2017/2018 Maximum		**0.17**	**0.37**	**0.48**	**0.39**	**0.89**	**0.73**	**0.75**	**0.86**	**5.88**	**0.52**	**0.58**	**2.03**	**0.44**	**0.43**	**0.76**	**0.60**	**1.20**	**0.88**
2016/2017 Minimum		**0.13**	**0.18**	**0.31**	**0.23**	**0.51**	**0.45**	**0.45**	**0.54**	**3.02**	**0.32**	**0.37**	**0.99**	**0.31**	**0.23**	**0.46**	**0.34**	**0.70**	**0.46**
2016/2017 Maximum		**0.19**	**0.26**	**0.55**	**0.44**	**0.93**	**0.83**	**0.77**	**0.88**	**6.39**	**0.54**	**0.61**	**2.18**	**0.49**	**0.49**	**0.82**	**0.66**	**1.32**	**1.01**

RSA WHEAT CROP QUALITY SUMMARY

RSA Crop Quality 2016/2017 and 2018/2019 Seasons

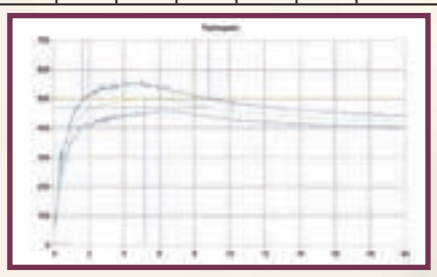
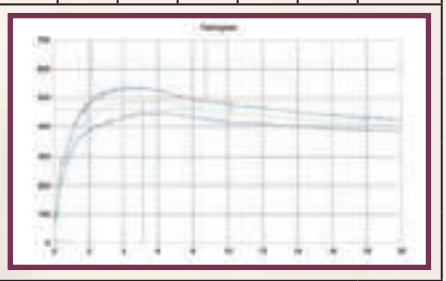
Country of origin	RSA Crop Average 2016/2017							RSA Crop Average 2018/2019						
Class and Grade bread wheat	**B1**	**B2**	**B3**	**B4**	**UT**	**COW**	**Average**	**B1**	**B2**	**B3**	**B4**	**UT**	**COW**	**Average**
No. of samples	***130***	***91***	***33***	***28***	***48***	***7***	***337***	***153***	***88***	***29***	***14***	***48***	***5***	***337***
WHEAT														
GRADING														
Protein (12% mb), %	13.0	11.5	11.0	11.0	11.4	13.6	12.0	12.8	11.6	10.5	10.7	12.0	11.5	12.1
Moisture, %	9.9	9.8	9.8	9.9	9.7	10.2	9.9	9.3	9.3	9.2	9.6	9.0	9.7	9.3
Falling number, sec	358	361	343	359	349	358	356	402	401	378	354	400	359	397
1000 Kernel mass (13% mb), g	37.7	39.6	40.5	37.8	38.6	35.6	38.6	38.9	39.7	39.9	37.0	39.0	42.9	39.2
Hlm (dirty), kg/hl	81.7	82.0	81.8	81.5	80.7	77.7	81.5	81.7	81.7	82.0	79.9	79.5	82.3	81.3
Screenings (<1.8 mm sieve), %	1.35	1.64	1.53	2.70	3.03	4.37	1.86	1.30	1.23	1.18	2.44	2.58	0.69	1.49
Gravel, stones, turf and glass, %	0.01	0.01	0.01	0.00	0.01	0.39	0.02	0.00	0.00	0.01	0.00	0.00	0.00	0.00
Foreign matter, %	0.16	0.16	0.15	0.15	0.31	0.82	0.19	0.14	0.13	0.11	0.14	0.27	0.12	0.15
Other grain & unthreshed ears, %	0.34	0.36	0.29	0.29	0.74	0.44	0.40	0.31	0.36	0.31	0.42	1.03	0.09	0.43
Heat damaged kernels, %	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.00
Immature kernels, %	0.04	0.03	0.04	0.01	0.04	0.03	0.03	0.09	0.07	0.06	0.09	0.04	0.18	0.08
Insect damaged kernels, %	0.36	0.48	0.41	0.49	0.94	0.32	0.49	0.49	0.47	0.53	0.49	0.81	1.50	0.55
Heavily frost damaged kernels, %	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.06	0.00	0.00	0.50	8.68	0.22
Sprouted kernels, %	0.16	0.14	0.11	0.06	0.16	1.09	0.16	0.02	0.02	0.01	0.00	0.10	0.16	0.03
Total damaged kernels, %	0.56	0.64	0.56	0.55	1.14	1.45	0.68	0.60	0.56	0.60	0.58	0.95	1.94	0.66
Combined deviations, %	2.40	2.82	2.55	3.70	5.21	7.21	3.14	2.35	2.29	2.20	3.58	4.83	2.85	2.73
Field fungi, %	0.32	0.35	0.32	0.43	0.41	0.57	0.36	0.12	0.14	0.10	0.12	0.12	0.08	0.12
Storage fungi, %	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ergot, %	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Poisonous seeds (*Crotalaria spp., etc.*)	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Poisonous seeds (*Argemone mexicana, etc.*)	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Live insects	No	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	No
	B1	**B2**	**B3**	**B4**	**UT**	**COW**	**Average**	**B1**	**B2**	**B3**	**B4**	**UT**	**COW**	**Average**
No. of samples	***23***	***14***	***11***	***10***	***11***	***1***	***70***	***28***	***21***	***11***	***7***	***3***	***-***	***70***
Bühler Extraction, %	72.8	72.7	72.2	72.8	71.6	73.1	72.5	71.5	71.7	71.5	69.2	70.7	-	71.3
FLOUR														
Colour, KJ (wet)	-3.7	-3.8	-3.6	-4.0	-3.8	-3.4	-3.8	-4.5	-4.6	-4.7	-4.4	-4.5	-	-4.5
Colour, Konica Minolta CM5 (dry)														
L*	93.65	93.68	93.68	93.90	93.77	93.38	93.71	93.74	93.80	93.89	93.61	93.99	-	93.78
a*	0.46	0.49	0.44	0.45	0.43	0.44	0.46	0.45	0.45	0.44	0.48	0.41	-	0.45
b*	9.91	10.21	10.17	10.48	10.05	10.15	10.12	10.04	10.05	10.23	10.65	9.82	-	10.12
Ash (db), %	0.58	0.60	0.58	0.60	0.60	0.62	0.59	0.60	0.60	0.61	0.61	0.57	-	0.60
Protein (12% mb), %	12.1	11.1	10.7	9.9	11.2	12.6	11.2	11.8	10.6	9.6	10.4	11.3	-	10.9
Wet Gluten (14% mb), %	33.0	30.7	29.5	25.9	31.0	34.3	30.7	32.7	28.9	25.6	30.1	31.3	-	30.1
Dry Gluten (14% mb), %	11.5	10.5	10.0	8.8	10.6	12.0	10.5	11.0	9.7	8.5	10.1	10.6	-	10.1
Gluten Index	95	93	94	96	93	96	94	92	95	96	96	93	-	94
100g BAKING TEST														
Baking water absorption, %	62.4	61.3	60.8	59.7	61.3	63.0	61.3	61.9	60.5	59.4	60.5	61.3	-	60.9
Loaf volume, cm^3	1104	1029	987	957	1036	1167	1040	1088	1014	936	994	1085	-	1033
Evaluation (see page 79)	0	0	0	0	0	0	0	0	0	0	0	0	-	0
FARINOGRAM														
Water absorption (14% mb), %	60.8	60.1	60.2	57.8	60.3	59.7	60.1	61.6	60.4	58.9	58.6	61.1	-	60.5
Development time, min	6.2	5.3	5.0	3.7	4.7	6.5	5.2	5.4	4.9	4.5	4.5	4.5	-	5.0
Stability, mm	9.0	8.0	7.8	7.3	8.3	9.3	8.3	7.4	6.8	6.4	7.1	6.8	-	7.0
Mixing tolerance index, BU	35	38	39	40	36	34	37	40	41	43	38	40	-	41
														

RSA Crop Quality of 2016/2017 and 2018/2019 Seasons

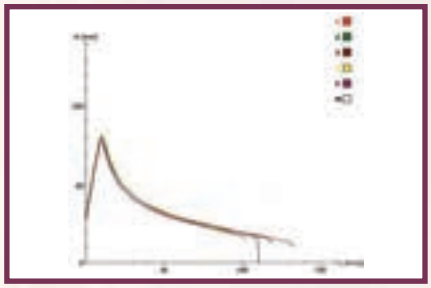
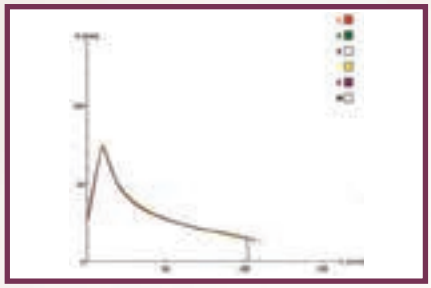
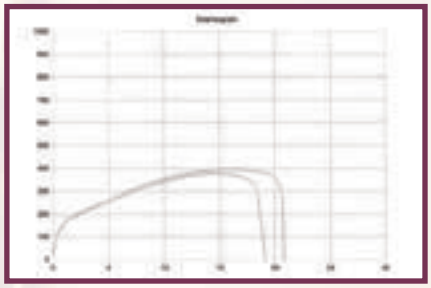
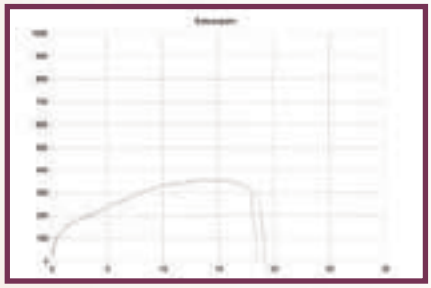
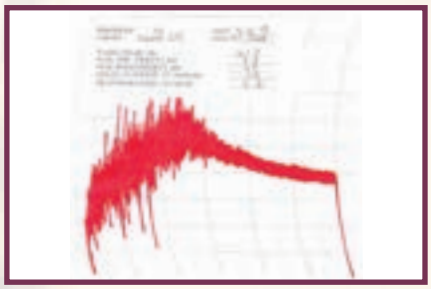
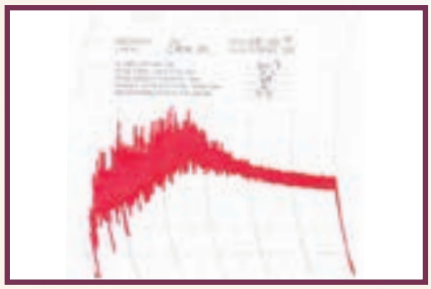
Country of origin	RSA Crop Average 2016/2017							RSA Crop Average 2018/2019						
Class and Grade bread wheat	**B1**	**B2**	**B3**	**B4**	**UT**	**COW**	**Average**	**B1**	**B2**	**B3**	**B4**	**UT**	**COW**	**Average**
No. of samples	***23***	***14***	***11***	***10***	***11***	***1***	***70***	***28***	***21***	***11***	***7***	***3***	***-***	***70***
ALVEOGRAM														
Strength (S), cm²	42.4	34.9	34.1	31.3	36.2	37.8	37.0	38.5	33.2	29.0	31.2	36.5	-	34.6
Stability (P), mm	74	72	77	69	76	71	73	84	82	76	81	80	-	82
Distensibility (L), mm	155	133	116	126	127	120	135	114	100	95	87	118	-	104
P/L	0.49	0.57	0.68	0.56	0.61	0.59	0.57	0.75	0.85	0.83	0.96	0.68	-	0.81
														
EXTENSOGRAM														
Strength, cm²	113	93	85	89	97	126	99	101	90	76	85	96	-	92
Max. height, BU	388	359	326	368	348	420	364	364	351	323	344	348	-	350
Extensibility, mm	210	186	184	168	195	217	193	204	187	172	177	201	-	191
														
MIXOGRAM														
Peak time, min	2.6	2.5	2.6	2.8	2.5	2.9	2.6	2.5	2.6	2.7	3.0	2.3	-	2.6
Water absorption (14% mb), %	62.4	61.1	60.9	59.9	61.4	63.0	61.4	61.9	60.5	59.4	60.5	61.3	-	60.9
														
MYCOTOXINS														
Aflatoxin B_1 (µg/kg)	ND							ND						
Aflatoxin B_2 (µg/kg)	ND							ND						
Aflatoxin G_1 (µg/kg)	ND							ND						
Aflatoxin G_2 (µg/kg)	ND							ND						
Fumonisin B_1 (µg/kg)	ND							ND						
Fumonisin B_2 (µg/kg)	ND							ND						
Fumonisin B_3 (µg/kg)	ND							ND						
Deoxynivalenol (µg/kg) [max. value]	<100 [501]							<100 [361]						
Ochratoxin A (µg/kg)	ND							ND						
Zearalenone (µg/kg)	ND							ND						
T-2 Toxin (µg/kg)	ND							ND						
No. of samples	***40***							***40***						

RSA WHEAT CROP QUALITY SUMMARY

RSA Crop Quality 2017/2018 and 2018/2019 Seasons

Country of origin	RSA Crop Average 2017/2018							RSA Crop Average 2018/2019						
Class and Grade bread wheat	B1	B2	B3	B4	UT	COW	Average	B1	B2	B3	B4	UT	COW	Average
No. of samples	*142*	*77*	*22*	*15*	*42*	*6*	*304*	*153*	*88*	*29*	*14*	*48*	*5*	*337*
WHEAT														
GRADING														
Protein (12% mb), %	13.1	12.0	11.0	11.9	13.0	13.3	12.6	12.8	11.6	10.5	10.7	12.0	11.5	12.1
Moisture, %	10.0	10.1	10.0	9.5	10.3	10.2	10.0	9.3	9.3	9.2	9.6	9.0	9.7	9.3
Falling number, sec	379	368	367	380	360	301	371	402	401	378	354	400	359	397
1000 Kernel mass (13% mb), g	36.9	39.4	40.9	37.0	36.4	34.2	37.7	38.9	39.7	39.9	37.0	39.0	42.9	39.2
Hlm (dirty), kg/hl	80.9	81.7	81.6	81.3	78.4	75.8	80.7	81.7	81.7	82.0	79.9	79.5	82.3	81.3
Screenings (<1.8 mm sieve), %	1.31	1.21	0.98	1.98	2.61	3.24	1.51	1.30	1.23	1.18	2.44	2.58	0.69	1.49
Gravel, stones, turf and glass, %	0.01	0.01	0.02	0.00	0.01	0.07	0.01	0.00	0.00	0.01	0.00	0.00	0.00	0.00
Foreign matter, %	0.11	0.13	0.10	0.10	0.29	0.39	0.14	0.14	0.13	0.11	0.14	0.27	0.12	0.15
Other grain & unthreshed ears, %	0.35	0.38	0.28	0.42	0.94	0.86	0.45	0.31	0.36	0.31	0.42	1.03	0.09	0.43
Heat damaged kernels, %	0.00	0.00	0.00	0.00	0.01	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.00
Immature kernels, %	0.05	0.04	0.02	0.01	0.11	0.30	0.06	0.09	0.07	0.06	0.09	0.04	0.18	0.08
Insect damaged kernels, %	0.59	0.54	0.60	0.55	1.20	3.44	0.72	0.49	0.47	0.53	0.49	0.81	1.50	0.55
Heavily frost damaged kernels, %	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.06	0.00	0.00	0.50	8.68	0.22
Sprouted kernels, %	0.02	0.02	0.02	0.00	0.05	1.93	0.06	0.02	0.02	0.01	0.00	0.10	0.16	0.03
Total damaged kernels, %	0.66	0.61	0.65	0.56	1.36	5.73	0.84	0.60	0.56	0.60	0.58	0.95	1.94	0.66
Combined deviations, %	2.43	2.32	2.01	3.06	5.20	10.22	2.94	2.35	2.29	2.20	3.58	4.83	2.85	2.73
Field fungi, %	0.10	0.08	0.07	0.11	0.13	1.23	0.12	0.12	0.14	0.10	0.12	0.12	0.08	0.12
Storage fungi, %	0.00	0.00	0.00	0.00	0.01	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ergot, %	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Poisonous seeds (*Crotalaria spp., etc.*)	0	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	0
Live insects	No	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	No
	B1	B2	B3	B4	UT	COW	Average	B1	B2	B3	B4	UT	COW	Average
No. of samples	*25*	*19*	*9*	*7*	*8*	*2*	*70*	*28*	*21*	*11*	*7*	*3*	*-*	*70*
Bühler Extraction, %	73.2	73.6	73.6	72.8	71.6	71.2	73.1	71.5	71.7	71.5	69.2	70.7	-	71.3
FLOUR														
Colour, KJ (wet)	-4.1	-4.2	-4.2	-4.3	-3.9	-3.5	-4.1	-4.5	-4.6	-4.7	-4.4	-4.5	-	-4.5
Colour, Konica Minolta CM5 (dry)														
L*	93.68	93.83	93.85	93.95	93.77	93.59	93.78	93.74	93.80	93.89	93.61	93.99	-	93.78
a*	0.44	0.44	0.45	0.38	0.41	0.31	0.43	0.45	0.45	0.44	0.48	0.41	-	0.45
b*	9.69	9.79	9.99	9.84	10.25	9.78	9.84	10.04	10.05	10.23	10.65	9.82	-	10.12
Ash (db), %	0.60	0.61	0.61	0.58	0.60	0.65	0.60	0.60	0.60	0.61	0.61	0.57	-	0.60
Protein (12% mb), %	12.0	11.1	10.2	10.0	11.7	11.9	11.3	11.8	10.6	9.6	10.4	11.3	-	10.9
Wet Gluten (14% mb), %	32.7	30.6	27.5	26.7	31.7	31.6	30.7	32.7	28.9	25.6	30.1	31.3	-	30.1
Dry Gluten (14% mb), %	11.1	10.3	9.2	9.0	10.8	10.9	10.4	11.0	9.7	8.5	10.1	10.6	-	10.1
Gluten Index	93	93	94	94	92	90	93	92	95	96	96	93	-	94
100g BAKING TEST														
Baking water absorption, %	62.2	61.1	60.2	60.2	61.9	62.3	61.4	61.9	60.5	59.4	60.5	61.3	-	60.9
Loaf volume, cm^3	1145	1104	1013	997	1109	1083	1096	1088	1014	936	994	1085	-	1033
Evaluation (see page 79)	0	0	0	0	0	0	0	0	0	0	0	0	-	0
FARINOGRAM														
Water absorption (14% mb), %	60.9	60.1	59.5	58.8	60.9	60.4	60.3	61.6	60.4	58.9	58.6	61.1	-	60.5
Development time, min	6.3	5.2	4.3	4.7	5.4	5.2	5.5	5.4	4.9	4.5	4.5	4.5	-	5.0
Stability, mm	9.0	7.1	7.2	7.8	8.8	7.2	8.0	7.4	6.8	6.4	7.1	6.8	-	7.0
Mixing tolerance index, BU	37	45	43	43	35	42	40	40	41	43	38	40	-	41
														

RSA Crop Quality of 2017/2018 and 2018/2019 Seasons

Country of origin	RSA Crop Average 2017/2018							RSA Crop Average 2018/2019						
Class and Grade bread wheat	**B1**	**B2**	**B3**	**B4**	**UT**	**COW**	**Average**	**B1**	**B2**	**B3**	**B4**	**UT**	**COW**	**Average**
No. of samples	***25***	***19***	***9***	***7***	***8***	***2***	***70***	***28***	***21***	***11***	***7***	***3***	***-***	***70***
ALVEOGRAM														
Strength (S), cm²	44.6	36.1	34.0	34.6	40.6	36.1	39.2	38.5	33.2	29.0	31.2	36.5	-	34.6
Stability (P), mm	85	79	86	78	86	79	83	84	82	76	81	80	-	82
Distensibility (L), mm	122	113	102	106	119	123	115	114	100	95	87	118	-	104
P/L	0.72	0.75	1.22	0.81	0.80	0.69	0.81	0.75	0.85	0.83	0.96	0.68	-	0.81
														
EXTENSOGRAM														
Strength, cm²	121	100	89	89	109	95	106	101	90	76	85	96	-	92
Max. height, BU	421	365	352	347	373	328	382	364	351	323	344	348	-	350
Extensibility, mm	209	197	180	178	206	200	198	204	187	172	177	201	-	191
														
MIXOGRAM														
Peak time, min	2.8	2.6	2.7	2.7	2.4	2.5	2.6	2.5	2.6	2.7	3.0	2.3	-	2.6
Water absorption (14% mb), %	62.2	61.1	60.2	60.2	61.9	62.3	61.4	61.9	60.5	59.4	60.5	61.3	-	60.9
														
MYCOTOXINS														
Aflatoxin B_1 (µg/kg)	ND							ND						
Aflatoxin B_2 (µg/kg)	ND							ND						
Aflatoxin G_1 (µg/kg)	ND							ND						
Aflatoxin G_2 (µg/kg)	ND							ND						
Fumonisin B_1 (µg/kg)	ND							ND						
Fumonisin B_2 (µg/kg)	ND							ND						
Fumonisin B_3 (µg/kg)	ND							ND						
Deoxynivalenol (µg/kg) [max. value]	<100 [570]							<100 [361]						
Ochratoxin A (µg/kg)	ND							ND						
Zearalenone (µg/kg)	ND							ND						
T-2 Toxin (µg/kg)	ND							ND						
No. of samples	***40***							***40***						

Methods

GRADING:

Full grading was conducted in accordance with the Regulations relating to the grading, packing and marking of bread wheat intended for sale in the Republic of South Africa (No. R. 64 of 29 January 2016). Please see pages 114 to 127.

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 by means of the Kern 222 instrument.

During the 2009/2010 season the hectolitre mass value was adjusted by the addition of 2 kg/hl to all hectolitre mass values as per an Industry-wide Hectolitre Mass Dispensation published by the National Department of Agriculture.

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. 64 on page 116 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 analyzing 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. Generally speaking, 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 (gelatinization 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 standardized 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 cm^2, gives an indication of the total force (work) needed to stretch the dough and is represented by the area under the curve.

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

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

ALVEOGRAPH:

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

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

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

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

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

MIXOGRAPH:

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

Mixogram peak time is the time measured in minutes that dough takes to reach its maximum consistency or first indication of dough weakening. The peak time is a measure of optimum dough development and thus a measure of protein quality.

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

100 g BAKING TEST:

This procedure, according to Industry Accepted Method 022 based on AACCI Method 10-10.03, latest edition, provides an optimized 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.

AMINO ACID PROFILE:

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

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

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

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

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 screening method using UPLC - MS/MS. 40 of the 337 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 Imports and Exports

WHEAT EXPORTS/IMPORTS PER COUNTRY

2017/2018 Season (30 Sep 2017 - 28 Sep 2018)

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	12 880	Argentina	132 433	Argentina	15 956	Botswana	111 053	Cape Town	334 750
Lesotho	6 918	Canada	90 944	Canada	5 674	Lesotho	67 345	Durban	1 927 814
Namibia	12 373	Czech Republic	47 904	Czech Republic	2 954	Mozambique	3 479	East London	83 126
Swaziland	10 943	Germany	282 312	Germany	27 533	Swaziland	39 144	Port Elizabeth	63 553
Zambia	30 097	Latvia	140 007	Latvia	31 345	Zimbabwe	26 074	Richards Bay	25 601
Zimbabwe	2 370	Lithuania	182 241	Lithuania	19 059				
		Poland	17 514	Poland	13 051				
		Romania	101 449	Russian Federation	137 486				
		Russian Federation	955 697	Ukraine	3 560				
		Ukraine	135 669	United States	4 992				
		United States	87 064						
Total	**75 581**	**Total**	**2 173 234**	**Total**	**261 610**	**Total**	**247 095**	**Total**	**2 434 844**

*Includes: Imports for RSA and Other Countries

WHEAT EXPORTS/IMPORTS PER COUNTRY

2018/2019 Season (29 Sep 2018 - 26 Jul 2019)

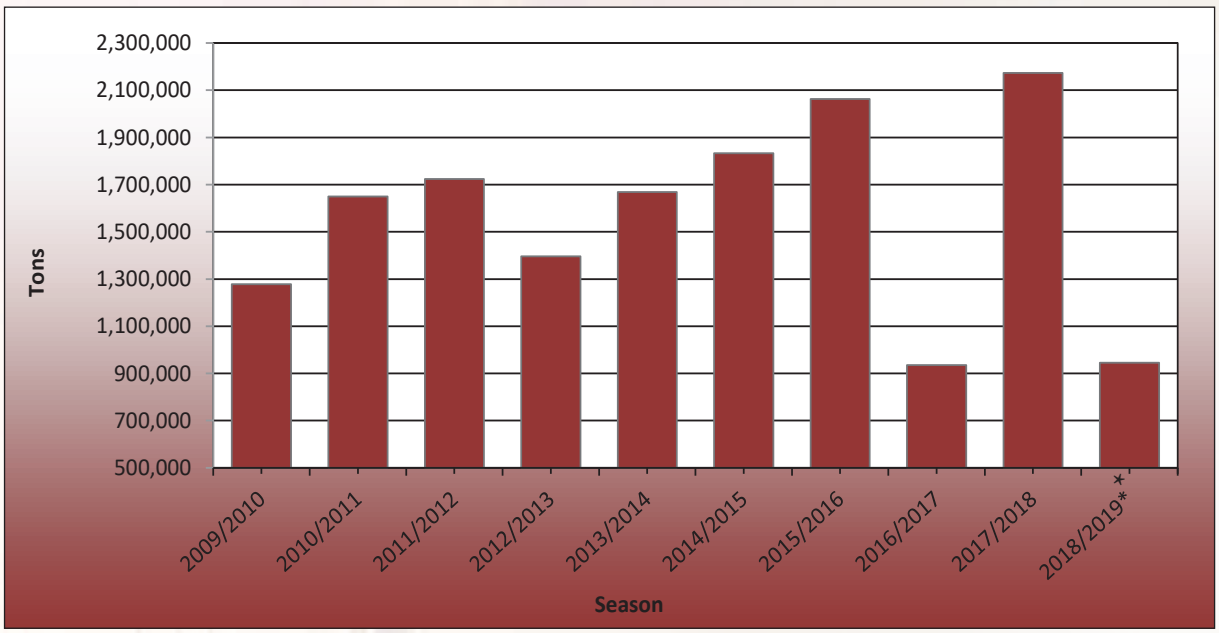
RSA EXPORTS		IMPORTS FOR RSA		IMPORTS FOR OTHER COUNTRIES		EXPORTS OF IMPORTED WHEAT		IMPORTS PER HARBOUR*	
To Country	**Tons**	**From Country**	**Tons**	**From Country**	**Tons**	**To country**	**Tons**	**Harbour**	**Tons**
Botswana	25 755	Argentina	35 519	Argentina	6 988	Botswana	57 134	Cape Town	29 012
Eswatini (Swaziland)	4 422	Canada	48 236	Czech Republic	3 000	Eswatini (Swaziland)	33 600	Durban	994 173
Lesotho	13 665	Czech Republic	110 602	Germany	32 124	Lesotho	44 964	East London	19 027
Mozambique	1 594	Germany	311 032	Latvia	13 500	Zimbabwe	20 821	Port Elizabeth	32 631
Namibia	6 427	Latvia	39 270	Lithuania	26 003			Richards Bay	18 550
Zambia	19 063	Lithuania	109 980	Russian Federation	39 344				
Zimbabwe	18 362	Russian Federation	147 186	Ukraine	14 757				
		Ukraine	21 686	United States	12 009				
		United States	122 157						
Total	**89 288**	**Total**	**945 668**	**Total**	**147 725**	**Total**	**156 519**	**Total**	**1 093 393**

*Includes: Imports for RSA and Other Countries

Quantity of wheat imported to the RSA

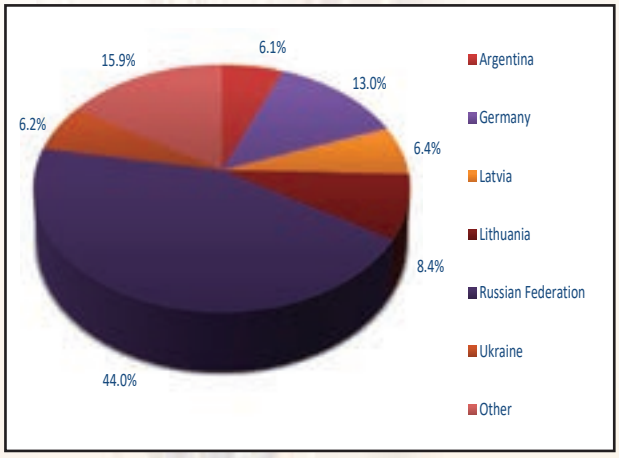
The graphs and table given below and on the next page, are based on progressive import figures per country provided by SAGIS.

Graph 23: Total wheat imports for domestic use from the 2009/2010 season

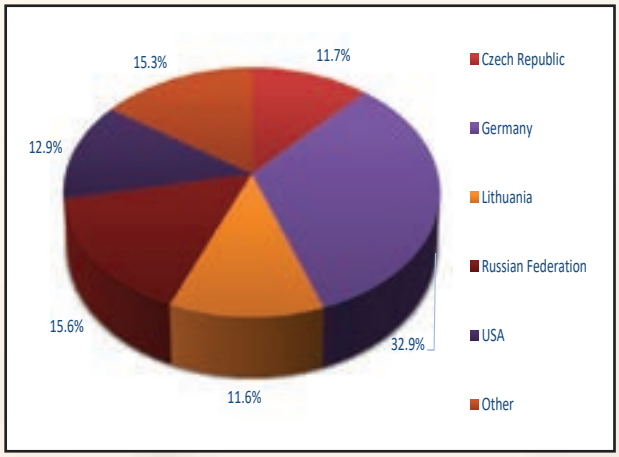


*2018/2019 season figure includes imports up to 26 July 2019.

Graph 24: Wheat imports per origin for domestic use 2017/2018 season



Graph 25: Wheat imports per origin for domestic use 2018/2019 season



*2018/2019 season figure includes imports up to 26 July 2019.

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

	Season										Total (Tons)
	2009/2010	2010/2011	2011/2012	2012/2013	2013/2014	2014/2015	2015/2016	2016/2017	2017/2018	2018/2019*	
Argentina	-	629 600	652 279	98 029	-	59 607	49 516	35 613	132 433	35 519	**1 692 596**
Australia	55 312	181 637	247 675	189 925	49 780	95 254	38 457	24 816	-	-	**882 856**
Brazil	123 944	58 551	276 420	234 733	-	-	-	-	-	-	**693 648**
Canada	72 911	79 697	45 252	48 583	111 289	105 457	102 816	27 841	90 944	48 236	**733 026**
Czech Republic	-	-	-	-	-	-	-	144 402	47 904	110 602	**302 908**
Finland	-	-	-	-	25 430	-	-	-	-	-	**25 430**
Germany	809 934	88 581	105 964	95 476	179 436	348 385	283 451	237 508	282 312	311 032	**2 742 079**
Latvia	-	-	-	-	22 013	61 005	-	17 098	140 007	39 270	**279 393**
Lesotho	-	-	-	384	-	-	-	-	-	-	**384**
Lithuania	1 611	-	8 880	-	40 532	43 791	151 047	-	182 241	109 980	**538 082**
Poland	-	-	-	-	-	91 483	185 036	76 912	17 514	-	**370 945**
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	147 186	**4 162 686**
Swaziland	-	-	-	288		-	-	-	-	-	**288**
Ukraine	41 230	-	39 016	341 976	372 500	279 364	109 350	13 568	135 669	21 686	**1 354 359**
Uruguay	-	25 249	45 250	99 033	-	-	-	-	-	-	**169 532**
USA	173 030	586 200	112 915	42 572	66 468	28 311	186 387	61 680	87 064	122 157	**1 466 784**
Total	**1 277 972**	**1 649 515**	**1 723 851**	**1 396 227**	**1 668 412**	**1 832 441**	**2 062 765**	**934 765**	**2 173 234**	**945 668**	**15 664 850**

*2018/2019 season figures include imports up to 26 July 2019.

Quality summary of imported wheat (1 October 2017 to 30 September 2018) (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, 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.

For grading as well as dough and baking quality results of the imported wheat per country, please refer to pages 88 to 109. This imported wheat quality is compared to a summary of the local crop quality of the corresponding (2017/2018) season. To simplify the comparison between the quality of the different countries of import, the average quality per country was summarised in Table 9 on pages 86 and 87. 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 231 samples of wheat imported from the following eleven countries were received (number of samples received in brackets): Argentina (28), Canada (9), Czech Republic (6), Germany (27), Latvia (7), Lithuania (10), Poland (5), Romania (12), Russian Federation (99), Ukraine (10) and USA (18). 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.

Hectolitre mass is an important grading factor that also provides an indication of flour extraction potential. 7% of the samples had hectoliter mass values below 77 kg/hl (minimum requirement for South African grade B1 wheat), compared to the 18% and 7% of the previous two seasons. These samples originated from Argentina, Germany, Romania, Russian Federation and the USA, which reported the lowest hectoliter mass values overall.

Screenings represent all material that passes through a standard sieve (1.8 mm), with 3% the maximum allowed for grades 1 to 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 Russian Federation and the USA also reported the highest levels of screenings, which explains the low hectolitre mass values observed on these samples at least in part.

None of the samples reported falling number results below 220 seconds. The wheat imported from Romania had the highest average falling number value, which equaled the RSA national average for the same season.

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 cm^2, 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. Flours having undesirably low protein starch ratios, require more time to produce continuous protein phases during mixing. Mixing time provides an indication of the amount of time needed to mix the dough to optimum development, between 2.8 and 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 results in general did not raise any concerns. Deoxynivalenol (DON) residues were observed on some of the samples, but none of the levels exceeded national or international maximum allowable levels. Ochratoxin A residues were observed on one sample from Canada and this value exceeds maximum allowable levels of amongst other the European Union and Codex.

Table 9: Summary of the quality results of imported wheat during the 2017/2018 season

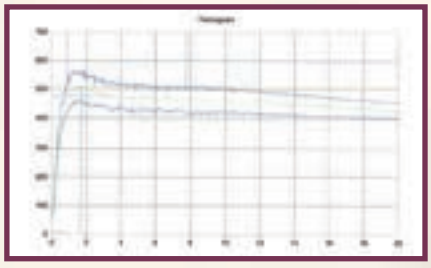
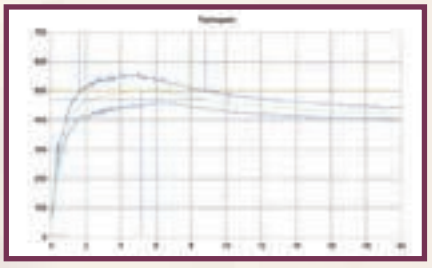
Quality parameter	Argentina				Canada				Czech Republic				Germany				Latvia				Lithuania			
	Ave	Min	Max	Stdev	Ave	Min	Max	Stdev	Ave	Min	Max	Stdev	Ave	Min	Max	Stdev	Ave	Min	Max	Stdev	Ave	Min	Max	Stdev
Hectolitre mass, kg/hl	80.8	73.2	82.0	1.62	83.2	82.6	84.6	0.74	78.1	77.4	78.7	0.49	78.8	76.5	81.2	1.07	82.5	82.0	82.9	0.30	80.5	79.6	82.0	0.63
Screenings (<1.8mm), %	1.79	0.94	2.41	0.37	2.30	1.58	3.69	0.75	1.58	1.42	1.80	0.14	1.94	0.95	3.73	0.68	1.08	0.87	1.35	0.19	0.86	0.46	1.16	0.21
1000 Kernel mass, g (13 % mb)	33.7	361.6	35.8	0.87	37.7	34.7	40.5	1.91	40.8	39.0	44.2	1.86	40.5	36.7	44.6	1.91	46.7	45.8	47.9	0.78	46.2	44.0	49.1	1.59
WWF Protein (12% mb), %	10.5	9.7	11.0	0.38	12.8	12.6	13.0	0.17	11.0	9.6	11.3	0.69	11.2	10.7	11.9	0.35	11.1	10.9	11.4	0.18	11.8	11.1	12.7	0.67
WWF Falling number, sec	366	326	413	22.06	340	314	407	29.52	291	226	344	52.90	307	243	355	27.92	361	334	381	18.27	332	267	397	37.77
Number of samples	*28*				*9*				*6*				*27*				*7*				*10*			
Flour moisture, %	13.8	13.2	14.3	0.30	13.6	12.9	14.0	0.37	13.5	13.3	13.8	0.19	13.7	12.6	14.7	0.55	14.1	13.7	14.3	0.23	13.9	13.7	14.3	0.19
Flour Protein, % (12 % mb)	9.3	8.5	9.9	0.39	11.8	11.5	12.0	0.23	9.6	9.4	9.8	0.13	9.7	9.3	10.8	0.43	9.8	9.7	10.1	0.16	10.5	10.0	11.3	0.54
Ash, % (db)	0.62	0.51	0.69	0.05	0.56	0.50	0.70	0.06	0.53	0.51	0.55	0.02	0.53	0.49	0.60	0.03	0.55	0.52	0.57	0.02	0.54	0.50	0.58	0.02
Colour, KJ (wet)	-3.7	-4.0	-3.2	0.14	-4.4	-4.6	-4.1	0.18	-3.4	-3.4	-3.3	0.04	-3.1	-3.8	-2.6	0.33	-3.7	-3.7	-3.6	0.05	-3.4	-3.7	-2.5	0.37
Konica Minolta CM-5 colour, L*	93.53	92.81	94.06	0.23	93.19	92.88	93.34	0.14	93.40	93.29	93.52	0.09	93.28	92.90	93.78	0.26	93.64	93.38	93.91	0.22	93.29	92.84	93.48	0.20
Konica Minolta CM-5 colour, b*	10.80	10.41	11.40	0.22	10.50	10.03	11.45	0.41	9.66	9.40	9.87	0.17	9.86	9.33	11.04	0.47	9.52	9.18	9.72	0.23	9.81	9.59	10.04	0.13
Wet gluten, % (14 % mb)	22.6	18.1	25.2	1.89	32.0	31.5	33.6	0.65	25.2	24.8	25.5	0.25	25.8	24.2	28.2	1.08	27.2	26.9	27.6	0.26	27.7	26.2	29.6	1.39
Dry gluten, % (14 % mb)	7.8	6.7	8.6	0.53	11.0	10.5	11.3	0.22	8.5	8.3	8.9	0.23	8.8	8.1	9.8	0.45	9.2	9.0	9.4	0.15	9.5	9.0	10.3	0.54
Gluten Index	99	97	100	0.77	95	85	98	4.00	98	97	99	0.82	98	95	100	1.14	95	92	98	2.12	98	95	99	1.14
Farinogram																								
Water absorption, % (14% mb)	55.6	53.9	56.7	0.77	61.5	60.6	62.8	0.65	56.8	56.1	57.2	0.38	57.3	55.4	58.9	0.98	57.9	57.7	58.1	0.17	57.3	56.5	58.8	0.82
Development time, min	1.8	1.5	2.2	0.21	7.3	4.0	9.7	1.83	2.0	1.8	2.2	0.15	2.2	1.7	5.5	0.72	2.2	1.7	2.5	0.31	2.2	1.7	2.5	0.25
Stability, mm	7.8	2.4	14.6	3.83	13.9	9.4	17.1	2.96	4.6	4.0	5.1	0.44	5.5	2.8	10.2	2.23	8.7	6.1	10.1	1.45	8.7	3.8	10.9	2.11
Alveogram																								
Strength, cm^2	30.5	22.6	37.3	3.74	47.8	41.6	54.6	5.08	32.2	30.9	35.6	1.79	30.0	20.4	37.5	5.00	33.5	31.7	37.9	2.22	36.6	31.2	43.9	4.74
Stability, mm	89	81	99	5.24	90	88	94	1.87	91	80	97	6.89	91	73	114	12.66	97	90	104	4.86	96	87	111	7.84
Distensibility, mm	62	39	83	11.13	115	101	133	12.98	70	58	88	12.62	66	28	115	24.47	69	53	82	10.42	72	45	84	11.17
P/L	1.50	1.01	2.33	0.35	0.79	0.68	0.88	0.08	1.34	0.97	1.67	0.32	1.64	0.65	3.93	0.87	1.44	1.18	1.96	0.30	1.37	1.11	2.47	0.40
Extensogram																								
Strength, cm^2	92	69	105	8.12	119	94	139	15.15	84	73	89	5.50	87	77	100	6.38	81	77	90	4.62	98	89	106	6.57
Max. height, BU	447	352	564	45.05	431	410	462	17.45	381	340	405	22.58	379	311	442	37.17	373	345	445	37.59	453	406	505	29.33
Extensibility, mm	153	140	167	7.32	209	162	237	24.80	158	153	169	6.22	166	143	194	12.54	159	147	164	6.35	159	143	170	7.70
Mixogram																								
Water absorption, % (14% mb)	59.2	58.5	59.7	0.35	61.9	61.5	62.2	0.28	59.4	59.2	59.6	0.15	59.5	59.1	60.7	0.44	59.6	59.1	59.9	0.25	60.4	59.8	61.3	0.64
Peak time, min	4.7	3.9	5.9	0.56	3.0	2.7	3.3	0.22	4.5	4.0	4.9	0.34	4.0	3.1	4.6	0.36	3.3	3.1	3.9	0.29	4.1	3.6	5.0	0.44
100g Baking Test																								
Loaf volume, cm^3	889	803	976	38.32	1044	977	1118	50.94	941	921	975	19.98	958	866	1007	37.21	952	935	984	15.62	977	923	1025	29.06
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	0	0	0	0.00
Number of samples	*28*				*9*				*6*				*27*				*7*				*10*			

Table 9: Summary of the quality results of imported wheat during the 2017/2018 season (continue)

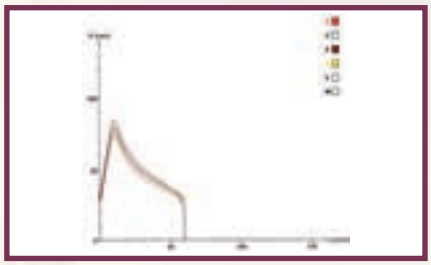
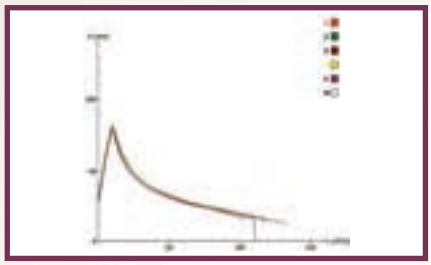
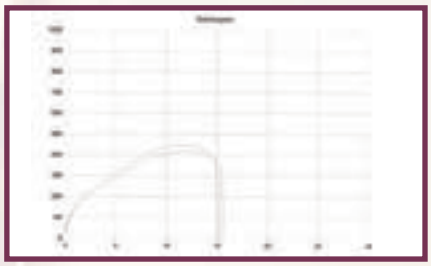
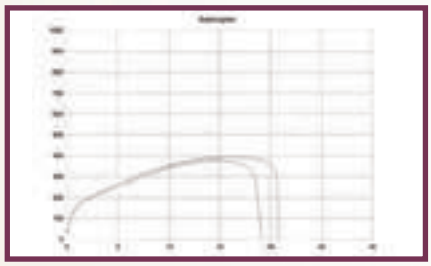
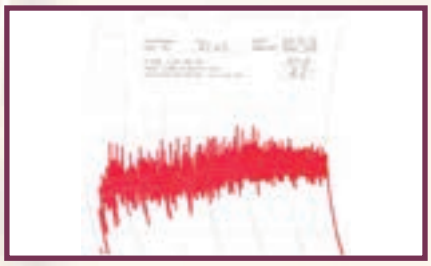
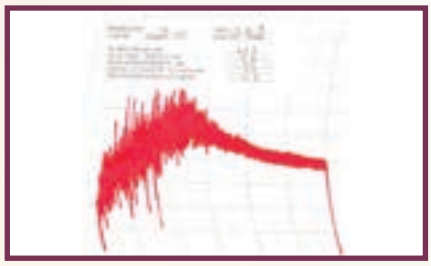
Quality parameter	Poland				Romania				Russian Federation				Ukraine				USA				RSA crop average 2017/2018			
	Ave	Min	Max	Stdev	Ave	Min	Max	Stdev	Ave	Min	Max	Stdev	Ave	Min	Max	Stdev	Ave	Min	Max	Stdev	Ave	Min	Max	Stdev
Hectolitre mass, kg/hl	79.7	79.6	79.9	0.11	78.3	76.8	80.6	1.24	80.9	75.8	83.4	1.45	80.9	79.1	82.8	1.08	77.6	73.2	80.3	2.04	80.7	72.7	86.3	2.75
Screenings (<1.8mm), %	2.12	1.79	2.58	0.29	1.74	0.51	2.78	0.66	3.00	0.62	9.56	1.46	1.44	1.02	1.89	0.31	2.45	0.99	3.29	0.79	1.51	0.03	6.58	1.11
1000 Kernel mass, g (13 % mb)	44.9	43.0	46.0	1.13	37.9	30.7	42.4	2.80	40.8	31.6	47.3	3.14	41.7	38.1	45.2	2.40	33.0	29.6	38.9	2.28	37.7	22.0	49.0	4.24
WWF Protein (12% mb), %	11.5	11.4	11.5	0.05	11.0	10.6	11.7	0.34	11.3	9.9	12.6	0.66	11.5	10.4	12.2	0.55	10.1	9.3	11.1	0.81	12.6	8.8	17.1	1.54
WWF Falling number, sec	314	303	329	10.61	371	292	474	50.39	356	227	489	55.13	289	247	340	30.60	352	279	474	69.47	371	89	579	50.83
Number of samples	*5*				*12*				*99*				*10*				*18*				*304*			
Flour moisture, %	13.7	13.4	13.8	0.15	13.8	13.5	14.3	0.27	13.7	12.2	14.6	0.43	13.8	13.4	14.4	0.30	13.5	12.8	14.2	0.32	13.7	12.7	14.7	0.46
Flour Protein, % (12 % mb)	10.0	10.0	10.1	0.03	9.6	9.1	10.0	0.28	10.1	8.6	11.4	0.63	10.2	9.1	10.8	0.50	8.4	7.3	9.8	1.07	11.3	8.1	15.4	1.52
Ash, % (db)	0.55	0.53	0.57	0.01	0.52	0.50	0.56	0.02	0.55	0.48	0.63	0.03	0.50	0.44	0.56	0.04	0.51	0.45	0.56	0.03	0.60	0.49	0.69	0.04
Colour, KJ (wet)	-2.7	-2.9	-2.4	0.23	-3.3	-3.9	-3.0	0.25	-3.5	-4.3	-2.3	0.36	-3.4	-3.8	-3.0	0.30	-3.4	-3.8	-2.8	0.29	-4.1	-4.9	-3.1	0.39
Konica Minolta CM-5 colour, L*	92.87	92.83	92.91	0.03	93.35	93.17	93.54	0.14	93.20	92.55	93.84	0.24	93.42	93.15	93.75	0.22	94.23	93.38	94.96	0.66	93.78	93.05	94.24	0.26
Konica Minolta CM-5 colour, b*	9.77	9.56	9.93	0.14	10.07	9.58	10.83	0.37	11.24	9.14	14.20	1.09	10.37	9.92	10.88	0.44	9.45	8.01	10.96	1.15	9.84	8.36	11.24	0.59
Wet gluten, % (14 % mb)	26.9	26.7	27.2	0.22	24.3	22.9	25.4	0.84	26.8	20.5	59.6	4.07	25.9	22.0	28.4	2.12	21.0	17.4	26.1	2.88	30.7	21.4	43.4	4.44
Dry gluten, % (14 % mb)	9.4	9.2	9.5	0.13	8.3	7.8	8.7	0.28	9.1	7.0	11.1	0.87	9.0	7.8	9.9	0.65	7.0	5.5	8.6	1.21	10.4	7.0	14.7	1.60
Gluten Index	99	99	99	0.00	99	96	100	1.08	97	93	100	1.57	99	97	100	1.05	97	92	99	2.45	93	75	100	4.56
Farinogram																								
Water absorption, % (14% mb)	58.6	58.3	58.9	0.22	55.3	53.8	56.3	0.74	57.8	54.3	61.1	1.28	56.3	54.7	57.4	0.95	51.6	48.5	55.7	3.02	60.3	56.0	63.2	1.51
Development time, min	2.0	1.9	2.0	0.05	1.8	1.5	2.0	0.16	2.5	1.7	7.2	1.03	2.0	1.5	2.7	0.37	1.5	1.0	2.2	0.45	5.5	1.9	10.0	1.55
Stability, mm	4.4	3.3	6.1	1.18	6.9	4.1	8.9	1.47	9.8	2.3	18.8	3.27	9.4	3.1	18.9	6.71	4.7	1.5	12.3	4.12	8.0	4.2	17.5	3.07
Alveogram																								
Strength, cm^2	32.8	28.1	36.4	3.66	27.6	22.5	38.8	4.73	33.8	19.9	45.0	6.52	36.4	25.5	43.0	5.57	20.3	12.5	36.7	8.91	39.2	18.8	64.7	9.12
Stability, mm	108	102	112	3.74	79	71	88	4.56	99	72	125	12.35	92	75	102	9.11	55	31	87	24.39	83	62	146	12.18
Distensibility, mm	55	42	70	11.30	65	49	90	11.70	65	26	122	21.70	74	48	116	20.04	80	41	106	18.39	115	30	197	30.87
P/L	2.03	1.46	2.62	0.46	1.24	0.98	1.61	0.20	1.78	0.62	4.81	0.86	1.35	0.65	2.08	0.42	0.79	0.31	2.02	0.55	0.81	0.40	4.87	0.54
Extensogram																								
Strength, cm^2	89	87	91	1.52	82	62	94	12.14	86	55	123	13.06	90	66	104	11.90	71	46	105	21.23	106	57	178	27.25
Max. height, BU	399	393	415	9.23	400	308	482	52.91	412	228	539	52.42	409	320	453	41.79	352	243	474	79.93	382	245	557	64.57
Extensibility, mm	160	155	166	4.42	148	136	161	9.36	153	115	213	15.79	161	144	196	15.12	140	116	160	15.26	198	139	289	28.69
Mixogram																								
Water absorption, % (14% mb)	59.8	59.8	59.9	0.05	59.4	59.0	59.8	0.27	59.9	58.5	61.4	0.68	60.0	59.0	60.7	0.52	58.6	57.7	59.7	0.86	61.4	58.2	67.1	1.89
Peak time, min	4.1	3.8	4.3	0.19	4.4	3.8	5.4	0.57	4.1	3.2	5.5	0.46	4.6	4.1	5.2	0.35	5.1	4.3	6.0	0.54	2.6	2.0	4.0	0.40
100g Baking Test																								
Loaf volume, cm^3	970	938	994	21.82	934	837	994	39.31	931	634	1093	70.91	975	897	1154	92.91	869	789	944	44.64	1096	856	1319	103.08
Evaluation	0	0	0	0.00	0	0	0	0.00	0	0	5	0.52	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00
Number of samples	*5*				*12*				*99*				*10*				*18*				*70*			

2017/2018 IMPORTED WHEAT QUALITY - ARGENTINA (1 Oct 2017 to 30 Sep 2018)

2017/2018 Imported Wheat Quality Versus 2017/2018 RSA Wheat Quality

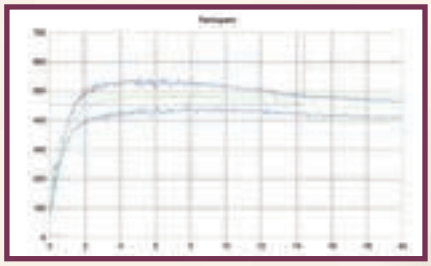
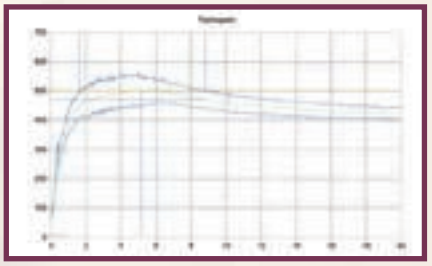
Country of origin	Argentina Average							RSA Crop Average						
Class and Grade bread wheat	**B1**	**B2**	**B3**	**B4**	**UT**	**COW**	**Average**	**B1**	**B2**	**B3**	**B4**	**UT**	**COW**	**Average**
No. of samples	-	-	*19*	*6*	*3*	-	*28*	*142*	*77*	*22*	*15*	*42*	*6*	*304*
WHEAT														
GRADING														
Protein (12% mb), %	-	-	10.6	10.0	10.7	-	10.5	13.1	12.0	11.0	11.9	13.0	13.3	12.6
Moisture, %	-	-	10.8	11.1	9.8	-	10.7	10.0	10.1	10.0	9.5	10.3	10.2	10.0
Falling number, sec	-	-	372	360	340	-	366	379	368	367	380	360	301	371
1000 Kernel mass (13% mb), g	-	-	33.4	34.0	35.2	-	33.7	36.9	39.4	40.9	37.0	36.4	34.2	37.7
Hlm (dirty), kg/hl	-	-	81.0	79.6	81.6	-	80.8	80.9	81.7	81.6	81.3	78.4	75.8	80.7
Screenings (<1.8 mm sieve), %	-	-	1.93	1.51	1.47	-	1.79	1.31	1.21	0.98	1.98	2.61	3.24	1.51
Gravel, stones, turf and glass, %	-	-	0.00	0.00	0.00	-	0.00	0.01	0.01	0.02	0.00	0.01	0.07	0.01
Foreign matter, %	-	-	0.11	0.12	0.15	-	0.12	0.11	0.13	0.10	0.10	0.29	0.39	0.14
Other grain & unthreshed ears, %	-	-	0.29	0.36	1.42	-	0.42	0.35	0.38	0.28	0.42	0.94	0.86	0.45
Heat damaged kernels, %	-	-	0.00	0.04	0.03	-	0.01	0.00	0.00	0.00	0.00	0.01	0.05	0.00
Immature kernels, %	-	-	0.07	0.03	0.04	-	0.06	0.05	0.04	0.02	0.01	0.11	0.30	0.06
Insect damaged kernels, %	-	-	0.20	0.18	0.09	-	0.19	0.59	0.54	0.60	0.55	1.20	3.44	0.72
Heavily frost damaged kernels, %	-	-	0.00	0.00	0.00	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sprouted kernels, %	-	-	0.00	0.04	0.00	-	0.01	0.02	0.02	0.02	0.00	0.05	1.93	0.06
Total damaged kernels, %	-	-	0.27	0.27	0.16	-	0.26	0.66	0.61	0.65	0.56	1.36	5.73	0.84
Combined deviations, %	-	-	2.60	2.26	3.21	-	2.59	2.43	2.32	2.01	3.06	5.20	10.22	2.94
Field fungi, %	-	-	0.68	0.61	0.36	-	0.63	0.10	0.08	0.07	0.11	0.13	1.23	0.12
Storage fungi, %	-	-	0.02	0.05	0.00	-	0.03	0.00	0.00	0.00	0.00	0.01	0.08	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
	B1	**B2**	**B3**	**B4**	**UT**	**COW**	**Average**	**B1**	**B2**	**B3**	**B4**	**UT**	**COW**	**Average**
No. of samples	-	-	*19*	*6*	*3*	-	*28*	*142*	*77*	*22*	*15*	*42*	*6*	*304*
Bühler Extraction, %	-	-	72.2	72.6	71.7	-	72.2	73.2	73.6	73.6	72.8	71.6	71.2	73.1
FLOUR														
Colour, KJ (wet)	-	-	-3.7	-3.7	-3.6	-	-3.7	-4.1	-4.2	-4.2	-4.3	-3.9	-3.5	-4.1
Colour, Konica Minolta CM5 (dry)														
L*	-	-	93.49	93.72	93.36	-	93.53	93.68	93.83	93.85	93.95	93.77	93.59	93.78
a*	-	-	0.51	0.47	0.48	-	0.50	0.44	0.44	0.45	0.38	0.41	0.31	0.43
b*	-	-	10.85	10.58	10.90	-	10.80	9.69	9.79	9.99	9.84	10.25	9.78	9.84
Ash (db), %	-	-	0.63	0.58	0.61	-	0.62	0.60	0.61	0.61	0.58	0.60	0.65	0.60
Protein (12% mb), %	-	-	9.5	8.7	9.4	-	9.3	12.0	11.1	10.2	10.0	11.7	11.9	11.3
Wet Gluten (14% mb), %	-	-	23.1	19.2	23.8	-	22.6	32.7	30.6	27.5	26.7	31.7	31.6	30.7
Dry Gluten (14% mb), %	-	-	7.9	6.9	8.0	-	7.8	11.1	10.3	9.2	9.0	10.8	10.9	10.4
Gluten Index	-	-	99	99	98	-	99	93	93	94	94	92	90	93
100g BAKING TEST														
Baking water absorption, %	-	-	59.3	58.7	59.2	-	59.2	62.2	61.1	60.2	60.2	61.9	62.3	61.4
Loaf volume, cm^3	-	-	901	854	881	-	889	1145	1104	1013	997	1109	1083	1096
Evaluation	-	-	0	0	0	-	0	0	0	0	0	0	0	0
FARINOGRAM														
Water absorption (14% mb), %	-	-	55.9	54.4	56.1	-	55.6	60.9	60.1	59.5	58.8	60.9	60.4	60.3
Development time, min	-	-	1.9	1.7	1.9	-	1.8	6.3	5.2	4.3	4.7	5.4	5.2	5.5
Stability, mm	-	-	8.8	3.2	10.4	-	7.8	9.0	7.1	7.2	7.8	8.8	7.2	8.0
Mixing tolerance index, BU	-	-	36	55	36	-	40	37	45	43	43	35	42	40
														

2017/2018 Imported Wheat Quality Versus 2017/2018 RSA Wheat Quality

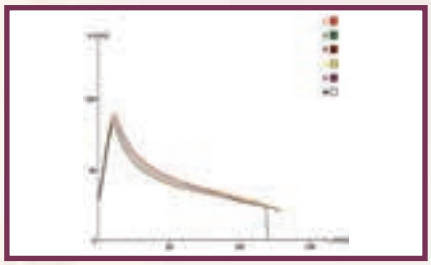
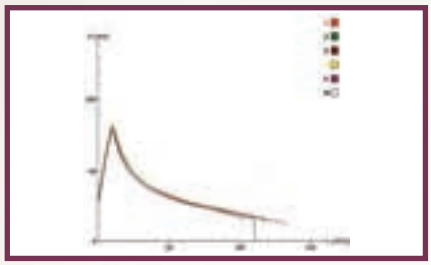
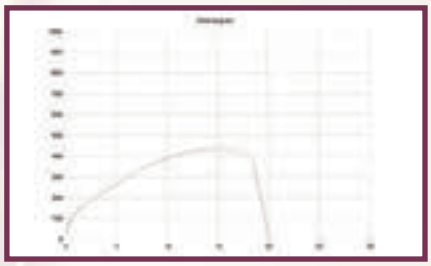
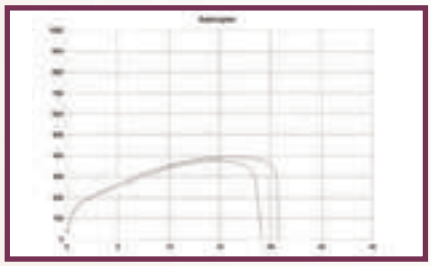
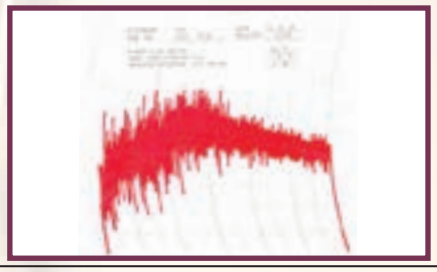
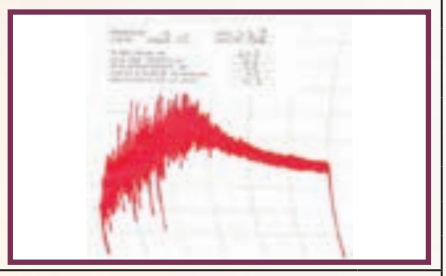
Country of origin	Argentina Average							RSA Crop Average						
Class and Grade bread wheat	B1	B2	B3	B4	UT	COW	Average	B1	B2	B3	B4	UT	COW	Average
No. of samples	-	-	19	6	3	-	28	25	19	9	7	8	2	70
ALVEOGRAM														
Strength (S), cm²	-	-	31.7	25.9	31.9	-	30.5	44.6	36.1	34.0	34.6	40.6	36.1	39.2
Stability (P), mm	-	-	89	88	89	-	89	85	79	86	78	86	79	83
Distensibility (L), mm	-	-	65	49	65	-	62	122	113	102	106	119	123	115
P/L	-	-	1.41	1.86	1.39	-	1.50	0.72	0.75	1.22	0.81	0.80	0.69	0.81
														
EXTENSOGRAM														
Strength, cm²	-	-	92	93	88	-	92	121	100	89	89	109	95	106
Max. height, BU	-	-	449	451	423	-	447	421	365	352	347	373	328	382
Extensibility, mm	-	-	153	153	153	-	153	209	197	180	178	206	200	198
														
MIXOGRAM														
Peak time, min	-	-	4.5	5.6	4.5	-	4.7	2.8	2.6	2.7	2.7	2.4	2.5	2.6
Water absorption (14% mb), %	-	-	59.3	58.7	59.2	-	59.2	62.2	61.1	60.2	60.2	61.9	62.3	61.4
														
MYCOTOXINS														
Aflatoxin B_1 (µg/kg)	0 [0]							0 [0]						
Aflatoxin B_2 (µg/kg)	0 [0]							0 [0]						
Aflatoxin G_1 (µg/kg)	0 [0]							0 [0]						
Aflatoxin G_2 (µg/kg)	0 [0]							0 [0]						
Fumonisin B_1 (µg/kg)	0 [0]							0 [0]						
Fumonisin B_2 (µg/kg)	0 [0]							0 [0]						
Fumonisin B_3 (µg/kg)	0 [0]							0 [0]						
Deoxynivalenol (µg/kg) [max. value]	623 [973]							<100 [570]						
15-ADON (µg/kg) [max. value]	0 [0]							0 [0]						
Ochratoxin A (µg/kg)	0 [0]							0 [0]						
Zearalenone (µg/kg)	0 [0]							0 [0]						
HT-2 (µg/kg)	0 [0]							0 [0]						
T-2 Toxin (µg/kg)	0 [0]							0 [0]						
No. of samples	9							40						

2017/2018 IMPORTED WHEAT QUALITY - CANADA (1 Oct 2017 to 30 Sep 2018)

2017/2018 Imported Wheat Quality Versus 2017/2018 RSA Wheat Quality

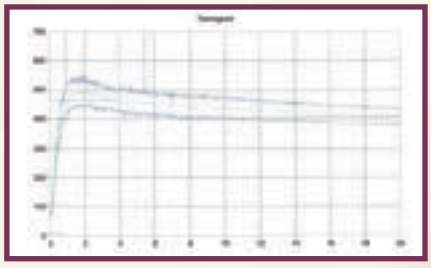
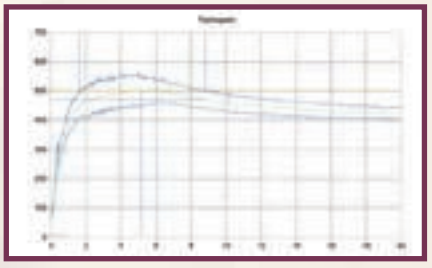
Country of origin	Canada Average							RSA Crop Average						
Class and Grade bread wheat	**B1**	**B2**	**B3**	**B4**	**UT**	**COW**	**Average**	**B1**	**B2**	**B3**	**B4**	**UT**	**COW**	**Average**
No. of samples	*2*	*-*	*-*	*2*	*4*	*1*	*9*	*142*	*77*	*22*	*15*	*42*	*6*	*304*
WHEAT														
GRADING														
Protein (12% mb), %	12.8	-	-	12.6	13.0	13.0	12.8	13.1	12.0	11.0	11.9	13.0	13.3	12.6
Moisture, %	11.4	-	-	10.4	11.3	10.6	11.0	10.0	10.1	10.0	9.5	10.3	10.2	10.0
Falling number, sec	345	-	-	319	354	314	340	379	368	367	380	360	301	371
1000 Kernel mass (13% mb), g	40.5	-	-	35.2	37.5	37.9	37.7	36.9	39.4	40.9	37.0	36.4	34.2	37.7
Hlm (dirty), kg/hl	83.0	-	-	84.5	82.7	83.1	83.2	80.9	81.7	81.6	81.3	78.4	75.8	80.7
Screenings (<1.8 mm sieve), %	2.52	-	-	3.45	1.80	1.59	2.30	1.31	1.21	0.98	1.98	2.61	3.24	1.51
Gravel, stones, turf and glass, %	0.00	-	-	0.00	0.00	0.00	0.00	0.01	0.01	0.02	0.00	0.01	0.07	0.01
Foreign matter, %	0.45	-	-	0.04	0.17	0.06	0.19	0.11	0.13	0.10	0.10	0.29	0.39	0.14
Other grain & unthreshed ears, %	0.16	-	-	0.91	0.38	0.48	0.46	0.35	0.38	0.28	0.42	0.94	0.86	0.45
Heat damaged kernels, %	0.00	-	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.05	0.00
Immature kernels, %	0.08	-	-	0.00	0.04	0.08	0.04	0.05	0.04	0.02	0.01	0.11	0.30	0.06
Insect damaged kernels, %	0.06	-	-	0.00	0.00	0.00	0.01	0.59	0.54	0.60	0.55	1.20	3.44	0.72
Heavily frost damaged kernels, %	1.89	-	-	3.26	5.29	2.40	3.76	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sprouted kernels, %	0.04	-	-	0.00	0.00	0.00	0.01	0.02	0.02	0.02	0.00	0.05	1.93	0.06
Total damaged kernels, %	0.18	-	-	0.00	0.04	0.08	0.07	0.66	0.61	0.65	0.56	1.36	5.73	0.84
Combined deviations, %	3.31	-	-	4.40	2.39	2.21	3.02	2.43	2.32	2.01	3.06	5.20	10.22	2.94
Field fungi, %	0.08	-	-	0.08	0.08	0.32	0.11	0.10	0.08	0.07	0.11	0.13	1.23	0.12
Storage fungi, %	0.00	-	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.08	0.00
Ergot, %	0.01	-	-	0.02	0.02	0.02	0.02	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**	**UT**	**COW**	**Average**	**B1**	**B2**	**B3**	**B4**	**UT**	**COW**	**Average**
No. of samples	*2*	*-*	*-*	*2*	*4*	*1*	*9*	*142*	*77*	*22*	*15*	*42*	*6*	*304*
Bühler Extraction, %	71.4	-	-	70.1	70.9	67.6	70.5	73.2	73.6	73.6	72.8	71.6	71.2	73.1
FLOUR														
Colour, KJ	-4.2	-	-	-4.6	-4.5	-4.2	-4.4	-4.1	-4.2	-4.2	-4.3	-3.9	-3.5	-4.1
Colour, Konica Minolta CM5 (dry)														
L*	93.14	-	-	93.32	93.23	92.88	93.19	93.68	93.83	93.85	93.95	93.77	93.59	93.78
a*	0.51	-	-	0.53	0.51	0.56	0.52	0.44	0.44	0.45	0.38	0.41	0.31	0.43
b*	10.05	-	-	10.60	10.45	11.45	10.50	9.69	9.79	9.99	9.84	10.25	9.78	9.84
Ash (db), %	0.63	-	-	0.53	0.53	0.60	0.56	0.60	0.61	0.61	0.58	0.60	0.65	0.60
Protein (12% mb), %	11.5	-	-	11.6	12.0	11.9	11.8	12.0	11.1	10.2	10.0	11.7	11.9	11.3
Wet Gluten (14% mb), %	31.7	-	-	31.8	31.9	33.6	32.0	32.7	30.6	27.5	26.7	31.7	31.6	30.7
Dry Gluten (14% mb), %	10.8	-	-	11.0	11.1	11.3	11.0	11.1	10.3	9.2	9.0	10.8	10.9	10.4
Gluten Index	97	-	-	97	97	85	95	93	93	94	94	92	90	93
100g BAKING TEST														
Baking water absorption, %	61.6	-	-	61.7	62.2	62.0	61.9	62.2	61.1	60.2	60.2	61.9	62.3	61.4
Loaf volume, cm^3	1025	-	-	997	1084	1022	1044	1145	1104	1013	997	1109	1083	1096
Evaluation	0	-	-	0	0	0	0	0	0	0	0	0	0	0
FARINOGRAM														
Water absorption (14% mb), %	60.7	-	-	61.6	61.6	62.8	61.5	60.9	60.1	59.5	58.8	60.9	60.4	60.3
Development time, min	5.3	-	-	7.5	8.9	5.3	7.3	6.3	5.2	4.3	4.7	5.4	5.2	5.5
Stability, mm	11.7	-	-	12.4	16.8	9.4	13.9	9.0	7.1	7.2	7.8	8.8	7.2	8.0
Mixing tolerance index, BU	18	-	-	22	18	25	20	37	45	43	43	35	42	40
														

2017/2018 Imported Wheat Quality Versus 2017/2018 RSA Wheat Quality

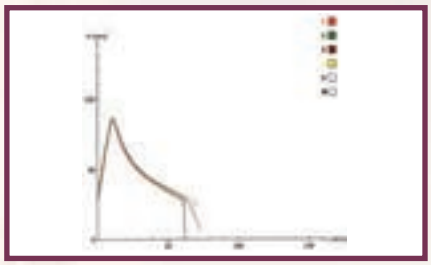
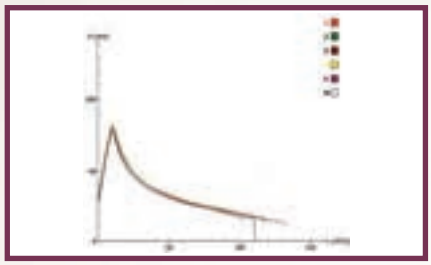
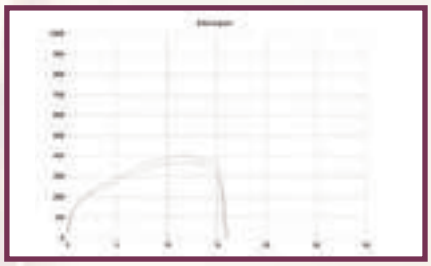
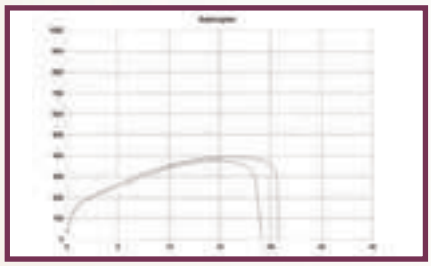
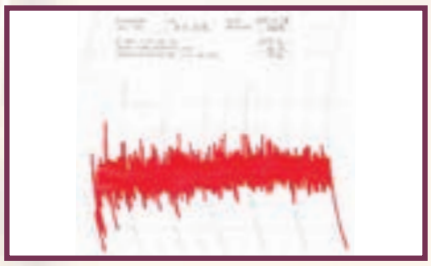
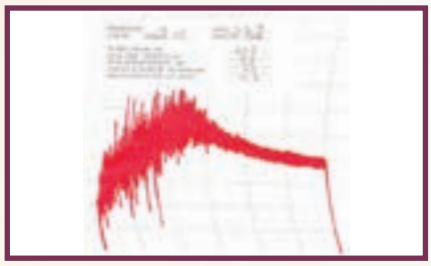
Country of origin	Canada Average							RSA Crop Average						
Class and Grade bread wheat	B1	B2	B3	B4	UT	COW	Average	B1	B2	B3	B4	UT	COW	Average
No. of samples	*2*	*-*	*-*	*2*	*4*	*1*	*9*	*25*	*19*	*9*	*7*	*8*	*2*	*70*
ALVEOGRAM														
Strength (S), cm²	43.4	-	-	45.1	53.0	41.6	47.8	44.6	36.1	34.0	34.6	40.6	36.1	39.2
Stability (P), mm	89	-	-	91	91	89	90	85	79	86	78	86	79	83
Distensibility (L), mm	102	-	-	108	128	105	115	122	113	102	106	119	123	115
P/L	0.88	-	-	0.84	0.72	0.85	0.79	0.72	0.75	1.22	0.81	0.80	0.69	0.81
														
EXTENSOGRAM														
Strength, cm²	110	-	-	115	133	94	119	121	100	89	89	109	95	106
Max. height, BU	440	-	-	414	439	416	431	421	365	352	347	373	328	382
Extensibility, mm	192	-	-	213	228	162	209	209	197	180	178	206	200	198
														
MIXOGRAM														
Peak time, min	3.2	-	-	2.8	3.2	2.7	3.0	2.8	2.6	2.7	2.7	2.4	2.5	2.6
Water absorption (14% mb), %	61.6	-	-	61.7	62.2	62.0	61.9	62.2	61.1	60.2	60.2	61.9	62.3	61.4
														
MYCOTOXINS														
Aflatoxin B_1 (µg/kg)	0 [0]							0 [0]						
Aflatoxin B_2 (µg/kg)	0 [0]							0 [0]						
Aflatoxin G_1 (µg/kg)	0 [0]							0 [0]						
Aflatoxin G_2 (µg/kg)	0 [0]							0 [0]						
Fumonisin B_1 (µg/kg)	0 [0]							0 [0]						
Fumonisin B_2 (µg/kg)	0 [0]							0 [0]						
Fumonisin B_3 (µg/kg)	0 [0]							0 [0]						
Deoxynivalenol (µg/kg) [max. value]	0 [<100]							<100 [570]						
15-ADON (µg/kg)	0 [0]							0 [0]						
Ochratoxin A (µg/kg)	<5 [8]							0 [0]						
Zearalenone (µg/kg) [max. value]	0 [0]							0 [0]						
HT-2 (µg/kg)	0 [0]							0 [0]						
T-2 Toxin (µg/kg)	0 [0]							0 [0]						
No. of samples	*3*							*40*						

2017/2018 IMPORTED WHEAT QUALITY - CZECH REPUBLIC (1 Oct 2017 to 30 Sep 2018)

2017/2018 Imported Wheat Quality Versus 2017/2018 RSA Wheat Quality

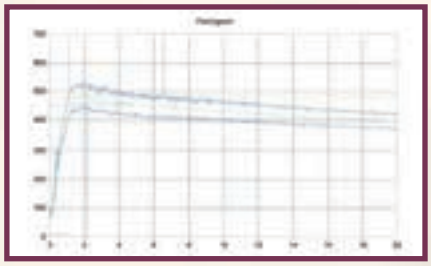
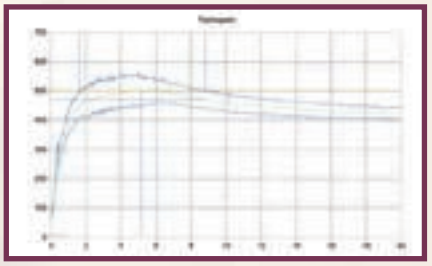
Country of origin	Czech Republic Average							RSA Crop Average						
Class and Grade bread wheat	**B1**	**B2**	**B3**	**B4**	**UT**	**COW**	**Average**	**B1**	**B2**	**B3**	**B4**	**UT**	**COW**	**Average**
No. of samples	-	*5*	-	*1*	-	-	*6*	*142*	*77*	*22*	*15*	*42*	*6*	*304*
WHEAT														
GRADING														
Protein (12% mb), %	-	11.2	-	9.6	-	-	11.0	13.1	12.0	11.0	11.9	13.0	13.3	12.6
Moisture, %	-	10.9	-	10.8	-	-	10.9	10.0	10.1	10.0	9.5	10.3	10.2	10.0
Falling number, sec	-	281	-	344	-	-	291	379	368	367	380	360	301	371
1000 Kernel mass (13% mb), g	-	40.7	-	41.1	-	-	40.8	36.9	39.4	40.9	37.0	36.4	34.2	37.7
Hlm (dirty), kg/hl	-	78.1	-	77.7	-	-	78.1	80.9	81.7	81.6	81.3	78.4	75.8	80.7
Screenings (<1.8 mm sieve), %	-	1.56	-	1.68	-	-	1.58	1.31	1.21	0.98	1.98	2.61	3.24	1.51
Gravel, stones, turf and glass, %	-	0.00	-	0.00	-	-	0.00	0.01	0.01	0.02	0.00	0.01	0.07	0.01
Foreign matter, %	-	0.06	-	0.04	-	-	0.06	0.11	0.13	0.10	0.10	0.29	0.39	0.14
Other grain & unthreshed ears, %	-	0.42	-	0.42	-	-	0.42	0.35	0.38	0.28	0.42	0.94	0.86	0.45
Heat damaged kernels, %	-	0.00	-	0.00	-	-	0.00	0.00	0.00	0.00	0.00	0.01	0.05	0.00
Immature kernels, %	-	0.00	-	0.00	-	-	0.00	0.05	0.04	0.02	0.01	0.11	0.30	0.06
Insect damaged kernels, %	-	0.00	-	0.00	-	-	0.00	0.59	0.54	0.60	0.55	1.20	3.44	0.72
Heavily frost damaged kernels, %	-	0.00	-	0.00	-	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sprouted kernels, %	-	0.28	-	0.28	-	-	0.28	0.02	0.02	0.02	0.00	0.05	1.93	0.06
Total damaged kernels, %	-	0.28	-	0.28	-	-	0.28	0.66	0.61	0.65	0.56	1.36	5.73	0.84
Combined deviations, %	-	2.32	-	2.42	-	-	2.34	2.43	2.32	2.01	3.06	5.20	10.22	2.94
Field fungi, %	-	0.28	-	0.18	-	-	0.26	0.10	0.08	0.07	0.11	0.13	1.23	0.12
Storage fungi, %	-	0.00	-	0.00	-	-	0.00	0.00	0.00	0.00	0.00	0.01	0.08	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
	B1	**B2**	**B3**	**B4**	**UT**	**COW**	**Average**	**B1**	**B2**	**B3**	**B4**	**UT**	**COW**	**Average**
No. of samples	-	*5*	-	*1*	-	-	*6*	*142*	*77*	*22*	*15*	*42*	*6*	*304*
Bühler Extraction, %	-	70.3	-	70.5	-	-	70.3	73.2	73.6	73.6	72.8	71.6	71.2	73.1
FLOUR														
Colour, KJ	-	-3.4	-	-3.4	-	-	-3.4	-4.1	-4.2	-4.2	-4.3	-3.9	-3.5	-4.1
Colour, Konica Minolta CM5 (dry)														
L*	-	93.39	-	93.45	-	-	93.40	93.68	93.83	93.85	93.95	93.77	93.59	93.78
a*	-	0.47	-	0.49	-	-	0.48	0.44	0.44	0.45	0.38	0.41	0.31	0.43
b*	-	9.65	-	9.71	-	-	9.66	9.69	9.79	9.99	9.84	10.25	9.78	9.84
Ash (db), %	-	0.53	-	0.51	-	-	0.53	0.60	0.61	0.61	0.58	0.60	0.65	0.60
Protein (12% mb), %	-	9.6	-	9.5	-	-	9.6	12.0	11.1	10.2	10.0	11.7	11.9	11.3
Wet Gluten (14% mb), %	-	25.2	-	25.2	-	-	25.2	32.7	30.6	27.5	26.7	31.7	31.6	30.7
Dry Gluten (14% mb), %	-	8.5	-	8.5	-	-	8.5	11.1	10.3	9.2	9.0	10.8	10.9	10.4
Gluten Index	-	98	-	99	-	-	98	93	93	94	94	92	90	93
100g BAKING TEST														
Baking water absorption, %	-	59.4	-	59.3	-	-	59.4	62.2	61.1	60.2	60.2	61.9	62.3	61.4
Loaf volume, cm³	-	942	-	937	-	-	941	1145	1104	1013	997	1109	1083	1096
Evaluation	-	0	-	0	-	-	0	0	0	0	0	0	0	0
FARINOGRAM														
Water absorption (14% mb), %	-	56.8	-	57.0	-	-	56.8	60.9	60.1	59.5	58.8	60.9	60.4	60.3
Development time, min	-	2.0	-	2.0	-	-	2.0	6.3	5.2	4.3	4.7	5.4	5.2	5.5
Stability, mm	-	4.6	-	4.3	-	-	4.6	9.0	7.1	7.2	7.8	8.8	7.2	8.0
Mixing tolerance index, BU	-	48	-	47	-	-	48	37	45	43	43	35	42	40
														

2017/2018 Imported Wheat Quality Versus 2017/2018 RSA Wheat Quality

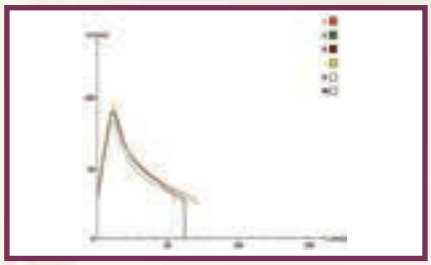
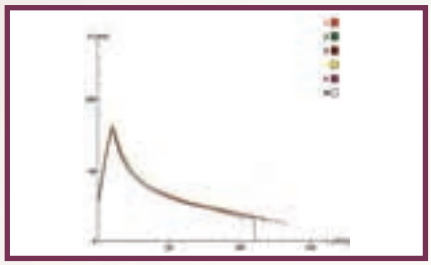
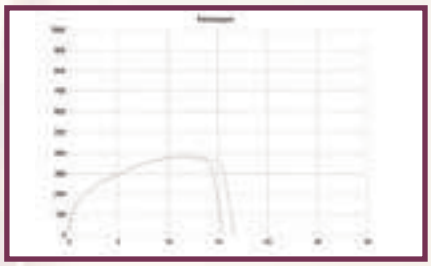
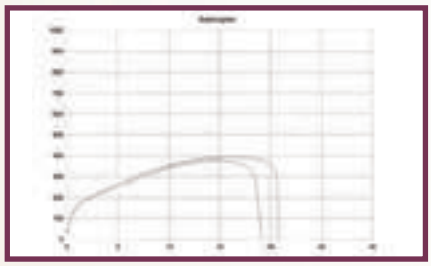
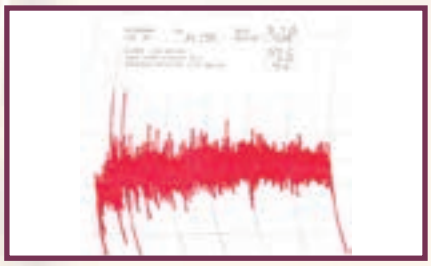
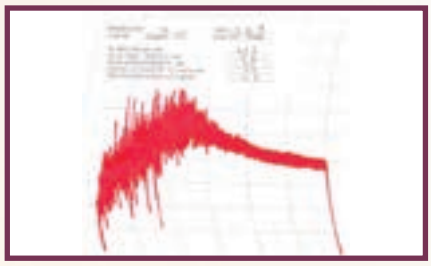
Country of origin	Czech Republic Average							RSA Crop Average						
Class and Grade bread wheat	B1	B2	B3	B4	UT	COW	Average	B1	B2	B3	B4	UT	COW	Average
No. of samples	-	*5*	-	*1*	-	-	*6*	*25*	*19*	*9*	*7*	*8*	*2*	*70*
ALVEOGRAM														
Strength (S), cm²	-	32.4	-	31.0	-	-	32.2	44.6	36.1	34.0	34.6	40.6	36.1	39.2
Stability (P), mm	-	89	-	97	-	-	91	85	79	86	78	86	79	83
Distensibility (L), mm	-	73	-	58	-	-	70	122	113	102	106	119	123	115
P/L	-	1.27	-	1.67	-	-	1.34	0.72	0.75	1.22	0.81	0.80	0.69	0.81
														
EXTENSOGRAM														
Strength, cm²	-	83	-	86	-	-	84	121	100	89	89	109	95	106
Max. height, BU	-	381	-	383	-	-	381	421	365	352	347	373	328	382
Extensibility, mm	-	157	-	160	-	-	158	209	197	180	178	206	200	198
														
MIXOGRAM														
Peak time, min	-	4.5	-	4.3	-	-	4.5	2.8	2.6	2.7	2.7	2.4	2.5	2.6
Water absorption (14% mb), %	-	59.4	-	59.3	-	-	59.4	62.2	61.1	60.2	60.2	61.9	62.3	61.4
														
MYCOTOXINS														
Aflatoxin B_1 (µg/kg)	0 [0]							0 [0]						
Aflatoxin B_2 (µg/kg)	0 [0]							0 [0]						
Aflatoxin G_1 (µg/kg)	0 [0]							0 [0]						
Aflatoxin G_2 (µg/kg)	0 [0]							0 [0]						
Fumonisin B_1 (µg/kg)	0 [0]							0 [0]						
Fumonisin B_2 (µg/kg)	0 [0]							0 [0]						
Fumonisin B_3 (µg/kg)	0 [0]							0 [0]						
Deoxynivalenol (µg/kg) [max. value]	0 [0]							<100 [570]						
15-ADON (µg/kg) [max. value]	0 [0]							0 [0]						
Ochratoxin A (µg/kg)	0 [0]							0 [0]						
Zearalenone (µg/kg) [max. value]	0 [0]							0 [0]						
HT-2 (µg/kg)	0 [0]							0 [0]						
T-2 Toxin (µg/kg)	0 [0]							0 [0]						
No. of samples	*2*							*40*						

2017/2018 IMPORTED WHEAT QUALITY - GERMANY (1 Oct 2017 to 30 Sep 2018)

2017/2018 Imported Wheat Quality Versus 2017/2018 RSA Wheat Quality

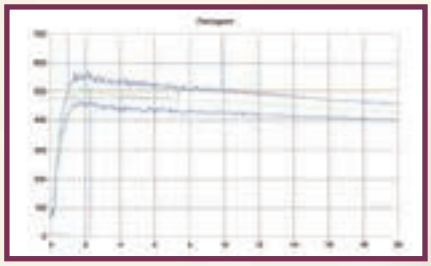
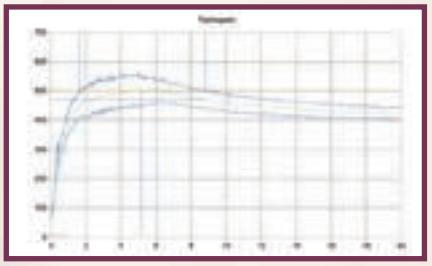
Country of origin	Germany Average							RSA Crop Average						
Class and Grade bread wheat	**B1**	**B2**	**B3**	**B4**	**UT**	**COW**	**Average**	**B1**	**B2**	**B3**	**B4**	**UT**	**COW**	**Average**
No. of samples	-	*17*	*8*	*1*	-	*1*	*27*	*142*	*77*	*22*	*15*	*42*	*6*	*304*
WHEAT														
GRADING														
Protein (12% mb), %	-	11.3	10.9	11.9	-	10.8	11.2	13.1	12.0	11.0	11.9	13.0	13.3	12.6
Moisture, %	-	11.3	11.4	11.1	-	11.0	11.3	10.0	10.1	10.0	9.5	10.3	10.2	10.0
Falling number, sec	-	307	297	327	-	355	307	379	368	367	380	360	301	371
1000 Kernel mass (13% mb), g	-	40.4	40.5	37.1	-	44.6	40.5	36.9	39.4	40.9	37.0	36.4	34.2	37.7
Hlm (dirty), kg/hl	-	78.8	78.3	81.2	-	79.9	78.8	80.9	81.7	81.6	81.3	78.4	75.8	80.7
Screenings (<1.8 mm sieve), %	-	1.89	1.83	3.73	-	2.11	1.94	1.31	1.21	0.98	1.98	2.61	3.24	1.51
Gravel, stones, turf and glass, %	-	0.00	0.00	0.00	-	0.00	0.00	0.01	0.01	0.02	0.00	0.01	0.07	0.01
Foreign matter, %	-	0.14	0.10	0.18	-	0.28	0.13	0.11	0.13	0.10	0.10	0.29	0.39	0.14
Other grain & unthreshed ears, %	-	0.50	0.68	0.26	-	0.44	0.54	0.35	0.38	0.28	0.42	0.94	0.86	0.45
Heat damaged kernels, %	-	0.00	0.00	0.00	-	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.05	0.00
Immature kernels, %	-	0.02	0.01	0.00	-	0.00	0.01	0.05	0.04	0.02	0.01	0.11	0.30	0.06
Insect damaged kernels, %	-	0.09	0.00	0.16	-	0.40	0.08	0.59	0.54	0.60	0.55	1.20	3.44	0.72
Heavily frost damaged kernels, %	-	0.00	0.00	0.00	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sprouted kernels, %	-	0.08	0.06	0.00	-	0.00	0.07	0.02	0.02	0.02	0.00	0.05	1.93	0.06
Total damaged kernels, %	-	0.19	0.07	0.16	-	0.40	0.16	0.66	0.61	0.65	0.56	1.36	5.73	0.84
Combined deviations, %	-	2.72	2.67	4.33	-	3.23	2.78	2.43	2.32	2.01	3.06	5.20	10.22	2.94
Field fungi, %	-	0.30	0.36	0.00	-	0.16	0.30	0.10	0.08	0.07	0.11	0.13	1.23	0.12
Storage fungi, %	-	0.05	0.03	0.00	-	0.00	0.04	0.00	0.00	0.00	0.00	0.01	0.08	0.00
Ergot, %	-	0.00	0.00	0.00	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Poisonous seeds (*Crotalaria spp., etc.*)	-	0	0	0	-	0	0	0	0	0	0	0	0	0
Poisonous seeds (*Argemone mexicana, etc.*)	-	1	0	4	-	16	1	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**	**UT**	**COW**	**Average**	**B1**	**B2**	**B3**	**B4**	**UT**	**COW**	**Average**
No. of samples	-	*17*	*8*	*1*	-	1	*27*	*142*	*77*	*22*	*15*	*42*	*6*	*304*
Bühler Extraction, %	-	72.0	71.0	72.6	-	71.8	71.7	73.2	73.6	73.6	72.8	71.6	71.2	73.1
FLOUR														
Colour, KJ	-	-3.1	-3.1	-3.7	-	-3.5	-3.1	-4.1	-4.2	-4.2	-4.3	-3.9	-3.5	-4.1
Colour, Konica Minolta CM5 (dry)														
L*	-	93.30	93.16	93.34	-	93.64	93.28	93.68	93.83	93.85	93.95	93.77	93.59	93.78
a*	-	0.49	0.50	0.53	-	0.40	0.49	0.44	0.44	0.45	0.38	0.41	0.31	0.43
b*	-	9.77	9.85	11.04	-	10.31	9.86	9.69	9.79	9.99	9.84	10.25	9.78	9.84
Ash (db), %	-	0.53	0.54	0.50	-	0.52	0.53	0.60	0.61	0.61	0.58	0.60	0.65	0.60
Protein (12% mb), %	-	9.9	9.4	10.7	-	9.3	9.7	12.0	11.1	10.2	10.0	11.7	11.9	11.3
Wet Gluten (14% mb), %	-	26.1	25.4	27.1	-	24.4	25.8	32.7	30.6	27.5	26.7	31.7	31.6	30.7
Dry Gluten (14% mb), %	-	8.9	8.6	9.6	-	8.5	8.8	11.1	10.3	9.2	9.0	10.8	10.9	10.4
Gluten Index	-	98	98	100	-	99	98	93	93	94	94	92	90	93
100g BAKING TEST														
Baking water absorption, %	-	59.6	59.3	60.6	-	59.1	59.5	62.2	61.1	60.2	60.2	61.9	62.3	61.4
Loaf volume, cm³	-	959	967	945	-	866	958	1145	1104	1013	997	1109	1083	1096
Evaluation	-	0	0	0	-	0	0	0	0	0	0	0	0	0
FARINOGRAM														
Water absorption (14% mb), %	-	57.0	58.0	57.2	-	57.9	57.3	60.9	60.1	59.5	58.8	60.9	60.4	60.3
Development time, min	-	2.1	2.0	5.5	-	2.0	2.2	6.3	5.2	4.3	4.7	5.4	5.2	5.5
Stability, mm	-	5.8	4.0	10.2	-	8.0	5.5	9.0	7.1	7.2	7.8	8.8	7.2	8.0
Mixing tolerance index, BU	-	42	52	30	-	33	44	37	45	43	43	35	42	40
														

2017/2018 Imported Wheat Quality Versus 2017/2018 RSA Wheat Quality

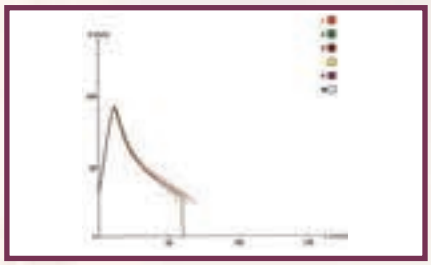
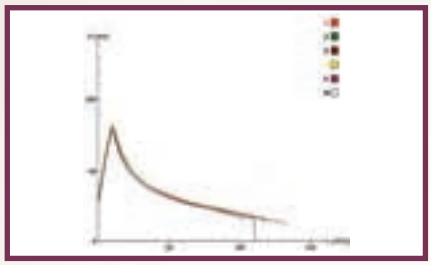
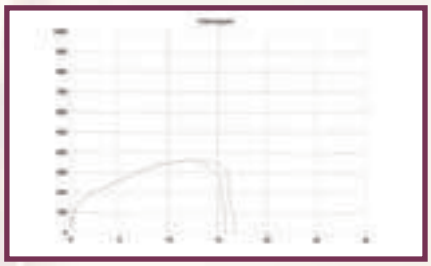
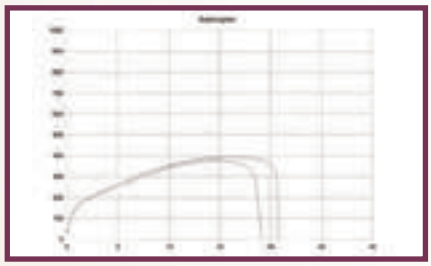
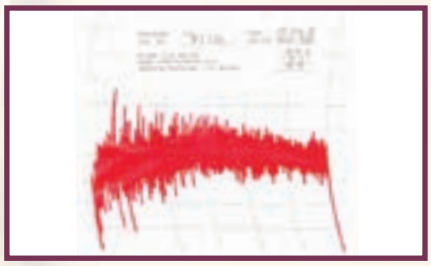
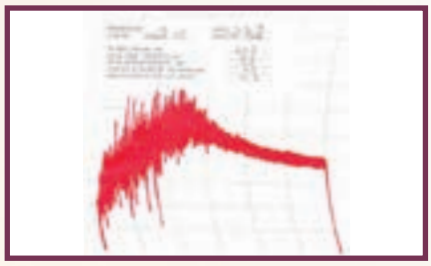
Country of origin	Germany Average							RSA Crop Average						
Class and Grade bread wheat	B1	B2	B3	B4	UT	COW	Average	B1	B2	B3	B4	UT	COW	Average
No. of samples	-	*17*	*8*	*1*	-	*1*	*27*	*25*	*19*	*9*	*7*	*8*	*2*	*70*
ALVEOGRAM														
Strength (S), cm²	-	30.1	28.3	36.2	-	35.2	30.0	44.6	36.1	34.0	34.6	40.6	36.1	39.2
Stability (P), mm	-	86	103	76	-	96	91	85	79	86	78	86	79	83
Distensibility (L), mm	-	72	50	101	-	71	66	122	113	102	106	119	123	115
P/L	-	1.41	2.30	0.75	-	1.35	1.64	0.72	0.75	1.22	0.81	0.80	0.69	0.81
														
EXTENSOGRAM														
Strength, cm²	-	87	85	89	-	92	87	121	100	89	89	109	95	106
Max. height, BU	-	379	372	374	-	442	379	421	365	352	347	373	328	382
Extensibility, mm	-	167	164	175	-	152	166	209	197	180	178	206	200	198
														
MIXOGRAM														
Peak time, min	-	4.0	3.8	4.0	-	4.0	4.0	2.8	2.6	2.7	2.7	2.4	2.5	2.6
Water absorption (14% mb), %	-	59.6	59.3	60.6	-	59.1	59.5	62.2	61.1	60.2	60.2	61.9	62.3	61.4
														
MYCOTOXINS														
Aflatoxin B_1 (µg/kg)	0 [0]							0 [0]						
Aflatoxin B_2 (µg/kg)	0 [0]							0 [0]						
Aflatoxin G_1 (µg/kg)	0 [0]							0 [0]						
Aflatoxin G_2 (µg/kg)	0 [0]							0 [0]						
Fumonisin B_1 (µg/kg)	0 [0]							0 [0]						
Fumonisin B_2 (µg/kg)	0 [0]							0 [0]						
Fumonisin B_3 (µg/kg)	0 [0]							0 [0]						
Deoxynivalenol (µg/kg) [max. value]	73 [227]							<100 [570]						
15-ADON (µg/kg)	0 [0]							0 [0]						
Ochratoxin A (µg/kg)	0 [0]							0 [0]						
Zearalenone (µg/kg)	0 [0]							0 [0]						
HT-2 (µg/kg) [max. value]	0 [0]							0 [0]						
T-2 Toxin (µg/kg)	0 [0]							0 [0]						
No. of samples	*8*							*40*						

2017/2018 IMPORTED WHEAT QUALITY - LATVIA (1 Oct 2017 to 30 Sep 2018)

2017/2018 Imported Wheat Quality Versus 2017/2018 RSA Wheat Quality

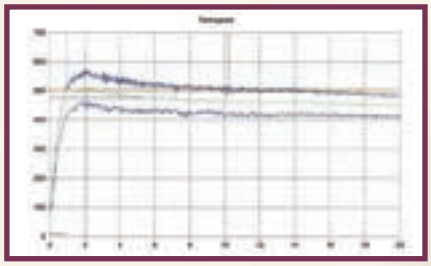
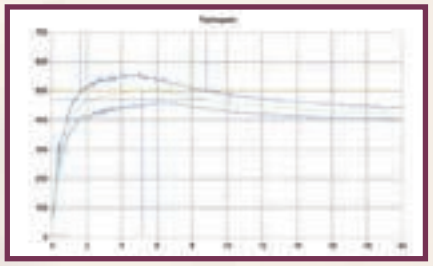
Country of origin	Latvia Average							RSA Crop Average						
Class and Grade bread wheat	**B1**	**B2**	**B3**	**B4**	**UT**	**COW**	**Average**	**B1**	**B2**	**B3**	**B4**	**UT**	**COW**	**Average**
No. of samples	-	*4*	*3*	-	-	-	*7*	*142*	*77*	*22*	*15*	*42*	*6*	*304*
WHEAT														
GRADING														
Protein (12% mb), %	-	11.2	10.9	-	-	-	11.1	13.1	12.0	11.0	11.9	13.0	13.3	12.6
Moisture, %	-	12.2	11.8	-	-	-	12.0	10.0	10.1	10.0	9.5	10.3	10.2	10.0
Falling number, sec	-	363	357	-	-	-	361	379	368	367	380	360	301	371
1000 Kernel mass (13% mb), g	-	47.1	46.3	-	-	-	46.7	36.9	39.4	40.9	37.0	36.4	34.2	37.7
Hlm (dirty), kg/hl	-	82.5	82.4	-	-	-	82.5	80.9	81.7	81.6	81.3	78.4	75.8	80.7
Screenings (<1.8 mm sieve), %	-	0.99	1.19	-	-	-	1.08	1.31	1.21	0.98	1.98	2.61	3.24	1.51
Gravel, stones, turf and glass, %	-	0.00	0.00	-	-	-	0.00	0.01	0.01	0.02	0.00	0.01	0.07	0.01
Foreign matter, %	-	0.06	0.08	-	-	-	0.07	0.11	0.13	0.10	0.10	0.29	0.39	0.14
Other grain & unthreshed ears, %	-	0.38	0.26	-	-	-	0.33	0.35	0.38	0.28	0.42	0.94	0.86	0.45
Heat damaged kernels, %	-	0.00	0.00	-	-	-	0.00	0.00	0.00	0.00	0.00	0.01	0.05	0.00
Immature kernels, %	-	0.07	0.05	-	-	-	0.06	0.05	0.04	0.02	0.01	0.11	0.30	0.06
Insect damaged kernels, %	-	0.03	0.00	-	-	-	0.02	0.59	0.54	0.60	0.55	1.20	3.44	0.72
Heavily frost damaged kernels, %	-	0.00	0.00	-	-	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sprouted kernels, %	-	0.02	0.03	-	-	-	0.02	0.02	0.02	0.02	0.00	0.05	1.93	0.06
Total damaged kernels, %	-	0.12	0.08	-	-	-	0.10	0.66	0.61	0.65	0.56	1.36	5.73	0.84
Combined deviations, %	-	1.55	1.61	-	-	-	1.57	2.43	2.32	2.01	3.06	5.20	10.22	2.94
Field fungi, %	-	0.31	0.16	-	-	-	0.25	0.10	0.08	0.07	0.11	0.13	1.23	0.12
Storage fungi, %	-	0.00	0.00	-	-	-	0.00	0.00	0.00	0.00	0.00	0.01	0.08	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
	B1	**B2**	**B3**	**B4**	**UT**	**COW**	**Average**	**B1**	**B2**	**B3**	**B4**	**UT**	**COW**	**Average**
No. of samples	-	*4*	*3*	-	-	-	*7*	*142*	*77*	*22*	*15*	*42*	*6*	*304*
Bühler Extraction, %	-	73.3	72.6	-	-	-	73.0	73.2	73.6	73.6	72.8	71.6	71.2	73.1
FLOUR														
Colour, KJ	-	-3.7	-3.7	-	-	-	-3.7	-4.1	-4.2	-4.2	-4.3	-3.9	-3.5	-4.1
Colour, Konica Minolta CM5 (dry)														
L*	-	93.46	93.87	-	-	-	93.64	93.68	93.83	93.85	93.95	93.77	93.59	93.78
a*	-	0.55	0.50	-	-	-	0.53	0.44	0.44	0.45	0.38	0.41	0.31	0.43
b*	-	9.70	9.28	-	-	-	9.52	9.69	9.79	9.99	9.84	10.25	9.78	9.84
Ash (db), %	-	0.55	0.55	-	-	-	0.55	0.60	0.61	0.61	0.58	0.60	0.65	0.60
Protein (12% mb), %	-	10.0	9.7	-	-	-	9.8	12.0	11.1	10.2	10.0	11.7	11.9	11.3
Wet Gluten (14% mb), %	-	27.4	27.0	-	-	-	27.2	32.7	30.6	27.5	26.7	31.7	31.6	30.7
Dry Gluten (14% mb), %	-	9.3	9.1	-	-	-	9.2	11.1	10.3	9.2	9.0	10.8	10.9	10.4
Gluten Index	-	95	95	-	-	-	95	93	93	94	94	92	90	93
100g BAKING TEST														
Baking water absorption, %	-	59.6	59.5	-	-	-	59.6	62.2	61.1	60.2	60.2	61.9	62.3	61.4
Loaf volume, cm^3	-	958	943	-	-	-	952	1145	1104	1013	997	1109	1083	1096
Evaluation	-	0	0	-	-	-	0	0	0	0	0	0	0	0
FARINOGRAM														
Water absorption (14% mb), %	-	57.9	57.9	-	-	-	57.9	60.9	60.1	59.5	58.8	60.9	60.4	60.3
Development time, min	-	2.2	2.1	-	-	-	2.2	6.3	5.2	4.3	4.7	5.4	5.2	5.5
Stability, mm	-	9.2	8.0	-	-	-	8.7	9.0	7.1	7.2	7.8	8.8	7.2	8.0
Mixing tolerance index, BU	-	29	33	-	-	-	31	37	45	43	43	35	42	40
														

2017/2018 Imported Wheat Quality Versus 2017/2018 RSA Wheat Quality

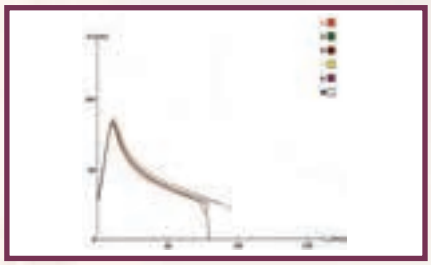
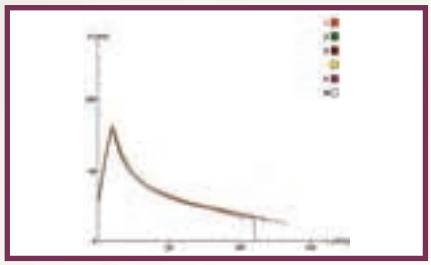
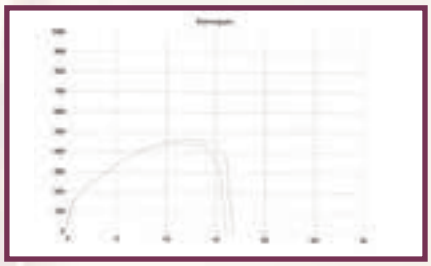
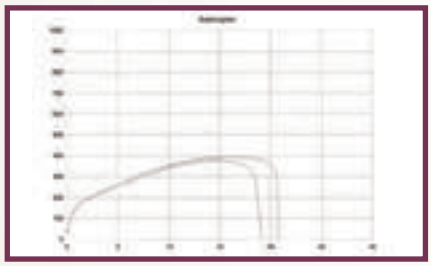
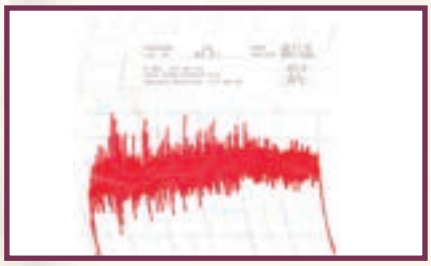
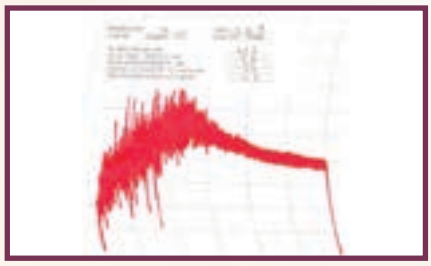
Country of origin	Latvia Average							RSA Crop Average						
Class and Grade bread wheat	B1	B2	B3	B4	UT	COW	Average	B1	B2	B3	B4	UT	COW	Average
No. of samples	-	*4*	*3*	-	-	-	*7*	*25*	*19*	*9*	*7*	*8*	*2*	*70*
ALVEOGRAM														
Strength (S), cm²	-	34.1	32.8	-	-	-	33.5	44.6	36.1	34.0	34.6	40.6	36.1	39.2
Stability (P), mm	-	98	95	-	-	-	97	85	79	86	78	86	79	83
Distensibility (L), mm	-	68	70	-	-	-	69	122	113	102	106	119	123	115
P/L	-	1.48	1.39	-	-	-	1.44	0.72	0.75	1.22	0.81	0.80	0.69	0.81
														
EXTENSOGRAM														
Strength, cm²	-	81	82	-	-	-	81	121	100	89	89	109	95	106
Max. height, BU	-	368	380	-	-	-	373	421	365	352	347	373	328	382
Extensibility, mm	-	160	157	-	-	-	159	209	197	180	178	206	200	198
														
MIXOGRAM														
Peak time, min	-	3.3	3.2	-	-	-	3.3	2.8	2.6	2.7	2.7	2.4	2.5	2.6
Water absorption (14% mb), %	-	59.6	59.5	-	-	-	59.6	62.2	61.1	60.2	60.2	61.9	62.3	61.4
														
MYCOTOXINS														
Aflatoxin B_1 (µg/kg)	0 [0]							0 [0]						
Aflatoxin B_2 (µg/kg)	0 [0]							0 [0]						
Aflatoxin G_1 (µg/kg)	0 [0]							0 [0]						
Aflatoxin G_2 (µg/kg)	0 [0]							0 [0]						
Fumonisin B_1 (µg/kg)	0 [0]							0 [0]						
Fumonisin B_2 (µg/kg)	0 [0]							0 [0]						
Fumonisin B_3 (µg/kg)	0 [0]							0 [0]						
Deoxynivalenol (µg/kg) [max. value]	<100 [109]							<100 [570]						
15-ADON (µg/kg)	0 [0]							0 [0]						
Ochratoxin A (µg/kg)	0 [0]							0 [0]						
Zearalenone (µg/kg)	0 [0]							0 [0]						
HT-2 (µg/kg)	0 [0]							0 [0]						
T-2 Toxin (µg/kg)	0 [0]							0 [0]						
No. of samples	*2*							*40*						

2017/2018 IMPORTED WHEAT QUALITY - LITHUANIA (1 Oct 2017 to 30 Sep 2018)

2017/2018 Imported Wheat Quality Versus 2017/2018 RSA Wheat Quality

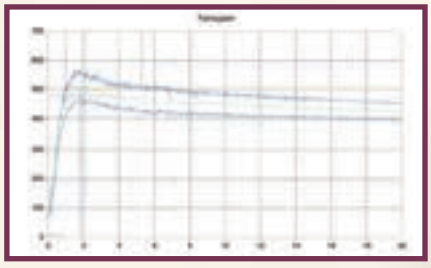
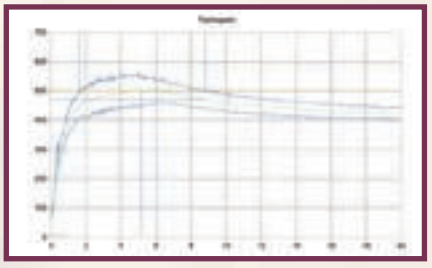
Country of origin	Lithuania Average							RSA Crop Average						
Class and Grade bread wheat	**B1**	**B2**	**B3**	**B4**	**UT**	**COW**	**Average**	**B1**	**B2**	**B3**	**B4**	**UT**	**COW**	**Average**
No. of samples	*5*	*5*	*-*	*-*	*-*	*-*	*10*	*142*	*77*	*22*	*15*	*42*	*6*	*304*
WHEAT														
GRADING														
Protein (12% mb), %	12.5	11.2	-	-	-	-	11.8	13.1	12.0	11.0	11.9	13.0	13.3	12.6
Moisture, %	11.8	11.1	-	-	-	-	11.5	10.0	10.1	10.0	9.5	10.3	10.2	10.0
Falling number, sec	337	326	-	-	-	-	332	379	368	367	380	360	301	371
1000 Kernel mass (13% mb), g	46.7	45.6	-	-	-	-	46.2	36.9	39.4	40.9	37.0	36.4	34.2	37.7
Hlm (dirty), kg/hl	80.5	80.5	-	-	-	-	80.5	80.9	81.7	81.6	81.3	78.4	75.8	80.7
Screenings (<1.8 mm sieve), %	0.78	0.93	-	-	-	-	0.86	1.31	1.21	0.98	1.98	2.61	3.24	1.51
Gravel, stones, turf and glass, %	0.00	0.00	-	-	-	-	0.00	0.01	0.01	0.02	0.00	0.01	0.07	0.01
Foreign matter, %	0.07	0.05	-	-	-	-	0.06	0.11	0.13	0.10	0.10	0.29	0.39	0.14
Other grain & unthreshed ears, %	0.12	0.28	-	-	-	-	0.20	0.35	0.38	0.28	0.42	0.94	0.86	0.45
Heat damaged kernels, %	0.03	0.00	-	-	-	-	0.02	0.00	0.00	0.00	0.00	0.01	0.05	0.00
Immature kernels, %	0.00	0.00	-	-	-	-	0.00	0.05	0.04	0.02	0.01	0.11	0.30	0.06
Insect damaged kernels, %	0.00	0.04	-	-	-	-	0.02	0.59	0.54	0.60	0.55	1.20	3.44	0.72
Heavily frost damaged kernels, %	0.00	0.00	-	-	-	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sprouted kernels, %	0.00	0.05	-	-	-	-	0.02	0.02	0.02	0.02	0.00	0.05	1.93	0.06
Total damaged kernels, %	0.03	0.09	-	-	-	-	0.06	0.66	0.61	0.65	0.56	1.36	5.73	0.84
Combined deviations, %	1.00	1.34	-	-	-	-	1.17	2.43	2.32	2.01	3.06	5.20	10.22	2.94
Field fungi, %	0.32	0.43	-	-	-	-	0.38	0.10	0.08	0.07	0.11	0.13	1.23	0.12
Storage fungi, %	0.00	0.10	-	-	-	-	0.05	0.00	0.00	0.00	0.00	0.01	0.08	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
	B1	**B2**	**B3**	**B4**	**UT**	**COW**	**Average**	**B1**	**B2**	**B3**	**B4**	**UT**	**COW**	**Average**
No. of samples	*5*	*5*	*-*	*-*	*-*	*-*	*10*	*142*	*77*	*22*	*15*	*42*	*6*	*304*
Bühler Extraction, %	71.6	73.9	-	-	-	-	72.7	73.2	73.6	73.6	72.8	71.6	71.2	73.1
FLOUR														
Colour, KJ	-3.3	-3.5	-	-	-	-	-3.4	-4.1	-4.2	-4.2	-4.3	-3.9	-3.5	-4.1
Colour, Konica Minolta CM5 (dry)														
L*	93.17	93.41	-	-	-	-	93.29	93.68	93.83	93.85	93.95	93.77	93.59	93.78
a*	0.59	0.54	-	-	-	-	0.56	0.44	0.44	0.45	0.38	0.41	0.31	0.43
b*	9.83	9.80	-	-	-	-	9.81	9.69	9.79	9.99	9.84	10.25	9.78	9.84
Ash (db), %	0.53	0.55	-	-	-	-	0.54	0.60	0.61	0.61	0.58	0.60	0.65	0.60
Protein (12% mb), %	11.0	10.1	-	-	-	-	10.5	12.0	11.1	10.2	10.0	11.7	11.9	11.3
Wet Gluten (14% mb), %	28.9	26.6	-	-	-	-	27.7	32.7	30.6	27.5	26.7	31.7	31.6	30.7
Dry Gluten (14% mb), %	10.0	9.1	-	-	-	-	9.5	11.1	10.3	9.2	9.0	10.8	10.9	10.4
Gluten Index	98	98	-	-	-	-	98	93	93	94	94	92	90	93
100g BAKING TEST														
Baking water absorption, %	61.0	59.8	-	-	-	-	60.4	62.2	61.1	60.2	60.2	61.9	62.3	61.4
Loaf volume, cm^3	977	977	-	-	-	-	977	1145	1104	1013	997	1109	1083	1096
Evaluation	0	0	-	-	-	-	0	0	0	0	0	0	0	0
FARINOGRAM														
Water absorption (14% mb), %	57.9	56.7	-	-	-	-	57.3	60.9	60.1	59.5	58.8	60.9	60.4	60.3
Development time, min	2.2	2.1	-	-	-	-	2.2	6.3	5.2	4.3	4.7	5.4	5.2	5.5
Stability, mm	8.9	8.6	-	-	-	-	8.7	9.0	7.1	7.2	7.8	8.8	7.2	8.0
Mixing tolerance index, BU	35	35	-	-	-	-	35	37	45	43	43	35	42	40
														

2017/2018 Imported Wheat Quality Versus 2017/2018 RSA Wheat Quality

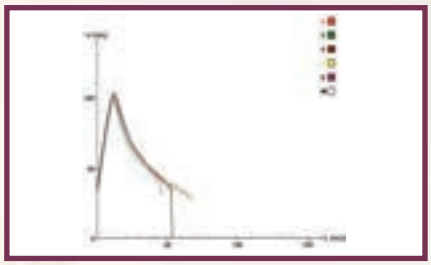
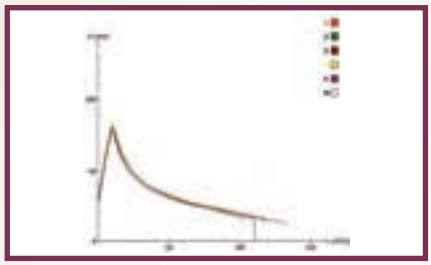
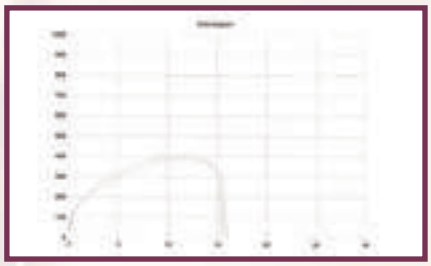
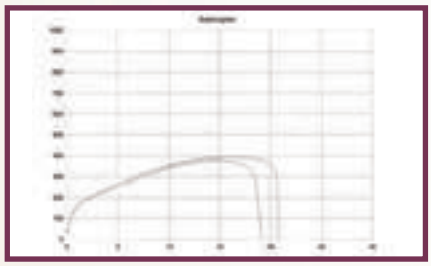
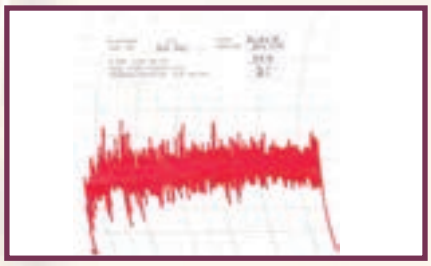
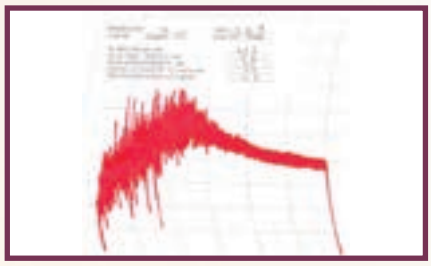
Country of origin	Lithuania Average							RSA Crop Average						
Class and Grade bread wheat	B1	B2	B3	B4	UT	COW	Average	B1	B2	B3	B4	UT	COW	Average
No. of samples	*5*	*5*	*-*	*-*	*-*	*-*	*10*	*25*	*19*	*9*	*7*	*8*	*2*	*70*
ALVEOGRAM														
Strength (S), cm²	39.4	33.8	-	-	-	-	36.6	44.6	36.1	34.0	34.6	40.6	36.1	39.2
Stability (P), mm	102	89	-	-	-	-	96	85	79	86	78	86	79	83
Distensibility (L), mm	72	73	-	-	-	-	72	122	113	102	106	119	123	115
P/L	1.51	1.23	-	-	-	-	1.37	0.72	0.75	1.22	0.81	0.80	0.69	0.81
														
EXTENSOGRAM														
Strength, cm²	95	100	-	-	-	-	98	121	100	89	89	109	95	106
Max. height, BU	444	461	-	-	-	-	453	421	365	352	347	373	328	382
Extensibility, mm	159	159	-	-	-	-	159	209	197	180	178	206	200	198
														
MIXOGRAM														
Peak time, min	4.2	4.0	-	-	-	-	4.1	2.8	2.6	2.7	2.7	2.4	2.5	2.6
Water absorption (14% mb), %	61.0	59.8	-	-	-	-	60.4	62.2	61.1	60.2	60.2	61.9	62.3	61.4
														
MYCOTOXINS														
Aflatoxin B_1 (µg/kg)	0 [0]							0 [0]						
Aflatoxin B_2 (µg/kg)	0 [0]							0 [0]						
Aflatoxin G_1 (µg/kg)	0 [0]							0 [0]						
Aflatoxin G_2 (µg/kg)	0 [0]							0 [0]						
Fumonisin B_1 (µg/kg)	0 [0]							0 [0]						
Fumonisin B_2 (µg/kg)	0 [0]							0 [0]						
Fumonisin B_3 (µg/kg)	0 [0]							0 [0]						
Deoxynivalenol (µg/kg) [max. value]	145 [241]							<100 [570]						
15-ADON (µg/kg)	0 [0]							0 [0]						
Ochratoxin A (µg/kg)	0 [0]							0 [0]						
Zearalenone (µg/kg)	0 [0]							0 [0]						
HT-2 (µg/kg)	0 [0]							0 [0]						
T-2 Toxin (µg/kg)	0 [0]							0 [0]						
No. of samples	*4*							*40*						

2017/2018 IMPORTED WHEAT QUALITY - POLAND (1 Oct 2017 to 30 Sep 2018)

2017/2018 Imported Wheat Quality Versus 2017/2018 RSA Wheat Quality

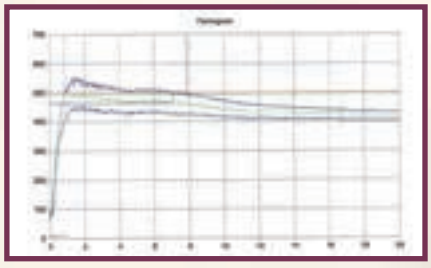
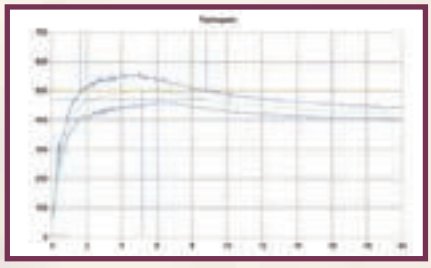
Country of origin	Poland Average							RSA Crop Average						
Class and Grade bread wheat	**B1**	**B2**	**B3**	**B4**	**UT**	**COW**	**Average**	**B1**	**B2**	**B3**	**B4**	**UT**	**COW**	**Average**
No. of samples	-	*5*	-	-	-	-	*5*	*142*	*77*	*22*	*15*	*42*	*6*	*304*
WHEAT														
GRADING														
Protein (12% mb), %	-	11.5	-	-	-	-	11.5	13.1	12.0	11.0	11.9	13.0	13.3	12.6
Moisture, %	-	11.5	-	-	-	-	11.5	10.0	10.1	10.0	9.5	10.3	10.2	10.0
Falling number, sec	-	314	-	-	-	-	314	379	368	367	380	360	301	371
1000 Kernel mass (13% mb), g	-	44.9	-	-	-	-	44.9	36.9	39.4	40.9	37.0	36.4	34.2	37.7
Hlm (dirty), kg/hl	-	79.7	-	-	-	-	79.7	80.9	81.7	81.6	81.3	78.4	75.8	80.7
Screenings (<1.8 mm sieve), %	-	2.12	-	-	-	-	2.12	1.31	1.21	0.98	1.98	2.61	3.24	1.51
Gravel, stones, turf and glass, %	-	0.00	-	-	-	-	0.00	0.01	0.01	0.02	0.00	0.01	0.07	0.01
Foreign matter, %	-	0.09	-	-	-	-	0.09	0.11	0.13	0.10	0.10	0.29	0.39	0.14
Other grain & unthreshed ears, %	-	0.41	-	-	-	-	0.41	0.35	0.38	0.28	0.42	0.94	0.86	0.45
Heat damaged kernels, %	-	0.00	-	-	-	-	0.00	0.00	0.00	0.00	0.00	0.01	0.05	0.00
Immature kernels, %	-	0.00	-	-	-	-	0.00	0.05	0.04	0.02	0.01	0.11	0.30	0.06
Insect damaged kernels, %	-	0.00	-	-	-	-	0.00	0.59	0.54	0.60	0.55	1.20	3.44	0.72
Heavily frost damaged kernels, %	-	0.00	-	-	-	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sprouted kernels, %	-	0.22	-	-	-	-	0.22	0.02	0.02	0.02	0.00	0.05	1.93	0.06
Total damaged kernels, %	-	0.22	-	-	-	-	0.22	0.66	0.61	0.65	0.56	1.36	5.73	0.84
Combined deviations, %	-	2.84	-	-	-	-	2.84	2.43	2.32	2.01	3.06	5.20	10.22	2.94
Field fungi, %	-	0.38	-	-	-	-	0.38	0.10	0.08	0.07	0.11	0.13	1.23	0.12
Storage fungi, %	-	0.08	-	-	-	-	0.08	0.00	0.00	0.00	0.00	0.01	0.08	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
	B1	**B2**	**B3**	**B4**	**UT**	**COW**	**Average**	**B1**	**B2**	**B3**	**B4**	**UT**	**COW**	**Average**
No. of samples	-	*5*	-	-	-	-	*5*	*142*	*77*	*22*	*15*	*42*	*6*	*304*
Bühler Extraction, %	-	72.6	-	-	-	-	72.6	73.2	73.6	73.6	72.8	71.6	71.2	73.1
FLOUR														
Colour, KJ	-	-2.7	-	-	-	-	-2.7	-4.1	-4.2	-4.2	-4.3	-3.9	-3.5	-4.1
Colour, Konica Minolta CM5 (dry)														
L*	-	92.87	-	-	-	-	92.87	93.68	93.83	93.85	93.95	93.77	93.59	93.78
a*	-	0.54	-	-	-	-	0.54	0.44	0.44	0.45	0.38	0.41	0.31	0.43
b*	-	9.77	-	-	-	-	9.77	9.69	9.79	9.99	9.84	10.25	9.78	9.84
Ash (db), %	-	0.55	-	-	-	-	0.55	0.60	0.61	0.61	0.58	0.60	0.65	0.60
Protein (12% mb), %	-	10.0	-	-	-	-	10.0	12.0	11.1	10.2	10.0	11.7	11.9	11.3
Wet Gluten (14% mb), %	-	26.9	-	-	-	-	26.9	32.7	30.6	27.5	26.7	31.7	31.6	30.7
Dry Gluten (14% mb), %	-	9.4	-	-	-	-	9.4	11.1	10.3	9.2	9.0	10.8	10.9	10.4
Gluten Index	-	99	-	-	-	-	99	93	93	94	94	92	90	93
100g BAKING TEST														
Baking water absorption, %	-	59.8	-	-	-	-	59.8	62.2	61.1	60.2	60.2	61.9	62.3	61.4
Loaf volume, cm^3	-	970	-	-	-	-	970	1145	1104	1013	997	1109	1083	1096
Evaluation	-	0	-	-	-	-	0	0	0	0	0	0	0	0
FARINOGRAM														
Water absorption (14% mb), %	-	58.6	-	-	-	-	58.6	60.9	60.1	59.5	58.8	60.9	60.4	60.3
Development time, min	-	2.0	-	-	-	-	2.0	6.3	5.2	4.3	4.7	5.4	5.2	5.5
Stability, mm	-	4.4	-	-	-	-	4.4	9.0	7.1	7.2	7.8	8.8	7.2	8.0
Mixing tolerance index, BU	-	49	-	-	-	-	49	37	45	43	43	35	42	40
														

2017/2018 Imported Wheat Quality Versus 2017/2018 RSA Wheat Quality

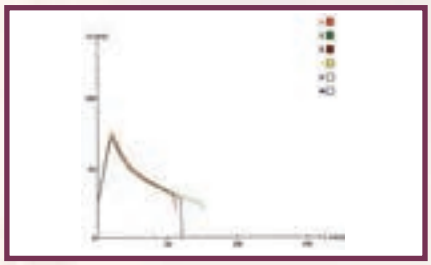
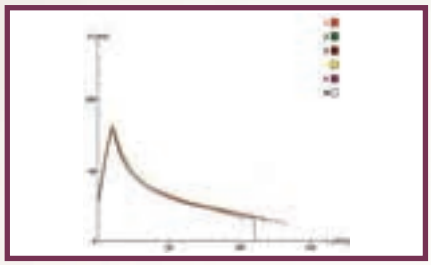
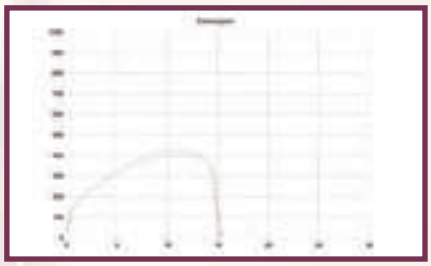
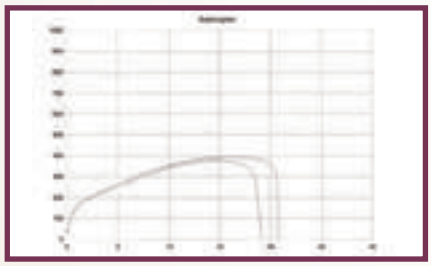
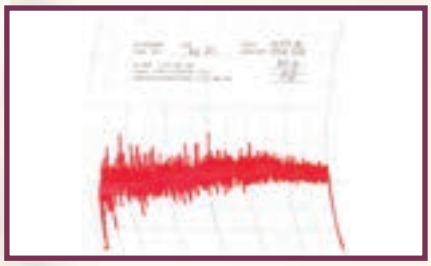
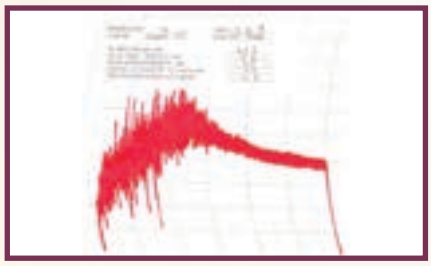
Country of origin	Poland Average							RSA Crop Average						
Class and Grade bread wheat	B1	B2	B3	B4	UT	COW	Average	B1	B2	B3	B4	UT	COW	Average
No. of samples	-	*5*	-	-	-	-	*5*	*25*	*19*	*9*	*7*	*8*	*2*	*70*
ALVEOGRAM														
Strength (S), cm²	-	32.8	-	-	-	-	32.8	44.6	36.1	34.0	34.6	40.6	36.1	39.2
Stability (P), mm	-	108	-	-	-	-	108	85	79	86	78	86	79	83
Distensibility (L), mm	-	55	-	-	-	-	55	122	113	102	106	119	123	115
P/L	-	2.03	-	-	-	-	2.03	0.72	0.75	1.22	0.81	0.80	0.69	0.81
														
EXTENSOGRAM														
Strength, cm²	-	89	-	-	-	-	89	121	100	89	89	109	95	106
Max. height, BU	-	399	-	-	-	-	399	421	365	352	347	373	328	382
Extensibility, mm	-	160	-	-	-	-	160	209	197	180	178	206	200	198
														
MIXOGRAM														
Peak time, min	-	4.1	-	-	-	-	4.1	2.8	2.6	2.7	2.7	2.4	2.5	2.6
Water absorption (14% mb), %	-	59.8	-	-	-	-	59.8	62.2	61.1	60.2	60.2	61.9	62.3	61.4
														
MYCOTOXINS														
Aflatoxin B_1 (µg/kg)	0 [0]							0 [0]						
Aflatoxin B_2 (µg/kg)	0 [0]							0 [0]						
Aflatoxin G_1 (µg/kg)	0 [0]							0 [0]						
Aflatoxin G_2 (µg/kg)	0 [0]							0 [0]						
Fumonisin B_1 (µg/kg)	0 [0]							0 [0]						
Fumonisin B_2 (µg/kg)	0 [0]							0 [0]						
Fumonisin B_3 (µg/kg)	0 [0]							0 [0]						
Deoxynivalenol (µg/kg) [max. value]	0 [0]							<100 [570]						
15-ADON (µg/kg)	0 [0]							0 [0]						
Ochratoxin A (µg/kg)	0 [0]							0 [0]						
Zearalenone (µg/kg)	0 [0]							0 [0]						
HT-2 (µg/kg)	0 [0]							0 [0]						
T-2 Toxin (µg/kg)	0 [0]							0 [0]						
No. of samples	*1*							*40*						

2017/2018 IMPORTED WHEAT QUALITY - ROMANIA (1 Oct 2017 to 30 Sep 2018)

2017/2018 Imported Wheat Quality Versus 2017/2018 RSA Wheat Quality

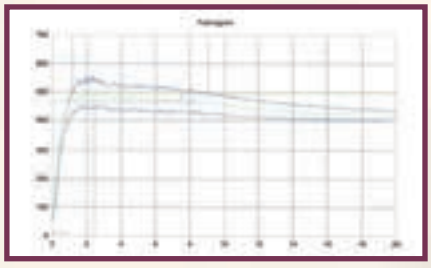
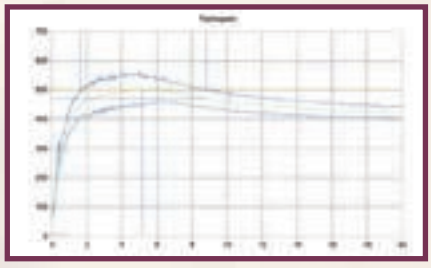
Country of origin	Romania Average							RSA Crop Average						
Class and Grade bread wheat	**B1**	**B2**	**B3**	**B4**	**UT**	**COW**	**Average**	**B1**	**B2**	**B3**	**B4**	**UT**	**COW**	**Average**
No. of samples	-	*4*	*1*	-	-	*7*	*12*	*142*	*77*	*22*	*15*	*42*	*6*	*304*
WHEAT														
GRADING														
Protein (12% mb), %	-	11.4	10.9	-	-	10.8	11.0	13.1	12.0	11.0	11.9	13.0	13.3	12.6
Moisture, %	-	10.9	10.2	-	-	10.8	10.8	10.0	10.1	10.0	9.5	10.3	10.2	10.0
Falling number, sec	-	356	474	-	-	365	371	379	368	367	380	360	301	371
1000 Kernel mass (13% mb), g	-	37.2	30.7	-	-	39.2	37.9	36.9	39.4	40.9	37.0	36.4	34.2	37.7
Hlm (dirty), kg/hl	-	79.1	80.6	-	-	77.5	78.3	80.9	81.7	81.6	81.3	78.4	75.8	80.7
Screenings (<1.8 mm sieve), %	-	2.35	0.51	-	-	1.56	1.74	1.31	1.21	0.98	1.98	2.61	3.24	1.51
Gravel, stones, turf and glass, %	-	0.00	0.00	-	-	0.00	0.00	0.01	0.01	0.02	0.00	0.01	0.07	0.01
Foreign matter, %	-	0.08	0.16	-	-	0.29	0.21	0.11	0.13	0.10	0.10	0.29	0.39	0.14
Other grain & unthreshed ears, %	-	0.10	0.36	-	-	0.23	0.20	0.35	0.38	0.28	0.42	0.94	0.86	0.45
Heat damaged kernels, %	-	0.00	0.00	-	-	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.05	0.00
Immature kernels, %	-	0.00	0.00	-	-	0.00	0.00	0.05	0.04	0.02	0.01	0.11	0.30	0.06
Insect damaged kernels, %	-	0.23	0.24	-	-	0.04	0.12	0.59	0.54	0.60	0.55	1.20	3.44	0.72
Heavily frost damaged kernels, %	-	0.00	0.00	-	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sprouted kernels, %	-	0.00	0.00	-	-	0.01	0.01	0.02	0.02	0.02	0.00	0.05	1.93	0.06
Total damaged kernels, %	-	0.23	0.24	-	-	0.05	0.13	0.66	0.61	0.65	0.56	1.36	5.73	0.84
Combined deviations, %	-	2.75	1.27	-	-	2.14	2.27	2.43	2.32	2.01	3.06	5.20	10.22	2.94
Field fungi, %	-	0.12	0.32	-	-	0.23	0.20	0.10	0.08	0.07	0.11	0.13	1.23	0.12
Storage fungi, %	-	0.06	0.00	-	-	0.02	0.03	0.00	0.00	0.00	0.00	0.01	0.08	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.*)	-	4	0	-	-	18	12	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
	B1	**B2**	**B3**	**B4**	**UT**	**COW**	**Average**	**B1**	**B2**	**B3**	**B4**	**UT**	**COW**	**Average**
No. of samples	-	*4*	*1*	-	-	*7*	*12*	*142*	*77*	*22*	*15*	*42*	*6*	*304*
Bühler Extraction, %	-	73.8	70.6	-	-	73.0	73.1	73.2	73.6	73.6	72.8	71.6	71.2	73.1
FLOUR														
Colour, KJ	-	-3.4	-3.6	-	-	-3.3	-3.3	-4.1	-4.2	-4.2	-4.3	-3.9	-3.5	-4.1
Colour, Konica Minolta CM5 (dry)														
L*	-	93.21	93.53	-	-	93.40	93.35	93.68	93.83	93.85	93.95	93.77	93.59	93.78
a*	-	0.44	0.45	-	-	0.41	0.43	0.44	0.44	0.45	0.38	0.41	0.31	0.43
b*	-	9.75	10.83	-	-	10.15	10.07	9.69	9.79	9.99	9.84	10.25	9.78	9.84
Ash (db), %	-	0.51	0.56	-	-	0.51	0.52	0.60	0.61	0.61	0.58	0.60	0.65	0.60
Protein (12% mb), %	-	9.9	9.5	-	-	9.4	9.6	12.0	11.1	10.2	10.0	11.7	11.9	11.3
Wet Gluten (14% mb), %	-	24.8	24.6	-	-	23.9	24.3	32.7	30.6	27.5	26.7	31.7	31.6	30.7
Dry Gluten (14% mb), %	-	8.4	8.6	-	-	8.2	8.3	11.1	10.3	9.2	9.0	10.8	10.9	10.4
Gluten Index	-	99	99	-	-	98	99	93	93	94	94	92	90	93
100g BAKING TEST														
Baking water absorption, %	-	59.5	59.3	-	-	59.1	59.2	62.2	61.1	60.2	60.2	61.9	62.3	61.4
Loaf volume, cm^3	-	950	964	-	-	921	934	1145	1104	1013	997	1109	1083	1096
Evaluation	-	0	0	-	-	0	0	0	0	0	0	0	0	0
FARINOGRAM														
Water absorption (14% mb), %	-	54.9	56.3	-	-	55.4	55.3	60.9	60.1	59.5	58.8	60.9	60.4	60.3
Development time, min	-	1.8	1.7	-	-	1.8	1.8	6.3	5.2	4.3	4.7	5.4	5.2	5.5
Stability, mm	-	7.8	5.8	-	-	6.5	6.9	9.0	7.1	7.2	7.8	8.8	7.2	8.0
Mixing tolerance index, BU	-	39	48	-	-	38	39	37	45	43	43	35	42	40
														

2017/2018 Imported Wheat Quality Versus 2017/2018 RSA Wheat Quality

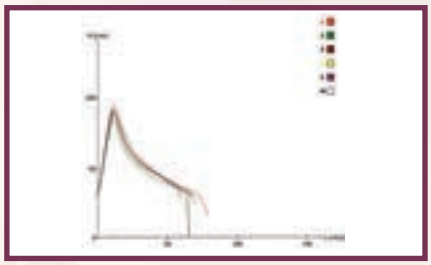
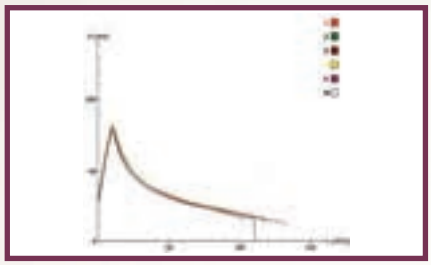
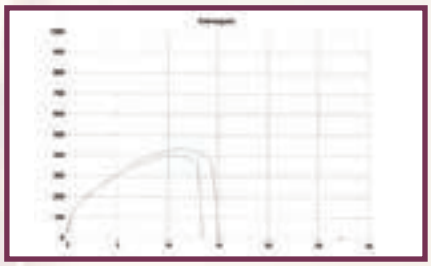
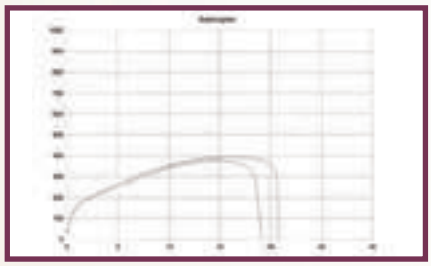
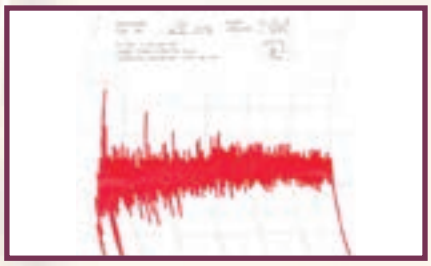
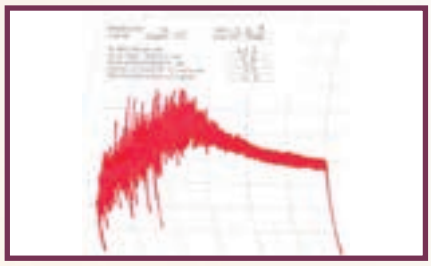
Country of origin	Romania Average							RSA Crop Average						
Class and Grade bread wheat	**B1**	**B2**	**B3**	**B4**	**UT**	**COW**	**Average**	**B1**	**B2**	**B3**	**B4**	**UT**	**COW**	**Average**
No. of samples	*-*	*4*	*1*	*-*	*-*	*7*	*12*	*25*	*19*	*9*	*7*	*8*	*2*	*70*
ALVEOGRAM														
Strength (S), cm²	-	26.8	38.8	-	-	26.5	27.6	44.6	36.1	34.0	34.6	40.6	36.1	39.2
Stability (P), mm	-	80	88	-	-	78	79	85	79	86	78	86	79	83
Distensibility (L), mm	-	59	90	-	-	65	65	122	113	102	106	119	123	115
P/L	-	1.37	0.98	-	-	1.21	1.24	0.72	0.75	1.22	0.81	0.80	0.69	0.81
														
EXTENSOGRAM														
Strength, cm²	-	92	94	-	-	75	82	121	100	89	89	109	95	106
Max. height, BU	-	426	455	-	-	377	400	421	365	352	347	373	328	382
Extensibility, mm	-	157	150	-	-	142	148	209	197	180	178	206	200	198
														
MIXOGRAM														
Peak time, min	-	4.8	4.0	-	-	4.3	4.4	2.8	2.6	2.7	2.7	2.4	2.5	2.6
Water absorption (14% mb), %	-	59.7	59.3	-	-	59.2	59.4	62.2	61.1	60.2	60.2	61.9	62.3	61.4
														
MYCOTOXINS														
Aflatoxin B_1 (µg/kg)	0 [0]							0 [0]						
Aflatoxin B_2 (µg/kg)	0 [0]							0 [0]						
Aflatoxin G_1 (µg/kg)	0 [0]							0 [0]						
Aflatoxin G_2 (µg/kg)	0 [0]							0 [0]						
Fumonisin B_1 (µg/kg)	0 [0]							0 [0]						
Fumonisin B_2 (µg/kg)	0 [0]							0 [0]						
Fumonisin B_3 (µg/kg)	0 [0]							0 [0]						
Deoxynivalenol (µg/kg) [max. value]	0 [0]							<100 [570]						
15-ADON (µg/kg)	0 [0]							0 [0]						
Ochratoxin A (µg/kg)	0 [0]							0 [0]						
Zearalenone (µg/kg)	0 [0]							0 [0]						
HT-2 (µg/kg)	0 [0]							0 [0]						
T-2 Toxin (µg/kg)	0 [0]							0 [0]						
No. of samples	*3*							*40*						

2017/2018 IMPORTED WHEAT QUALITY - RUSSIAN FEDERATION (1 Oct 2017 to 30 Sep 2018)

2017/2018 Imported Wheat Quality Versus 2017/2018 RSA Wheat Quality

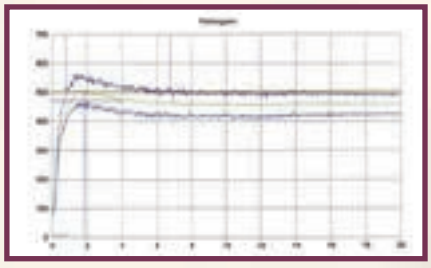
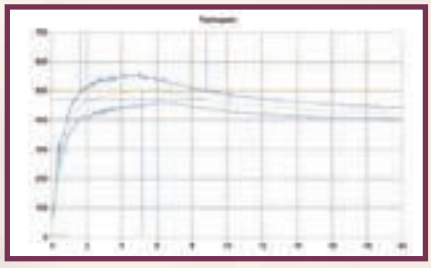
Country of origin	Russian Federation Average							RSA Crop Average						
Class and Grade bread wheat	**B1**	**B2**	**B3**	**B4**	**UT**	**COW**	**Average**	**B1**	**B2**	**B3**	**B4**	**UT**	**COW**	**Average**
No. of samples	*7*	*14*	*13*	*24*	*16*	*25*	*99*	*142*	*77*	*22*	*15*	*42*	*6*	*304*
WHEAT														
GRADING														
Protein (12% mb), %	12.3	11.3	10.8	11.0	11.6	11.4	11.3	13.1	12.0	11.0	11.9	13.0	13.3	12.6
Moisture, %	10.5	10.2	10.4	9.9	10.3	10.4	10.2	10.0	10.1	10.0	9.5	10.3	10.2	10.0
Falling number, sec	376	364	364	364	353	336	356	379	368	367	380	360	301	371
1000 Kernel mass (13% mb), g	44.7	41.1	40.8	40.7	38.6	41.0	40.8	36.9	39.4	40.9	37.0	36.4	34.2	37.7
Hlm (dirty), kg/hl	81.1	80.8	79.8	81.4	80.8	80.9	80.9	80.9	81.7	81.6	81.3	78.4	75.8	80.7
Screenings (<1.8 mm sieve), %	1.28	2.14	2.33	3.14	3.55	3.83	3.00	1.31	1.21	0.98	1.98	2.61	3.24	1.51
Gravel, stones, turf and glass, %	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.02	0.00	0.01	0.07	0.01
Foreign matter, %	0.11	0.22	0.12	0.16	0.44	0.24	0.22	0.11	0.13	0.10	0.10	0.29	0.39	0.14
Other grain & unthreshed ears, %	0.27	0.38	0.16	0.34	0.64	0.27	0.35	0.35	0.38	0.28	0.42	0.94	0.86	0.45
Heat damaged kernels, %	0.00	0.02	0.00	0.00	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.01	0.05	0.00
Immature kernels, %	0.07	0.02	0.01	0.02	0.02	0.03	0.03	0.05	0.04	0.02	0.01	0.11	0.30	0.06
Insect damaged kernels, %	0.06	0.07	0.16	0.16	0.21	0.18	0.15	0.59	0.54	0.60	0.55	1.20	3.44	0.72
Heavily frost damaged kernels, %	0.00	0.03	0.00	0.01	0.01	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sprouted kernels, %	0.00	0.05	0.01	0.02	0.04	0.03	0.03	0.02	0.02	0.02	0.00	0.05	1.93	0.06
Total damaged kernels, %	0.13	0.15	0.18	0.21	0.27	0.25	0.21	0.66	0.61	0.65	0.56	1.36	5.73	0.84
Combined deviations, %	1.78	2.89	2.79	3.84	4.97	4.58	3.79	2.43	2.32	2.01	3.06	5.20	10.22	2.94
Field fungi, %	0.30	0.15	0.27	0.21	0.29	0.33	0.26	0.10	0.08	0.07	0.11	0.13	1.23	0.12
Storage fungi, %	0.00	0.01	0.01	0.01	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.01	0.08	0.00
Ergot, %	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Poisonous seeds (*Crotalaria spp., etc.*)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Poisonous seeds (*Argemone mexicana, etc.*)	1	4	4	4	5	14	6	0	0	0	0	0	0	0
Live insects	No	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	No
	B1	**B2**	**B3**	**B4**	**UT**	**COW**	**Average**	**B1**	**B2**	**B3**	**B4**	**UT**	**COW**	**Average**
No. of samples	*7*	*14*	*13*	*24*	*16*	*25*	*99*	*142*	*77*	*22*	*15*	*42*	*6*	*304*
Bühler Extraction, %	72.4	71.2	71.7	71.8	71.7	71.8	71.7	73.2	73.6	73.6	72.8	71.6	71.2	73.1
FLOUR														
Colour, KJ	-3.3	-3.5	-3.1	-3.6	-3.6	-3.5	-3.5	-4.1	-4.2	-4.2	-4.3	-3.9	-3.5	-4.1
Colour, Konica Minolta CM5 (dry)														
L*	93.22	93.13	93.05	93.28	93.26	93.18	93.20	93.68	93.83	93.85	93.95	93.77	93.59	93.78
a*	0.55	0.49	0.39	0.50	0.51	0.49	0.49	0.44	0.44	0.45	0.38	0.41	0.31	0.43
b*	10.54	11.35	11.14	11.51	11.16	11.23	11.24	9.69	9.79	9.99	9.84	10.25	9.78	9.84
Ash (db), %	0.52	0.54	0.55	0.55	0.54	0.56	0.55	0.60	0.61	0.61	0.58	0.60	0.65	0.60
Protein (12% mb), %	11.0	10.0	9.6	9.8	10.4	10.2	10.1	12.0	11.1	10.2	10.0	11.7	11.9	11.3
Wet Gluten (14% mb), %	29.9	27.0	25.6	25.4	26.9	27.8	26.8	32.7	30.6	27.5	26.7	31.7	31.6	30.7
Dry Gluten (14% mb), %	10.4	9.4	8.6	8.7	9.2	9.0	9.1	11.1	10.3	9.2	9.0	10.8	10.9	10.4
Gluten Index	97	97	97	97	98	98	97	93	93	94	94	92	90	93
100g BAKING TEST														
Baking water absorption, %	60.9	59.9	59.4	59.7	60.2	60.1	59.9	62.2	61.1	60.2	60.2	61.9	62.3	61.4
Loaf volume, cm^3	995	908	905	908	952	950	931	1145	1104	1013	997	1109	1083	1096
Evaluation	0	1	0	0	0	0	0	0	0	0	0	0	0	0
FARINOGRAM														
Water absorption (14% mb), %	58.2	57.9	57.0	57.7	57.9	58.2	57.8	60.9	60.1	59.5	58.8	60.9	60.4	60.3
Development time, min	2.6	2.6	1.9	2.1	2.6	2.8	2.5	6.3	5.2	4.3	4.7	5.4	5.2	5.5
Stability, mm	14.0	10.1	7.2	9.0	10.6	9.9	9.8	9.0	7.1	7.2	7.8	8.8	7.2	8.0
Mixing tolerance index, BU	20	26	35	27	25	28	27	37	45	43	43	35	42	40
														

2017/2018 Imported Wheat Quality Versus 2017/2018 RSA Wheat Quality

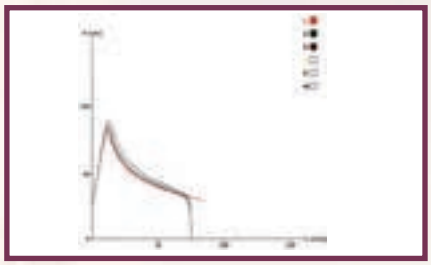
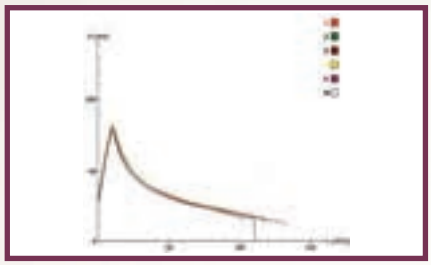
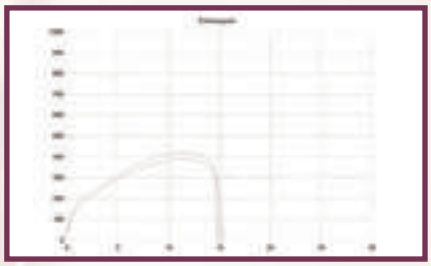
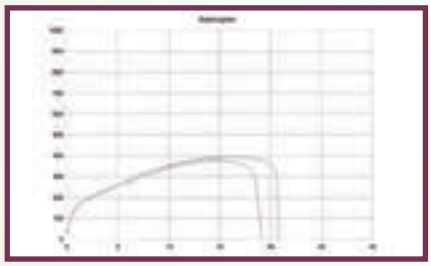
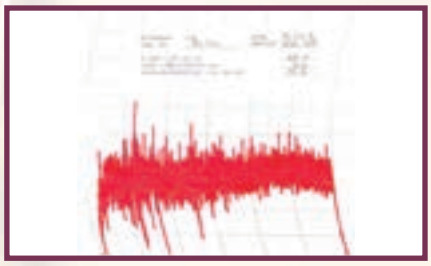
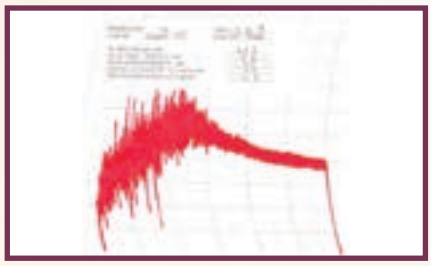
Country of origin	Russian Federation Average							RSA Crop Average						
Class and Grade bread wheat	B1	B2	B3	B4	UT	COW	Average	B1	B2	B3	B4	UT	COW	Average
No. of samples	*7*	*14*	*13*	*24*	*16*	*25*	*99*	*25*	*19*	*9*	*7*	*8*	*2*	*70*
ALVEOGRAM														
Strength (S), cm²	40.5	33.2	30.3	33.3	37.2	32.2	33.8	44.6	36.1	34.0	34.6	40.6	36.1	39.2
Stability (P), mm	100	101	92	99	97	101	99	85	79	86	78	86	79	83
Distensibility (L), mm	77	61	61	64	75	60	65	122	113	102	106	119	123	115
P/L	1.34	1.91	1.61	1.83	1.49	2.06	1.78	0.72	0.75	1.22	0.81	0.80	0.69	0.81
														
EXTENSOGRAM														
Strength, cm²	92	85	75	84	97	84	86	121	100	89	89	109	95	106
Max. height, BU	425	424	371	417	445	395	412	421	365	352	347	373	328	382
Extensibility, mm	157	147	145	148	164	157	153	209	197	180	178	206	200	198
														
MIXOGRAM														
Peak time, min	3.9	4.3	4.1	4.1	4.2	4.1	4.1	2.8	2.6	2.7	2.7	2.4	2.5	2.6
Water absorption (14% mb), %	60.9	59.9	59.4	59.7	60.2	60.0	59.9	62.2	61.1	60.2	60.2	61.9	62.3	61.4
														
MYCOTOXINS														
Aflatoxin B_1 (µg/kg)	0 [0]							0 [0]						
Aflatoxin B_2 (µg/kg)	0 [0]							0 [0]						
Aflatoxin G_1 (µg/kg)	0 [0]							0 [0]						
Aflatoxin G_2 (µg/kg)	0 [0]							0 [0]						
Fumonisin B_1 (µg/kg)	0 [0]							0 [0]						
Fumonisin B_2 (µg/kg)	0 [0]							0 [0]						
Fumonisin B_3 (µg/kg)	0 [0]							0 [0]						
Deoxynivalenol (µg/kg) [max. value]	<100 [378]							<100 [570]						
15-ADON (µg/kg)	0 [0]							0 [0]						
Ochratoxin A (µg/kg)	0 [0]							0 [0]						
Zearalenone (µg/kg) [max. value]	0 [0]							0 [0]						
HT-2 (µg/kg)	0 [0]							0 [0]						
T-2 Toxin (µg/kg)	0 [0]							0 [0]						
No. of samples	*37*							*40*						

2017/2018 IMPORTED WHEAT QUALITY - UKRAINE (1 Oct 2017 to 30 Sep 2018)

2017/2018 Imported Wheat Quality Versus 2017/2018 RSA Wheat Quality

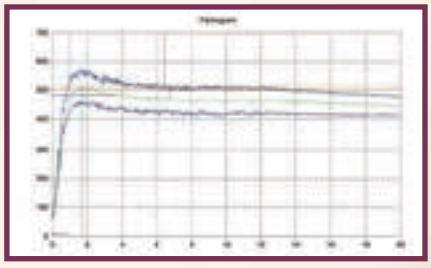
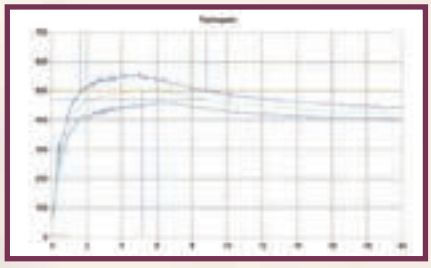
Country of origin	Ukraine Average							RSA Crop Average						
Class and Grade bread wheat	**B1**	**B2**	**B3**	**B4**	**UT**	**COW**	**Average**	**B1**	**B2**	**B3**	**B4**	**UT**	**COW**	**Average**
No. of samples	-	*6*	*1*	-	-	*3*	*10*	*142*	*77*	*22*	*15*	*42*	*6*	*304*
WHEAT														
GRADING														
Protein (12% mb), %	-	11.6	10.9	-	-	11.6	11.5	13.1	12.0	11.0	11.9	13.0	13.3	12.6
Moisture, %	-	10.5	10.6	-	-	10.9	10.6	10.0	10.1	10.0	9.5	10.3	10.2	10.0
Falling number, sec	-	289	295	-	-	286	289	379	368	367	380	360	301	371
1000 Kernel mass (13% mb), g	-	42.9	40.4	-	-	39.9	41.7	36.9	39.4	40.9	37.0	36.4	34.2	37.7
Hlm (dirty), kg/hl	-	80.7	82.8	-	-	80.7	80.9	80.9	81.7	81.6	81.3	78.4	75.8	80.7
Screenings (<1.8 mm sieve), %	-	1.47	1.05	-	-	1.52	1.44	1.31	1.21	0.98	1.98	2.61	3.24	1.51
Gravel, stones, turf and glass, %	-	0.00	0.00	-	-	0.00	0.00	0.01	0.01	0.02	0.00	0.01	0.07	0.01
Foreign matter, %	-	0.10	0.04	-	-	0.08	0.09	0.11	0.13	0.10	0.10	0.29	0.39	0.14
Other grain & unthreshed ears, %	-	0.57	0.44	-	-	0.34	0.49	0.35	0.38	0.28	0.42	0.94	0.86	0.45
Heat damaged kernels, %	-	0.01	0.00	-	-	0.00	0.01	0.00	0.00	0.00	0.00	0.01	0.05	0.00
Immature kernels, %	-	0.01	0.00	-	-	0.00	0.01	0.05	0.04	0.02	0.01	0.11	0.30	0.06
Insect damaged kernels, %	-	0.08	0.08	-	-	0.18	0.11	0.59	0.54	0.60	0.55	1.20	3.44	0.72
Heavily frost damaged kernels, %	-	0.00	0.00	-	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sprouted kernels, %	-	0.03	0.08	-	-	0.13	0.06	0.02	0.02	0.02	0.00	0.05	1.93	0.06
Total damaged kernels, %	-	0.14	0.16	-	-	0.31	0.19	0.66	0.61	0.65	0.56	1.36	5.73	0.84
Combined deviations, %	-	2.27	1.69	-	-	2.25	2.21	2.43	2.32	2.01	3.06	5.20	10.22	2.94
Field fungi, %	-	0.22	0.00	-	-	0.05	0.15	0.10	0.08	0.07	0.11	0.13	1.23	0.12
Storage fungi, %	-	0.03	0.00	-	-	0.00	0.02	0.00	0.00	0.00	0.00	0.01	0.08	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.*)	-	1	6	-	-	10	4	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
	B1	**B2**	**B3**	**B4**	**UT**	**COW**	**Average**	**B1**	**B2**	**B3**	**B4**	**UT**	**COW**	**Average**
No. of samples	-	*6*	*1*	-	-	*3*	*10*	*142*	*77*	*22*	*15*	*42*	*6*	*304*
Bühler Extraction, %	-	71.8	70.5	-	-	71.3	71.5	73.2	73.6	73.6	72.8	71.6	71.2	73.1
FLOUR														
Colour, KJ	-	-3.2	-3.8	-	-	-3.5	-3.4	-4.1	-4.2	-4.2	-4.3	-3.9	-3.5	-4.1
Colour, Konica Minolta CM5 (dry)														
L*	-	93.29	93.75	-	-	93.56	93.42	93.68	93.83	93.85	93.95	93.77	93.59	93.78
a*	-	0.51	0.42	-	-	0.42	0.47	0.44	0.44	0.45	0.38	0.41	0.31	0.43
b*	-	10.13	10.86	-	-	10.69	10.37	9.69	9.79	9.99	9.84	10.25	9.78	9.84
Ash (db), %	-	0.53	0.47	-	-	0.47	0.50	0.60	0.61	0.61	0.58	0.60	0.65	0.60
Protein (12% mb), %	-	10.2	9.7	-	-	10.3	10.2	12.0	11.1	10.2	10.0	11.7	11.9	11.3
Wet Gluten (14% mb), %	-	26.6	22.3	-	-	25.6	25.9	32.7	30.6	27.5	26.7	31.7	31.6	30.7
Dry Gluten (14% mb), %	-	9.2	8.1	-	-	9.1	9.0	11.1	10.3	9.2	9.0	10.8	10.9	10.4
Gluten Index	-	99	100	-	-	100	99	93	93	94	94	92	90	93
100g BAKING TEST														
Baking water absorption, %	-	60.0	59.5	-	-	60.1	60.0	62.2	61.1	60.2	60.2	61.9	62.3	61.4
Loaf volume, cm^3	-	944	916	-	-	1056	975	1145	1104	1013	997	1109	1083	1096
Evaluation	-	0	0	-	-	0	0	0	0	0	0	0	0	0
FARINOGRAM														
Water absorption (14% mb), %	-	56.9	55.8	-	-	55.2	56.3	60.9	60.1	59.5	58.8	60.9	60.4	60.3
Development time, min	-	1.9	1.9	-	-	2.1	2.0	6.3	5.2	4.3	4.7	5.4	5.2	5.5
Stability, mm	-	6.9	6.0	-	-	15.6	9.4	9.0	7.1	7.2	7.8	8.8	7.2	8.0
Mixing tolerance index, BU	-	47	41	-	-	26	40	37	45	43	43	35	42	40
														

2017/2018 Imported Wheat Quality Versus 2017/2018 RSA Wheat Quality

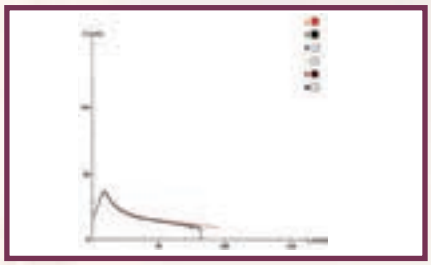
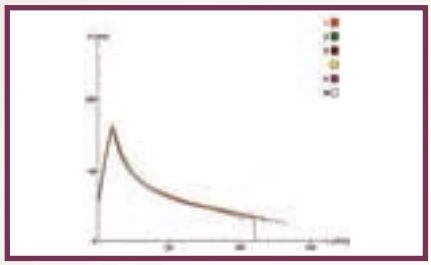
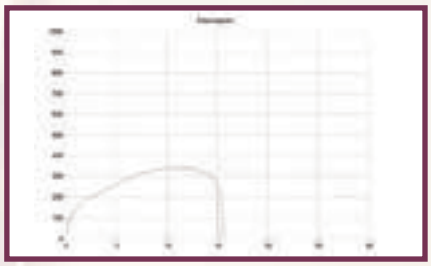
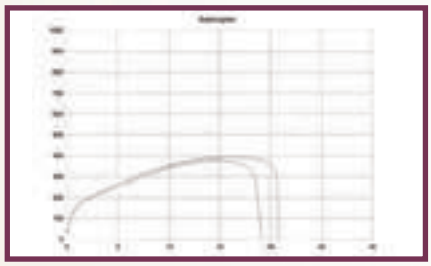
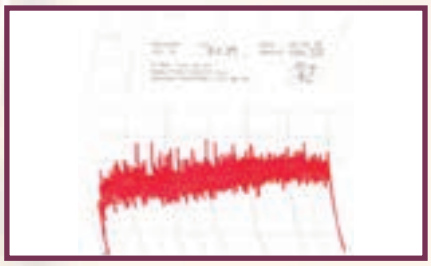
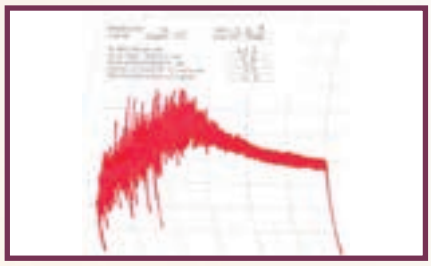
Country of origin	Ukraine Average							RSA Crop Average						
Class and Grade bread wheat	B1	B2	B3	B4	UT	COW	Average	B1	B2	B3	B4	UT	COW	Average
No. of samples	-	*6*	*1*	-	-	*3*	*10*	*25*	*19*	*9*	*7*	*8*	*2*	*70*
ALVEOGRAM														
Strength (S), cm²	-	37.5	30.3	-	-	36.1	36.4	44.6	36.1	34.0	34.6	40.6	36.1	39.2
Stability (P), mm	-	97	100	-	-	81	92	85	79	86	78	86	79	83
Distensibility (L), mm	-	72	48	-	-	86	74	122	113	102	106	119	123	115
P/L	-	1.39	2.08	-	-	1.04	1.35	0.72	0.75	1.22	0.81	0.80	0.69	0.81
														
EXTENSOGRAM														
Strength, cm²	-	88	98	-	-	90	90	121	100	89	89	109	95	106
Max. height, BU	-	417	449	-	-	381	409	421	365	352	347	373	328	382
Extensibility, mm	-	155	164	-	-	171	161	209	197	180	178	206	200	198
														
MIXOGRAM														
Peak time, min	-	4.4	5.2	-	-	4.7	4.6	2.8	2.6	2.7	2.7	2.4	2.5	2.6
Water absorption (14% mb), %	-	60.0	59.5	-	-	60.1	60.0	62.2	61.1	60.2	60.2	61.9	62.3	61.4
														
MYCOTOXINS														
Aflatoxin B_1 (µg/kg)	0 [0]							0 [0]						
Aflatoxin B_2 (µg/kg)	0 [0]							0 [0]						
Aflatoxin G_1 (µg/kg)	0 [0]							0 [0]						
Aflatoxin G_2 (µg/kg)	0 [0]							0 [0]						
Fumonisin B_1 (µg/kg)	0 [0]							0 [0]						
Fumonisin B_2 (µg/kg)	0 [0]							0 [0]						
Fumonisin B_3 (µg/kg)	0 [0]							0 [0]						
Deoxynivalenol (µg/kg) [max. value]	<100 [128]							<100 [570]						
15-ADON (µg/kg)	0 [0]							0 [0]						
Ochratoxin A (µg/kg)	0 [0]							0 [0]						
Zearalenone (µg/kg) [max. value]	0 [0]							0 [0]						
HT-2 (µg/kg)	0 [0]							0 [0]						
T-2 Toxin (µg/kg)	0 [0]							0 [0]						
No. of samples	*3*							*40*						

2017/2018 IMPORTED WHEAT QUALITY - USA (1 Oct 2017 to 30 Sep 2018)

2017/2018 Imported Wheat Quality Versus 2017/2018 RSA Wheat Quality

Country of origin	USA Average							RSA Crop Average						
Class and Grade bread wheat	**B1**	**B2**	**B3**	**B4**	**UT**	**COW**	**Average**	**B1**	**B2**	**B3**	**B4**	**UT**	**COW**	**Average**
No. of samples	-	*3*	-	*9*	-	*6*	*18*	*142*	*77*	*22*	*15*	*42*	*6*	*304*
WHEAT														
GRADING														
Protein (12% mb), %	-	11.1	-	9.4	-	10.5	10.1	13.1	12.0	11.0	11.9	13.0	13.3	12.6
Moisture, %	-	10.4	-	9.4	-	10.2	9.8	10.0	10.1	10.0	9.5	10.3	10.2	10.0
Falling number, sec	-	439	-	305	-	379	352	379	368	367	380	360	301	371
1000 Kernel mass (13% mb), g	-	31.6	-	33.5	-	33.0	33.0	36.9	39.4	40.9	37.0	36.4	34.2	37.7
Hlm (dirty), kg/hl	-	80.1	-	76.4	-	78.2	77.6	80.9	81.7	81.6	81.3	78.4	75.8	80.7
Screenings (<1.8 mm sieve), %	-	2.63	-	2.57	-	2.18	2.45	1.31	1.21	0.98	1.98	2.61	3.24	1.51
Gravel, stones, turf and glass, %	-	0.00	-	0.00	-	0.00	0.00	0.01	0.01	0.02	0.00	0.01	0.07	0.01
Foreign matter, %	-	0.11	-	0.18	-	0.06	0.13	0.11	0.13	0.10	0.10	0.29	0.39	0.14
Other grain & unthreshed ears, %	-	0.16	-	0.44	-	0.26	0.33	0.35	0.38	0.28	0.42	0.94	0.86	0.45
Heat damaged kernels, %	-	0.19	-	0.00	-	0.00	0.03	0.00	0.00	0.00	0.00	0.01	0.05	0.00
Immature kernels, %	-	0.00	-	0.00	-	0.00	0.00	0.05	0.04	0.02	0.01	0.11	0.30	0.06
Insect damaged kernels, %	-	0.06	-	0.37	-	0.09	0.22	0.59	0.54	0.60	0.55	1.20	3.44	0.72
Heavily frost damaged kernels, %	-	0.00	-	0.00	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sprouted kernels, %	-	0.00	-	0.26	-	0.28	0.22	0.02	0.02	0.02	0.00	0.05	1.93	0.06
Total damaged kernels, %	-	0.25	-	0.63	-	0.37	0.48	0.66	0.61	0.65	0.56	1.36	5.73	0.84
Combined deviations, %	-	3.14	-	3.82	-	2.87	3.39	2.43	2.32	2.01	3.06	5.20	10.22	2.94
Field fungi, %	-	0.38	-	0.28	-	0.29	0.30	0.10	0.08	0.07	0.11	0.13	1.23	0.12
Storage fungi, %	-	0.00	-	0.07	-	0.03	0.04	0.00	0.00	0.00	0.00	0.01	0.08	0.00
Ergot, %	-	0.01	-	0.00	-	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	0	0
Poisonous seeds (*Argemone mexicana, etc.*)	-	6	-	0	-	6	3	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
	B1	**B2**	**B3**	**B4**	**UT**	**COW**	**Average**	**B1**	**B2**	**B3**	**B4**	**UT**	**COW**	**Average**
No. of samples	-	*3*	-	*9*	-	*6*	*18*	*142*	*77*	*22*	*15*	*42*	*6*	*304*
Bühler Extraction, %	-	70.1	-	69.4	-	70.8	70.0	73.2	73.6	73.6	72.8	71.6	71.2	73.1
FLOUR														
Colour, KJ	-	-3.3	-	-3.5	-	-3.3	-3.4	-4.1	-4.2	-4.2	-4.3	-3.9	-3.5	-4.1
Colour, Konica Minolta CM5 (dry)														
L*	-	93.44	-	94.77	-	93.81	94.23	93.68	93.83	93.85	93.95	93.77	93.59	93.78
a*	-	0.45	-	0.19	-	0.33	0.28	0.44	0.44	0.45	0.38	0.41	0.31	0.43
b*	-	10.87	-	8.53	-	10.13	9.45	9.69	9.79	9.99	9.84	10.25	9.78	9.84
Ash (db), %	-	0.55	-	0.49	-	0.51	0.51	0.60	0.61	0.61	0.58	0.60	0.65	0.60
Protein (12% mb), %	-	9.7	-	7.6	-	8.9	8.4	12.0	11.1	10.2	10.0	11.7	11.9	11.3
Wet Gluten (14% mb), %	-	24.4	-	18.9	-	21.8	21.0	32.7	30.6	27.5	26.7	31.7	31.6	30.7
Dry Gluten (14% mb), %	-	8.3	-	6.2	-	7.4	7.0	11.1	10.3	9.2	9.0	10.8	10.9	10.4
Gluten Index	-	99	-	96	-	97	97	93	93	94	94	92	90	93
100g BAKING TEST														
Baking water absorption, %	-	59.5	-	57.2	-	58.5	58.0	62.2	61.1	60.2	60.2	61.9	62.3	61.4
Loaf volume, cm^3	-	906	-	833	-	904	869	1145	1104	1013	997	1109	1083	1096
Evaluation	-	0	-	0	-	0	0	0	0	0	0	0	0	0
FARINOGRAM														
Water absorption (14% mb), %	-	55.2	-	49.3	-	53.3	51.6	60.9	60.1	59.5	58.8	60.9	60.4	60.3
Development time, min	-	2.0	-	1.2	-	1.8	1.5	6.3	5.2	4.3	4.7	5.4	5.2	5.5
Stability, mm	-	9.8	-	1.9	-	6.4	4.7	9.0	7.1	7.2	7.8	8.8	7.2	8.0
Mixing tolerance index, BU	-	38	-	80	-	57	65	37	45	43	43	35	42	40
														

2017/2018 Imported Wheat Quality Versus 2017/2018 RSA Wheat Quality

Country of origin	USA Average							RSA Crop Average						
Class and Grade bread wheat	B1	B2	B3	B4	UT	COW	Average	B1	B2	B3	B4	UT	COW	Average
No. of samples	-	*3*	-	*9*	-	*6*	*18*	*25*	*19*	*9*	*7*	*8*	*2*	*70*
ALVEOGRAM														
Strength (S), cm²	-	32.0	-	14.2	-	23.7	20.3	44.6	36.1	34.0	34.6	40.6	36.1	39.2
Stability (P), mm	-	84	-	37	-	67	55	85	79	86	78	86	79	83
Distensibility (L), mm	-	71	-	87	-	74	80	122	113	102	106	119	123	115
P/L	-	1.29	-	0.43	-	1.08	0.79	0.72	0.75	1.22	0.81	0.80	0.69	0.81
														
EXTENSOGRAM														
Strength, cm²	-	99	-	56	-	76	71	121	100	89	89	109	95	106
Max. height, BU	-	422	-	311	-	365	352	421	365	352	347	373	328	382
Extensibility, mm	-	156	-	125	-	149	140	209	197	180	178	206	200	198
														
MIXOGRAM														
Peak time, min	-	4.8	-	5.3	-	4.9	5.1	2.8	2.6	2.7	2.7	2.4	2.5	2.6
Water absorption (14% mb), %	-	59.5	-	58.1	-	58.8	58.6	62.2	61.1	60.2	60.2	61.9	62.3	61.4
														
MYCOTOXINS														
Aflatoxin B_1 (µg/kg)	0 [0]							0 [0]						
Aflatoxin B_2 (µg/kg)	0 [0]							0 [0]						
Aflatoxin G_1 (µg/kg)	0 [0]							0 [0]						
Aflatoxin G_2 (µg/kg)	0 [0]							0 [0]						
Fumonisin B_1 (µg/kg)	0 [0]							0 [0]						
Fumonisin B_2 (µg/kg)	0 [0]							0 [0]						
Fumonisin B_3 (µg/kg)	0 [0]							0 [0]						
Deoxynivalenol (µg/kg) [max. value]	244 [999]							<100 [570]						
15-ADON (µg/kg)	0 [0]							0 [0]						
Ochratoxin A (µg/kg)	0 [0]							0 [0]						
Zearalenone (µg/kg) [max. value]	0 [0]							0 [0]						
HT-2 (µg/kg)	0 [0]							0 [0]						
T-2 Toxin (µg/kg)	0 [0]							0 [0]						
No. of samples	*6*							*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 Testing laboratory provided that all SANAS 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 17025:2005

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

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

Mr R Josias
Chief Executive Officer
Effective Date: 01 November 2014
Certificate Expires: 31 October 2019

ANNEXURE A

SCHEDULE OF ACCREDITATION

Facility Number: T0116

Permanent Address of Laboratory:

South 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 M Hammes (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)
Ms I Terblanche (Rheological Methods)
Ms H Meyer (All Chemical, Nutrients and Contaminants & Grading Methods)
Ms J Kruger (All Chemical Methods)
Ms P Modiba (All Chemical Methods)
Ms M Motlanthe (In-house Methods 001, 003 & 026)
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Ms M Ramare (All Chemical Methods Excl. In-House Method 012 and SOP MC23)
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Ms PM Modiba

Issue No.: 28
Date of Issue: 20 December 2018
Expiry Date: 31 October 2019

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	Moisture (Oven Method)	AACCI 44-15.02, Latest Edition (1 hour; 130°C)

are sugar coated)		(72 hour; 103°C)
Maize Grits	Moisture (Oven Method)	Analytical EBC Method 6.2.2, latest edition (4 hours, 130°C)
Animal feed, Plant tissue and Sunflower (Milled)	Moisture (Oven Method)	AgriLASA 2.1, Latest Edition (5 hours, 105°C)
All flours, cereal grains, oilseeds and animal feeds	Nitrogen and protein (Combustion method - Dumas)	AACCI 46-30.01, Latest Edition
Cereal based food stuff	Dietary fibres (Total)	In-house method 012
Food stuff and feeds	Carbohydrates (by difference) (calculation) Energy value (calculation) Total digestible nutritional value (calculation)	SOP MC 23
Food Stuff and feeds	Determination of Ash	In-house method 011
Wheat Kernels	Moisture (Oven Method)	Government Gazette Wheat Regulation, Latest Edition (72 hour, 103°C)
Flours of grains e.g. barley, oats, triticale, maize, rye, sorghum and wheat; oilseeds like soybeans and sunflower, feeds and mixed feeds and foodstuffs	Crude fat (Ether extraction by Soxhlet)	In-house method 024
Meal and flour of wheat, rye, barley, other grains, starch containing and malted products	Falling number	ICC Std 107/1, Latest Edition
NUTRIENTS AND CONTAMINANTS		
Vitamin fortified food and feed products and fortification mixes grain based	Vitamin A as all trans Retinol (Saponification) (HPLC)	In-house method 001
	Thiamine Mononitrate (HPLC) Riboflavin (HPLC) Nicotinamide (HPLC) Pyridoxine Hydrochloride (HPLC)	In-house method 002
	Folic Acid (HPLC)	In-house method 003
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_2, B_1, G_1, B_2 and total -Deoxynivalenol (DON), 15-ADON -Fumonisin B_1, B_2, B_3 -Ochratoxin A -T2, HT-2 - Zearalenone	In-house method 026
GRADING		
Maize	Defective kernels (White maize/ yellow maize)	Government Gazette Maize Regulation, Latest Edition
Cereal as grains (Wheat, barley, rye and oats)	Hectolitre mass (Kern222)	ISO 7971-3, Latest edition
Wheat	Screenings	Government Gazette Wheat Grading Regulation, Latest Edition
RHEOLOGICAL		
Wheat flour	Alveograph (Rheological properties)	ICC Std.121, Latest Edition
Flours	Farinograph (Rheological properties)	AACCI 54.02, Latest Edition (Rheological behaviour of flour Farinograph: Constant Flour Weight procedure)
Hard, soft and durum wheat (flour and whole wheat flour)	Mixograph (Rheological properties)	Industry accepted method 020 (Based on AACCI 54-40.02, Latest Edition Mixograph Method)

Original Date of Accreditation: 01 November 1999

ISSUED BY THE SOUTH AFRICAN NATIONAL ACCREDITATION SYSTEM

Accreditation Manager

DEPARTMENT OF AGRICULTURE, FORESTRY AND FISHERIES

NO. R. 64 29 JANUARY 2016

AGRICULTURAL PRODUCT STANDARDS ACT, 1990
(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 No. R1186 of December 2010.

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% 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 12,7 mm 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 infected 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 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 stones, 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 Grade 1, Grade 2, Grade 3, Grade 4 or Utility Grade 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) Grade 1.

(b) Grade 2.

(c) Grade 3.

(d) Grade 4; and

(e) Utility grade.

(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) 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 2 of the said table opposite the deviation concerned;

(b) 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 3 of the said table opposite the deviation concerned;

(c) 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 4 of the said table opposite the deviation concerned;

(d) Grade 4 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; and

(e) Utility 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 6 of the said table opposite the deviation concerned.

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

(a) Grade 1 - 77 kg.

(b) Grade 2 - 76 kg.

(c) Grade 3 - 74 kg.

(d) Grade 4 - 72 kg; and

(e) Utility Grade - 70 kg.

(3) (a) Grade 1, Grade 2 and Grade 3 shall have a minimum falling number value of not less than 250 seconds.

(b) Grade 4 shall have a minimum falling number value of not less than 200 seconds.

(c) Utility Grade shall have a minimum falling number value of not less than 150 seconds.

(d) 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 Grade 1, Grade 2 and Grade 3, as the case may be.

(4) The minimum protein content (on a 12 percent moisture basis) for the different grades shall be as follows:

(a) Grade 1 - 12 percent.

(b) Grade 2 - 11 percent.

(c) Grade 3 - 10 percent.

(d) Grade 4 - 9 percent; and

(e) Utility Grade - 8 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) 1 in the case of Grade 1;

(ii) 2 in the case of Grade 2;

(iii) 3 in the case of Grade 3;

(iv) 4 in the case of Grade 4; and

(v) UT in the case of Utility Grade.

PART III

SAMPLING

Taking of sample

9. (1) A 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 to be 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, un threshed 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 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 of not exceeding R50 000 or to imprisonment for a period not exceeding two years, or to both that fine or imprisonment.

ANNEXURE

TABLE 1

STANDARDS FOR GRADES OF BREAD WHEAT

Nature of deviation	Maximum percentage permissible deviation (m/m)				
	Grade 1	Grade 2	Grade 3	Grade 4	Utility Grade
1	3	4	5	6	7
(a) Heavily frost-damaged kernel	5	5	5	5	10
(b) Field fungi infected kernels	2	2	2	2	2
(c) Storage fungi infected kernels	0,5	0,5	0,5	0,5	0,5
(d) Screenings	3	3	3	4	10
(e) Other grain and unthreshed ears	1	1	1	1	4
(f) Gravel, stones and turf.	0,5	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	3
(h) Heat-damaged kernels	0,5	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	5
(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	10

DEPARTMENT OF AGRICULTURE, FORESTRY AND FISHERIES

NO. 1218 **07 OCTOBER 2016**

AGRICULTURAL PRODUCT STANDARDS ACT, 1990

(ACT No. 119 OF 1990)

AMENDMENT: REGULATIONS REGARDING THE GRADING, PACKING AND MARKING OF BREAD WHEAT INTENDED FOR SALE IN THE REPUBLIC OF SOUTH AFRICA

The Minister of Agriculture, Forestry and Fisheries, under section 15 of the Agricultural Product Standards Act, 1990 (Act No. 119 of 1990)–

(a) made the regulations in the Schedule; and

(b) determined that the said regulations shall come into operation on the date of publication thereof.

SCHEDULE

In this Schedule "the Regulations" means the regulations published by Government Gazette No. 39627, Notice No R.64 of 29 January 2016.

1. **Amendment of regulation 4 of the Regulations**

Regulation 4 of the Regulations is hereby amended by the substitution for paragraph (g) of subregulation (1) of the following paragraph:

"(g) ... be free from glass, metal, coal or dung"