South African

WHEAT CROP QUALITY REPORT

2014/2015 SEASON

INDEX

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SOUTH AFRICAN
COMMERCIAL WHEAT QUALITY FOR THE 2014/2015 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.*
- *Milling companies for providing samples of wheat delivered directly to the mills.*

Summary

The commercial wheat crop of the 2014/2015 season was set at 1.750 million tons which is 120 000 tons lower than the previous season's crop. A total area of 476 570 hectares was utilized for wheat production and the average yield was 3.67 tons per hectare (Figures obtained from the Crop Estimates Committee).

The whole wheat protein average was 11.8% compared to the 11.6% of the previous season and the ten year average of 11.7%. The percentage of samples having protein contents higher than 12.0% increased from 39.5% to 45.5%. The average hectolitre mass was 80.2 kg/hl, higher than the 79.5 kg/hl of the 2013/2014 season. The hectoliter mass of only 7.7% of the samples was below the minimum Grade 1 requirement of 77 kg/hl.

The average falling number this season was 368 seconds. Four of the samples analysed gave falling number values below 250 seconds and of these only one was below 220 seconds. One of these samples was from the Free State, two from Mpumalanga and the remaining sample from Limpopo province. Sprouted kernel levels in these samples varied between 0 and 1.72% and no frost damage was observed, which may indicate the presence of late maturity alpha amylase in at least one of the samples.

The average mixogram peak time of 3.0 minutes was equal to the previous season and compared well with the ten year average of 2.9 minutes.

The overall flour and dough quality were good and compared well with the previous three seasons. The water absorption according to the Farinograph was lower and the distensibility of the dough as measured with the Alveograph increased on average compared to previous seasons.

Introduction

This report provides the results of the seventeenth 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 one national and sixteen international proficiency testing schemes 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.

A sub-sample of each of these grading samples was collected in a bin according to grade and class per silo bin at each silo. This composite bin sample was then divided and a 3 kg sample was sent to SAGL for the annual wheat crop quality survey. SAGL analysed 337 samples to provide as best possible a proportional representation of the production of wheat in all of the different production regions.

Cultivar identification was done on these samples and sales figures of seed sold by the commercial grain silo owners were obtained. The samples were graded and the thousand kernel mass determined. Sub-samples were milled on the Quadromat mill for a mixograph analysis.

Composite samples were made up per class and grade for each production region and milled on a Bühler MLU 202 laboratory mill. Moisture, protein, ash and colour were determined and a RVA analysis conducted. Rheological tests, namely gluten, mixogram, farinogram, alveogram, extensogram and 100-gram baking tests, were then performed.

The results (as averages per region) are made available weekly on the SAGL website (www.sagl.co.za) as soon as the first samples are received. The 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 Crop Estimates Committee (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. SAGIS (South African Grain Information Service) supply and demand information over several seasons is presented in table and graph format. The national bread wheat grading regulations as published in the Government Gazette of 17 December 2010 are provided as the last section of the report.

Data on wheat imported for domestic use during the 2013/2014 (previous) season is also included in the report and compared to the quality of the local crop.

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.

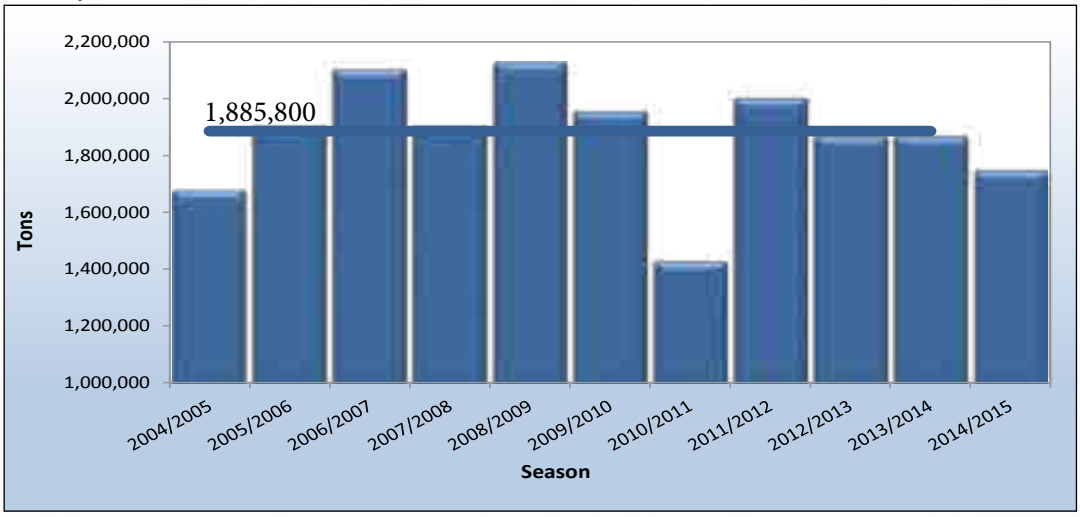
Production

Wheat contributes approximately 80% to the total winter cereal crop production in South Africa. Other winter crops produced are barley for malting purposes and canola.

South Africa (made up of nine provinces) is divided into 36 crop production regions with wheat planted in about 28 of these regions. Please see Figure 1 (RSA Provincial map) and Figure 2 (RSA Crop Production Regional map) on pages 22 and 23.

The national Crop Estimates Committee's (CEC) estimated total production figures was revised, using as basis for the calculations, the South African Grain Information Services' (SAGIS) published figures of actual deliveries. Figures to determine on-farm usage and retentions obtained from a wheat utilization survey conducted by the Department of Agriculture, Forestry and Fisheries (DAFF), were added to the SAGIS delivery figures to calculate the final crop production figures.

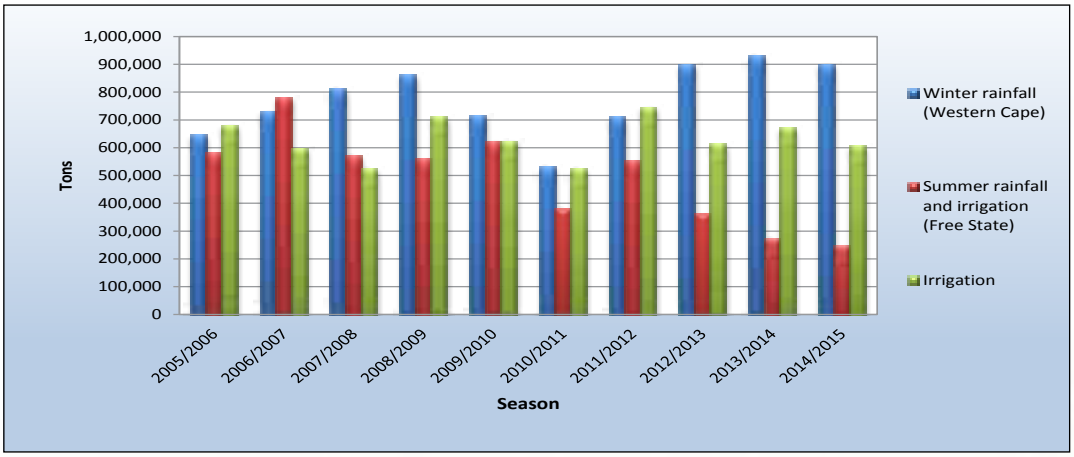
Graph 1: Wheat production in the RSA from the 2004/2005 to 2014/2015 seasons



Figures obtained from the CEC.

The final figure of 1 750 000 tons is 7% lower than the 10 year production average of 1 885 800 tons (2004/2005 to 2013/2014 seasons). The Western Cape produced 899 000 tons of wheat this season, contributing 51% of the total crop. The Free State's production was 24 500 tons lower than the previous season at 245 500 tons. The Northern Cape's irrigation areas, although still the second largest producer of wheat with 285 000 tons, produced 35 000 tons less than the previous season. The remainder of the wheat were produced in mainly Limpopo (137 500 tons) and North West (107 100 tons).

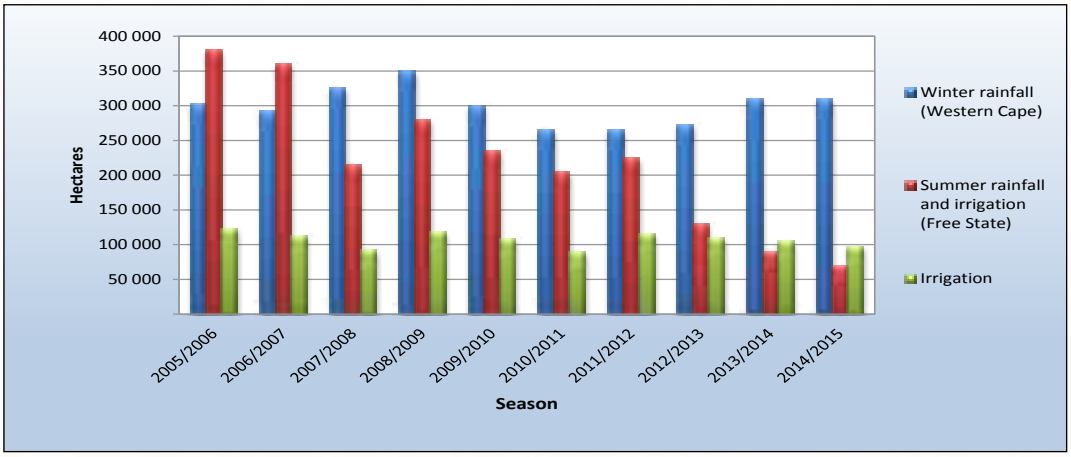
Graph 2: Wheat production figures per production area over seasons



Figures obtained from the CEC.

The area utilized for wheat production continued its declining trend, decreasing by almost 43% from the 2004/2005 season and by 6% compared to the 2013/2014 season. Decreased plantings by dry land wheat producers in the summer rainfall area (Free State province), mainly due to a shift from wheat to summer crops like maize and soybeans, are the largest contributing factor to this observed decline.

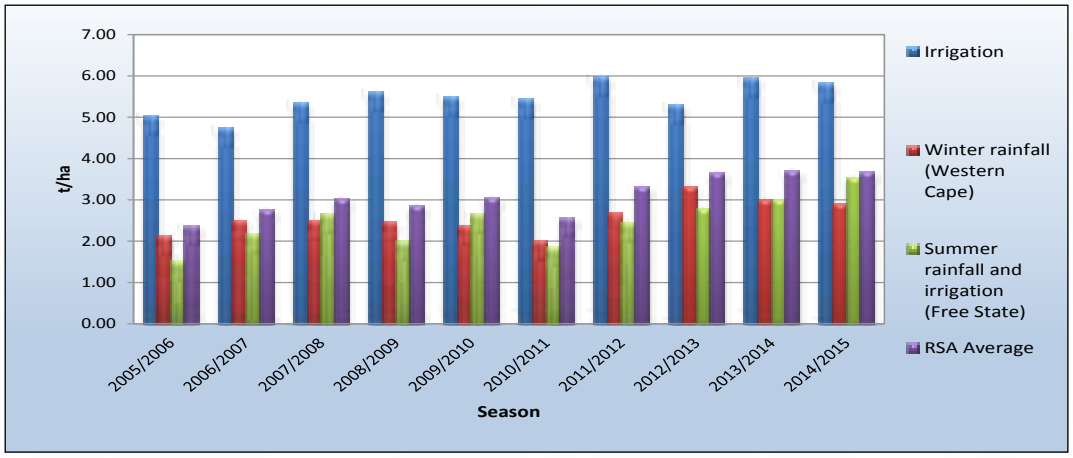
Graph 3: Area planted per production area over seasons



Figures obtained from the CEC.

The yield in the main production areas ranged from 2.90 tons per hectare (t/ha) in the winter rainfall area (Western Cape) to 7.50 t/ha for irrigation wheat produced in the Northern Cape. The national yield average varied only 0.04 t/ha over the last three seasons.

Graph 4: Average yield per production area over seasons



Figures obtained from the CEC.

Please see Table 1 for an overview of the dry land versus irrigation wheat production in the 2014/2015 season, compared to the 2013/2014 season.

Table1: Wheat production overview over two seasons

Province	Type of production	2013/2014			2014/2015		
		Hectares planted, ha	Crop, tons	Yield, t/ha	Hectares planted, ha	Crop, tons	Yield, t/ha
Western Cape	Dryland	306 000	898 000	2.93	305 800	856 000	2.80
	Irrigation	4 000	30 000	7.50	4 200	27 500	6.55
	Total	310 000	928 000	2.99	310 000	883 500	2.85
Northern Cape	Dryland	1 000	2 900	2.90	450	700	1.56
	Irrigation	41 000	317 100	7.73	37 550	284 300	7.57
	Total	42 000	320 000	7.62	38 000	285 000	7.50
Free State	Dryland	57 000	74 000	1.30	35 100	55 000	1.57
	Irrigation	33 000	196 000	5.94	34 400	213 000	6.19
	Total	90 000	270 000	3.00	69 500	268 000	3.86
Eastern Cape	Dryland	1 500	2 600	1.73	1 000	1 250	1.25
	Irrigation	3 000	17 200	5.73	2 000	10 750	5.38
	Total	4 500	19 800	4.40	3 000	12 000	4.00
KwaZulu-Natal	Dryland	-	-	-	-	-	-
	Irrigation	7 000	42 000	6.00	6 500	39 000	6.00
	Total	7 000	42 000	6.00	6 500	39 000	6.00
Mpumalanga	Dryland	-	-	-	200	690	3.45
	Irrigation	4 500	28 000	6.22	3 300	20 660	6.26
	Total	4 500	28 000	6.22	3 500	21 350	6.10
Limpopo	Dryland	1 500	750	0.50	1 500	1 200	0.80
	Irrigation	26 500	145 250	5.48	26 000	129 450	4.98
	Total	28 000	146 000	5.21	27 500	130 650	4.75
Gauteng	Dryland	150	255	1.70	80	200	2.50
	Irrigation	850	5 945	6.99	490	3 200	6.53
	Total	1 000	6 200	6.20	570	3 400	5.96
North West	Dryland	200	340	1.70	2 000	5 600	2.80
	Irrigation	18 300	109 660	5.99	16 000	101 500	6.34
	Total	18 500	110 000	5.95	18 000	107 100	5.95
RSA	Dryland	367 350	978 845	2.66	346 130	920 640	2.66
	Irrigation	138 150	891 155	6.45	130 440	829 360	6.36
	Total	505 500	1 870 000	3.70	476 570	1 750 000	3.67

Figures obtained from the CEC.

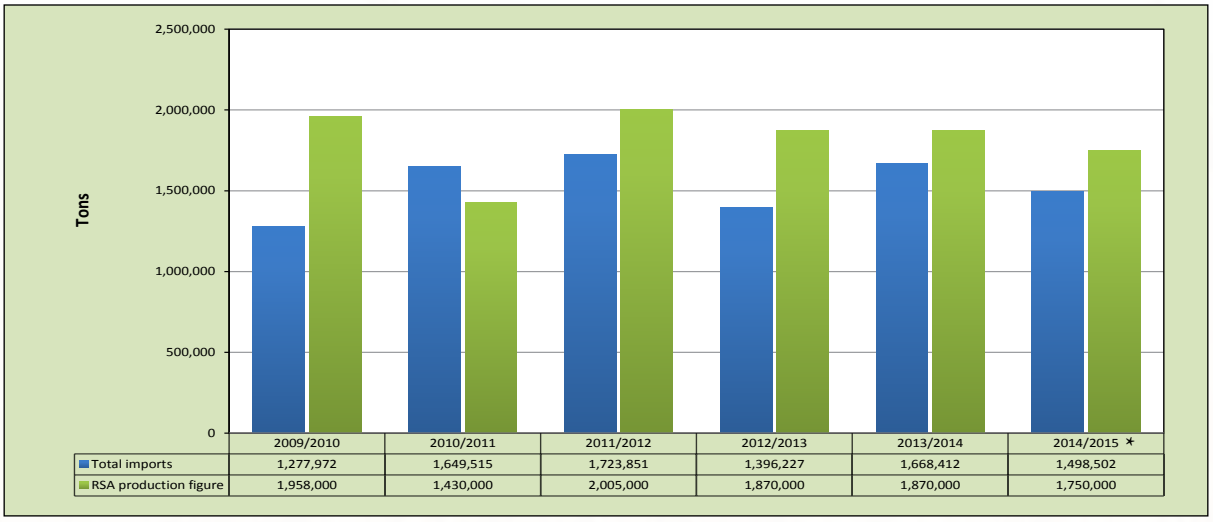
Supply and Demand

According to the BFAP Baseline, Agricultural Outlook 2014 – 2023, wheat producers in especially the western part of the winter rainfall area, are projected to over the longer term progressively incorporate other crops like canola in what is considered to be a more sustainable crop rotation system. By the end of the baseline period, winter rainfall area wheat plantings, are projected to consolidate just below 250 000 hectares. Wheat planted under dryland conditions in the summer rainfall area has been declining as mentioned previously and is expected to continue to decline. Irrigation wheat is set to remain relatively stable with most of the hectares being planted in a double cropping system.

Due to the projected decline in local wheat plantings in the long term, South Africa will remain a net importer of wheat and will increasingly rely on imports to supply in the growing local demand. During the 2013/2014 season 1 668 412 tons of wheat were imported from mainly the Russian Federation (800 964 tons). Please see pages 74 to 87 for the quality of the wheat imported during 2013/2014. During the same period 255 136 tons of wheat from South Africa were exported to countries like Botswana, Lesotho and Zimbabwe.

The amount of wheat imported for local consumption so far during the 2014/2015 marketing season, is 1 498 502 tons according to SAGIS. This figure includes imports up until 17 July 2015. The marketing season commences on 1 October every year.

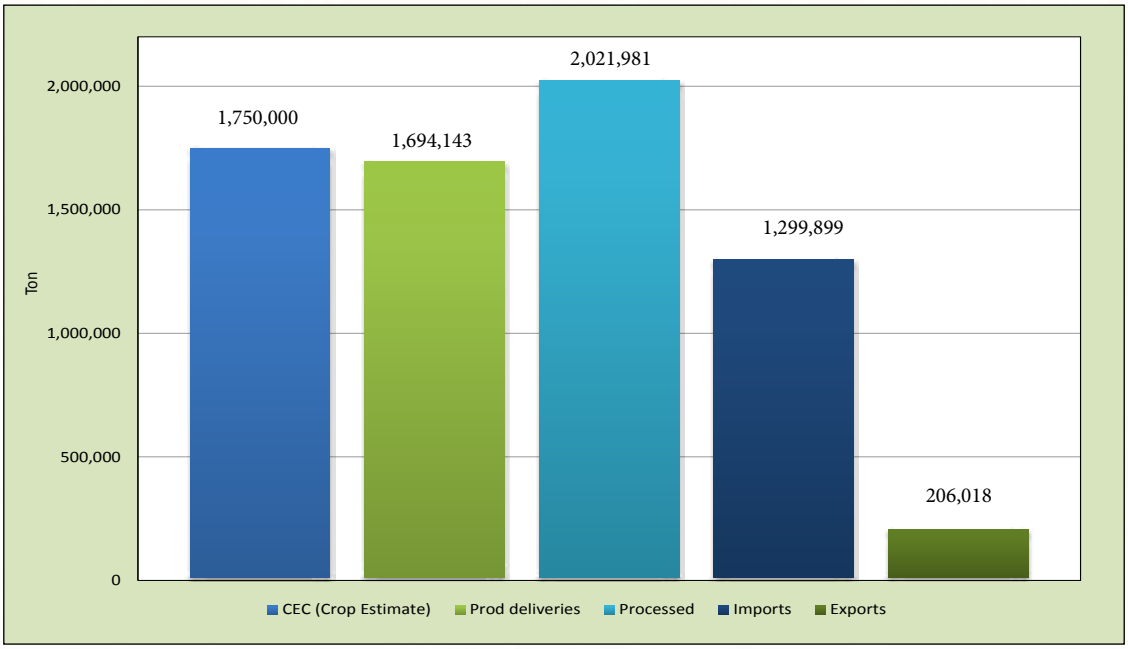
Graph 5: RSA production figure versus the total import figure over six seasons



	2009/2010	2010/2011	2011/2012	2012/2013	2013/2014	2014/2015 *
Total imports	1,277,972	1,649,515	1,723,851	1,396,227	1,668,412	1,498,502
RSA production figure	1,958,000	1,430,000	2,005,000	1,870,000	1,870,000	1,750,000

*2014/2015 season figure includes imports up to 17 July 2015.

Graph 6: Wheat supply and demand overview 2014/2015 season (Oct - May)

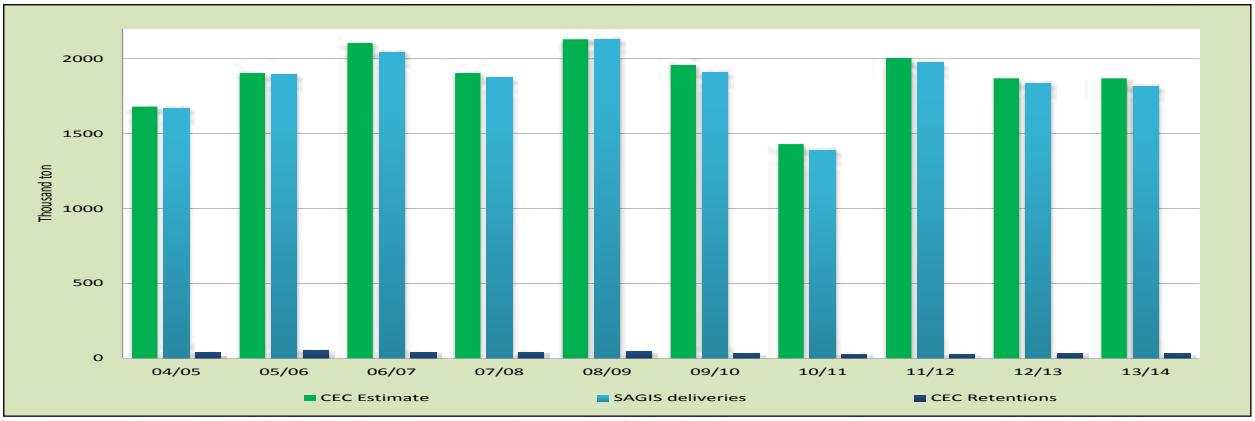


Figures provided by SAGIS, (Publication date: 2015-06-26)

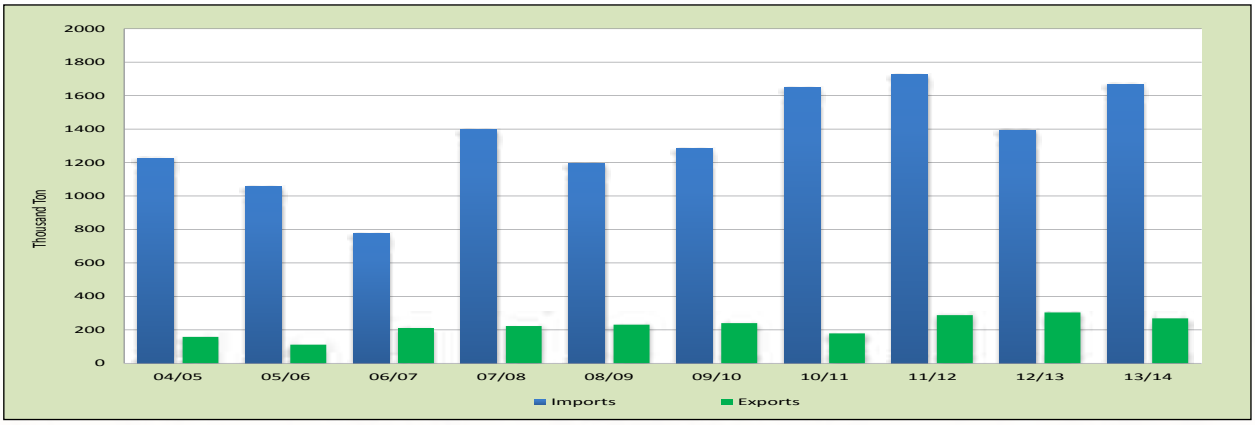
SAGIS South African Grain Information Services NPC
Suid-Afrikaanse Graaninligtingsdiens NWM
Reg no. 1997/019186/08

WHEAT: SUPPLY AND DEMAND TABLE BASED ON SAGIS' INFO														Publication date: 2015-06-26					
	Season (Oct - Sep)																	Current Season Oct - May	10 YEAR AVER-AGE 2004/5-2013/14
	97/98	98/99	99/00	00/01	01/02	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	
																		8	
CEC	2,284,000	1,531,000	1,725,000	2,349,000	2,493,000	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	1,885,800
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		36,050
SUPPLY																			
Opening stock (1 Oct)	578,000	1,241,000	771,000	507,000	551,000	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	553,043
Prod deliveries	2,449,000	1,644,000	1,725,000	2,353,000	2,415,000	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	1,694,143	1,854,012
Imports	469,000	484,000	624,000	308,000	407,000	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	1,299,899	1,336,663
Surplus	0	0	0	0	0	0	6,000	6,000	9,000	32,000	0	13,000	0	23,000	14,000	0	0	10,810	9,700
Total supply	3,496,000	3,369,000	3,120,000	3,168,000	3,373,000	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	3,493,378	3,753,418
DEMAND																			
Processed	2,181,000	2,400,000	2,371,000	2,427,000	2,541,000	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	3,175,086	2,021,981	2,943,092
-human	2,138,000	2,348,000	2,345,000	2,424,000	2,519,000	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	2,019,993	2,915,751
-animal	43,000	52,000	24,000	2,000	22,000	2,000	1,000	2,000	12,000	2,000	1,000	8,000	26,000	1,000	136,000	31,694	53,695	1,988	27,339
-gristing	0	0	2,000	1,000	0	0	0	0	0	0	0	0	0	0	0	14	5	0	2
-bio-fuel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Withdrawn by producers	0	0	43,000	33,000	31,000	24,000	13,000	7,000	10,000	7,000	12,000	12,000	14,000	6,000	4,000	3,934	3,127	1,333	7,906
Released to end-consumers	2,000	5,000	12,000	4,000	7,000	5,000	2,000	2,000	4,000	4,000	2,000	5,000	3,000	6,000	7,000	7,322	3,095	2,335	4,342
Seed for planting purposes	0	16,000	26,000	24,000	27,000	20,000	21,000	18,000	26,000	17,000	22,000	26,000	17,000	13,000	18,000	15,998	18,198	23,256	19,120
Net receipts(-)/disp(+)	-7,000	76,000	37,000	9,000	15,000	11,000	12,000	6,000	5,000	1,000	26,000	19,000	15,000	13,000	19,000	19,990	16,172	14,113	14,016
Deficit	0	60,000	52,000	17,000	23,000	1,000	0	0	0	0	9,000	0	4,000	0	0	713	1,243	0	1,496
Exports	79,000	75,000	72,000	103,000	149,000	179,000	158,000	158,000	111,000	211,000	223,000	231,000	240,000	179,000	288,000	304,236	268,451	206,018	221,369
Total Demand	2,255,000	2,632,000	2,613,000	2,617,000	2,793,000	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	2,269,036	3,211,340
STOCK POSITION																			
Ending Stock (30 Sep)	1,241,000	737,000	507,000	551,000	580,000	897,000	598,000	574,000	582,000	376,000	509,000	694,000	579,000	478,000	651,000	489,253	488,526	1,224,342	542,078
- processed p/month	181,800	200,000	197,600	202,300	211,800	214,800	221,100	228,000	232,800	235,000	237,100	238,100	251,400	245,400	266,800	253,341	264,653	252,748	245,259
- months' stock	6.8	3.7	2.6	2.7	2.7	4.2	2.7	2.5	2.5	1.6	2.1	2.9	2.3	1.9	2.4	1.9	1.8	4.8	2.2
Note: ***Figures for current season up to date																			

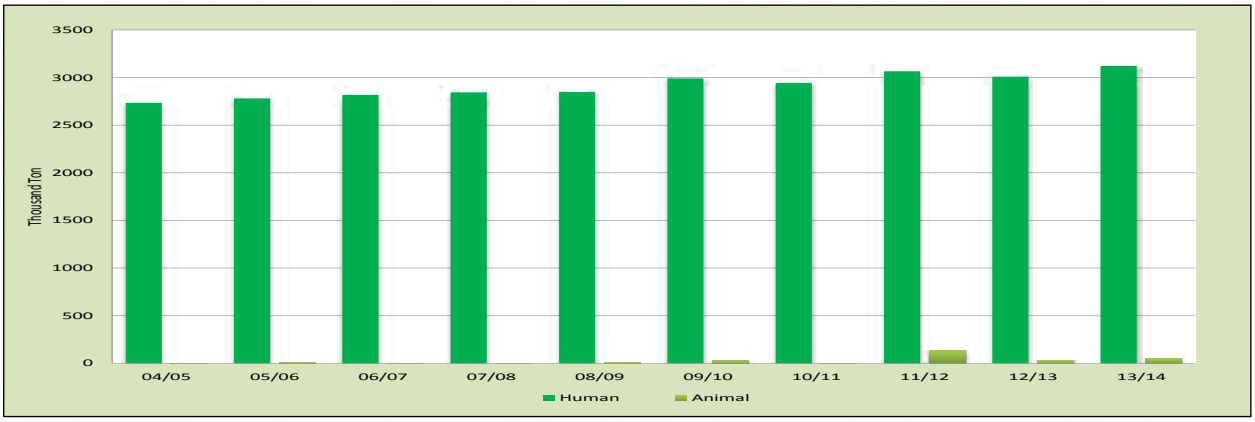
Graph 7: Wheat: CEC Estimate, Retentions and SAGIS deliveries over 10 seasons



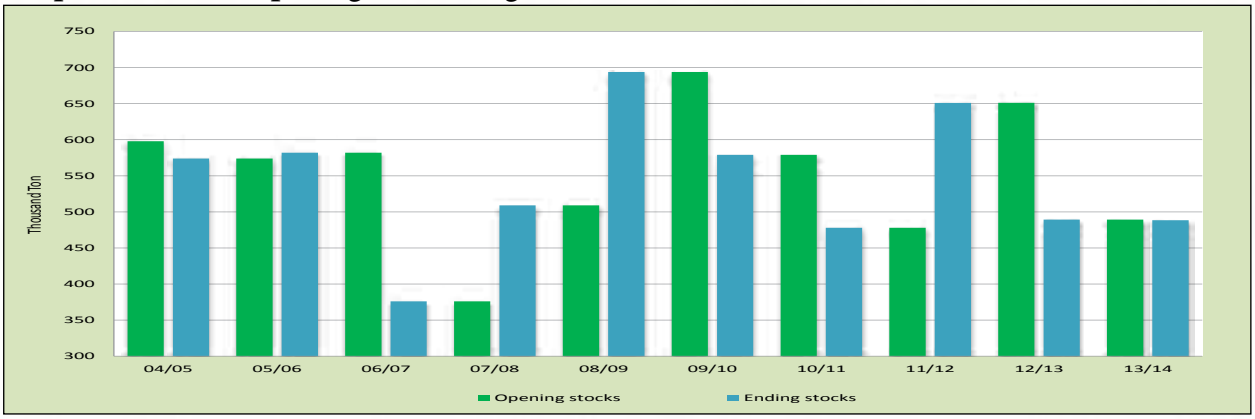
Graph 8: Wheat: Imports and exports over 10 seasons



Graph 9: Wheat: RSA consumption over 10 seasons



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



Figures provided by SAGIS.

Assuring the quality of South African wheat

South Africa has three major wheat-breeding programs. New or introduction cultivars can only be released for planting if it has 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.

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 of wheat with the suitable quality characteristics is a long-term project, classification norms and quality standards are provided to breeders in an attempt to provide them with 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.

The effect of the climate, rainfall, environmental interaction, cultivation practices and other factors on 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. Grading standards are also set high to ensure adequate quality control.

Wheat grades

The 337 representative crop samples were graded as follows: 31% was graded B1, 18% was graded B2, 13% was graded B3, 5% was graded B4, 26% UT (Utility Grade) and 7% COW (Class Other Wheat). The majority of the samples (69%) downgraded to Utility Grade was as a result of the percentage of either other grain and unthreshed ears or insect damaged kernels or a combination of both exceeding the maximum allowable level for grades B1 to B4. The percentage total damaged kernels and/or combined deviations (19% of UT samples) were also contributing factors. Most of these downgraded samples originated from the Western Cape. Of the samples downgraded to Class Other Wheat, 68% was due to the presence of live insects and 24% as a result of the percentage field fungi infected kernels exceeding the maximum allowable level of 2%.

Grade B1 wheat in the Free State province amounted to 48% (38% in the previous season). In the Irrigation areas 46% (39% in the previous season) of the wheat graded as B1 and in the Western Cape Province 8% graded as B1 (12% in the previous 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 and unthreshed ears	Gravel, stones, turf and glass	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	25 g sifted	500 g unsifted	50 g sifted	100 g sifted	100 g sifted	100 g sifted	25 g sifted	-

Government Notice No. R. 1186 of 17 December 2010

WHEAT SEED SOLD BY COMMERCIAL GRAIN SILO OWNERS TO WHEAT PRODUCERS FOR THE 2014 PLANTING SEASON

Cultivar	%	Cultivar	%
SST 087	23.09	SST 347	0.299
SST 056	21.30	Ratel	0.256
SST 015	9.42	PAN 3400	0.251
SST 884	8.70	SST 867	0.212
SST 027	8.49	SST 876	0.178
SST 88	8.39	Elands	0.164
SST 875	3.61	SST 316	0.095
SST 843	3.34	PAN 3379	0.089
SST 835	3.25	PAN 3120	0.053
SST 806	2.01	SST 317	0.051
Duzi	1.89	SST 387	0.039
SST 895	1.41	Kariega	0.037
SST 822	0.63	SST 047	0.035
PAN 3471	0.55	SST 0127	0.026
PAN 3408	0.51	PAN 3161	0.022
SST 866	0.42	SST 374	0.015
SST 356	0.413	Komati	0.014
SST 877	0.405	Tankwa	0.006
Matlabas	0.324	PAN 3368	0.005
			100

Note: These figures are not absolute, but the best and only figures available.

Cultivars

In the Western Cape, SST 015 (31.4%) and SST 88 (28.7%) dominated the market, SST 056 (12.4%) and SST 027 (12.0%) were also popular cultivars.

Farmers in the Vaal and Orange River areas preferred SST 835 (26.7%) and PAN 3471 (23.9%). SST 843 (16.4%) and SST 875 (13.7%) were popular cultivars also.

The most preferred cultivar in the North West was SST 843 (29.9%) followed by SST 835 (27.3%), Duzi (18.8%) and SST 884 (11.3%).

In regions 21 to 24 of the Free State SST 387 (20.3%) was the prevalent cultivar, followed by PAN 3120 (14.1%), SST 835 (11.1%) and SST 843 (11.0%). Elands was the most planted cultivar in regions 25 to 28 with 17.3%. SST 835, PAN 3161 and SST 356 were also popular cultivars with 16.3%, 15.5% and 10.7% respectively.

In Mpumalanga, Gauteng, Limpopo and KwaZulu-Natal, SST 843 (29.3%) and SST 835 (26.8%) were the dominant cultivars, followed by SST 884 (15.8%).

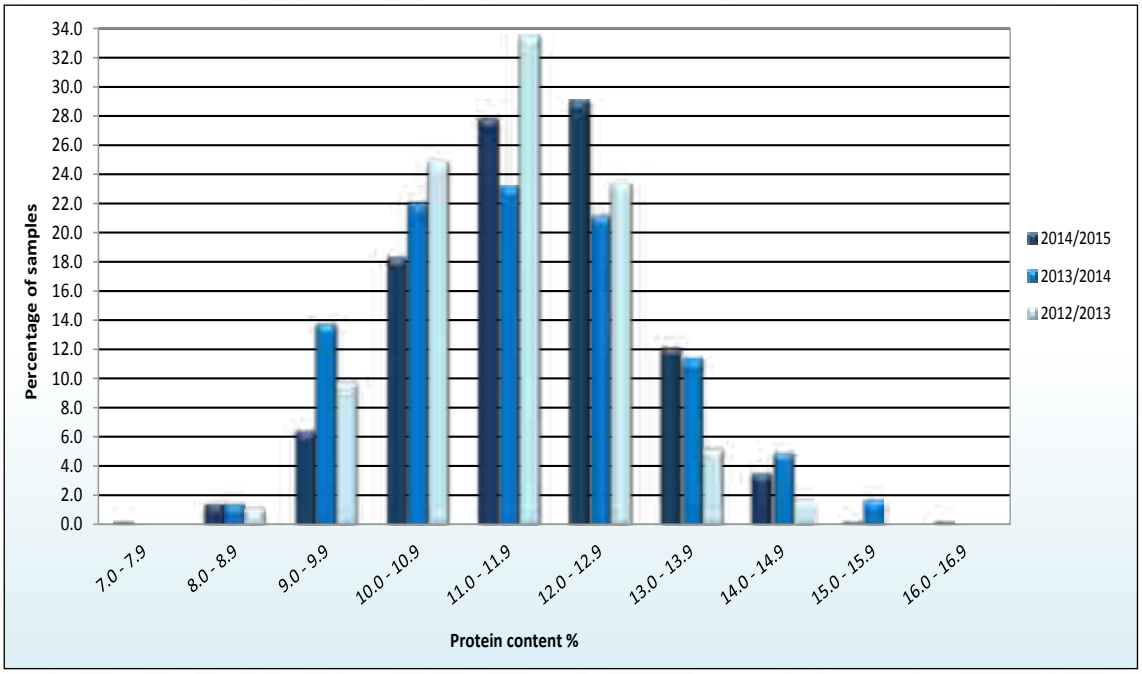
The above mentioned percentages, are weighted averages based on the top 5 cultivars per region provided on pages 28 to 54. The top 5 cultivars per region were calculated from the cultivar identification done on each of the 337 crop samples.

Crop quality of the 2014/2015 season

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

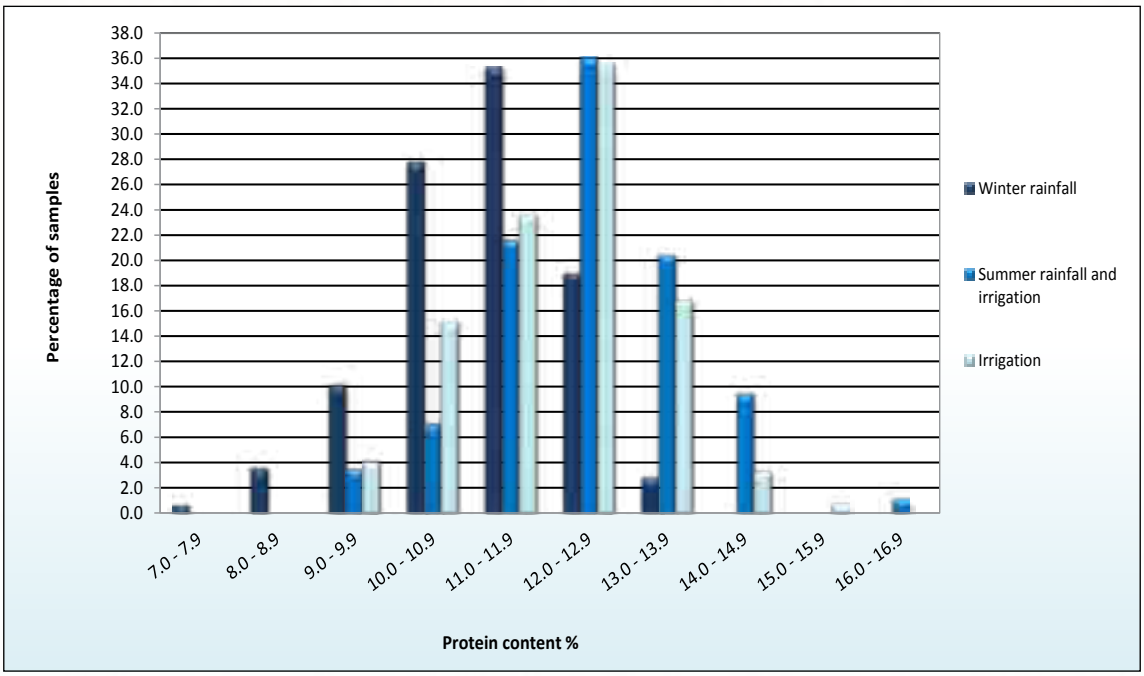
The national whole wheat protein average has varied with less than half a percent over the last three seasons, from 11.4% in the 2012/2013 season to 11.8% in the 2014/2015 season. The percentages of samples having protein contents in the intervals 11.0 - 11.9% and 12.0 - 12.9% increased with almost 5 and 8% respectively compared to the previous season.

Graph 11: Protein content distribution over the last three seasons



Although the Winter rainfall areas again reported the lowest average whole wheat protein namely 11.1%, this value is 0.3% and 0.4% respectively higher than the previous two seasons. The production regions in the Free State province, reported the highest average protein content (12.4%) followed by the 12.1% of the Irrigation areas.

Graph 12: Protein content distribution between the three production areas



The protein content is reported on a 14% moisture basis. The flour protein content is on average 0.5 to 1.2% lower than that of whole wheat. The protein loss can be attributed to the removal of the bran and aleuron layer as well as the germ during milling.

The average hectolitre increased by 0.7 kg/hl to 80.2 kg/hl compared to the previous season and was just below the six year weighted average of 80.3 kg/hl. Of the 26 samples that reported values below the minimum level for grade B1 wheat, 10 originated in the Western Cape (Winter rainfall area), 15 in the Free State and only one in Mpumalanga. The regional averages ranged from 79.2 kg/hl in the Free State regions to 81.2 in the Irrigation areas.

The thousand kernel mass, reported on a 13% moisture basis, decreased from 39.3 g in the 2013/2014 season to 38.8 g this season. The weighted average screenings (1.8 mm sieve) of 1.55% compared well with the previous two seasons.

The weighted average falling number was 368 seconds. Samples from the Free State's production regions gave the lowest average falling number of 352 seconds and those of the Western Cape the highest, namely 379 seconds. All Falling number values reported are corrected for the altitude at which the test were performed. Compared to the 29 samples in the previous season, only four samples reported falling numbers below 250 seconds this season.

The weighted mixogram peak time on flour from the Quadromat mill averaged 3.0 minutes, equal to the previous season and comparing very well with the ten year average (2.9 minutes). The weighted mixogram peak time of the flour from the Bühler mill was 2.7 minutes, similar to the 2.8 minutes mixing time last season.

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. 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 73.4%, slightly higher than the previous two seasons.

The average Kent Jones colour this season was -3.3 KJ units, lower than the previous two seasons. As from the 2012/2013 survey, a dry colour determination by means of a Konica Minolta CM-5 spectrophotometer is also included. Please see the comparison of the CIE L*a*b* values obtained below. The average and range (in brackets) are provided:
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.

This is the first survey that the ash content is determined on the composite samples. The average ash content was determined to be 0.59 % on a dry basis (moisture free basis). Flour milled on the laboratory mill has a lower ash content on average than industrial type mills. According to the Wheat product regulations (Government Notice No. R. 186 of 22 February 2008), cake flour's ash content should not exceed 0.60% and white bread flour's should be between 0.60 to 1.00%.

This is the second survey that include Rapid Visco Analyser (RVA) analyses on the composite samples. The average peak viscosity of the samples analysed was 2246 cP (centipoise), the minimum viscosity 1719 cP and the final viscosity 2550 cP. Last season the values were 2170 cP, 1750 cP and 2432 cP respectively. The analysis conditions were kept constant during all of the analyses.

The wet gluten (14% mb) averaged 28.9% and the dry gluten also on a 14% moisture basis, 9.8%. These values are slightly lower than the previous season, but still indicative of a good quality gluten for pan bread baking

if the flour protein content of 10.7% is considered. The average gluten index value was 88, ranging between 78 and 97. 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 bread baking purposes. The average gluten index value last season was 86.

The farinogram had an average water absorption of 59.5% (60.1% the previous season) and an average development time of 5.3 minutes (5.2 minutes the previous season). The stability value of 8.3 minutes compared well with the 8.0 minutes reported previously. There was also no significant difference between the mixing tolerance indexes of these two season, namely 35 and 38 respectively.

The average alveogram strength was 38.1 cm^2 and the average P/L value 0.59 (37.6 cm^2 and 0.74 the previous season). The distensibility of the dough reported on the Alveograph was higher for the 2014/2015 season. A combination of this and also a slightly lower stability value resulted in the observed decrease in P/L value.

The average extensogram strength was 98 cm^2 (92 cm^2 previous season). The maximum height in Brabender Units did not increase significantly compared to the previous season (360 BU in 2014/2015 and 341 BU in 2013/2014). The extensibility values were equal, 196 mm now and 194 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.

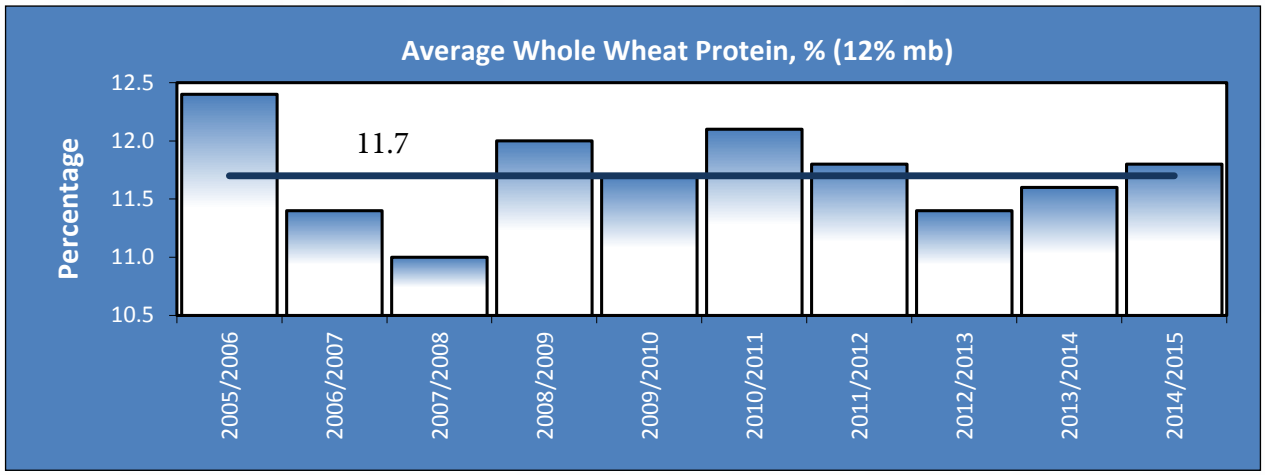
Forty samples, randomly selected to represent different regions as well as classes and grades, were tested by means of a SANAS ISO/IEC 17025 accredited multi-mycotoxin screening method using UPLC-MS/MS. With this technique simultaneous quantification and confirmation of Aflatoxin G_1; B_1; G_2; B_2,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

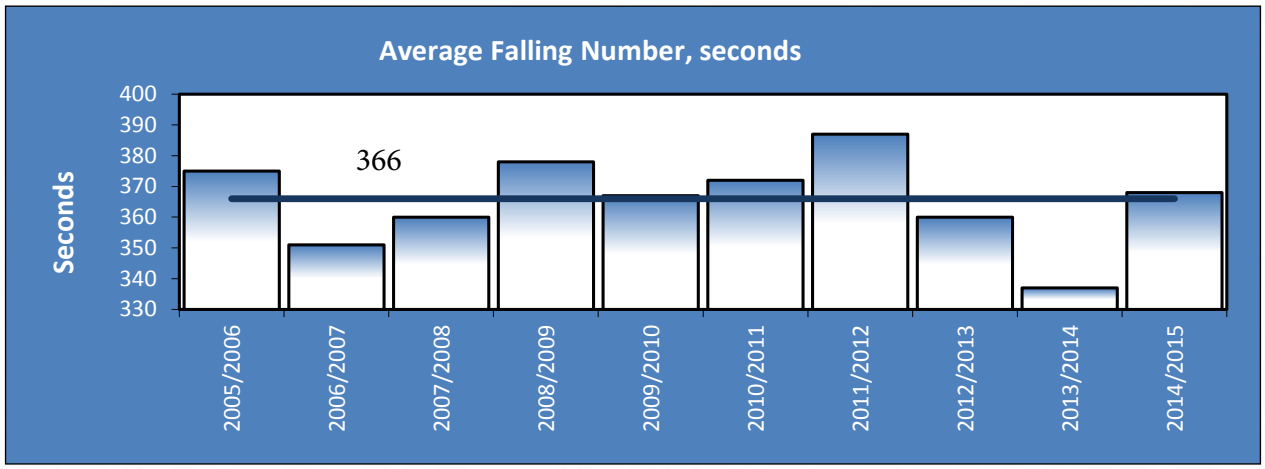
Five samples tested positive for deoxynivalenol (DON) residues. The average value of the 5 positive results were 229 µg/kg (ppb) and the highest value obtained 361 µg/kg, which is still well below international maximum residue levels. Please see page 58 - 59.

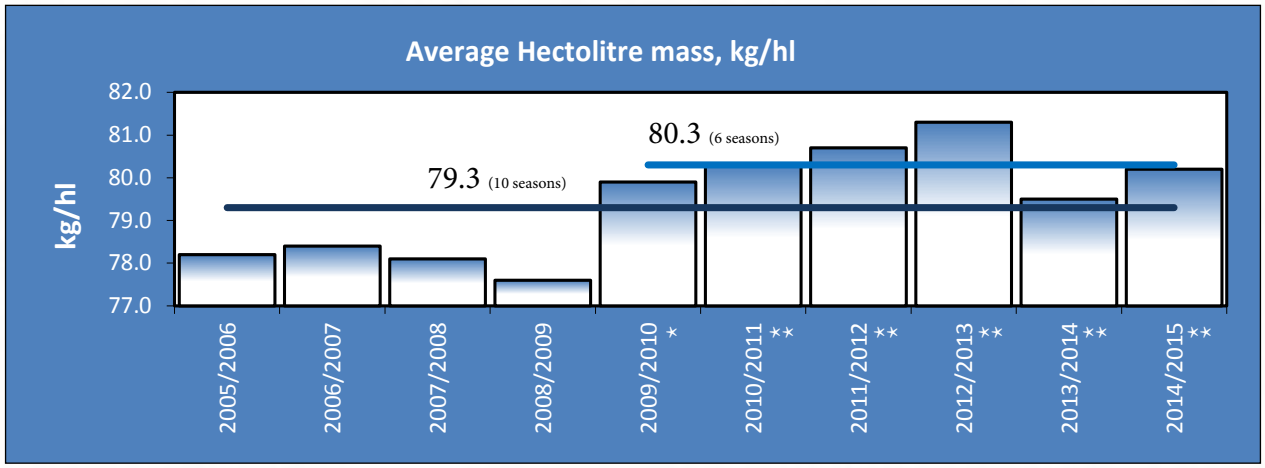
Table 3: Weighted average results for the last three seasons

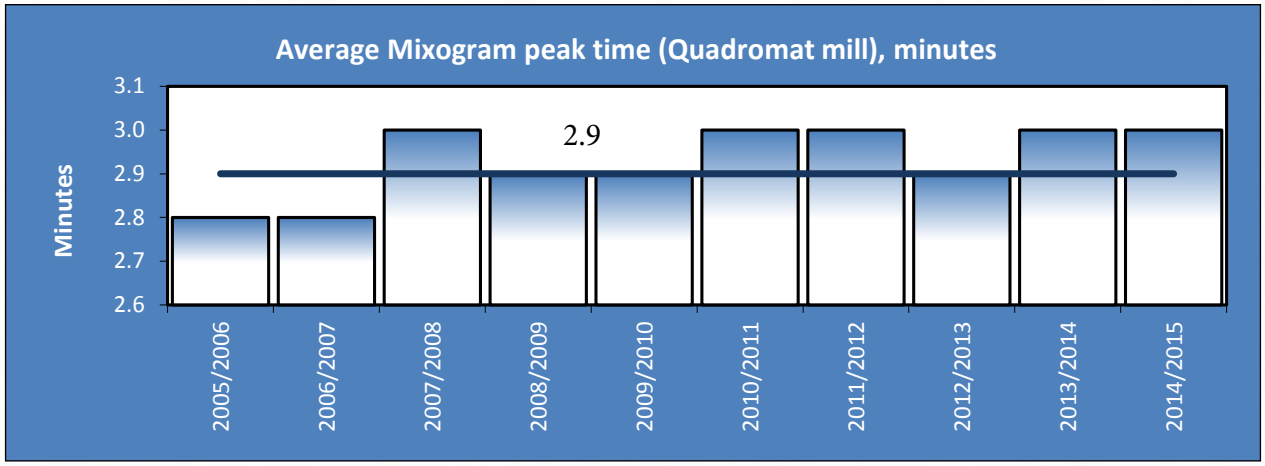
	2014/2015					2013/2014					2012/2013				
Region	**Protein (12% mb), %**	**FN, sec**	**Hlm, kg/hl**	**Mixo PT, min**	***n***	**Protein (12% mb), %**	**FN, sec**	**Hlm, kg/hl**	**Mixo PT, min**	***n***	**Protein (12% mb), %**	**FN, sec**	**Hlm, kg/hl**	**Mixo PT, min**	***n***
1	11.4	310	78.5	2.9	*4*	10.9	369	78.8	2.9	*4*	-	-	-	-	-
2	11.0	401	77.0	3.2	*14*	10.5	355	78.5	3.2	*20*	11.0	396	80.5	3.1	*20*
3	11.2	380	79.9	2.6	*51*	10.5	361	78.6	2.9	*55*	11.0	385	82.4	2.6	*69*
4	10.7	388	81.3	2.6	*31*	10.6	331	77.8	3.0	*31*	10.6	397	83.1	2.6	*28*
5	11.3	381	79.0	2.8	*17*	10.9	300	79.2	2.6	*23*	11.0	341	81.5	2.6	*19*
6	11.1	360	80.2	2.4	*19*	11.2	325	79.4	2.5	*12*	10.6	276	79.8	3.0	*35*
7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10	12.1	380	80.9	2.8	*23*	11.5	382	81.8	2.8	*19*	12.0	378	82.3	2.7	*31*
11	11.9	364	82.3	2.9	*12*	12.4	375	81.0	2.5	*14*	12.0	405	82.4	2.6	*16*
12	12.9	373	81.4	3.7	*4*	12.2	357	80.8	3.1	*6*	12.6	348	81.6	3.1	*2*
13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
14	12.8	373	83.0	3.0	*4*	12.0	368	82.2	3.2	*2*	12.6	367	80.0	3.8	*1*
15	-	-	-	-	-	-	-	-	-	-	11.4	376	82.8	2.5	*3*
16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
17	11.9	387	83.1	3.4	*2*	12.1	257	78.3	3.0	*8*	12.7	440	83.0	2.8	*1*
18	14.3	376	79.9	4.0	*2*	11.8	340	79.0	3.1	*2*	13.4	387	78.7	4.0	*2*
19	12.8	386	82.9	3.6	*2*	12.3	319	79.1	3.4	*11*	13.1	324	81.3	3.8	*2*
20	12.1	369	80.0	3.5	*15*	11.4	379	81.8	3.2	*7*	-	-	-	-	-
21	12.3	324	73.0	3.3	*1*	-	-	-	-	-	11.6	336	81.0	2.5	*1*
22	13.4	363	77.9	3.0	*3*	11.8	377	79.7	3.5	*3*	12.4	323	82.1	2.8	*4*
23	13.3	333	78.1	3.2	*15*	14.0	295	77.1	3.2	*13*	12.2	306	78.3	3.0	*14*
24	12.4	366	79.4	3.2	*21*	12.7	373	80.3	2.9	*13*	12.1	298	80.0	3.2	*7*
25	12.0	356	79.5	3.1	*19*	12.9	309	79.9	3.3	*12*	11.4	321	79.2	3.7	*18*
26	11.5	364	79.5	3.3	*6*	11.9	304	79.7	3.2	*7*	12.1	373	80.8	3.5	*6*
27	12.8	352	78.4	3.8	*3*	12.4	282	78.8	3.5	*2*	12.2	378	79.2	3.6	*6*
28	12.3	340	80.4	3.1	*15*	12.2	278	79.3	3.4	*26*	11.3	352	80.9	3.6	*21*
29	12.5	350	81.3	3.3	*1*	12.7	275	80.8	3.0	*1*	13.1	278	83.5	2.4	*1*
30	-	-	-	-	-	11.4	345	82.4	3.0	*2*	12.3	393	82.8	3.0	*6*
31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
32	12.7	282	79.7	3.3	*7*	12.8	307	80.5	2.7	*9*	-	-	-	-	-
33	11.5	408	81.5	3.1	*6*	12.5	278	80.3	3.0	*8*	12.1	417	81.6	4.3	*2*
34	11.8	338	81.5	3.6	*8*	11.5	353	81.4	2.8	*8*	11.4	380	80.5	3.0	*8*
35	11.6	374	81.4	3.5	*28*	12.0	384	81.7	3.4	*18*	12.4	378	79.7	3.1	*13*
36	12.3	354	82.2	2.8	4	12.0	391	83.3	2.6	4	11.4	390	82.3	3.3	*1*
Ave.	**11.8**	**368**	**80.2**	**3.0**	**337**	**11.6**	**337**	**79.5**	**3.0**	**340**	**11.4**	**360**	**81.3**	**2.9**	***337***

Graph 13: Weighted average quality over 10 seasons









*** Includes addition of 2 kg/hl according to Hectolitre mass Dispensation.**
**** Hectolitre mass determined using Kern 222 instrument.**

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

Flour Quality 2014/2015 season			
Flour protein (12% mb) (%)	10.7	Farinogram abs. (14% mb) (%)	59.5
Bread volume 100g (cm^3)	889	Farinogram dev. time (min.)	5.3
Mixogram (Bühler) peak time (min)	2.7	Alveogram strength (cm^2)	38.1
Wet gluten (14% mb) (%)	28.9	Alveogram P/L	0.59
Dry gluten (14% mb) (%)	9.8	Extensogram strength (cm^2)	98

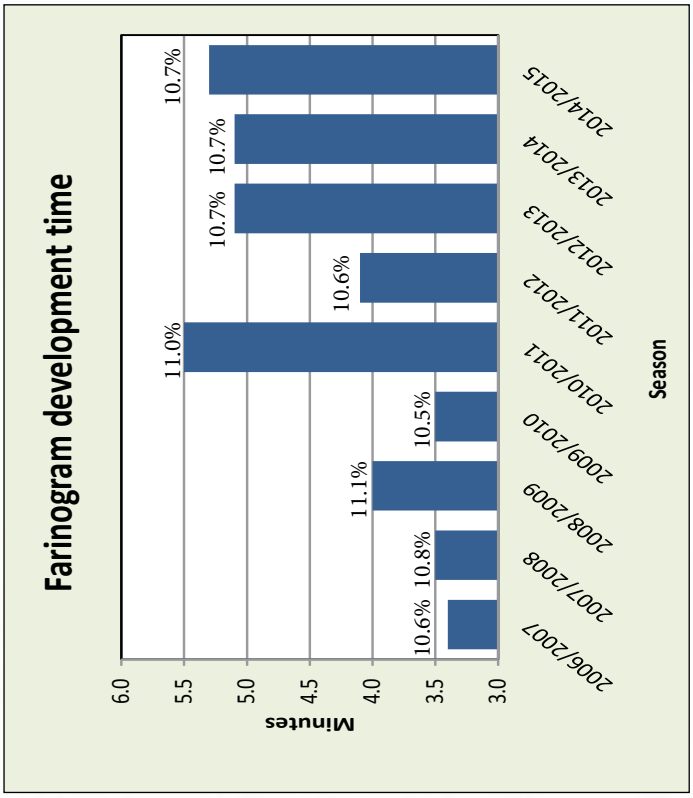
Flour Quality 2013/2014 season			
Flour protein (12% mb) (%)	10.7	Farinogram abs. (14% mb) (%)	60.1
Bread volume 100g (cm^3)	868	Farinogram dev. time (min.)	5.2
Mixogram (Bühler) peak time (min)	2.8	Alveogram strength (cm^2)	37.6
Wet gluten (14% mb) (%)	29.5	Alveogram P/L	0.74
Dry gluten (14% mb) (%)	10.4	Extensogram strength (cm^2)	92

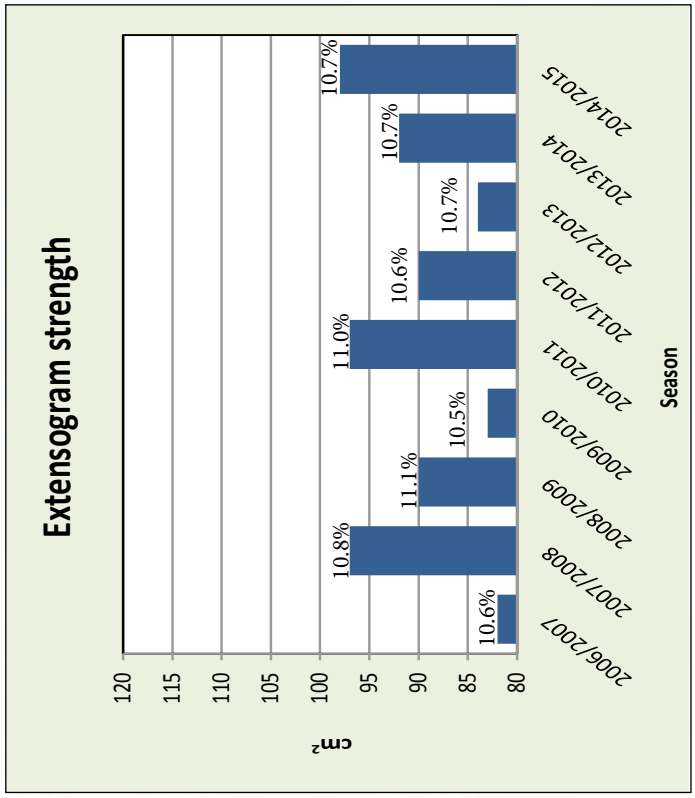
Flour Quality 2012/2013 season			
Flour protein (12% mb) (%)	10.7	Farinogram abs. (14% mb) (%)	60.8
Bread volume 100g (cm^3)	886	Farinogram dev. time (min.)	5.1
Mixogram (Bühler) peak time (min)	2.8	Alveogram strength (cm^2)	36.7
Wet gluten (14% mb) (%)	29.0	Alveogram P/L	0.96
Dry gluten (14% mb) (%)	10.0	Extensogram strength (cm^2)	84

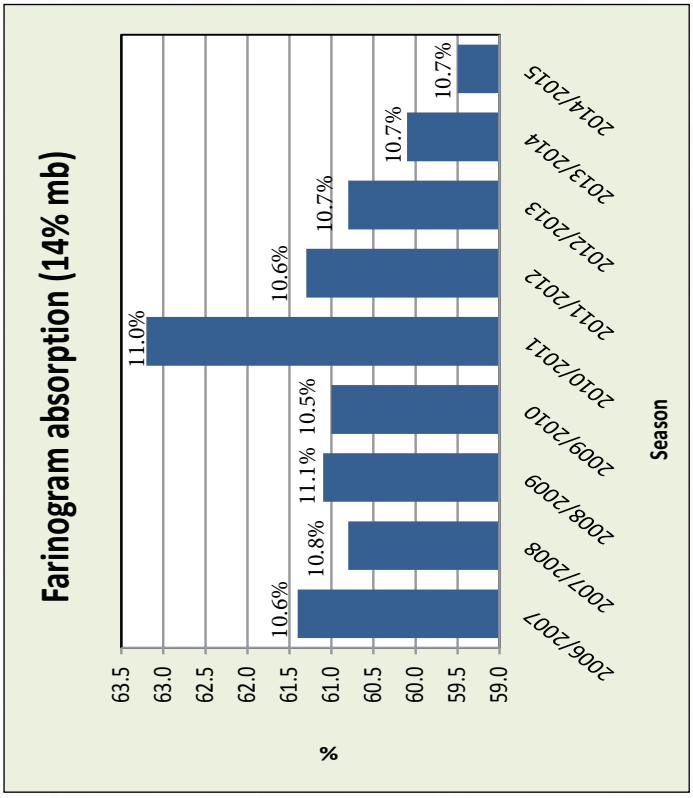
Flour Quality 2011/2012 season			
Flour protein (12% mb) (%)	10.6	Farinogram abs. (14% mb) (%)	61.3
Bread volume 100g (cm^3)	852	Farinogram dev. time (min.)	4.1
Mixogram (Bühler) peak time (min)	3.0	Alveogram strength (cm^2)	35.0
Wet gluten (14% mb) (%)	28.7	Alveogram P/L	0.89
Dry gluten (14% mb) (%)	9.9	Extensogram strength (cm^2)	90

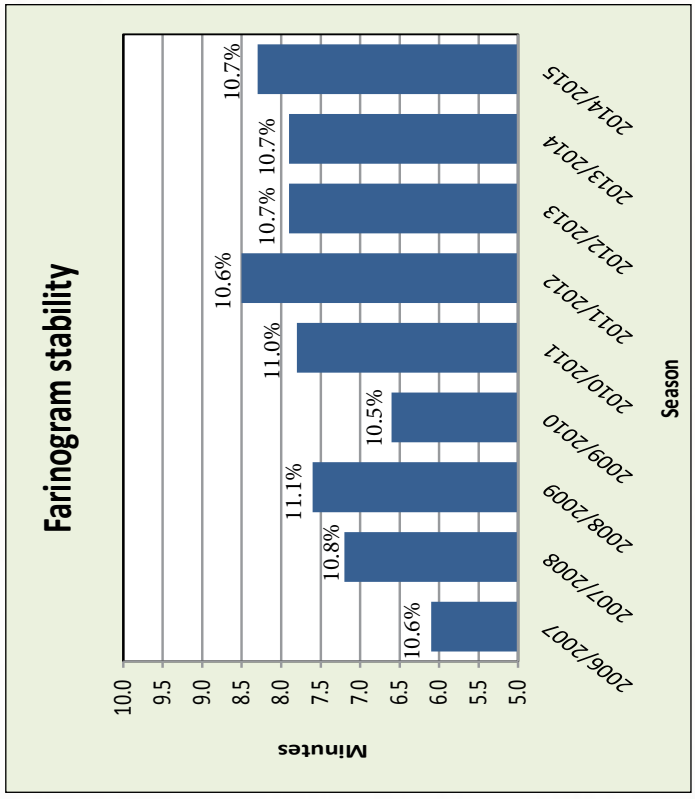
Graph 14: Comparison of rheological quality over seasons

(Flour protein content (12% mb) is indicated above each bar)



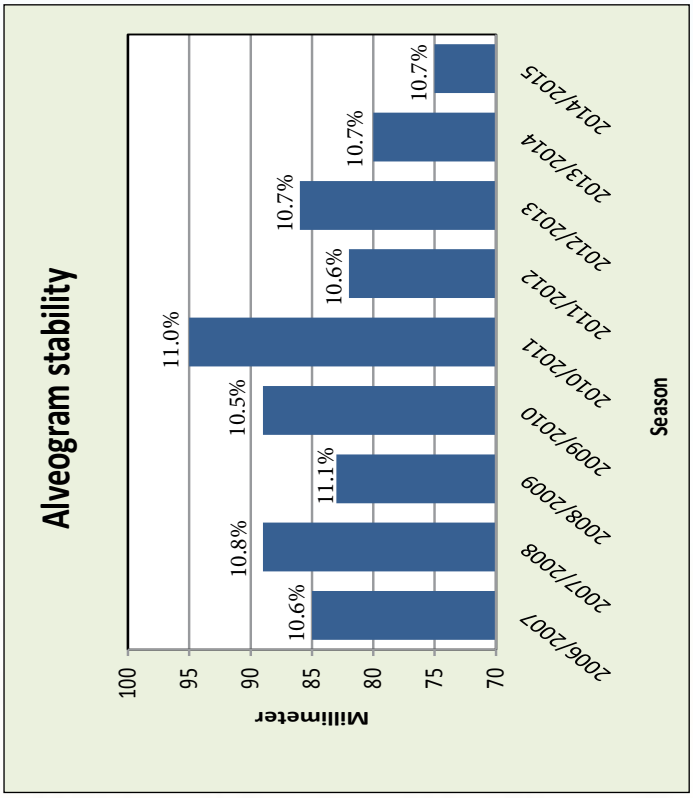


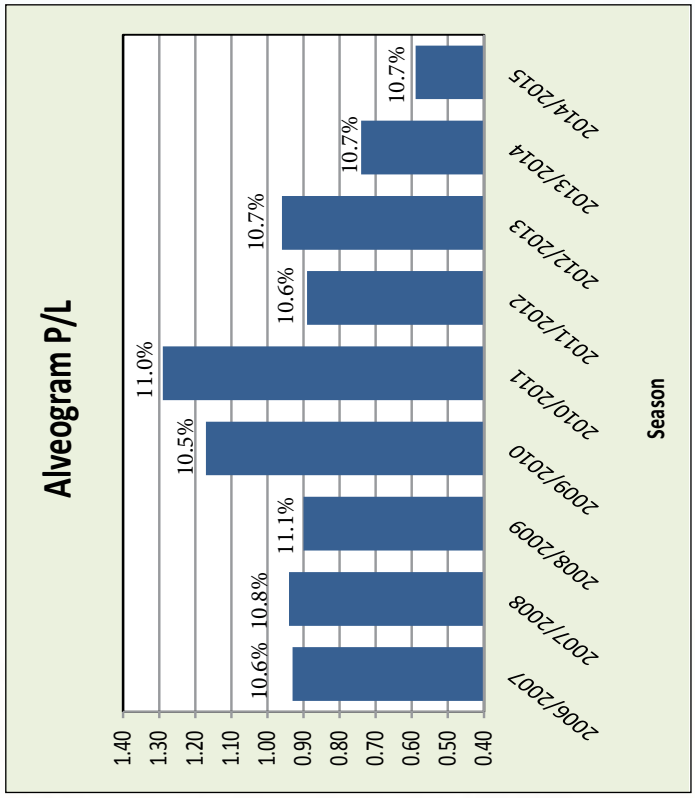


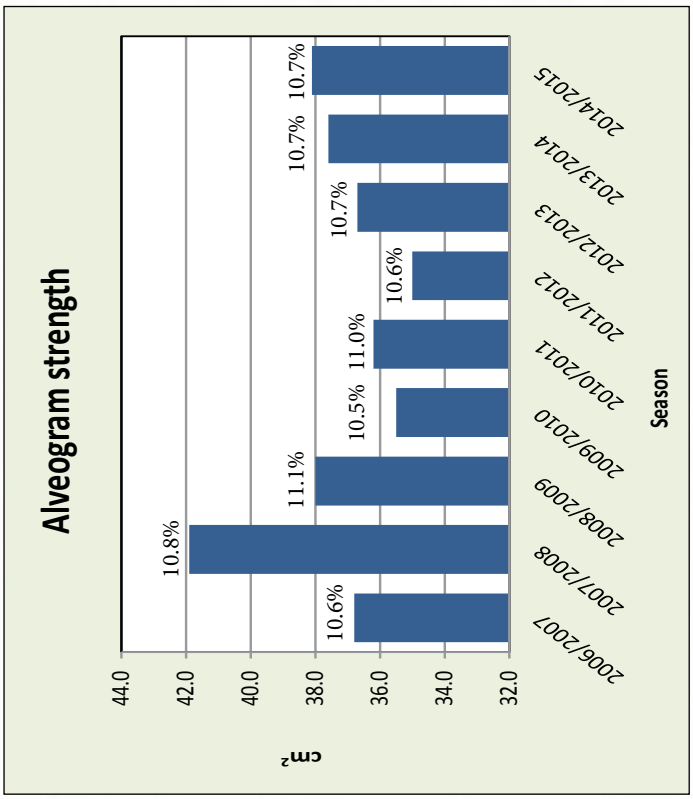


Graph 14: Comparison of rheological quality over seasons

(Flour protein content (12% mb) is indicated above each bar) (continue)







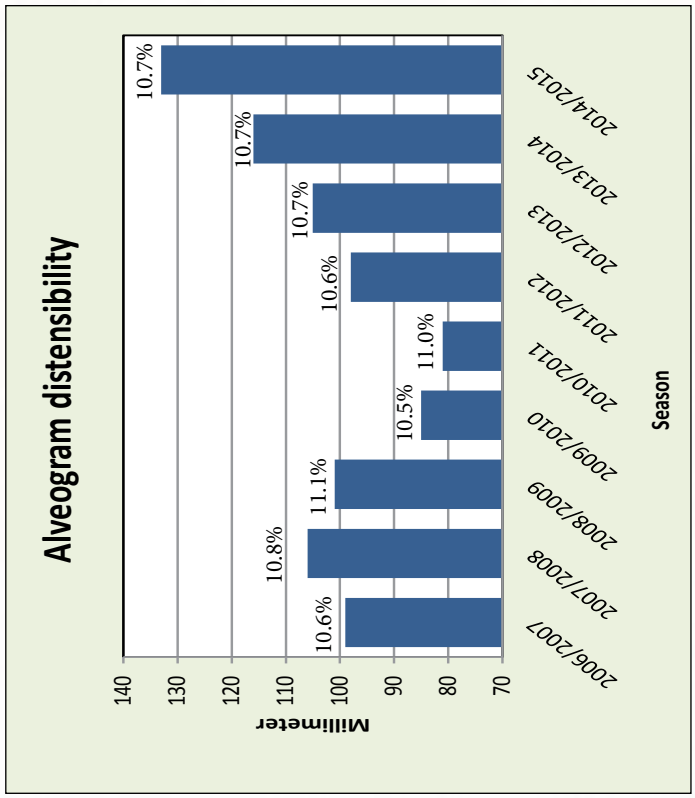


Table 5: Regional quality weighted averages

	Winter rainfall area (Western Cape)			Summer rainfall and Irrigation area (Free State)			Irrigation areas			RSA average		
Number of samples per area	**136**			**83**			**118**			**337**		
Regions	**1 - 6**			**21 - 28**			**10 - 11, 12 - 20, 29 - 33, 34, 35, 36**			**All**		
Hectolitre mass dirty, kg/hl	79.8			79.2			81.2			80.2		
1000 kernel mass (13% mb), g	39.7			36.8			39.2			38.8		
Falling number, sec	379			352			367			368		
Screenings (1,8 mm), %	1.85			1.41			1.22			1.55		
Protein (12% mb), % (ww)	11.1			12.4			12.1			11.8		
Mixogram peak time, min (Quadromat)	2.7			3.2			3.3			3.0		
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	***4***	***4***	***6***	***7***	***4***	***4***	***13***	***7***	***5***	***24***	***15***	***15***
	3	***4***	-	***2***	***3***	***1***	***1***	***2***	-	***6***	***9***	***1***
Bühler extraction, %	72.7	73.0	72.7	73.5	72.8	73.4	73.8	74.3	73.9	73.5	73.6	73.3
	73.2	72.6	-	75.3	73.0	70.9	73.5	72.7	-	73.9	72.8	70.9
Flour colour, KJ (wet)	-3.5	-3.6	-3.6	-3.1	-3.3	-3.2	-3.3	-3.2	-3.6	-3.3	-3.3	-3.5
	-3.7	-3.5	-	-3.6	-3.1	-2.2	-3.6	-3.0	-	-3.7	-3.2	-2.2
Colour, Minolta CM5 (dry)												
L*	94.06	94.00	94.01	93.44	93.65	93.87	93.65	93.61	93.88	93.66	93.72	93.93
	94.12	93.98	-	94.11	93.64	92.98	93.86	93.54	-	94.07	93.77	92.98
b*	10.00	10.14	10.34	9.73	9.93	9.68	9.37	9.47	9.60	9.58	9.81	9.87
	9.95	10.24	-	8.70	9.76	9.78	9.69	9.07	-	9.49	9.82	9.78
Ash (db), %	0.59	0.59	0.59	0.57	0.56	0.56	0.59	0.61	0.58	0.58	0.59	0.58
	0.59	0.59	-	0.57	0.61	0.65	0.56	0.64	-	0.58	0.61	0.65
Flour protein (12% mb), %	11.1	10.5	9.6	12.0	10.7	10.2	12.0	10.5	9.5	11.9	10.5	9.7
	8.8	10.7	-	9.0	10.7	10.9	9.1	11.6	-	8.9	10.9	10.9

Table 5: Regional quality weighted averages (continue)

	Winter rainfall area (Western Cape)			Summer rainfall and Irrigation area (Free State)			Irrigation areas			RSA average		
Regions	1 - 6			21 - 28			10 - 11, 12 - 20, 29 - 33, 34, 35, 36			All		
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	***4***	***4***	***6***	***7***	***4***	***4***	***13***	***7***	***5***	***24***	***15***	***15***
	3	***4***	***-***	***2***	***3***	***1***	***1***	***2***	***-***	***6***	***9***	***1***
Wet gluten (14% mb), %	29.7	28.1	25.7	32.8	29.8	26.2	31.8	28.9	25.4	31.8	28.9	25.7
	24.6	29.1	-	23.8	30.2	27.2	23.3	31.8	-	24.1	30.2	27.2
Dry gluten (14% mb), %	9.9	9.6	8.7	11.0	9.9	8.9	10.9	9.6	8.4	10.8	9.7	8.6
	8.8	10.1	-	7.7	10.2	9.2	7.8	11.0	-	8.3	10.4	9.2
Gluten Index	88	90	86	84	85	91	89	85	88	88	86	88
	91	87	-	85	84	94	97	89	-	90	86	94
Farinogram: Water absorption (14% mb), %	60.2	60.1	58.9	61.4	59.5	59.0	60.4	58.7	58.2	60.6	59.2	58.7
	58.6	59.4	-	57.1	60.1	58.0	58.3	59.8	-	58.0	59.7	58.0
Farinogram: Development time, min	5.3	4.7	4.2	6.2	4.8	3.6	7.5	5.2	3.4	6.8	4.9	3.8
	3.4	5.2	-	3.3	6.3	4.3	6.0	5.1	-	3.8	5.5	4.3
Alveogram: Strength (S), cm²	38.9	33.2	31.2	42.3	36.2	38.3	50.3	33.6	34.2	46.1	34.2	34.1
	27.0	34.7	-	27.2	38.8	26.9	34.3	41.6	-	28.3	37.6	26.9
Alveogram: P/L	0.52	0.59	0.62	0.54	0.60	0.91	0.53	0.50	0.78	0.53	0.55	0.75
	0.72	0.51	-	0.57	0.71	0.31	0.86	0.45	-	0.71	0.54	0.31
Extensogram: Strength, cm²	93	78	76	120	93	97	131	89	86	122	87	85
	64	88	-	73	88	74	101	116	-	73	94	74
Mixogram peak time, min	2.3	2.3	2.5	2.6	2.6	3.1	3.1	2.7	3.0	2.8	2.6	2.8
	2.4	2.5	-	2.7	2.3	3.1	3.3	2.9	-	2.7	2.5	3.1
Relationship between protein and bread volume	VG	EX	EX	VG	EX	VG	EX	EX	EX	VG	EX	EX
	EX	EX	-	VG	EX	EX	EX	EX	-	EX	EX	EX

EX = Excellent VG = Very Good

REGIONAL QUALITY SUMMARY

WINTER RAINFALL AREA
(Western Cape)

Production regions 1 to 6 fall within the Winter rainfall area (Western Cape Province). Wheat is planted from the second half of April until the middle of June and harvested during October to December.

The hectolitre mass averaged 79.8 kg/hl compared to the previous season's 78.6 kg/hl. The thousand kernel mass averaged 39.7 gram, 1.1 g lower than the previous season. The average falling number was 379 seconds. None of the 136 samples from the Winter rainfall area had a falling number lower than 250 seconds. The average whole wheat protein content of 11.1% (12% mb) (10.7% in 2013/2014) was the lowest of the three production areas, a trend observed over previous seasons as well.

The screenings of 1.85% was a little higher than the previous season's 1.67%, the highest of the three areas and 0.30% higher than the national average for 2014/2015. The mixogram peak time (Quadromat mill) averaged 2.7 minutes, the shortest of the three areas. The Bühler extraction averaged 72.8% (average of wheat grades B1 to B4 and UT), similar to 2013/2014. The average dry colour of the flour was -3.6 KJ units and the dry colour L* value (indicating lightness) 94.03. This colour indicates a white/light flour that is preferred by millers and bakers. Both these values compares with previous seasons. The average ash content was 0.59% (db).

The flour protein content averaged 10.1%. The average wet and dry gluten values namely 27.3% and 9.3% (14% mb) were respectively 0.8% and 0.7% lower than the previous season. The gluten index was 88. The average farinogram absorption was 59.4% and the development time 4.6 minutes, the shortest of the three areas. The average alveogram strength was 33.1 cm^2, slightly higher, but still comparing well with the previous season. The alveogram P/L value was 0.59 compared to the 0.81 of 2013/2014, indicating dough with a higher distensibility. The average strength on the extensogram was 80 cm^2. The mixogram peak time on the Bühler milled flour averaged 2.4 minutes. The 100-gram baking test showed an excellent relationship between protein content and bread volume.

SUMMER RAINFALL AND IRRIGATION AREA
(Free State)

Early planting commences in June and continues until August. Harvesting takes place from November to January.

The average hectolitre mass was 79.2 kg/hl. The physical characteristic thousand kernel mass (36.8 g) was slightly lower than the previous season's 37.0 g and 2.0 g lower than the RSA average. The average screenings was 1.41%. The average whole wheat protein content decreased slightly from 12.7% the previous season to 12.4% (12% mb) this season. This protein is the highest of the three production areas, although only 0.3% higher than the irrigation areas. The falling number increased on average from 308 seconds in 2013/2014 to 352 seconds. One of the four samples reporting falling numbers lower than 250 seconds this season, originated in the Free State.

The mixogram (Quadromat) peak time of 3.2 minutes, was similar to the previous season. The average Bühler extraction percentage in the Free State was 73.3% (72.2% previous season). The Kent Jones flour colour was -3.1 KJ units (-2.5 KJ units in the previous season) and the L* value 93.63 (previously 93.74). The average ash content was 0.58% and the average flour protein content 10.9%. The wet gluten content (14% mb) was 29.5% and the dry gluten 9.9%, both approximately 1% lower than last season. The gluten index was 86.

The average farinogram water absorption of 59.8% was lower than the previous season's 60.9% but slightly higher than the other two areas. The development time averaged 5.1 minutes. The average alveogram strength of 37.7 cm² and extensogram strength of 99 cm² was also lower than in the 2013/2014 season. The Bühler milled flour had an average peak time of 2.7 minutes. The 100-gram baking test showed that the relationship between protein content and bread volume was very good between the different grades.

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

The irrigation areas are divided into the cooler central areas and the warmer northern areas. Planting commences in July and continues until August. Harvesting takes place from November to January.

The irrigation wheat had the highest weighted average hectolitre mass of 81.2 kg/hl. The thousand kernel mass was 39.2 g. Both these averages are slightly higher than the previous season. The average falling number was 367 seconds (equal to the national average) and the screenings averaged the lowest of the three areas at 1.22%. Two samples from Mpumalanga and one from Limpopo had falling numbers below 250 seconds.

The whole wheat protein content was on average 12.1% and the flour's protein content 11.1%. The average mixogram (Quadromat) peak time was slightly longer than that of the Free State and averaged 3.3 minutes, the longest of the three areas. The average Bühler extraction percentage was 73.9, similar to last season and again the highest of the three production areas.

The dry colour L* value was 93.68 and the Kent Jones wet colour value -3.3 KJ units. The wet and dry gluten contents were 29.6% and 10.0% respectively and the gluten index 88. The average farinogram water absorption was 59.4% (59.9% during previous season) and the farinogram development at 6.0 minutes, the longest of the three areas.

The average alveogram strength was 42.1 cm² and the average P/L 0.57 (37.8 cm² and 0.61 respectively the previous season). Lower P/L values are indicative of dough being more extensible (having higher L values) than dough with higher P/L values. The average extensogram strength was 111 cm². The mixogram peak time averaged 3.0 minutes. Based on the average values, the irrigation wheat had the strongest rheological (dough) quality. The relationship between protein content and 100 g bread volume was also shown to be excellent.

Please see the regional results provided on pages 28 to 55.

RSA Production Regions

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

Figure 1: RSA Provinces

Provincial map with gratitude to SiQ.

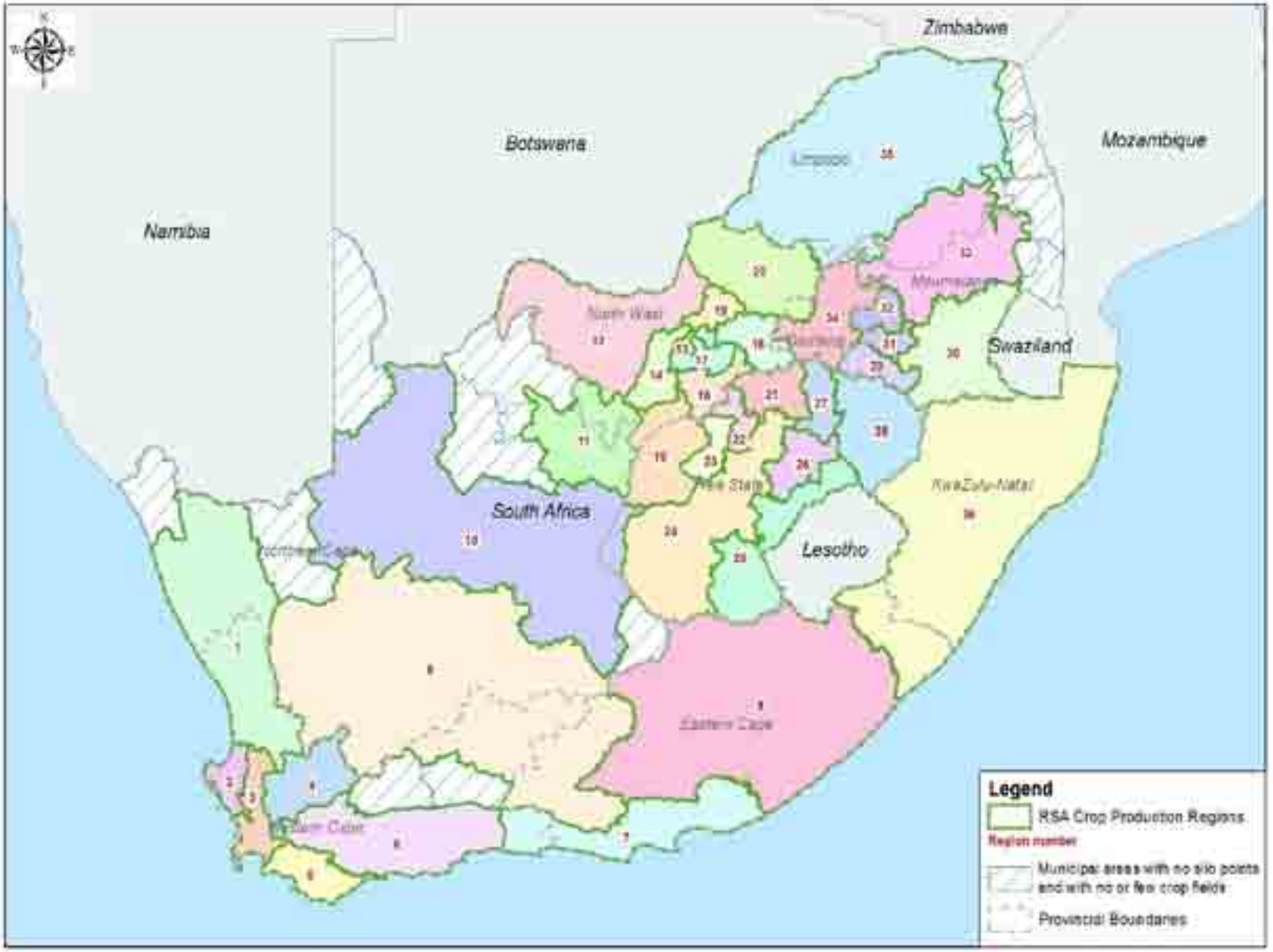
The 9 provinces are divided into 36 grain production regions.

The regions are distributed as follows:
Region 1: Namakwaland
Regions 2 and 3: Swartland
Regions 4 to 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 have been received for the crop quality survey of the 2014/2015 production season, are named and described on pages 24 to 27. The silo/intake stands as well as the type of storage structure are provided.

Figure 2: RSA Crop Production Regions



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			
KaapAgri	Graafwater *(Bags/Bins)*		

Region 2: Swartland Western Region			
KaapAgri	Darling *(Bins)*	OverbergAgri	Bergrivier *(Bins)*
KaapAgri	Vredenburg *(Bins)*	OverbergAgri	Koperfontein *(Bins)*

Region 3: Swartland Central Region			
KaapAgri	Eendekuil *(Bins)*	KaapAgri	Ruststasie *(Bins)*
KaapAgri	Klipheuwel *(Bins)*	OverbergAgri	Koringberg *(Bins)*
KaapAgri	Malmesbury *(Bins)*	OverbergAgri	Moorreesburg *(Bins)*
KaapAgri	Piketberg *(Bins)*	OverbergAgri	Moravia *(Bins)*
KaapAgri	Pools *(Bins)*	Afgri	Eensgezind *(Bunkers)*

Region 4: Swartland Eastern Region			
KaapAgri	Ceres *(Bunkers)*	KaapAgri	Porterville *(Bins)*
KaapAgri	Ceres *(Bins)*	KaapAgri	Riebeeck-Wes *(Bins)*
KaapAgri	Gouda *(Bins)*	OverbergAgri	Leliedam *(Bins)*
KaapAgri	Halfmanshof *(Bins)*		

Region 5: Ruens Western Region			
OverbergAgri	Bredasdorp *(Bags/Bins/Bunkers)*	OverbergAgri	Napier *(Bags/Bins)*
OverbergAgri	Caledon *(Bins/Bunkers)*	OverbergAgri	Protem *(Bags/Bins)*
OverbergAgri	Klipdale *(Bags/Bins)*	OverbergAgri	Rietpoel *(Bags/Bins/Bunkers)*
OverbergAgri	Krige *(Bags/Bins/Bunkers)*		

Region 6: Ruens 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)*		

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 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 *(Bins)*
Senwes	Enselspruit *(Bins)*		

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

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

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)*		

Grain Production Regions (continue)

Silo/Intake stands per region indicating type of storage structure

Region 22: Free State North Western Region (Bothaville)			
Senwes	Allanrigde *(Bins)*	Senwes	Schoonspruit *(Bins)*
Senwes	Bothaville *(Bins)*	Senwes	Schuttesdraai *(Bins)*
Senwes	Mirage *(Bins)*	Suidwes Landbou	Misgunst (Bunkers)
Senwes	Odendaalsrus *(Bins)*		

Region 23: Free state North Western Region (Bultfontein)			
Senwes	Bultfontein *(Bins)*	Senwes	Tierfontein *(Bins)*
Senwes	Losdoorns *(Bins)*	Senwes	Wesselsbron *(Bins)*
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)*		

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 27: Free State Northern Region			
Senwes	Gottenburg *(Bins)*	Senwes	Mooigeleë *(Bins)*
Senwes	Heilbron *(Bins)*	Senwes	Wolwehoek *(Bins)*
Senwes	Hoogte *(Bins)*	VKB	Petrus Steyn *(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 (continue)

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 32: Mpumalanga Western Region			
Afgri	Argent *(Bins/Bunkers)*	Afgri	Hawerklip *(Bins)*
Afgri	Dryden *(Bins)*	Afgri	Kendal *(Bins)*
Afgri	Eloff *(Bins)*	Afgri	Ogies *(Bins)*
Afgri	Endicott *(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)*	NTK	Nylstroom (Modimolle) *(Bins)*
NTK	Alma *(Bins)*	NTK	Potgietersrus (Mokopane) *(Bins)*
NTK	Lehau *(Bins)*	NTK	Roedtan *(Bins)*
NTK	Naboomspruit (Mookgophong) *(Bins)*	NTK	Settlers *(Bins)*
NTK	Nutfield *(Bins)*	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) Namaqualand				(2) Swartland Western Region			
WHEAT								
	ave	**min**	**max**	**stdev**	**ave**	**min**	**max**	**stdev**
Protein (12% mb), %	11.4	10.4	13.0	1.20	11.0	8.9	12.4	1.05
Falling number, sec	310	289	324	16.75	401	309	471	48.32
1000 Kernel mass (13% mb), g	35.6	34.8	36.5	0.79	36.6	33.0	40.8	2.20
Hectolitre mass (dirty), kg/hl	78.5	78.1	79.2	0.50	77.0	74.0	79.3	1.70
Screenings (<1.8mm), %	2.69	2.47	2.93	0.19	3.40	1.89	4.90	0.75
Total damaged kernels, %	1.59	0.92	2.08	0.52	1.68	0.00	3.54	0.91
Combined deviations, %	4.86	4.24	5.47	0.52	6.50	4.81	9.06	1.13
Number of samples		***4***				***14***		
CULTIVARS								
	SST 015	42.0			SST 88	38.6		
cultivars	SST 88	19.0			SST 015	20.7		
with highest %	SST 056	18.5			SST 027	15.6		
occurrence	SST 027	8.8			SST 087	12.4		
	SST 047	6.3			SST 056	6.3		
Number of samples		***4***				***14***		
MIXOGRAM (Quadromat)								
	ave	**min**	**max**	**stdev**	**ave**	**min**	**max**	**stdev**
Peak time, min	2.9	2.7	3.0	0.13	3.2	2.8	3.5	0.21
Tail height (6 min), mm	48	46	49	1.41	49	46	53	1.77
Number of samples		***4***				***14***		

	COMPOSITE SAMPLES											
CLASS AND GRADE	**B1**	**B2**	**B3**	**B4**	**UT**	**COW**	**B1**	**B2**	**B3**	**B4**	**UT**	**COW**
BÜHLER EXTRACTION, %	-	-	71.6	-	71.7	-	-	-	72.4	-	72.6	-
FLOUR												
Protein (12% mb), %	-	-	9.5	-	11.3	-	-	-	9.7	-	10.4	-
Ash (db), %	-	-	0.57	-	0.57	-	-	-	0.62	-	0.59	-
Colour, KJ (wet)	-	-	-3.6	-	-3.4	-	-	-	-3.4	-	-3.5	-
Colour, Minolta CM5 (dry)												
L*	-	-	94.16	-	93.90	-	-	-	93.77	-	94.15	-
a*	-	-	0.37	-	0.41	-	-	-	0.41	-	0.37	-
b*	-	-	10.27	-	10.03	-	-	-	10.59	-	10.38	-
RVA												
Peak Viscosity, cP	-	-	1912	-	1867	-	-	-	2246	-	2255	-
Minimum viscosity (Through), cP	-	-	1546	-	1528	-	-	-	1631	-	1644	-
Final Viscosity, cP	-	-	2158	-	2035	-	-	-	2599	-	2616	-
Peak Time, min	-	-	7.00	-	7.00	-	-	-	7.00	-	7.00	-
GLUTEN												
Wet gluten (14% mb), %	-	-	24.2	-	30.7	-	-	-	26.5	-	26.5	-
Dry gluten (14% mb), %	-	-	8.2	-	10.4	-	-	-	9.3	-	9.4	-
Gluten Index	-	-	92	-	88	-	-	-	91	-	91	-
FARINOGRAM												
Water absorption (14% mb), %	-	-	57.2	-	59.4	-	-	-	58.3	-	57.9	-
Development time, min	-	-	4.7	-	6.0	-	-	-	4.5	-	5.5	-
Stability, min	-	-	8.1	-	8.6	-	-	-	10.2	-	9.9	-
Mixing tolerance index, BU	-	-	35	-	33	-	-	-	20	-	28	-
EXTENSOGRAM (45 min pull)												
Area, cm^2	-	-	89	-	107	-	-	-	87	-	90	-
Maximum height, BU	-	-	383	-	388	-	-	-	378	-	360	-
Extensibility, mm	-	-	165	-	202	-	-	-	167	-	180	-
ALVEOGRAM												
Strength (S), cm^2	-	-	32.4	-	39.4	-	-	-	34.4	-	35.3	-
Stability (P), mm	-	-	72	-	73	-	-	-	79	-	71	-
Distensibility (L), mm	-	-	113	-	143	-	-	-	110	-	130	-
Configuration ratio (P/L)	-	-	0.64	-	0.51	-	-	-	0.72	-	0.55	-
MIXOGRAM												
Peak time, min	-	-	3.0	-	2.7	-	-	-	2.7	-	2.9	-
100g BAKING TEST												
Loaf volume, cm^3	-	-	795	-	875	-	-	-	858	-	815	-
Evaluation (see page 60)	-	-	0	-	0	-	-	-	0	-	0	-

RHEOLOGICAL GRAPHS PER PRODUCTION REGION

MIXOGRAM

1

2

FARINOGRAM

1

2

EXTENSOGRAM

1

2

ALVEOGRAM

1

2

South African Quality data per production region

WINTER RAINFALL WHEAT

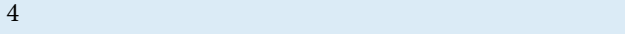
PRODUCTION REGION	(3) Swartland Central Region				(4) Swartland Eastern Region			
WHEAT								
	ave	**min**	**max**	**stdev**	**ave**	**min**	**max**	**stdev**
Protein (12% mb), %	11.2	8.3	13.50	1.17	10.7	7.2	12.8	1.35
Falling number, sec	380	333	452	22.03	388	324	451	28.85
1000 Kernel mass (13% mb), g	38.8	31.5	43.4	2.64	39.0	33.9	46.7	3.14
Hectolitre mass (dirty), kg/hl	79.9	74.0	83.1	1.85	81.3	76.9	83.8	1.52
Screenings (<1.8mm), %	2.17	0.40	6.97	1.16	1.44	0.11	4.82	1.28
Total damaged kernels, %	1.70	0.36	4.68	0.84	1.41	0.00	3.86	0.84
Combined deviations, %	5.01	1.00	9.44	1.80	3.39	0.32	7.84	1.70
Number of samples	***51***				***31***			
CULTIVARS								
	SST 015	34.5			SST 015	33.5		
cultivars	SST 88	24.5			SST 88	26.4		
with highest %	SST 056	15.9			SST 087	14.8		
occurrence	SST 027	11.2			SST 056	13.4		
	SST 087	7.5			SST 027	8.0		
Number of samples	***51***				***31***			
MIXOGRAM (Quadromat)								
	ave	**min**	**max**	**stdev**	**ave**	**min**	**max**	**stdev**
Peak time, min	2.6	2.1	3.1	0.24	2.6	2.0	3.4	0.39
Tail height (6 min), mm	49	43	58	2.75	47	41	53	3.14
Number of samples	***51***				***31***			

	COMPOSITE SAMPLES											
CLASS AND GRADE	**B1**	**B2**	**B3**	**B4**	**UT**	**COW**	**B1**	**B2**	**B3**	**B4**	**UT**	**COW**
BÜHLER EXTRACTION, %	71.7	72.4	73.1	73.0	73.3	-	71.4	72.1	72.4	73.3	72.9	-
FLOUR												
Protein (12% mb), %	10.9	9.8	9.6	9.0	10.9	-	11.0	10.8	9.5	8.7	10.3	-
Ash (db), %	0.58	0.58	0.62	0.58	0.61	-	0.59	0.54	0.58	0.59	0.59	-
Colour, KJ (wet)	-3.6	-3.8	-3.7	-3.6	-3.5	-	-3.8	-3.8	-3.8	-3.9	-3.5	-
Colour, Minolta CM5 (dry)												
L*	94.08	94.25	94.12	94.00	93.88	-	94.17	94.10	94.08	94.26	93.99	-
a*	0.43	0.39	0.41	0.44	0.46	-	0.42	0.48	0.41	0.34	0.39	-
b*	10.52	10.33	9.92	9.86	10.58	-	10.56	10.46	11.11	9.82	9.96	-
RVA												
Peak Viscosity, cP	2192	2158	2246	2222	2102	-	2253	2056	2192	2289	2191	-
Minimum viscosity (Through), cP	1608	1587	1651	1601	1554	-	1614	1526	1623	1724	1592	-
Final Viscosity, cP	2583	2602	2719	2702	2466	-	2722	2447	2667	2810	2571	-
Peak Time, min	7.00	7.00	7.00	7.00	7.00	-	7.00	7.00	7.00	7.00	7.00	-
GLUTEN												
Wet gluten (14% mb), %	30.9	26.1	27.6	24.2	-	-	29.4	29.1	24.6	27.1	30.1	-
Dry gluten (14% mb), %	10.7	8.8	9.4	8.1	-	-	10.1	9.9	7.9	10.5	10.6	-
Gluten Index	92	94	81	92	90	-	88	92	88	92	80	-
FARINOGRAM												
Water absorption (14% mb), %	60.7	59.4	60.4	59.5	60.7	-	59.7	60.1	58.9	58.6	59.4	-
Development time, min	5.4	5.2	4.0	4.2	4.5	-	5.3	5.0	4.0	3.7	4.7	-
Stability, min	9.3	7.6	5.6	5.7	6.4	-	8.0	6.0	6.7	5.0	5.7	-
Mixing tolerance index, BU	25	35	40	41	39	-	32	43	37	46	48	-
EXTENSOGRAM (45 min pull)												
Area, cm^2	99	86	68	72	77	-	98	77	78	58	78	-
Maximum height, BU	366	353	271	294	275	-	373	291	297	234	283	-
Extensibility, mm	193	176	175	171	196	-	188	184	185	169	194	-
ALVEOGRAM												
Strength (S), cm^2	41.9	35.9	31.2	28.0	33.8	-	37.5	35.2	30.6	25.8	30.1	-
Stability (P), mm	80	81	74	75	73	-	76	77	72	72	64	-
Distensibility (L), mm	146	123	128	102	132	-	130	126	128	102	146	-
Configuration ratio (P/L)	0.55	0.66	0.58	0.74	0.55	-	0.58	0.61	0.56	0.71	0.44	-
MIXOGRAM												
Peak time, min	2.0	2.5	2.3	2.5	2.3	-	2.5	2.4	2.5	2.3	2.2	-
100g BAKING TEST												
Loaf volume, cm^3	804	778	840	818	908	-	959	958	836	801	904	-
Evaluation (see page 60)	2	0	0	0	0	-	0	0	0	0	0	-

RHEOLOGICAL GRAPHS PER PRODUCTION REGION

MIXOGRAM

3



4

FARINOGRAM

3

4

EXTENSOGRAM

3

4

ALVEOGRAM

3

4

South African Quality data per production region

WINTER RAINFALL WHEAT

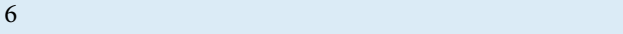
PRODUCTION REGION	(5) Rûens Western Region				(6) Rûens Eastern Region			
WHEAT								
	ave	**min**	**max**	**stdev**	**ave**	**min**	**max**	**stdev**
Protein (12% mb), %	11.3	10.4	12.4	0.65	11.1	9.2	12.8	0.98
Falling number, sec	381	334	413	23.07	360	311	433	26.97
1000 Kernel mass (13% mb), g	43.8	40.9	46.3	1.39	42.8	40.0	46.0	1.81
Hectolitre mass (dirty), kg/hl	79.0	73.2	82.4	2.11	80.2	79.2	81.7	0.76
Screenings (<1.8mm), %	0.82	0.16	2.06	0.62	1.23	0.18	2.70	0.78
Total damaged kernels, %	1.91	0.84	8.56	1.80	1.44	0.32	4.00	0.84
Combined deviations, %	3.39	1.74	9.08	1.76	3.32	1.38	6.08	1.34
Number of samples	***17***				***19***			
CULTIVARS								
	SST 88	34.5			SST 88	33.2		
cultivars	SST 015	28.5			SST 015	27.7		
with highest %	SST 027	14.8			SST 027	16.5		
occurrence	SST 087	9.8			SST 087	8.2		
	SST 056	9.4			SST 056	7.1		
Number of samples	***17***				***19***			
MIXOGRAM (Quadromat)								
	ave	**min**	**max**	**stdev**	**ave**	**min**	**max**	**stdev**
Peak time, min	2.8	2.1	3.1	0.29	2.4	2.1	3.0	0.20
Tail height (6 min), mm	49	43	55	2.84	49	42	55	2.62
Number of samples	***17***				***19***			

	COMPOSITE SAMPLES											
CLASS AND GRADE	**B1**	**B2**	**B3**	**B4**	**UT**	**COW**	**B1**	**B2**	**B3**	**B4**	**UT**	**COW**
BÜHLER EXTRACTION, %	74.4	73.7	73.6	-	-	-	73.3	73.9	73.1	73.3	-	-
FLOUR												
Protein (12% mb), %	11.1	10.7	9.6	-	-	-	11.4	10.5	9.6	8.8	-	-
Ash (db), %	0.62	0.61	0.58	-	-	-	0.56	0.61	0.55	0.59	-	-
Colour, KJ (wet)	-3.1	-3.3	-3.3	-	-	-	-3.6	-3.4	-3.7	-3.6	-	-
Colour, Minolta CM5 (dry)												
L*	93.84	93.89	93.85	-	-	-	94.14	93.75	94.08	94.09	-	-
a*	0.49	0.52	0.50	-	-	-	0.39	0.41	0.38	0.33	-	-
b*	9.28	9.70	9.93	-	-	-	9.63	10.07	10.21	10.18	-	-
RVA												
Peak Viscosity, cP	2154	2270	2307	-	-	-	2393	2330	2191	2171	-	-
Minimum viscosity (Through), cP	1553	1671	1613	-	-	-	1776	1800	1664	1672	-	-
Final Viscosity, cP	2581	2671	2780	-	-	-	2826	2756	2597	2543	-	-
Peak Time, min	7.00	7.00	7.00	-	-	-	7.00	7.00	7.00	7.00	-	-
GLUTEN												
Wet gluten (14% mb), %	28.3	28.5	25.7	-	-	-	30.2	28.8	25.5	22.6	-	-
Dry gluten (14% mb), %	8.1	9.8	8.9	-	-	-	10.6	9.7	8.7	7.7	-	-
Gluten Index	91	93	86	-	-	-	80	80	79	89	-	-
FARINOGRAM												
Water absorption (14% mb), %	59.6	60.6	58.3	-	-	-	60.9	60.2	60.0	57.6	-	-
Development time, min	5.2	4.5	4.7	-	-	-	5.2	4.2	3.2	2.2	-	-
Stability, min	6.8	5.8	5.7	-	-	-	6.4	5.2	5.1	5.8	-	-
Mixing tolerance index, BU	39	53	54	-	-	-	44	47	42	35	-	-
EXTENSOGRAM (45 min pull)												
Area, cm^2	91	84	73	-	-	-	82	66	63	63	-	-
Maximum height, BU	314	285	284	-	-	-	286	246	238	284	-	-
Extensibility, mm	208	210	183	-	-	-	202	187	183	155	-	-
ALVEOGRAM												
Strength (S), cm^2	35.7	32.1	28.1	-	-	-	40.3	29.7	30.6	27.2	-	-
Stability (P), mm	69	72	70	-	-	-	76	71	76	72	-	-
Distensibility (L), mm	147	131	110	-	-	-	161	131	127	101	-	-
Configuration ratio (P/L)	0.47	0.55	0.64	-	-	-	0.47	0.54	0.60	0.71	-	-
MIXOGRAM												
Peak time, min	2.5	2.3	2.5	-	-	-	2.3	2.0	2.0	2.5	-	-
100g BAKING TEST												
Loaf volume, cm^3	922	883	846	-	-	-	869	811	803	742	-	-
Evaluation (see page 60)	0	0	0	-	-	-	1	1	0	0	-	-

RHEOLOGICAL GRAPHS PER PRODUCTION REGION

MIXOGRAM

5



6

FARINOGRAM

5

6

EXTENSOGRAM

5

6

ALVEOGRAM

5

6

South African Quality data per production region
IRRIGATION WHEAT

PRODUCTION REGION	(10) Griqualand-West				(11) Vaalharts			
WHEAT								
	ave	**min**	**max**	**stdev**	**ave**	**min**	**max**	**stdev**
Protein (12% mb), %	12.1	10.3	13.8	1.00	11.9	10.6	13.3	0.80
Falling number, sec	380	271	570	65.01	364	320	402	21.52
1000 Kernel mass (13% mb), g	37.6	33.3	43.7	2.66	37.7	34.6	41.0	1.95
Hectolitre mass (dirty), kg/hl	80.9	77.3	84.2	2.47	82.3	81.1	84.2	0.90
Screenings (<1.8mm), %	1.40	0.10	3.94	0.99	1.93	0.28	4.38	1.11
Total damaged kernels, %	0.73	0.08	2.12	0.66	0.62	0.16	1.46	0.42
Combined deviations, %	2.87	0.38	7.46	1.70	3.27	0.82	5.34	1.40
Number of samples	***23***				***12***			
CULTIVARS								
	SST 835	30.5			PAN 3471	39.8		
cultivars	SST 843	20.6			SST 835	19.3		
with highest %	PAN 3471	15.6			SST 875	11.5		
occurrence	SST 875	14.8			SST 884	9.9		
	SST 884	9.3			SST 843	8.4		
Number of samples	***23***				***12***			
MIXOGRAM (Quadromat)								
	ave	**min**	**max**	**stdev**	**ave**	**min**	**max**	**stdev**
Peak time, min	2.8	2.1	4.0	0.37	2.9	2.4	3.6	0.38
Tail height (6 min), mm	48	42	54	2.81	48	46	50	1.15
Number of samples	***23***				***12***			

	COMPOSITE SAMPLES											
CLASS AND GRADE	**B1**	**B2**	**B3**	**B4**	**UT**	**COW**	**B1**	**B2**	**B3**	**B4**	**UT**	**COW**
BÜHLER EXTRACTION, %	72.9	73.4	73.7	-	72.1	-	75.1	74.0	74.0	-	-	-
FLOUR												
Protein (12% mb), %	12.0	10.7	9.6	-	11.9	-	11.8	10.5	9.8	-	-	-
Ash (db), %	0.57	0.63	0.55	-	0.66	-	0.59	0.56	0.62	-	-	-
Colour, KJ (wet)	-3.5	-3.7	-3.9	-	-3.0	-	-3.2	-3.4	-3.6	-	-	-
Colour, Minolta CM5 (dry)												
L*	93.72	93.94	94.21	-	93.46	-	93.50	93.88	94.07	-	-	-
a*	0.59	0.55	0.44	-	0.44	-	0.57	0.48	0.47	-	-	-
b*	10.01	9.96	9.54	-	9.35	-	9.98	9.52	9.38	-	-	-
RVA												
Peak Viscosity, cP	2171	2362	2592	-	2143	-	2217	2394	2501	-	-	-
Minimum viscosity (Through), cP	1645	1838	1910	-	1773	-	1768	1803	1910	-	-	-
Final Viscosity, cP	2382	2625	2940	-	2273	-	2430	2711	2852	-	-	-
Peak Time, min	7.00	7.00	7.00	-	7.00	-	7.00	7.00	7.00	-	-	-
GLUTEN												
Wet gluten (14% mb), %	33.4	31.0	26.6	-	34.4	-	32.8	29.7	27.4	-	-	-
Dry gluten (14% mb), %	10.9	9.9	8.8	-	11.7	-	11.0	9.7	9.1	-	-	-
Gluten Index	79	90	84	-	85	-	84	83	80	-	-	-
FARINOGRAM												
Water absorption (14% mb), %	61.0	59.4	57.3	-	60.1	-	59.0	57.6	58.1	-	-	-
Development time, min	5.8	5.2	3.2	-	5.3	-	4.9	5.4	3.2	-	-	-
Stability, min	7.2	6.1	7.8	-	7.5	-	6.6	6.6	5.0	-	-	-
Mixing tolerance index, BU	39	42	29	-	39	-	42	47	49	-	-	-
EXTENSOGRAM (45 min pull)												
Area, cm^2	97	86	91	-	111	-	113	96	80	-	-	-
Maximum height, BU	350	348	418	-	367	-	372	374	332	-	-	-
Extensibility, mm	199	183	159	-	222	-	221	187	171	-	-	-
ALVEOGRAM												
Strength (S), cm^2	38.8	33.6	33.9	-	38.4	-	41.9	35.9	33.3	-	-	-
Stability (P), mm	73	67	74	-	63	-	64	62	71	-	-	-
Distensibility (L), mm	145	141	118	-	171	-	183	165	135	-	-	-
Configuration ratio (P/L)	0.50	0.48	0.63	-	0.37	-	0.35	0.38	0.53	-	-	-
MIXOGRAM												
Peak time, min	2.7	2.6	2.5	-	2.7	-	2.6	2.7	2.7	-	-	-
100g BAKING TEST												
Loaf volume, cm^3	917	877	841	-	1035	-	977	879	822	-	-	-
Evaluation (see page 60)	0	0	0	-	0	-	0	0	0	-	-	-

RHEOLOGICAL GRAPHS PER PRODUCTION REGION

MIXOGRAM

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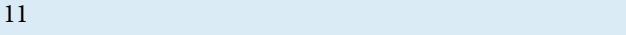

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FARINOGRAM

10

11

EXTENSOGRAM

10

11

ALVEOGRAM

10

11

South African Quality data per production region

IRRIGATION WHEAT

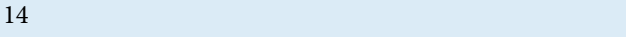
PRODUCTION REGION	(12) North-West Western Region						(14) North-West Southern Region					
WHEAT												
	ave		**min**	**max**	**stdev**		**ave**		**min**	**max**	**stdev**	
Protein (12% mb), %	12.9		10.7	15.6	2.15		12.8		11.5	13.5	0.87	
Falling number, sec	373		348	397	25.33		373		354	393	16.66	
1000 Kernel mass (13% mb), g	33.6		32.5	34.3	0.77		38.6		37.4	39.6	0.90	
Hectolitre mass (dirty), kg/hl	81.4		81.1	81.6	0.22		83.0		82.7	83.5	0.36	
Screenings (<1.8mm), %	1.65		0.63	2.65	1.02		1.00		0.72	1.44	0.31	
Total damaged kernels, %	0.29		0.12	0.44	0.13		0.62		0.42	0.88	0.20	
Combined deviations, %	3.17		1.75	4.53	1.39		2.10		1.84	2.41	0.29	
Number of samples	***4***						***4***					
CULTIVARS												
	SST 835	60.0					SST 843	31.0				
cultivars	SST 843	29.5					SST 835	21.5				
with highest %	SST 875	10.5					SST 884	21.3				
occurrence							PAN 3471	13.0				
							SST 88	4.0				
Number of samples	***4***						***4***					
MIXOGRAM (Quadromat)												
	ave		**min**	**max**	**stdev**		**ave**		**min**	**max**	**stdev**	
Peak time, min	3.7		2.6	5.5	1.28		3.0		2.7	3.3	0.26	
Tail height (6 min), mm	53		46	62	7.39		50		46	52	2.87	
Number of samples	***4***						***4***					

	COMPOSITE SAMPLES											
CLASS AND GRADE	**B1**	**B2**	**B3**	**B4**	**UT**	**COW**	**B1**	**B2**	**B3**	**B4**	**UT**	**COW**
BÜHLER EXTRACTION, %	72.1	-	-	-	-	-	74.0	-	-	-	-	-
FLOUR												
Protein (12% mb), %	13.9	-	-	-	-	-	12.4	-	-	-	-	-
Ash (db), %	0.56	-	-	-	-	-	0.58	-	-	-	-	-
Colour, KJ (wet)	-3.4	-	-	-	-	-	-3.5	-	-	-	-	-
Colour, Minolta CM5 (dry)												
L*	94.02	-	-	-	-	-	93.75	-	-	-	-	-
a*	0.48	-	-	-	-	-	0.56	-	-	-	-	-
b*	9.34	-	-	-	-	-	9.69	-	-	-	-	-
RVA												
Peak Viscosity, cP	2513	-	-	-	-	-	2296	-	-	-	-	-
Minimum viscosity (Through), cP	1784	-	-	-	-	-	1724	-	-	-	-	-
Final Viscosity, cP	2874	-	-	-	-	-	2514	-	-	-	-	-
Peak Time, min	7.00	-	-	-	-	-	7.00	-	-	-	-	-
GLUTEN												
Wet gluten (14% mb), %	35.5	-	-	-	-	-	33.6	-	-	-	-	-
Dry gluten (14% mb), %	12.7	-	-	-	-	-	11.6	-	-	-	-	-
Gluten Index	96	-	-	-	-	-	87	-	-	-	-	-
FARINOGRAM												
Water absorption (14% mb), %	60.6	-	-	-	-	-	60.9	-	-	-	-	-
Development time, min	13.2	-	-	-	-	-	6.3	-	-	-	-	-
Stability, min	17.0	-	-	-	-	-	9.2	-	-	-	-	-
Mixing tolerance index, BU	9	-	-	-	-	-	35	-	-	-	-	-
EXTENSOGRAM (45 min pull)												
Area, cm^2	201	-	-	-	-	-	133	-	-	-	-	-
Maximum height, BU	566	-	-	-	-	-	419	-	-	-	-	-
Extensibility, mm	267	-	-	-	-	-	232	-	-	-	-	-
ALVEOGRAM												
Strength (S), cm^2	70.9	-	-	-	-	-	53.9	-	-	-	-	-
Stability (P), mm	84	-	-	-	-	-	79	-	-	-	-	-
Distensibility (L), mm	168	-	-	-	-	-	173	-	-	-	-	-
Configuration ratio (P/L)	0.50	-	-	-	-	-	0.46	-	-	-	-	-
MIXOGRAM												
Peak time, min	4.1	-	-	-	-	-	3.0	-	-	-	-	-
100g BAKING TEST												
Loaf volume, cm^3	1027	-	-	-	-	-	983	-	-	-	-	-
Evaluation (see page 60)	1	-	-	-	-	-	0	-	-	-	-	-

RHEOLOGICAL GRAPHS PER PRODUCTION REGION

MIXOGRAM

12



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FARINOGRAM

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EXTENSOGRAM

12

14

ALVEOGRAM

12

14

South African Quality data per production region
IRRIGATION WHEAT

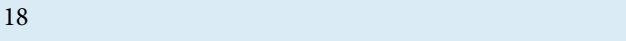
PRODUCTION REGION	(17) North-West Central Northern Region (Ottosdal)				(18) North-West Central Region (Ventersdorp)			
WHEAT								
	ave	**min**	**max**	**stdev**	**ave**	**min**	**max**	**stdev**
Protein (12% mb), %	11.9	11.0	12.7	1.20	14.3	14.1	14.4	0.21
Falling number, sec	387	372	401	20.51	376	374	378	2.83
1000 Kernel mass (13% mb), g	36.4	35.9	36.8	0.64	36.3	35.8	36.7	0.64
Hectolitre mass (dirty), kg/hl	83.1	82.6	83.5	0.64	79.9	79.6	80.2	0.42
Screenings (<1.8mm), %	1.60	1.54	1.65	0.08	0.78	0.74	0.81	0.05
Total damaged kernels, %	0.40	0.32	0.48	0.11	0.77	0.50	1.04	0.38
Combined deviations, %	2.23	2.12	2.33	0.15	2.12	1.73	2.50	0.54
Number of samples	***2***				***2***			
CULTIVARS								
	SST 843	70.5			SST 843	39.0		
cultivars	SST 835	22.5			SST 835	25.0		
with highest %	SST 884	7.0			PAN 3471	18.0		
occurrence					Duzi	11.5		
					SST 884	6.5		
Number of samples	***2***				***2***			
MIXOGRAM (Quadromat)								
	ave	**min**	**max**	**stdev**	**ave**	**min**	**max**	**stdev**
Peak time, min	3.4	2.9	3.8	0.64	4.0	3.3	4.7	0.99
Tail height (6 min), mm	52	47	57	7.07	59	56	62	4.24
Number of samples	***2***				***2***			

	COMPOSITE SAMPLES											
CLASS AND GRADE	**B1**	**B2**	**B3**	**B4**	**UT**	**COW**	**B1**	**B2**	**B3**	**B4**	**UT**	**COW**
BÜHLER EXTRACTION, %	73.7	-	-	-	-	-	72.4	-	-	-	-	-
FLOUR												
Protein (12% mb), %	11.1	-	-	-	-	-	13.2	-	-	-	-	-
Ash (db), %	0.60	-	-	-	-	-	0.59	-	-	-	-	-
Colour, KJ (wet)	-3.5	-	-	-	-	-	-3.1	-	-	-	-	-
Colour, Minolta CM5 (dry)												
L*	93.81	-	-	-	-	-	93.47	-	-	-	-	-
a*	0.43	-	-	-	-	-	0.50	-	-	-	-	-
b*	9.01	-	-	-	-	-	9.25	-	-	-	-	-
RVA												
Peak Viscosity, cP	2617	-	-	-	-	-	2113	-	-	-	-	-
Minimum viscosity (Through), cP	1917	-	-	-	-	-	1560	-	-	-	-	-
Final Viscosity, cP	2953	-	-	-	-	-	2273	-	-	-	-	-
Peak Time, min	7.00	-	-	-	-	-	7.00	-	-	-	-	-
GLUTEN												
Wet gluten (14% mb), %	29.0	-	-	-	-	-	33.5	-	-	-	-	-
Dry gluten (14% mb), %	9.8	-	-	-	-	-	12.1	-	-	-	-	-
Gluten Index	93	-	-	-	-	-	95	-	-	-	-	-
FARINOGRAM												
Water absorption (14% mb), %	58.2	-	-	-	-	-	60.9	-	-	-	-	-
Development time, min	7.2	-	-	-	-	-	10.7	-	-	-	-	-
Stability, min	10.7	-	-	-	-	-	17.7	-	-	-	-	-
Mixing tolerance index, BU	32	-	-	-	-	-	16	-	-	-	-	-
EXTENSOGRAM (45 min pull)												
Area, cm^2	128	-	-	-	-	-	157	-	-	-	-	-
Maximum height, BU	463	-	-	-	-	-	516	-	-	-	-	-
Extensibility, mm	205	-	-	-	-	-	230	-	-	-	-	-
ALVEOGRAM												
Strength (S), cm^2	43.7	-	-	-	-	-	63.0	-	-	-	-	-
Stability (P), mm	69	-	-	-	-	-	88	-	-	-	-	-
Distensibility (L), mm	158	-	-	-	-	-	144	-	-	-	-	-
Configuration ratio (P/L)	0.44	-	-	-	-	-	0.61	-	-	-	-	-
MIXOGRAM												
Peak time, min	3.0	-	-	-	-	-	3.8	-	-	-	-	-
100g BAKING TEST												
Loaf volume, cm^3	997	-	-	-	-	-	932	-	-	-	-	-
Evaluation (see page 60)	0	-	-	-	-	-	2	-	-	-	-	-

RHEOLOGICAL GRAPHS PER PRODUCTION REGION

MIXOGRAM

17



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FARINOGRAM

17

18

EXTENSOGRAM

17

18

ALVEOGRAM

17

18

South African Quality data per production region

IRRIGATION WHEAT

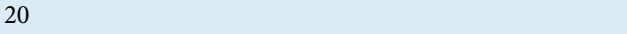
PRODUCTION REGION	(19) North-West Central Region (Lichtenburg)				(20) North-West Eastern Region			
WHEAT								
	ave	**min**	**max**	**stdev**	**ave**	**min**	**max**	**stdev**
Protein (12% mb), %	12.8	12.7	12.9	0.14	12.1	9.9	14.5	1.33
Falling number, sec	386	384	388	2.83	369	284	520	54.07
1000 Kernel mass (13% mb), g	37.8	37.1	38.5	0.99	39.6	34.3	43.1	2.33
Hectolitre mass (dirty), kg/hl	82.9	82.7	83.0	0.21	80.0	78.1	83.2	1.69
Screenings (<1.8mm), %	1.16	1.06	1.26	0.14	0.40	0.11	0.91	0.25
Total damaged kernels, %	0.31	0.26	0.36	0.07	1.00	0.18	2.50	0.71
Combined deviations, %	2.03	1.76	2.30	0.38	2.00	1.02	3.23	0.72
Number of samples	***2***				***15***			
CULTIVARS								
	SST 843	73.0			Duzi	34.9		
cultivars	SST 835	17.0			SST 835	22.4		
with highest %	SST 884	7.0			SST 843	17.3		
occurrence	PAN 3471	3.0			SST 884	13.5		
					SST 875	5.3		
Number of samples	***2***				***15***			
MIXOGRAM (Quadromat)								
	ave	**min**	**max**	**stdev**	**ave**	**min**	**max**	**stdev**
Peak time, min	3.6	3.1	4.0	0.64	3.5	2.3	5.2	0.69
Tail height (6 min), mm	56	53	58	3.54	51	44	69	6.62
Number of samples	***2***				***15***			

	COMPOSITE SAMPLES											
CLASS AND GRADE	**B1**	**B2**	**B3**	**B4**	**UT**	**COW**	**B1**	**B2**	**B3**	**B4**	**UT**	**COW**
BÜHLER EXTRACTION, %	73.9	-	-	-	-	-	74.2	75.6	-	-	-	-
FLOUR												
Protein (12% mb), %	12.2	-	-	-	-	-	12.1	10.3	-	-	-	-
Ash (db), %	0.59	-	-	-	-	-	0.59	0.62	-	-	-	-
Colour, KJ (wet)	-3.7	-	-	-	-	-	-3.2	-3.1	-	-	-	-
Colour, Minolta CM5 (dry)												
L*	93.80	-	-	-	-	-	93.65	93.51	-	-	-	-
a*	0.50	-	-	-	-	-	0.50	0.38	-	-	-	-
b*	9.00	-	-	-	-	-	9.26	9.65	-	-	-	-
RVA												
Peak Viscosity, cP	2346	-	-	-	-	-	2341	2302	-	-	-	-
Minimum viscosity (Through), cP	1740	-	-	-	-	-	1722	1942	-	-	-	-
Final Viscosity, cP	2598	-	-	-	-	-	2613	2535	-	-	-	-
Peak Time, min	7.00	-	-	-	-	-	7.00	6.87	-	-	-	-
GLUTEN												
Wet gluten (14% mb), %	30.9	-	-	-	-	-	31.7	27.7	-	-	-	-
Dry gluten (14% mb), %	11.0	-	-	-	-	-	10.4	9.4	-	-	-	-
Gluten Index	92	-	-	-	-	-	91	89	-	-	-	-
FARINOGRAM												
Water absorption (14% mb), %	60.8	-	-	-	-	-	60.2	56.4	-	-	-	-
Development time, min	8.3	-	-	-	-	-	8.4	5.2	-	-	-	-
Stability, min	10.9	-	-	-	-	-	15.4	6.4	-	-	-	-
Mixing tolerance index, BU	34	-	-	-	-	-	21	49	-	-	-	-
EXTENSOGRAM (45 min pull)												
Area, cm^2	148	-	-	-	-	-	140	93	-	-	-	-
Maximum height, BU	477	-	-	-	-	-	448	324	-	-	-	-
Extensibility, mm	234	-	-	-	-	-	230	209	-	-	-	-
ALVEOGRAM												
Strength (S), cm^2	57.7	-	-	-	-	-	54.2	31.1	-	-	-	-
Stability (P), mm	86	-	-	-	-	-	79	49	-	-	-	-
Distensibility (L), mm	147	-	-	-	-	-	162	187	-	-	-	-
Configuration ratio (P/L)	0.59	-	-	-	-	-	0.49	0.26	-	-	-	-
MIXOGRAM												
Peak time, min	3.3	-	-	-	-	-	3.4	2.8	-	-	-	-
100g BAKING TEST												
Loaf volume, cm^3	910	-	-	-	-	-	924	942	-	-	-	-
Evaluation (see page 60)	1	-	-	-	-	-	0	0	-	-	-	-

RHEOLOGICAL GRAPHS PER PRODUCTION REGION

MIXOGRAM

19



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FARINOGRAM

19

20

EXTENSOGRAM

19

20

ALVEOGRAM

19

20

South African Quality data per production region

SUMMER RAINFALL AND IRRIGATION WHEAT

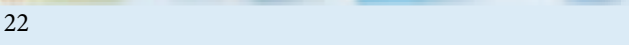
PRODUCTION REGION	(21) Free-State North-Western Region (Viljoenskroon)				(22) Free-State North-Western Region (Bothaville)			
WHEAT	**ave**	**min**	**max**	**stdev**	**ave**	**min**	**max**	**stdev**
Protein (12% mb), %	12.3	-	-	-	13.4	11.7	14.7	1.53
Falling number, sec	324	-	-	-	363	346	374	14.93
1000 Kernel mass (13% mb), g	26.0	-	-	-	34.8	32.1	36.6	2.40
Hectolitre mass (dirty), kg/hl	73.0	-	-	-	77.9	75.3	80.1	2.42
Screenings (<1.8mm), %	6.58	-	-	-	1.67	1.12	1.98	0.48
Total damaged kernels, %	0.50	-	-	-	0.37	0.28	0.46	0.09
Combined deviations, %	7.76	-	-	-	2.79	2.58	3.18	0.34
Number of samples	***1***				***3***			
CULTIVARS								
	SST 875	85.0			SST 387	27.0		
cultivars	SST 387	15.0			PAN 3120	25.7		
with highest %					SST 875	23.7		
occurrence					Buffels	14.0		
					SST 843	5.0		
Number of samples	***1***				***3***			
MIXOGRAM (Quadromat)	**ave**	**min**	**max**	**stdev**	**ave**	**min**	**max**	**stdev**
Peak time, min	3.3	-	-	-	3.0	2.7	3.3	0.31
Tail height (6 min), mm	48	-	-	-	53	52	54	1.00
Number of samples	***1***				***3***			

	COMPOSITE SAMPLES											
CLASS AND GRADE	**B1**	**B2**	**B3**	**B4**	**UT**	**COW**	**B1**	**B2**	**B3**	**B4**	**UT**	**COW**
BÜHLER EXTRACTION, %	-	-	-	-	-	70.9	73.2	-	-	-	-	-
FLOUR												
Protein (12% mb), %	-	-	-	-	-	10.9	13.5	-	-	-	-	-
Ash (db), %	-	-	-	-	-	0.65	0.59	-	-	-	-	-
Colour, KJ (wet)	-	-	-	-	-	-2.2	-2.9	-	-	-	-	-
Colour, Minolta CM5 (dry)												
L*	-	-	-	-	-	92.98	93.27	-	-	-	-	-
a*	-	-	-	-	-	0.56	0.58	-	-	-	-	-
b*	-	-	-	-	-	9.78	9.58	-	-	-	-	-
RVA												
Peak Viscosity, cP	-	-	-	-	-	2810	2090	-	-	-	-	-
Minimum viscosity (Through), cP	-	-	-	-	-	2166	1548	-	-	-	-	-
Final Viscosity, cP	-	-	-	-	-	3127	2277	-	-	-	-	-
Peak Time, min	-	-	-	-	-	7.00	7.00	-	-	-	-	-
GLUTEN												
Wet gluten (14% mb), %	-	-	-	-	-	27.2	37.7	-	-	-	-	-
Dry gluten (14% mb), %	-	-	-	-	-	9.2	12.4	-	-	-	-	-
Gluten Index	-	-	-	-	-	94	85	-	-	-	-	-
FARINOGRAM												
Water absorption (14% mb), %	-	-	-	-	-	58.0	63.5	-	-	-	-	-
Development time, min	-	-	-	-	-	4.3	6.4	-	-	-	-	-
Stability, min	-	-	-	-	-	6.7	9.1	-	-	-	-	-
Mixing tolerance index, BU	-	-	-	-	-	39	31	-	-	-	-	-
EXTENSOGRAM (45 min pull)												
Area, cm^2	-	-	-	-	-	74	134	-	-	-	-	-
Maximum height, BU	-	-	-	-	-	238	395	-	-	-	-	-
Extensibility, mm	-	-	-	-	-	219	249	-	-	-	-	-
ALVEOGRAM												
Strength (S), cm^2	-	-	-	-	-	26.9	50.8	-	-	-	-	-
Stability (P), mm	-	-	-	-	-	50	81	-	-	-	-	-
Distensibility (L), mm	-	-	-	-	-	163	159	-	-	-	-	-
Configuration ratio (P/L)	-	-	-	-	-	0.31	0.51	-	-	-	-	-
MIXOGRAM												
Peak time, min	-	-	-	-	-	3.1	2.5	-	-	-	-	-
100g BAKING TEST												
Loaf volume, cm^3	-	-	-	-	-	1132	1006	-	-	-	-	-
Evaluation (see page 60)	-	-	-	-	-	0	1	-	-	-	-	-

RHEOLOGICAL GRAPHS PER PRODUCTION REGION

MIXOGRAM

21



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FARINOGRAM

21

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EXTENSOGRAM

21

22

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), %	13.3	9.5	16.0	1.65	12.4	10.6	14.2	1.08
Falling number, sec	333	263	390	36.59	366	291	424	30.65
1000 Kernel mass (13% mb), g	34.8	25.6	44.8	5.46	35.9	26.6	46.0	5.32
Hectolitre mass (dirty), kg/hl	78.1	71.5	80.7	2.73	79.4	70.5	82.8	2.89
Screenings (<1.8mm), %	1.86	1.14	3.77	0.64	1.84	0.60	4.0	0.95
Total damaged kernels, %	0.38	0.20	0.78	0.17	0.53	0.06	1.90	0.44
Combined deviations, %	3.02	2.04	6.15	0.99	2.93	1.40	5.20	1.06
Number of samples	***15***				***21***			
CULTIVARS								
	PAN 3120	32.5			SST 387	17.0		
cultivars	SST 387	23.9			SST 843	13.8		
with highest %	SST 835	14.3			PAN 3471	12.1		
occurrence	SST 843	9.0			SST 835	10.9		
	PAN 3471	7.5			SST 88	7.5		
Number of samples	***15***				***21***			
MIXOGRAM (Quadromat)								
	ave	**min**	**max**	**stdev**	**ave**	**min**	**max**	**stdev**
Peak time, min	3.2	2.5	4.2	0.44	3.2	1.7	4.4	0.55
Tail height (6 min), mm	52	43	56	3.50	49	42	59	3.74
Number of samples	***15***				***21***			

	COMPOSITE SAMPLES											
CLASS AND GRADE	**B1**	**B2**	**B3**	**B4**	**UT**	**COW**	**B1**	**B2**	**B3**	**B4**	**UT**	**COW**
BÜHLER EXTRACTION, %	72.2	72.8	71.9	75.6	-	-	73.6	73.1	73.9	-	74.0	-
FLOUR												
Protein (12% mb), %	11.8	11.8	12.1	8.5	-	-	12.5	10.3	10.2	-	11.7	-
Ash (db), %	0.58	0.57	0.60	0.56	-	-	0.56	0.59	0.59	-	0.64	-
Colour, KJ (wet)	-3.2	-3.4	-3.2	-3.5	-	-	-3.2	-3.1	-3.0	-	-2.9	-
Colour, Minolta CM5 (dry)												
L*	93.49	93.65	93.59	94.12	-	-	93.57	93.44	93.75	-	93.49	-
a*	0.52	0.50	0.46	0.45	-	-	0.46	0.51	0.44	-	0.44	-
b*	9.85	9.98	9.98	8.21	-	-	9.98	10.23	10.50	-	9.42	-
RVA												
Peak Viscosity, cP	2240	2196	2234	2446	-	-	2415	2154	2225	-	2347	-
Minimum viscosity (Through), cP	1734	1764	1869	2050	-	-	1889	1775	1748	-	1902	-
Final Viscosity, cP	2421	2466	2421	2799	-	-	2621	2397	2519	-	2634	-
Peak Time, min	7.00	6.93	7.00	6.80	-	-	7.00	6.93	7.00	-	7.00	-
GLUTEN												
Wet gluten (14% mb), %	33.9	31.8	32.9	22.5	-	-	33.3	26.3	26.4	-	33.9	-
Dry gluten (14% mb), %	11.5	10.3	10.7	7.2	-	-	10.9	9.0	8.9	-	11.4	-
Gluten Index	85	81	80	85	-	-	78	87	89	-	83	-
FARINOGRAM												
Water absorption (14% mb), %	60.8	60.0	61.2	55.9	-	-	60.6	57.4	58.3	-	61.0	-
Development time, min	6.0	6.0	6.0	2.0	-	-	6.0	2.4	4.5	-	6.4	-
Stability, min	11.2	9.0	9.7	5.6	-	-	8.4	6.9	6.7	-	7.2	-
Mixing tolerance index, BU	21	29	26	43	-	-	36	27	40	-	43	-
EXTENSOGRAM (45 min pull)												
Area, cm^2	139	107	111	66	-	-	120	96	85	-	101	-
Maximum height, BU	428	357	372	286	-	-	374	390	338	-	341	-
Extensibility, mm	236	218	218	164	-	-	231	178	180	-	213	-
ALVEOGRAM												
Strength (S), cm^2	44.0	40.3	44.3	25.2	-	-	39.1	32.7	32.9	-	41.5	-
Stability (P), mm	72	70	80	59	-	-	71	67	68	-	72	-
Distensibility (L), mm	148	161	142	122	-	-	142	125	134	-	154	-
Configuration ratio (P/L)	0.49	0.43	0.56	0.48	-	-	0.50	0.54	0.51	-	0.47	-
MIXOGRAM												
Peak time, min	2.6	2.5	2.6	2.4	-	-	2.4	2.8	2.6	-	2.0	-
100g BAKING TEST												
Loaf volume, cm^3	1032	1013	1026	779	-	-	1041	890	894	-	991	-
Evaluation (see page 60)	0	0	0	0	-	-	0	0	0	-	0	-

RHEOLOGICAL GRAPHS PER PRODUCTION REGION

MIXOGRAM

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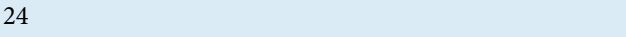

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FARINOGRAM

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EXTENSOGRAM

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ALVEOGRAM

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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), %	12.0	9.8	14.4	1.01	11.5	9.8	12.4	1.02
Falling number, sec	356	271	418	40.29	364	319	403	33.88
1000 Kernel mass (13% mb), g	38.3	31.9	47.5	3.94	38.5	33.2	41.8	3.04
Hectolitre mass (dirty), kg/hl	79.5	74.7	84.5	2.86	79.5	77.0	80.9	1.44
Screenings (<1.8mm), %	1.45	0.49	3.50	0.74	1.46	0.50	3.04	1.07
Total damaged kernels, %	0.81	0.08	4.78	1.06	0.45	0.18	0.90	0.34
Combined deviations, %	2.88	0.88	6.95	1.52	2.48	0.78	5.00	1.49
Number of samples	***19***				***6***			
CULTIVARS								
	SST 835	21.2			SST 875	27.2		
cultivars	Elands	16.8			PAN 3161	23.7		
with highest %	SST 356	12.5			SST 835	18.7		
occurrence	PAN 3161	9.7			Elands	10.0		
	Matlabas	8.8			Gariep	8.8		
Number of samples	***19***				***6***			
MIXOGRAM (Quadromat)								
	ave	**min**	**max**	**stdev**	**ave**	**min**	**max**	**stdev**
Peak time, min	3.1	2.1	5.3	0.65	3.3	2.3	4.2	0.79
Tail height (6 min), mm	51	44	59	4.27	52	46	59	5.24
Number of samples	***19***				***6***			

	COMPOSITE SAMPLES											
CLASS AND GRADE	**B1**	**B2**	**B3**	**B4**	**UT**	**COW**	**B1**	**B2**	**B3**	**B4**	**UT**	**COW**
BÜHLER EXTRACTION, %	73.7	72.9	73.3	74.9	72.5	-	74.6	-	74.6	-	-	-
FLOUR												
Protein (12% mb), %	11.7	10.6	9.1	9.4	10.4	-	11.2	-	9.5	-	-	-
Ash (db), %	0.56	0.56	0.51	0.58	0.58	-	0.58	-	0.54	-	-	-
Colour, KJ (wet)	-3.2	-3.3	-3.5	-3.7	-3.3	-	-3.4	-	-2.9	-	-	-
Colour, Minolta CM5 (dry)												
L*	93.42	93.66	94.30	94.09	93.79	-	93.65	-	93.82	-	-	-
a*	0.44	0.39	0.22	0.38	0.43	-	0.43	-	0.28	-	-	-
b*	9.78	10.09	8.32	9.19	9.15	-	9.72	-	9.93	-	-	-
RVA												
Peak Viscosity, cP	2114	2254	2661	2385	2170	-	2194	-	2440	-	-	-
Minimum viscosity (Through), cP	1619	1678	1894	1707	1631	-	1665	-	1793	-	-	-
Final Viscosity, cP	2310	2597	3130	2742	2457	-	2449	-	2769	-	-	-
Peak Time, min	7.00	7.00	7.00	7.00	7.00	-	7.00	-	7.00	-	-	-
GLUTEN												
Wet gluten (14% mb), %	32.4	31.5	20.9	25.1	29.1	-	30.9	-	24.5	-	-	-
Dry gluten (14% mb), %	11.0	10.4	7.2	8.2	10.0	-	10.3	-	8.6	-	-	-
Gluten Index	83	86	96	84	78	-	78	-	97	-	-	-
FARINOGRAM												
Water absorption (14% mb), %	61.8	60.2	57.4	58.3	59.0	-	61.2	-	59.1	-	-	-
Development time, min	6.0	5.3	1.7	4.5	5.3	-	4.8	-	2.2	-	-	-
Stability, min	9.4	8.1	7.5	6.7	6.6	-	5.5	-	11.8	-	-	-
Mixing tolerance index, BU	24	31	31	43	45	-	41	-	20	-	-	-
EXTENSOGRAM (45 min pull)												
Area, cm^2	119	83	87	80	80	-	89	-	104	-	-	-
Maximum height, BU	401	330	381	348	337	-	309	-	448	-	-	-
Extensibility, mm	216	182	170	165	174	-	206	-	171	-	-	-
ALVEOGRAM												
Strength (S), cm^2	32.6	36.7	32.6	29.2	35.9	-	37.6	-	43.3	-	-	-
Stability (P), mm	55	80	86	74	74	-	76	-	109	-	-	-
Distensibility (L), mm	151	121	71	97	126	-	128	-	81	-	-	-
Configuration ratio (P/L)	0.36	0.66	1.21	0.76	0.59	-	0.59	-	1.35	-	-	-
MIXOGRAM												
Peak time, min	2.6	2.3	3.9	2.9	2.3	-	2.3	-	3.2	-	-	-
100g BAKING TEST												
Loaf volume, cm^3	859	830	744	747	825	-	983	-	725	-	-	-
Evaluation (see page 60)	1	0	0	1	0	-	0	-	2	-	-	-

RHEOLOGICAL GRAPHS PER PRODUCTION REGION

MIXOGRAM

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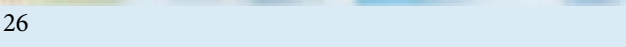

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FARINOGRAM

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EXTENSOGRAM

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ALVEOGRAM

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South African Quality data per production region

SUMMER RAINFALL AND IRRIGATION WHEAT

PRODUCTION REGION	(27) Free State Northern Region				(28) Free State Eastern Region			
WHEAT								
	ave	**min**	**max**	**stdev**	**ave**	**min**	**max**	**stdev**
Protein (12% mb), %	12.8	12.6	13.0	0.21	12.3	11.2	13.6	0.72
Falling number, sec	352	325	377	26.06	340	241	418	49.23
1000 Kernel mass (13% mb), g	37.2	36.0	39.2	1.72	38.6	33.0	44.4	3.12
Hectolitre mass (dirty), kg/hl	78.4	77.0	79.8	1.40	80.4	77.7	83.7	2.08
Screenings (<1.8mm), %	0.93	0.41	1.30	0.46	0.65	0.20	1.54	0.44
Total damaged kernels, %	0.63	0.36	1.08	0.39	0.69	0.20	1.68	0.41
Combined deviations, %	2.15	1.85	2.45	0.30	1.88	0.53	4.27	1.27
Number of samples	***3***				***15***			
CULTIVARS								
	Elands	35.0			PAN 3161	17.5		
cultivars	PAN 3161	26.0			Elands	17.2		
with highest %	SST 356	19.7			Matlabas	14.9		
occurrence	Gariep	8.7			SST 835	12.4		
	SST 056	8.3			SST 356	10.8		
Number of samples	***3***				***15***			
MIXOGRAM (Quadromat)								
	ave	**min**	**max**	**stdev**	**ave**	**min**	**max**	**stdev**
Peak time, min	3.8	3.2	4.3	0.57	3.1	2.7	3.5	0.24
Tail height (6 min), mm	59	54	62	4.36	53	47	56	2.42
Number of samples	***3***				***15***			

	COMPOSITE SAMPLES											
CLASS AND GRADE	**B1**	**B2**	**B3**	**B4**	**UT**	**COW**	**B1**	**B2**	**B3**	**B4**	**UT**	**COW**
BÜHLER EXTRACTION, %	74.0	-	-	-	-	-	72.9	72.5	-	-	72.6	-
FLOUR												
Protein (12% mb), %	11.8	-	-	-	-	-	11.4	10.2	-	-	10.1	-
Ash (db), %	0.56	-	-	-	-	-	0.57	0.53	-	-	0.61	-
Colour, KJ (wet)	-2.7	-	-	-	-	-	-3.0	-3.5	-	-	-3.0	-
Colour, Minolta CM5 (dry)												
L*	93.16	-	-	-	-	-	93.50	93.85	-	-	93.63	-
a*	0.44	-	-	-	-	-	0.41	0.38	-	-	0.40	-
b*	9.26	-	-	-	-	-	10.02	9.41	-	-	10.72	-
RVA												
Peak Viscosity, cP	2330	-	-	-	-	-	2049	2189	-	-	2277	-
Minimum viscosity (Through), cP	1807	-	-	-	-	-	1596	1662	-	-	1755	-
Final Viscosity, cP	2559	-	-	-	-	-	2246	2484	-	-	2675	-
Peak Time, min	7.00	-	-	-	-	-	7.00	7.00	-	-	7.00	-
GLUTEN												
Wet gluten (14% mb), %	30.1	-	-	-	-	-	31.1	29.4	-	-	27.7	-
Dry gluten (14% mb), %	10.7	-	-	-	-	-	10.4	9.9	-	-	9.3	-
Gluten Index	94	-	-	-	-	-	85	87	-	-	90	-
FARINOGRAM												
Water absorption (14% mb), %	60.5	-	-	-	-	-	61.2	60.5	-	-	60.2	-
Development time, min	8.8	-	-	-	-	-	5.4	5.3	-	-	7.2	-
Stability, min	14.9	-	-	-	-	-	10.3	8.5	-	-	13.9	-
Mixing tolerance index, BU	18	-	-	-	-	-	20	34	-	-	20	-
EXTENSOGRAM (45 min pull)												
Area, cm^2	132	-	-	-	-	-	105	86	-	-	82	-
Maximum height, BU	453	-	-	-	-	-	380	335	-	-	315	-
Extensibility, mm	217	-	-	-	-	-	201	187	-	-	186	-
ALVEOGRAM												
Strength (S), cm^2	48.2	-	-	-	-	-	43.7	35.2	-	-	39.1	-
Stability (P), mm	85	-	-	-	-	-	86	83	-	-	89	-
Distensibility (L), mm	132	-	-	-	-	-	125	108	-	-	108	-
Configuration ratio (P/L)	0.64	-	-	-	-	-	0.69	0.77	-	-	0.82	-
MIXOGRAM												
Peak time, min	3.2	-	-	-	-	-	2.4	2.9	-	-	2.6	-
100g BAKING TEST												
Loaf volume, cm^3	894	-	-	-	-	-	858	816	-	-	909	-
Evaluation (see page 60)	1	-	-	-	-	-	1	0	-	-	0	-

RHEOLOGICAL GRAPHS PER PRODUCTION REGION

MIXOGRAM

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FARINOGRAM

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EXTENSOGRAM

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ALVEOGRAM

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South African Quality data per production region
IRRIGATION WHEAT

PRODUCTION REGION	(29) Mpumalanga Southern Region				(32) Mpumalanga Western Region			
WHEAT								
	ave	**min**	**max**	**stdev**	**ave**	**min**	**max**	**stdev**
Protein (12% mb), %	12.5	-	-	-	12.7	11.9	13.4	0.61
Falling number, sec	350	-	-	-	282	174	348	60.49
1000 Kernel mass (13% mb), g	34.4	-	-	-	39.2	31.2	46.8	5.71
Hectolitre mass (dirty), kg/hl	81.3	-	-	-	79.7	76.0	82.8	2.28
Screenings (<1.8mm), %	2.01	-	-	-	1.39	0.20	2.52	1.10
Total damaged kernels, %	1.06	-	-	-	0.79	0.20	2.16	0.66
Combined deviations, %	3.43	-	-	-	2.86	0.72	6.42	1.94
Number of samples	***1***				***7***			
CULTIVARS								
	SST 835	65.0			SST 835	41.4		
cultivars	SST 875	27.0			SST 843	33.9		
with highest %	SST 843	8.0			Duzi	7.4		
occurrence					SST 876	6.4		
					SST 884	5.3		
Number of samples	***1***				***7***			
MIXOGRAM (Quadromat)								
	ave	**min**	**max**	**stdev**	**ave**	**min**	**max**	**stdev**
Peak time, min	3.3	-	-	-	3.3	2.3	4.3	0.70
Tail height (6min), mm	51	-	-	-	53	50	57	2.54
Number of samples	***1***				***7***			

	COMPOSITE SAMPLES											
CLASS AND GRADE	**B1**	**B2**	**B3**	**B4**	**UT**	**COW**	**B1**	**B2**	**B3**	**B4**	**UT**	**COW**
BÜHLER EXTRACTION, %							73.1	74.2	-	-	-	-
FLOUR												
Protein (12% mb), %							11.5	11.1	-	-	-	-
Ash (db), %							0.54	0.61	-	-	-	-
Colour, KJ (wet)							-2.9	-3.0	-	-	-	-
Colour, Minolta CM5 (dry)												
L*							93.34	93.32	-	-	-	-
a*							0.39	0.42	-	-	-	-
b*							9.13	9.15	-	-	-	-
RVA												
Peak Viscosity, cP							1929	1698	-	-	-	-
Minimum viscosity (Through), cP							1683	1440	-	-	-	-
Final Viscosity, cP							2094	1836	-	-	-	-
Peak Time, min							6.73	6.60	-	-	-	-
GLUTEN												
Wet gluten (14% mb), %							31.4	30.5	-	-	-	-
Dry gluten (14% mb), %							10.6	10.0	-	-	-	-
Gluten Index							88	84	-	-	-	-
FARINOGRAM												
Water absorption (14% mb), %							60.3	61.1	-	-	-	-
Development time, min							7.5	5.7	-	-	-	-
Stability, min							9.8	5.8	-	-	-	-
Mixing tolerance index, BU							35	57	-	-	-	-
EXTENSOGRAM (45 min pull)												
Area, cm^2							119	90	-	-	-	-
Maximum height, BU							395	302	-	-	-	-
Extensibility, mm							224	217	-	-	-	-
ALVEOGRAM												
Strength (S), cm^2							44.6	37.3	-	-	-	-
Stability (P), mm							74	70	-	-	-	-
Distensibility (L), mm							151	160	-	-	-	-
Configuration ratio (P/L)							0.49	0.44	-	-	-	-
MIXOGRAM												
Peak time, min							2.8	2.6	-	-	-	-
100g BAKING TEST												
Loaf volume, cm^3							879	849	-	-	-	-
Evaluation (see page 60)							1	1	-	-	-	-

RHEOLOGICAL GRAPHS PER PRODUCTION REGION

MIXOGRAM

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FARINOGRAM

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EXTENSOGRAM

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ALVEOGRAM

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South African Quality data per production region
IRRIGATION WHEAT

PRODUCTION REGION	(33) Mpumalanga Northern Region				(34) Gauteng			
WHEAT								
	ave	**min**	**max**	**stdev**	**ave**	**min**	**max**	**stdev**
Protein (12% mb), %	11.5	10.0	12.7	0.94	11.8	10.3	12.9	0.87
Falling number, sec	408	374	442	25.80	338	288	392	34.14
1000 Kernel mass (13% mb), g	42.6	38.5	46.7	3.40	41.5	37.4	46.6	3.51
Hectolitre mass (dirty), kg/hl	81.5	80.1	82.6	0.99	81.5	79.8	83.4	1.31
Screenings (<1.8mm), %	0.60	0.38	1.02	0.23	2.85	0.34	17.12	5.78
Total damaged kernels, %	2.16	0.40	3.66	1.38	0.40	0.00	1.00	0.37
Combined deviations, %	2.90	0.88	4.22	1.54	3.66	0.77	17.98	5.81
Number of samples		***6***				***8***		
CULTIVARS								
	SST 843	30.7			SST 875	32.4		
cultivars	SST 835	23.7			SST 884	32.1		
with highest %	Duzi	17.5			SST 835	18.1		
occurrence	Kariega	16.7			SST 843	11.1		
	SST 876	4.3			PAN 3471	6.1		
Number of samples		***6***				***8***		
MIXOGRAM (Quadromat)								
	ave	**min**	**max**	**stdev**	**ave**	**min**	**max**	**stdev**
Peak time, min	3.1	2.3	3.5	0.48	3.6	2.5	4.8	0.92
Tail height (6 min), mm	50	46	56	3.85	49	45	57	4.03
Number of samples		***6***				***8***		

	COMPOSITE SAMPLES											
CLASS AND GRADE	**B1**	**B2**	**B3**	**B4**	**UT**	**COW**	**B1**	**B2**	**B3**	**B4**	**UT**	**COW**
BÜHLER EXTRACTION, %	74.0	-	74.2	-	-	-	74.8	72.6	73.9	-	-	-
FLOUR												
Protein (12% mb), %	11.2	-	8.9	-	-	-	11.6	9.9	9.7	-	-	-
Ash (db), %	0.58	-	0.60	-	-	-	0.63	0.62	0.56	-	-	-
Colour, KJ (wet)	-3.5	-	-3.9	-	-	-	-3.1	-2.5	-3.0	-	-	-
Colour, Minolta CM5 (dry)												
L*	93.76	-	93.98	-	-	-	93.28	93.11	93.45	-	-	-
a*	0.48	-	0.41	-	-	-	0.51	0.52	0.50	-	-	-
b*	9.21	-	8.92	-	-	-	9.88	10.27	9.82	-	-	-
RVA												
Peak Viscosity, cP	2331	-	2385	-	-	-	2118	1953	1847	-	-	-
Minimum viscosity (Through), cP	1788	-	1783	-	-	-	1737	1674	1575	-	-	-
Final Viscosity, cP	2546	-	2768	-	-	-	2304	2206	2027	-	-	-
Peak Time, min	7.00	-	7.00	-	-	-	6.87	6.73	6.60	-	-	-
GLUTEN												
Wet gluten (14% mb), %	29.1	-	23.4	-	-	-	31.5	27.8	25.6	-	-	-
Dry gluten (14% mb), %	9.9	-	7.7	-	-	-	10.4	9.7	8.3	-	-	-
Gluten Index	94	-	91	-	-	-	79	86	89	-	-	-
FARINOGRAM												
Water absorption (14% mb), %	60.4	-	59.4	-	-	-	61.1	57.8	59.0	-	-	-
Development time, min	5.9	-	2.0	-	-	-	6.0	4.3	2.2	-	-	-
Stability, min	10.5	-	7.0	-	-	-	7.4	9.5	7.0	-	-	-
Mixing tolerance index, BU	20	-	29	-	-	-	44	23	34	-	-	-
EXTENSOGRAM (45 min pull)												
Area, cm^2	131	-	78	-	-	-	90	92	84	-	-	-
Maximum height, BU	437	-	328	-	-	-	332	364	388	-	-	-
Extensibility, mm	220	-	174	-	-	-	197	182	155	-	-	-
ALVEOGRAM												
Strength (S), cm^2	52.2	-	33.2	-	-	-	38.8	36.7	35.9	-	-	-
Stability (P), mm	87	-	80	-	-	-	80	69	100	-	-	-
Distensibility (L), mm	142	-	101	-	-	-	121	139	74	-	-	-
Configuration ratio (P/L)	0.61	-	0.79	-	-	-	0.66	0.50	1.35	-	-	-
MIXOGRAM												
Peak time, min	3.0	-	3.1	-	-	-	2.5	3.0	3.7	-	-	-
100g BAKING TEST												
Loaf volume, cm^3	873	-	761	-	-	-	974	905	787	-	-	-
Evaluation (see page 60)	0	-	0	-	-	-	0	0	0	-	-	-

RHEOLOGICAL GRAPHS PER PRODUCTION REGION

MIXOGRAM

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FARINOGRAM

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EXTENSOGRAM

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ALVEOGRAM

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South African Quality data per production region
IRRIGATION WHEAT

PRODUCTION REGION	(35) Limpopo Region				(36) Kwazulu-Natal			
WHEAT								
	ave	**min**	**max**	**stdev**	**ave**	**min**	**max**	**stdev**
Protein (12% mb), %	11.6	9.2	13.8	1.23	12.3	11.0	13.2	0.94
Falling number, sec	374	231	487	54.60	354	251	416	75.44
1000 Kernel mass (13% mb), g	40.8	35.4	46.2	3.06	40.2	38.1	43.9	2.62
Hectolitre mass (dirty), kg/hl	81.4	78.9	84.8	1.33	82.2	81.8	82.4	0.28
Screenings (<1.8mm), %	0.80	0.15	2.63	0.60	1.21	0.41	2.09	0.75
Total damaged kernels, %	0.93	0.06	2.90	0.78	1.17	0.54	2.46	0.89
Combined deviations, %	1.97	0.45	5.36	1.30	2.73	1.21	4.34	1.53
Number of samples	***28***				***4***			
CULTIVARS								
	SST 843	36.6			SST 835	41.0		
cultivars	SST 835	23.0			SST 875	20.8		
with highest %	SST 884	18.7			PAN 3400	14.0		
occurrence	Duzi	10.1			SST 843	10.0		
	SST 875	4.7			SST 884	9.0		
Number of samples	***28***				***4***			
MIXOGRAM (Quadromat)								
	ave	**min**	**max**	**stdev**	**ave**	**min**	**max**	**stdev**
Peak time, min	3.5	2.4	5.3	0.72	2.8	2.5	3.3	0.39
Tail height (6 min), mm	53	43	70	6.01	52	46	56	4.50
Number of samples	***28***				***4***			

	COMPOSITE SAMPLES											
CLASS AND GRADE	**B1**	**B2**	**B3**	**B4**	**UT**	**COW**	**B1**	**B2**	**B3**	**B4**	**UT**	**COW**
BÜHLER EXTRACTION, %	74.6	74.9	73.8	73.5	73.3	-	74.3	75.5	-	-	-	-
FLOUR												
Protein (12% mb), %	12.1	10.7	9.4	9.1	11.3	-	11.5	10.0	-	-	-	-
Ash (db), %	0.62	0.63	0.59	0.56	0.62	-	0.58	0.62	-	-	-	-
Colour, KJ (wet)	-3.5	-3.4	-3.5	-3.6	-3.0	-	-3.2	-3.5	-	-	-	-
Colour, Minolta CM5 (dry)												
L*	93.60	93.57	93.69	93.86	93.62	-	93.81	93.93	-	-	-	-
a*	0.49	0.45	0.39	0.41	0.36	-	0.38	0.38	-	-	-	-
b*	9.31	9.67	9.65	9.69	8.79	-	8.71	8.62	-	-	-	-
RVA												
Peak Viscosity, cP	2503	2453	2337	2410	1499	-	2391	2218	-	-	-	-
Minimum viscosity (Through), cP	1905	1884	1853	1838	1232	-	1881	1614	-	-	-	-
Final Viscosity, cP	2811	2752	2635	2762	1652	-	2539	2486	-	-	-	-
Peak Time, min	7.00	7.00	7.00	7.00	6.40	-	7.00	7.00	-	-	-	-
GLUTEN												
Wet gluten (14% mb), %	31.0	28.2	23.8	23.3	29.2	-	30.6	27.1	-	-	-	-
Dry gluten (14% mb), %	10.7	9.5	7.9	7.8	10.3	-	10.4	9.3	-	-	-	-
Gluten Index	93	85	94	97	92	-	92	79	-	-	-	-
FARINOGRAM												
Water absorption (14% mb), %	59.9	59.0	57.1	58.3	59.4	-	61.4	58.7	-	-	-	-
Development time, min	7.0	6.0	6.2	6.0	4.8	-	6.6	4.3	-	-	-	-
Stability, min	10.1	8.0	9.5	10.7	9.6	-	9.4	4.7	-	-	-	-
Mixing tolerance index, BU	33	41	35	23	25	-	32	63	-	-	-	-
EXTENSOGRAM (45 min pull)												
Area, cm^2	135	96	96	101	121	-	116	71	-	-	-	-
Maximum height, BU	459	385	405	440	427	-	418	275	-	-	-	-
Extensibility, mm	220	188	177	172	217	-	204	182	-	-	-	-
ALVEOGRAM												
Strength (S), cm^2	50.6	32.4	34.6	34.3	44.8	-	44.2	28.1	-	-	-	-
Stability (P), mm	75	80	71	82	72	-	88	66	-	-	-	-
Distensibility (L), mm	157	89	121	95	139	-	131	127	-	-	-	-
Configuration ratio (P/L)	0.48	0.90	0.59	0.86	0.52	-	0.67	0.52	-	-	-	-
MIXOGRAM												
Peak time, min	3.0	2.8	3.0	3.3	3.0	-	2.9	2.2	-	-	-	-
100g BAKING TEST												
Loaf volume, cm^3	947	878	883	830	993	-	940	823	-	-	-	-
Evaluation (see page 60)	0	0	0	0	0	-	0	0	-	-	-	-

RHEOLOGICAL GRAPHS PER PRODUCTION REGION

MIXOGRAM

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FARINOGRAM

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EXTENSOGRAM

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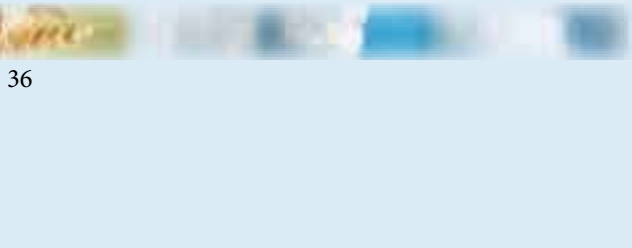

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ALVEOGRAM

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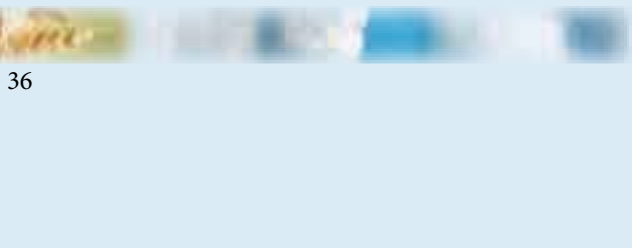

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Mycotoxins

Mycotoxins can occur in both tropical areas and temperate regions of the world. Major food commodities affected include cereals, nuts, oil seeds and fruit. 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 quality reduction of commodities.

Mycotoxins are produced by one or more very specific fungal or mould species. In some cases one species can produce more than one mycotoxin. It is important to remember that the presence of a toxin-producing mould does not automatically imply the presence of the associated toxin as many factors influence the production of mycotoxins. Mycotoxins are often produced when the mould is under stress, for example, when the temperature, water activity or amount of oxygen becomes less favourable. In general, the minimum water activity for growth is lower than the minimum for mycotoxin production. Conversely, the absence of any visible mould does not guarantee that no toxins are present as the mould may have already died out while leaving the toxin intact.

Mycotoxin-producing moulds are generally divided into field and storage moulds. Field mould primarily occur pre-harvest in the field and storage mould post-harvest during storage. Any crop that is stored for more than a few days is a target for mould growth and mycotoxin formation.

Moulds tend to develop in isolated pockets in stored commodities. This results in a very uneven distribution of the mould and any associated mycotoxin within a consignment. Correct sampling procedures to ensure a truly representative sample of the whole consignment is therefore vital. Most mycotoxins are toxic in very low concentrations so this requires sensitive and reliable methods for their detection. Failure to achieve satisfactory sampling and analysis performance can lead to unacceptable consignments being accepted or satisfactory loads being unnecessarily rejected.

Most mycotoxins are chemically stable and tend to survive storage and processing even when cooked to quite high temperatures as reached during baking bread or producing breakfast cereals. The difficulty of removing a mycotoxin once produced means that the best method of control is prevention.

Mould growth in the field can be limited by amongst other planting resistant cultivars, correct planting density, weed control and control of insect and pest damage. Other control methods include harvesting at the correct time, rapid drying of the grain, avoiding rewetting and controlling insects during storage to reduce the risk of mould growth. Milling will also reduce the level of contamination by removal of the outer layers of affected kernels. This milling fraction will by comparison contain much higher levels of contamination and most probably cannot be used for animal feed. [(1)]

Results obtained with comprehensive mycotoxin surveys, such as the worldwide annual survey conducted by Biomin are useful to answer questions such as how severe is the mycotoxin contamination in different commodities, what is the situation worldwide and in different regions and which mycotoxins and concentration levels occurred. The Biomin survey report for 2014 covers 6 844 agricultural commodity samples from 64 countries. Samples of primary components used for animal feed including maize, wheat, soybean meal, dried distillers grains, silage, etc. were tested for Aflatoxins (Afla), Zearalenone (ZON), Deoxynivalenol (DON), T-2 toxin, Fumonisins (FUM) and Ochratoxin A (OTA).

Of the African samples tested, 78% tested positive for ZON, 69% for DON, 67% for FUM, 15% for Afla, 8% for OTA and 2% for T-2 toxin. Globally, DON poses the most frequent threat to livestock and were found in more than half of the samples tested, with 82% of the samples containing DON levels exceeding the risk thresholds for livestock. FUM and ZON are also causes for concern with 50% of the samples exceeding risk threshold levels. The average concentrations of DON and ZON nearly doubled compared to 2013. Altough the prevalence of several mycotoxins in wheat were not notably high, the average concentrations of Afla, ZON, DON and T-2 in wheat samples all exceeded risk threshold levels. The average of the positive results on 592 wheat samples was 860 µg/kg (ppb) with the highest level tested 28 864 µg/kg.

The Biomin report for the first time also highlighted the co-occurence of myctoxins. Of 814 samples tested, all contained multiple metabolites, ranging from a low of four metabolites to a high of 75 metabolites. [(2)]

Constant monitoring and continued research on the preventation and mitigation of mycotoxin contamination are necessary. Application of good agricultural practices and storage conditions as well as effective mycotoxin risk management programs is essential elements in preventing the negative effects of mycotoxins.

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

Aflatoxins

- All cereals and all produts derived from cereals, including processed cereal products, with the exception of maize,

rice, processed cereal-based foods for infants and young children and dietary foods for special medical purposes intended specifically for infants, $B_1 \leq 2.0$ µg/kg.
- All cereals and all products derived from cereals, including processed cereal products, with the exception of maize, rice, processed cereal-based foods for infants and young children and dietary foods for special medical purposes intended specifically for infants, sum of $B_1 + B_2 + G_1 + G_2 \leq 4.0$ µg/kg.

Ochratoxin A
- Unprocessed cereals, ≤ 5.0 µg/kg.
- All products derived from unprocessed cereals, including processed cereal products and cereals intended for direct human consumption with certain exceptions (see full regulation), ≤ 3.0 µg/kg.

Deoxynivalenol
- Unprocessed cereals other than durum wheat, oats and maize, ≤ 1 250 µg/kg.
- Cereals intended for direct human consumption, cereal flour, bran and germ as end product marketed for direct human consumption, with the certain exceptions (see full regulation) ≤ 750 µg/kg.
- Bread (including small bakery wares), pastries, biscuits, 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 and germ as end product marketed for direct human consumption and the germ with the certain exceptions (see full regulation) ≤ 75 µg/kg.
- Bread (including small bakery wares), pastries, biscuits, cereal snacks and breakfast cereals, excluding maize-snacks and maize-based breakfast cereals, ≤ 50 µg/kg. [3]

T-2 and HT-2 toxin
- Unprocessed cereal – wheat, rye and other cereal, indicative level 100 µg/kg.
- Cereal grains for direct human consumption – cereals other than oats and maize, indicative level 50 µg/kg.
- Cereal products for human consumption – cereal milling products other than oat and maize, indicative level 50 µg/kg.
- Cereal products for human consumption – breakfast cereals including formed cereal flakes, indicative level 75 µg/kg.
- Cereal products for human consumption – bread (including small bakery wares), pastries, biscuits, cereal snacks, pasta, indicative level 25 µg/kg.
- Cereal products for human consumption – cereal-based foods for infants and young children, indicative level 15 µg/kg. [4]

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). Advisory maximum levels for **DON** in finished wheat products intended for human consumption is 1 000 µg/kg. [5]

In **China** the maximum level for Aflatoxin B_1 in wheat is 5.0 µg/kg. The maximum level for DON in cereals and their product including wheat and wheatmeal is 1 000 µg/kg. Ochratoxin A in cereals and processed products of milled grains may not exceed 5.0 µg/kg and Zearalenone in wheat flour may not exceed 60 µg/kg. [6]

According to **Codex**, Ochratoxin A in raw wheat may not exceed 5 µg/kg and the proposed maximum level for DON is 2 mg/kg in raw wheat and 1 mg/kg in flour, semolina, meal and flakes derived from wheat. [7]

References:

1. Fact sheets available from the European Mycotoxin Awareness Network website. www.mycotoxins.org.
2. BIOMIN Mycotoxin Annual Report 2014. www.biomin.net.
3. COMMISSION REGULATION (EC) No 1881/226 of 19 December 2006 setting maximum levels for certain contaminants in foodstuffs.
4. COMMISSION RECOMMENDATION of 27 March 2013 on the presence of T-2 and HT-2 toxin in cereals and cereal products.
5. FDA Mycotoxin Regulatory Guidance, A Guide for Grain Elevators, Feed Manufacturers, Grain Processors and Exporters, August 2011.
6. National Food Safety Standard, Maximum Levels of Mycotoxins in Foods, GB 2761-2011.
7. CODEX General Standard for contaminants and toxins in food and feed, CODEX STAN 193-1995, Revised in 1997, 2006, 2008, 2009, Amended 2009.

Table 6: Mycotoxin results for the 2014/2015 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)
		G_1	B_1	G_2	B_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	B3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2	UT	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	B1	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	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
4	B1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
5	UT	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
5	B2	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	B3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
10	B2	ND	ND	ND	ND	ND	ND	ND	<100	ND	ND	ND	ND	ND
10	B1	ND	ND	ND	ND	ND	ND	ND	<100	ND	ND	ND	ND	ND
10	UT	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
11	B1	ND	ND	ND	ND	ND	ND	ND	236	ND	ND	ND	ND	ND
12	B2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
14	B2	ND	ND	ND	ND	ND	ND	ND	<100	ND	ND	ND	ND	ND
17	B2	ND	ND	ND	ND	ND	ND	ND	<100	ND	ND	ND	ND	ND
18	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
22	B1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
23	B1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
24	B2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
24	B1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
25	B1	ND	ND	ND	ND	ND	ND	ND	361	ND	ND	ND	ND	ND
25	COW	ND	ND	ND	ND	ND	ND	ND	136	ND	ND	ND	ND	ND
25	UT	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
26	B1	ND	ND	ND	ND	ND	ND	ND	208	ND	ND	ND	ND	ND

Table 6: Mycotoxin results for the 2014/2015 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)
		G_1	B_1	G_2	B_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
27	B1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
28	B2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
29	B1	ND	ND	ND	ND	ND	ND	ND	206	ND	ND	ND	ND	ND
32	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	B1	ND	ND	ND	ND	ND	ND	ND	ND	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
35	B2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
36	B1	ND	ND	ND	ND	ND	ND	ND	<100	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	29	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		-	-	-	-	-	-	-	229	-	-	-	-	-
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 spectrometer. A concentration measured below the LOQ is reported as <LOQ.
- Limit of detection (LOD) is the lowest concentration level that can be detected but not quantified and is 50% of the LOQ of each mycotoxin. A concentration measured below the LOD is reported as not detected (ND).
- Mycotoxin levels lower than the LOQ were seen as tested negative for calculation purposes.
- µg/kg = ppb (parts per billion)

RSA WHEAT CROP QUALITY SUMMARY

RSA Crop Quality 2012/2013 and 2014/2015 Seasons

Country of origin	RSA Crop Average 2012/2013							RSA Crop Average 2014/2015						
Class and Grade bread wheat	**B1**	**B2**	**B3**	**B4**	**UT**	**COW**	**Average**	**B1**	**B2**	**B3**	**B4**	**UT**	**COW**	**Average**
No. of samples	**74**	**95**	**69**	**36**	**59**	**4**	**337**	***105***	***59***	***42***	***17***	***89***	***25***	***337***
WHEAT														
GRADING														
Protein (12% mb), %	12.59	11.55	10.50	10.15	11.30	12.23	11.38	12.91	11.53	10.78	9.68	11.51	11.35	11.75
Moisture, %	11.1	11.1	11.0	11.1	11.2	12.1	11.1	11.0	11.1	11.1	12.3	11.2	11.3	11.2
Falling number, sec	375	371	361	355	333	280	360	364	369	375	375	369	364	368
1000 Kernel mass (13% mb), g	39.5	40.4	41.2	41.4	39.2	36.9	40.2	38.0	39.6	40.3	41.9	38.2	38.2	38.8
Hlm (dirty), kg/hl	81.7	81.7	81.9	81.7	79.5	75.1	81.3	80.9	80.7	80.6	81.0	79.1	78.6	80.2
Screenings (<1,8mm), %	1.14	1.25	1.13	1.64	2.32	3.60	1.46	1.17	1.26	1.32	1.42	2.19	2.01	1.55
Gravel, stones, turf and glass, %	0.00	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Foreign matter, %	0.08	0.10	0.13	0.14	0.25	0.25	0.13	0.09	0.07	0.09	0.07	0.18	0.12	0.11
Other grain & unthreshed ears, %	0.37	0.42	0.34	0.40	1.04	0.64	0.50	0.42	0.44	0.43	0.38	0.98	0.58	0.58
Heat damaged kernels, %	0.04	0.02	0.02	0.03	0.02	0.00	0.02	0.00	0.00	0.01	0.01	0.00	0.01	0.00
Immature kernels, %	0.20	0.15	0.11	0.09	0.25	0.12	0.16	0.13	0.05	0.05	0.04	0.10	0.03	0.09
Insect damaged kernels, %	0.24	0.32	0.27	0.31	0.68	0.31	0.36	0.44	0.71	0.76	0.85	1.71	1.22	0.94
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	0.00	0.00
Sprouted kernels, %	0.32	0.16	0.07	0.09	0.42	1.96	0.24	0.04	0.04	0.04	0.10	0.10	0.08	0.06
Total damaged kernels, %	0.80	0.65	0.47	0.53	1.38	2.39	0.78	0.62	0.79	0.85	0.99	1.92	1.34	1.09
Combined deviations, %	2.38	2.43	2.08	2.72	4.91	6.88	2.86	2.29	2.57	2.69	2.86	5.27	4.05	3.34
Field fungi, %	0.49	0.40	0.35	0.28	0.45	1.69	0.42	0.23	0.16	0.09	0.06	0.11	1.76	0.27
Storage fungi, %	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.01	0.01	0.00	0.00	0.01	0.00	0.01
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
Noxious seeds (*Crotalaria spp., etc.*)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Noxious 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	Yes	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	***22***	***17***	***13***	***11***	***7***	***-***	***70***	***24***	***15***	***15***	***6***	***9***	***1***	***70***
BÜHLER EXTRACTION, %	73.5	73.5	73.1	72.7	72.1	-	73.2	73.5	73.6	73.3	73.9	72.8	70.9	73.4
FLOUR														
Colour, KJ (wet)	-2.8	-2.8	-3.0	-2.8	-2.8	-	-2.9	-3.3	-3.3	-3.5	-3.7	-3.2	-2.2	-3.3
Colour, Minolta CM5 (dry)														
L*	93.76	93.82	94.02	83.84	93.88	-	93.85	93.66	93.72	93.93	94.07	93.77	92.98	93.77
a*	0.44	0.42	0.38	0.38	0.43	-	0.41	0.47	0.45	0.41	0.39	0.41	0.56	0.44
b*	9.73	9.91	9.99	10.19	10.00	-	9.92	9.58	9.81	9.87	9.49	9.82	9.78	9.72
Protein (12% mb), %	11.7	10.8	9.7	9.6	10.9	-	10.7	11.9	10.5	9.7	8.9	10.9	10.9	10.7
Wet Gluten (14% mb), %	31.7	29.4	26.4	25.4	30.0	-	29.0	31.8	28.9	25.7	24.1	30.2	27.2	28.9
Dry Gluten (14% mb), %	11.0	10.2	9.0	8.8	10.3	-	10.0	10.8	9.7	8.6	8.3	10.4	9.2	9.8
Gluten Index	84	78	87	83	81	-	83	88	86	88	90	86	94	88
100g BAKING TEST														
Baking water absorption, %	61.3	60.4	59.3	59.2	60.4	-	60.3	61.8	60.3	59.4	58.7	60.7	60.3	60.6
Loaf volume, cm^3	930	900	828	822	916	-	886	938	875	831	786	917	1132	889
Evaluation	0	0	0	0	0	-	0	1	0	0	0	0	0	0
FARINOGRAM														
Water absorption, %	61.3	60.6	60.5	60.3	61.3	-	60.8	60.6	59.2	58.7	58.0	59.7	58.0	59.5
Development time, min	6.4	5.0	4.1	4.0	4.9	-	5.1	6.8	4.9	3.8	3.8	5.5	4.3	5.3
Stability, mm	9.7	7.4	7.0	7.3	7.3	-	7.9	10.1	6.9	7.6	6.6	8.4	6.7	8.3
Mixing tolerance index, BU	34	42	38	35	36	-	37	30	41	35	39	36	39	35

RSA Crop Quality of 2012/2013 and 2014/2015 Seasons

Country of origin	RSA Crop Average 2012/2013							RSA Crop Average 2014/2015						
Class and Grade bread wheat	**B1**	**B2**	**B3**	**B4**	**UT**	**COW**	**Average**	**B1**	**B2**	**B3**	**B4**	**UT**	**COW**	**Average**
No. of samples	**22**	**17**	**13**	**11**	**7**	**-**	**70**	***24***	***15***	***15***	***6***	***9***	***1***	***70***
ALVEOGRAM														
Strength (S), cm²	43.1	35.1	32.6	31.8	36.5	-	36.7	46.1	34.2	34.1	28.3	37.6	26.9	38.1
Stability (P), mm	86	81	90	91	86	-	86	77	71	79	72	72	50	75
Distensibility (L), mm	120	109	90	84	104	-	105	148	136	113	103	139	163	133
P/L	0.77	0.80	1.23	1.34	0.89	-	0.96	0.53	0.55	0.75	0.71	0.54	0.31	0.59
EXTENSOGRAM														
Strength, cm²	102	82	72	70	85	-	84	122	87	85	73	94	74	98
Max. height, BU	365	313	299	308	320	-	325	405	331	351	314	344	238	360
Extensibility, mm	204	189	171	159	190	-	185	218	191	176	166	198	219	196
MIXOGRAM														
Peak time, min	2.9	2.6	2.9	3.0	2.7	-	2.8	2.8	2.6	2.8	2.7	2.5	3.1	2.7
Absorption, %	61.8	60.7	59.5	59.5	60.9	-	60.6	62.0	60.4	59.6	58.8	60.8	60.8	60.7
MYCOTOXINS														
Afla G_1 (µg/kg)	ND							ND						
Afla B_1 (µg/kg)	ND							ND						
Afla G_2 (µg/kg)	ND							ND						
Afla B_2 (µg/kg)	ND							ND						
Fum B_1 (µg/kg)	ND							ND						
Fum B_2 (µg/kg)	ND							ND						
Fum B_3(µg/kg)	ND							ND						
Deoxynivalenol (µg/kg) [max. value]	ND [380]							ND [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 2013/2014 and 2014/2015 Seasons

Country of origin	RSA Crop Average 2013/2014							RSA Crop Average 2014/2015						
Class and Grade bread wheat	**B1**	**B2**	**B3**	**B4**	**UT**	**COW**	**Average**	**B1**	**B2**	**B3**	**B4**	**UT**	**COW**	**Average**
No. of samples	**93**	**74**	**70**	**47**	**43**	**13**	**340**	***105***	***59***	***42***	***17***	***89***	***25***	***337***
WHEAT														
GRADING														
Protein (12% mb), %	12.90	11.49	10.62	9.77	12.06	12.80	11.58	12.91	11.53	10.78	9.68	11.51	11.35	11.75
Moisture, %	11.5	11.4	11.3	11.3	11.6	11.6	11.4	11.0	11.1	11.1	12.3	11.2	11.3	11.2
Falling number, sec	344	350	349	344	322	163	337	364	369	375	375	369	364	368
1000 Kernel mass (13% mb), g	38.3	40.6	40.3	39.7	37.3	38.4	39.3	38.0	39.6	40.3	41.9	38.2	38.2	38.8
Hlm (dirty), kg/hl	80.4	80.4	79.4	78.7	78.5	76.4	79.5	80.9	80.7	80.6	81.0	79.1	78.6	80.2
Screenings (<1,8mm), %	1.25	1.19	1.43	1.88	2.56	2.58	1.58	1.17	1.26	1.32	1.42	2.19	2.01	1.55
Gravel, stones, turf and glass, %	0.01	0.01	0.00	0.00	0.00	0.07	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Foreign matter, %	0.14	0.16	0.22	0.18	0.37	0.38	0.20	0.09	0.07	0.09	0.07	0.18	0.12	0.11
Other grain & unthreshed ears, %	0.30	0.35	0.47	0.40	0.77	0.67	0.43	0.42	0.44	0.43	0.38	0.98	0.58	0.58
Heat damaged kernels, %	0.00	0.00	0.01	0.00	0.01	0.01	0.00	0.00	0.00	0.01	0.01	0.00	0.01	0.00
Immature kernels, %	0.11	0.05	0.03	0.02	0.19	0.12	0.08	0.13	0.05	0.05	0.04	0.10	0.03	0.09
Insect damaged kernels, %	0.18	0.18	0.13	0.10	0.20	0.16	0.16	0.44	0.71	0.76	0.85	1.71	1.22	0.94
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	0.00	0.00
Sprouted kernels, %	0.14	0.08	0.09	0.04	0.31	2.02	0.20	0.04	0.04	0.04	0.10	0.10	0.08	0.06
Total damaged kernels, %	0.43	0.31	0.26	0.17	0.71	2.32	0.44	0.62	0.79	0.85	0.99	1.92	1.34	1.09
Combined deviations, %	2.12	2.00	2.28	2.59	4.29	5.95	2.61	2.29	2.57	2.69	2.86	5.27	4.05	3.34
Field fungi, %	0.10	0.07	0.06	0.05	0.12	0.07	0.08	0.23	0.16	0.09	0.06	0.11	1.76	0.27
Storage fungi, %	0.03	0.02	0.01	0.01	0.02	0.10	0.02	0.01	0.01	0.00	0.00	0.01	0.00	0.01
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
Noxious seeds (*Crotalaria spp., etc.*)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Noxious 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	Yes	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***	***18***	***11***	***8***	***8***	***2***	***70***	***24***	***15***	***15***	***6***	***9***	***1***	***70***
BÜHLER EXTRACTION, %	73.0	73.5	73.8	73.1	72.8	70.9	73.2	73.5	73.6	73.3	73.9	72.8	70.9	73.4
FLOUR														
Colour, KJ (wet)	-2.8	-2.9	-3.1	-3.1	-2.8	-2.3	-2.9	-3.3	-3.3	-3.5	-3.7	-3.2	-2.2	-3.3
Colour, Minolta CM5 (dry)														
L*	93.88	94.01	94.16	94.10	93.97	93.62	93.99	93.66	93.72	93.93	94.07	93.77	92.98	93.77
a*	0.42	0.41	0.36	0.37	0.38	0.34	0.40	0.47	0.45	0.41	0.39	0.41	0.56	0.44
b*	9.40	9.38	9.54	9.92	9.60	9.65	9.50	9.58	9.81	9.87	9.49	9.82	9.78	9.72
Protein (12% mb), %	11.8	10.5	9.7	8.9	10.9	12.9	10.7	11.9	10.5	9.7	8.9	10.9	10.9	10.7
Wet Gluten (14% mb), %	32.5	29.2	27.6	23.1	29.9	36.6	29.5	31.8	28.9	25.7	24.1	30.2	27.2	28.9
Dry Gluten (14% mb), %	11.5	10.1	9.9	8.1	10.5	12.9	10.4	10.8	9.7	8.6	8.3	10.4	9.2	9.8
Gluten Index	87	86	83	83	90	93	86	88	86	88	90	86	94	88
100g BAKING TEST														
Baking water absorption, %	61.6	60.2	59.3	58.7	60.8	62.7	60.5	61.8	60.3	59.4	58.7	60.7	60.3	60.6
Loaf volume, cm^3	917	854	820	764	886	1034	868	938	875	831	786	917	1132	889
Evaluation	0	0	0	0	0	0	0	1	0	0	0	0	0	0
FARINOGRAM														
Water absorption, %	61.6	60.2	58.9	57.6	59.8	60.4	60.1	60.6	59.2	58.7	58.0	59.7	58.0	59.5
Development time, min	6.5	5.1	4.2	3.0	5.1	5.7	5.2	6.8	4.9	3.8	3.8	5.5	4.3	5.3
Stability, mm	9.7	7.4	6.3	6.1	8.1	8.8	8.0	10.1	6.9	7.6	6.6	8.4	6.7	8.3
Mixing tolerance index, BU	34	39	43	41	37	37	38	30	41	35	39	36	39	35

RSA Crop Quality of 2013/2014 and 2014/2015 Seasons

Country of origin	RSA Crop Average 2013/2014							RSA Crop Average 2014/2015						
Class and Grade bread wheat	**B1**	**B2**	**B3**	**B4**	**UT**	**COW**	**Average**	**B1**	**B2**	**B3**	**B4**	**UT**	**COW**	**Average**
No. of samples	**23**	**18**	**11**	**8**	**8**	**2**	**70**	***24***	***15***	***15***	***6***	***9***	***1***	***70***
ALVEOGRAM														
Strength (S), cm²	44.7	35.8	30.1	27.4	39.8	45.7	37.6	46.1	34.2	34.1	28.3	37.6	26.9	38.1
Stability (P), mm	87	80	72	74	79	71	80	77	71	79	72	72	50	75
Distensibility (L), mm	122	113	110	94	125	156	116	148	136	113	103	139	163	133
P/L	0.75	0.74	0.69	0.91	0.69	0.47	0.74	0.53	0.55	0.75	0.71	0.54	0.31	0.59
EXTENSOGRAM														
Strength, cm²	110	85	71	72	99	129	92	122	87	85	73	94	74	98
Max. height, BU	374	325	284	317	364	425	341	405	331	351	314	344	238	360
Extensibility, mm	215	188	175	162	194	225	194	218	191	176	166	198	219	196
MIXOGRAM														
Peak time, min	2.8	2.7	2.7	3.0	3.0	2.9	2.8	2.8	2.6	2.8	2.7	2.5	3.1	2.7
Absorption, %	61.9	60.4	59.5	58.8	61.0	63.4	60.7	62.0	60.4	59.6	58.8	60.8	60.8	60.7
MYCOTOXINS														
Afla G_1 (µg/kg)	ND							ND						
Afla B_1 (µg/kg)	ND							ND						
Afla G_2 (µg/kg)	ND							ND						
Afla B_2 (µg/kg)	ND							ND						
Fum B_1 (µg/kg)	ND							ND						
Fum B_2 (µg/kg)	ND							ND						
Fum B_3(µg/kg)	ND							ND						
Deoxynivalenol (µg/kg) [max. value]	ND [151]							ND [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 done 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. 1186 of 17 December 2010). Please see pages 94-106.

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

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

During earlier seasons the hectolitre mass was determined by means of the Two-level funnel method. In 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. 1186 on pages 95 - 96 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.

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 the 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 checked by analyzing every fifth sample by means of the primary methods, described later on 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. Only the altitude-corrected value is reported.

QUADROMAT 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. Bühler MLU 202 mill 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 or 2 hours for flour and whole wheat flour respectively.

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 (1100 °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/brigher the flour and vice versa.

The dry colour of wheat flour can be measured accurately and precisely with the **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 76-21.01, latest edition, is followed to prepare a complete pasting curve by means of the Rapid Visco Analyser (RVA). The RVA is a rotational viscometer that is 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). 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 millimetres, 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:

ICC Standard No. 121, latest edition is followed.

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.

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 100g Baking test:

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

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

MYCOTOXIN ANALYSES

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

SAGL implements a validated SAGL In-house multi-mycotoxin screening method using UPLC - MS/MS. 40 of the 337 wheat crop samples were tested for Aflatoxin G_1; B_1; G_2; B_2, Fumonisin B_1; B_2; B_3, Deoxynivalenol, 15-ADON, HT2 - Toxin, T-2 Toxin, Zearalenone and Ochtratoxin A.

WHEAT IMPORTS PER COUNTRY

2013/14 Season (28 Sep 2013 - 26 Sep 2014)

FROM COUNTRY	FOR RSA TON	FOR AFRICA TON	TOTAL TON
Australia	49 780	3 815	53 595
Canada	111 289	1 798	113 087
Finland	25 430	0	25 430
Germany	179 436	5 271	184 707
Latvia	22 013	0	22 013
Lithuania	40 532	0	40532
Russian Federation	800 964	38 069	839 033
Ukraine	372 500	19 502	392 002
USA	66 468	274	66 742
	1 668 412	**68 729**	**1 737 141**

WHEAT EXPORTS PER COUNTRY

2013/14 Season (28 Sep 2013 - 26 Sep 2014)

TO COUNTRY	FROM RSA TO AFRICA TON	FROM OVERSEAS TO AFRICA TON	TOTAL TON
Botswana	84 859	17 501	102 360
Lesotho	63 595	36 849	100 444
Mozambique	0	168	168
Namibia	37 054	0	37 054
Swaziland	11 539	13 044	24 583
Zimbabwe	58 089	4 884	62 973
	255 136	**72 446**	**327 582**

WHEAT IMPORTS PER COUNTRY

2014/15 Season (27 Sep 2014 - 17 Jul 2015)

FROM COUNTRY	FOR RSA TON	FOR AFRICA TON	TOTAL TON
Argentina	58 987	5 000	63 987
Australia	98 457	7 745	106 202
Canada	98 877	5 046	103 923
Germany	335 203	7,228	342 431
Latvia	61 005	0	61 005
Lithuania	43 791	0	43 791
Poland	91 483	0	91483
Russian Federation	431 694	44 114	475 808
Ukraine	257 195	9 323	266 518
USA	21 810	0	21 810
	1 498 502	**78 456**	**1 576 958**

WHEAT EXPORTS PER COUNTRY

2014/15 Season (27 Sep 2014 - 17 Jul 2015)

TO COUNTRY	FROM RSA TO AFRICA TON	FROM OVERSEAS TO AFRICA TON	TOTAL TON
Botswana	63 096	19 481	82 577
Lesotho	21 940	40 443	62 383
Mauritius	580	0	580
Mozambique	56	106	162
Namibia	17 730	1,486	19 216
Swaziland	15 347	15 013	30 360
Zambia	40 784	0	40 784
Zimbabwe	76 109	3 197	79 306
	235 642	**79 726**	**315 368**

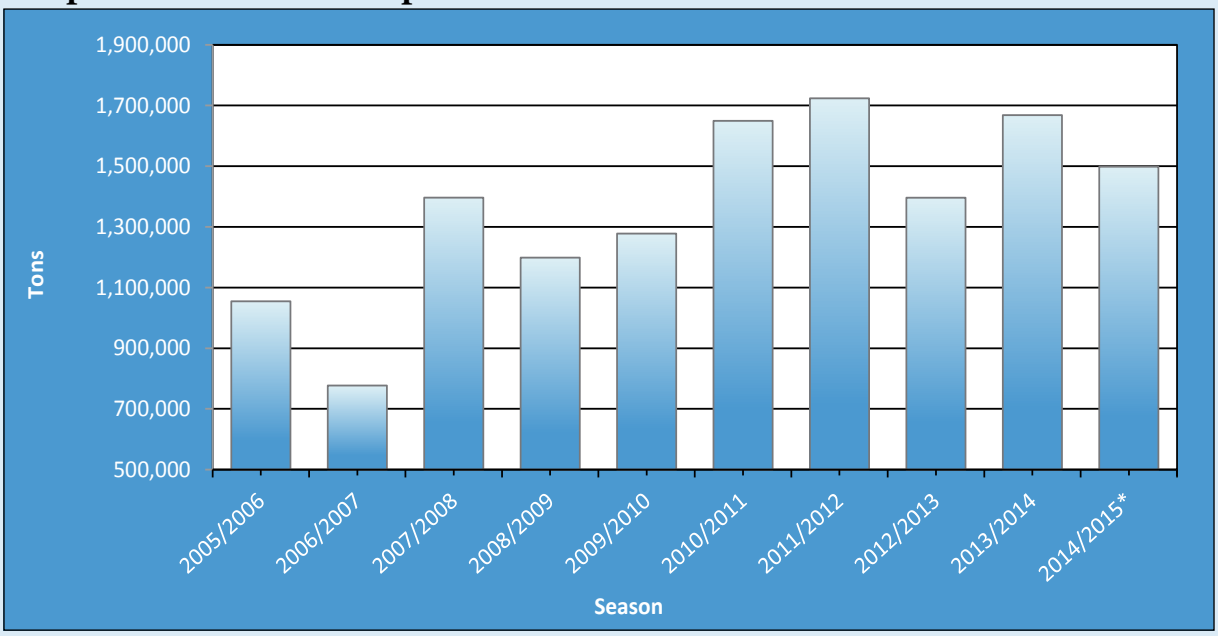
Imported Wheat

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 obtained from SAGIS.

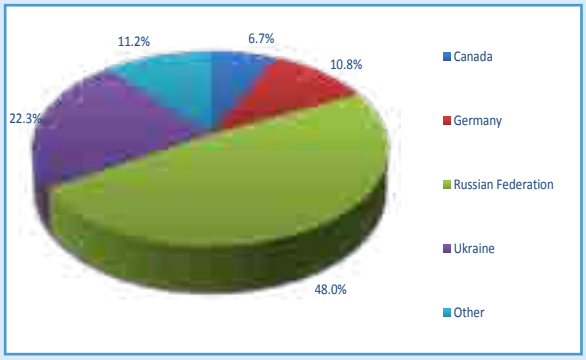
Import figures per season are calculated from 1 October to 30 September of the following year.

Graph 15: Total wheat imports for domestic use since the 2005/2006 season



*2014/2015 season figure includes imports up to 17 July 2015.

Graph 16: Wheat imports per origin for domestic use 2013/2014 season



Graph 17: Wheat imports per origin for domestic use 2014/2015 season

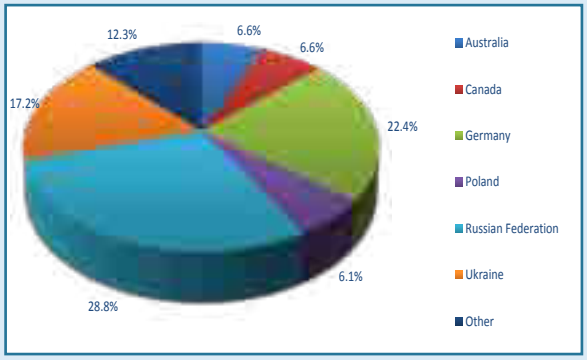


Table 7: Total wheat imports per country per season for use in RSA

	Season										Total (Tons)
	2005/2006	2006/2007	2007/2008	2008/2009	2009/2010	2010/2011	2011/2012	2012/2013	2013/2014	2014/2015*	
Argentina	392,930	310,524	684,160	368,739	-	629,600	652,279	98,029	-	58,987	**3,195,248**
Australia	59,927	-	-	74,714	55,312	181,637	247,675	189,925	49,780	98,457	**957,427**
Brazil	-	-	-	42,449	123,944	58,551	276,420	234,733	-	-	**736,097**
Canada	62,643	153,694	194,764	54,831	72,911	79,697	45,252	48,583	111,289	98,877	**922,541**
Finland	-	-	-	-	-	-	-	-	25,430	-	**25,430**
France	9,920	-	-	-	-	-	-	-	-	-	**9,920**
Germany	354,718	80,649	111,013	518,002	809,934	88,581	105,964	95,476	179,436	335,203	**2,678,976**
Latvia	-	-	-	-	-	-	-	-	22,013	61,005	**83,018**
Lesotho	-	-	-	-	-	-	-	384	-	-	**384**
Lithuania	-	-	-	-	1,611	-	8,880	-	40,532	43,791	**94,814**
Poland	-	-	-	13,013	-	-	-	-	-	91,483	**104,496**
Romania	-	-	-	-	-	-	36,071	-	-	-	**36,071**
Russia Federation	-	-	-	-	-	-	154,129	245,228	800,964	431,694	**1,632,015**
Swaziland	-	-	-	-	-	-	-	288		-	**288**
UK	-	-	-	-	-	-	-	-	-	-	**0**
Ukraine	85,979	-	-	13,521	41,230	-	39,016	341,976	372,500	257,195	**1,151,417**
Uruguay	-	-	-	-	-	25,249	45,250	99,033	-	-	**169,532**
USA	88,651	232,266	406,562	113,434	173,030	586,200	112,915	42,572	66,468	21,810	**1,843,908**
Total	**1,054,768**	**777,133**	**1,396,499**	**1,198,703**	**1,277,972**	**1,649,515**	**1,723,851**	**1,396,227**	**1,668,412**	**1,498,502**	**13,641,582**

*2014/2015 season figures include imports up to 17 July 2015.

Quality summary of imported wheat (1 October 2013 to 30 September 2014) (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 only at the end of each production and marketing season.

Please take note that according to the South African grading regulations (please see pages 94 to 106), Regulation 4 Standards for classes, Sub paragraph (2) A consignment shall be classified as Bread Wheat if -- (a) "the wheat in the consignment consists of at least 95 per cent (m/m) of one or more of the bread wheat cultivars specified in the cultivar list;" all imported wheat should be graded as Class Other Wheat. However, for comparison purposes, the wheat is graded by SAGL as if of local origin.

For grading as well as dough and baking quality results of the imported wheat per country, please refer to pages 74 to 87. This imported wheat quality is compared to a summary of the local crop quality of the same (2013/2014) season. To simplify the comparison between the quality of the different countries of import and South African wheat, the average quality per country was summarised in Table 8 on page 73. The minimum, maximum and standard deviation per country was also calculated. Please also 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.

Samples of wheat imported from the following countries were received (number of samples received in brackets): Australia (7), Canada (10), Germany (23), Latvia (5), Russian Federation (85), Ukraine (43) and USA (11). Wheat imported for purposes other than bread baking (e.g. soft types for biscuit making) is included in this data set.

Australian and Canadian imported wheat had the highest hectolitre mass results, indicating a potential for good (high) flour extraction. Screenings represent all material that passes through a standard sieve,1.8 mm in this instance, with 3% the maximum allowed for grades 1 to 3 according to RSA grading regulations. Higher percentages screenings result in higher losses due to the removal of unmillable material. Samples from the Russian Federation, Canada and USA had the highest average levels of screenings.

The wheat imported from the USA had the lowest average whole wheat protein content, resulting in the lowest average flour protein content. No falling number results below 220 seconds were reported on any of the imported wheat samples. The wheat samples imported from Australia had the highest falling number values.

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 season, the imported Canadian wheat had the highest protein content resulting in the highest gluten content and the imported American wheat the lowest. When evaluating gluten content, the protein content should also be taken into account. The wet gluten content of good quality white bread flour normally ranges between 27 – 33%.

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 in the range of 60.0 – 65.0%, averaging 61.0 – 63.0%. In general, longer 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. The farinogram absorption values and development times of the imported wheat (Australian and Canadian excluded) tended to be lower and shorter. Based on the low protein and weak gluten and rheological results, the wheat imported from the USA were most probably not intended for bread baking purposes.

Acceptable ranges for the Alveograph parameters generally are as follows: Strength 30 – 45 cm^2, stability (P) 65 – 120 mm, distensibility (L) 80 – 120 mm and P/L 0.80 – 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, although not observed on any of these imported samples, are indicative of soft doughs with excess stretching properties, which can also result in low loaf volumes as a result of poor gas retention properties. In general, Extensograph 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. The average results of the imported wheat samples (with exceptions and excluding the samples imported from the USA) fell mostly within these ranges.

The imported wheat samples, except for the Australian and Canadian samples, again showed a tendency towards longer mixogram mixing times. Mixing times between 2.8 and 3.5 minutes are considered to be acceptable in South Africa. The mixing time is an indication of the amount of time needed to mix the dough to optimum development. 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. Longer mixing times can also have cost implications due to higher energy inputs required.

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. DON, HT-2 toxin and Zearalenone residues were however observed in some of the samples. Only one sample (from the USA) exceeded the EU maximum limits with regards to Zearalenone on unprocessed cereals (100 µg/kg).

Table 8: Average quality data of imported wheat during the 2013/2014 season (previous season)

Quality parameter	Australia				Canada				Germany				Latvia				Russian Federation				Ukraine				USA				RSA crop average 2013/2014			
	Ave	Min	Max	Stdev	**Ave**	Min	Max	Stdev	**Ave**	Min	Max	Stdev	**Ave**	Min	Max	Stdev	**Ave**	Min	Max	Stdev	**Ave**	Min	Max	Stdev	**Ave**	Min	Max	Stdev	**Ave**	Min	Max	Stdev
Hlm, kg/hl	**84.2**	83.6	84.9	0.55	**83.0**	78.8	84.1	1.53	**80.4**	73.4	82.9	2.20	**80.2**	79.8	81.1	0.55	**78.7**	75.2	84.2	1.95	**79.5**	75.8	82.6	1.55	**77.8**	73.6	79.7	1.63	**79.5**	71.3	85.7	1.81
Screenings, %	**1.89**	1.49	2.02	0.19	**3.09**	0.86	5.42	1.88	**1.73**	1.42	2.21	0.22	**2.27**	1.71	2.75	0.49	**3.10**	0.88	5.12	0.86	**2.25**	1.30	3.31	0.49	**3.08**	1.64	4.86	0.91	**1.58**	0.10	8.94	0.99
1000 kernel mass, g (13% mb)	**36.9**	35.7	38.9	1.12	**36.1**	34.2	37.4	1.02	**44.2**	41.1	47.2	1.23	**40.8**	38.2	44.4	2.24	**35.6**	31.8	43.6	2.21	**38.2**	30.9	42.2	2.29	**34.1**	31.6	36.4	1.66	**39.3**	29.1	48.9	2.98
WWF Protein, % (12% mb)	**10.8**	10.5	11.4	0.39	**13.2**	12.9	13.7	0.28	**11.5**	10.4	12.1	0.48	**12.4**	12.3	12.6	0.13	**11.6**	9.6	14.5	1.00	**11.9**	10.0	12.8	0.66	**10.1**	9.0	10.7	0.45	**11.6**	8.4	15.8	2.56
WWF Falling number, sec	**443**	390	482	30.64	**381**	351	401	18.75	**354**	281	408	32.29	**361**	329	381	19.27	**356**	258	460	50.26	**323**	231	417	35.53	**308**	247	344	27.92	**337**	47	554	50.21
Number of samples	***7***				***10***				***23***				***5***				***85***				***43***				***11***				***340***			
Flour Protein, % (12% mb)	**9.7**	9.6	10.2	0.28	**12.2**	11.9	12.5	0.20	**10.1**	9.2	10.7	0.46	**11.3**	11.1	11.4	0.11	**10.5**	8.3	13.5	1.05	**10.5**	8.2	11.5	0.74	**8.3**	6.9	8.8	0.49	**10.7**	8.0	13.7	1.23
Flour colour, KJ	**-3.3**	-3.5	-3.0	0.19	**-2.8**	-3.2	-1.6	0.46	**-2.3**	-2.6	-2.1	0.13	**-2.4**	-2.5	-2.4	0.05	**-2.1**	-3.3	3.9	0.94	**-2.3**	-2.8	-1.3	0.33	**-1.8**	-2.3	-1.3	0.32	**-2.9**	-3.5	-1.8	0.42
Minolta CM-5 colour, L*	**92.44**	84.12	93.97	3.67	**92.99**	92.17	93.39	0.34	**93.37**	92.93	94.00	0.23	**93.60**	93.09	93.86	0.31	**93.20**	91.74	93.72	0.33	**93.49**	92.93	94.67	0.33	**94.42**	94.16	94.64	0.18	**93.99**	93.11	94.59	0.30
Minolta CM-5 colour, b*	**10.97**	10.78	11.15	0.13	**10.63**	10.19	10.89	0.22	**10.28**	8.49	10.76	0.46	**9.63**	9.52	9.81	0.11	**10.77**	9.80	11.91	0.46	**10.25**	8.37	10.99	0.54	**8.50**	7.91	9.16	0.36	**9.50**	8.49	10.63	0.49
Wet gluten, % (14% mb)	**25.8**	25.0	27.1	0.81	**34.5**	33.2	36.4	1.01	**27.4**	23.8	29.6	1.61	**30.5**	30.0	31.3	0.50	**26.9**	19.4	39.1	3.79	**27.4**	21.5	31.4	2.30	**20.5**	13.2	23.0	2.96	**29.5**	21.4	38.4	3.88
Dry gluten, % (14% mb)	**8.9**	8.4	9.3	0.33	**12.0**	11.7	12.3	0.22	**9.6**	8.3	11.0	0.66	**10.9**	10.7	11.2	0.21	**9.5**	6.7	14.1	1.35	**9.8**	7.0	11.4	0.96	**6.7**	4.4	7.7	1.00	**10.4**	7.3	13.7	1.51
Gluten Index	**80**	72	87	5.08	**78**	75	84	2.95	**83**	76	89	3.81	**90**	83	94	4.53	**92**	65	99	6.69	**91**	77	98	5.74	**82**	74	95	6.85	**86**	50	97	8.78
Farinogram																																
Water absorption, % (14% mb)	**61.8**	61.5	62.5	0.33	**63.7**	63.1	64.1	0.35	**59.2**	58.1	60.1	0.66	**57.6**	56.3	58.3	0.77	**57.6**	54.7	64.5	2.26	**57.1**	49.5	59.7	2.26	**50.6**	50.0	51.7	0.47	**60.1**	55.0	63.9	2.06
Development time, min	**5.3**	4.0	6.2	0.73	**6.2**	4.2	8.3	1.49	**2.3**	1.5	3.0	0.41	**2.9**	2.7	3.2	0.24	**2.6**	1.3	6.5	1.18	**2.6**	1.2	6.8	1.11	**1.3**	1.0	1.7	0.25	**5.2**	1.4	10.5	1.86
Stability, min	**8.0**	7.0	9.3	0.88	**10.0**	8.1	13.1	1.84	**6.5**	2.4	11.3	2.63	**11.1**	8.7	12.9	1.51	**8.8**	1.8	18.6	3.50	**9.3**	2.0	15.4	2.72	**2.3**	0.9	4.9	1.32	**8.0**	4.7	17.9	2.83
Alveogram																																
Strength, cm2	**36.9**	33.5	41.0	2.67	**46.2**	42.4	51.8	3.33	**34.3**	29.8	39.6	2.68	**42.8**	36.9	45.3	3.44	**38.4**	23.1	54.4	6.78	**37.1**	13.6	46.5	7.32	**16.0**	11.5	20.0	2.01	**37.6**	21.9	65.4	9.24
Stability, mm	**104**	99	108	3.78	**97**	86	108	7.56	**100**	89	113	5.57	**76**	70	81	4.72	**90**	60	115	11.31	**85**	33	102	15.48	**39**	31	51	5.42	**80**	52	129	14.76
Distensibility, mm	**76**	72	81	3.20	**106**	91	117	7.47	**66**	52	86	8.95	**124**	117	141	9.79	**83**	53	126	15.99	**86**	63	114	11.77	**96**	61	113	15.34	**116**	53	177	24.38
P/L	**1.36**	1.22	1.43	0.07	**0.92**	0.74	1.14	0.13	**1.56**	1.09	2.17	0.26	**0.62**	0.52	0.69	0.07	**1.13**	0.56	1.95	0.29	**1.02**	0.32	1.56	0.28	**0.42**	0.32	0.84	0.15	**0.74**	0.35	2.13	0.29
Extensogram																																
Strength, cm2	**78**	72	88	6.05	**99**	89	122	10.88	**78**	68	85	5.04	**105**	97	111	5.41	**100**	59	147	17.47	**95**	56	119	14.94	**57**	48	64	5.01	**92**	54	156	24.85
Maximum height, BU	**323**	291	366	30.24	**332**	288	425	47.98	**360**	314	425	24.88	**416**	398	430	12.05	**444**	294	569	71.81	**419**	305	516	58.58	**321**	296	404	31.09	**341**	220	516	65.92
Extensibility, mm	**170**	166	174	2.85	**216**	193	229	10.24	**155**	140	169	7.87	**186**	179	192	4.72	**165**	127	233	20.51	**166**	125	194	14.35	**126**	107	139	9.61	**194**	141	256	25.74
Mixogram																																
Peak time, min	**2.8**	2.5	3.2	0.21	**2.7**	2.3	3.0	0.23	**3.5**	2.8	4.2	0.36	**3.9**	3.8	4.2	0.18	**4.2**	2.3	5.3	0.69	**4.1**	2.8	4.8	0.46	**4.6**	3.8	5.4	0.55	**2.8**	2.2	3.8	0.39
100g Baking test																																
Volume, cm3	**791**	755	815	18.46	**857**	791	908	37.64	**789**	731	861	34.33	**861**	790	936	51.75	**817**	712	950	48.08	**821**	672	925	51.70	**746**	642	818	60.17	**868**	715	1061	76.25
Number of samples	***7***				***10***				***23***				***5***				***85***				***43***				***11***				***70***			

2013/2014 IMPORTED WHEAT QUALITY - AUSTRALIA (1 Oct 2013 to 30 Sep 2014)

2013/2014 Imported Wheat Quality Versus 2013/2014 RSA Wheat Quality

Country of origin	Australia 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***	***5***	***-***	***-***	***-***	***7***	***93***	***74***	***70***	***47***	***43***	***13***	***340***
WHEAT														
GRADING														
Protein (12% mb), %	-	11.35	10.55	-	-	-	10.78	12.90	11.49	10.62	9.77	12.06	12.80	11.58
Moisture, %	-	10.2	9.5	-	-	-	9.7	11.5	11.4	11.3	11.3	11.6	11.6	11.4
Falling number, sec	-	410	457	-	-	-	443	344	350	349	344	322	163	337
1000 Kernel mass (13% mb), g	-	38.3	36.3	-	-	-	36.9	38.3	40.6	40.3	39.7	37.3	38.4	39.3
Hlm (dirty), kg/hl	-	84.9	83.9	-	-	-	84.2	80.4	80.4	79.4	78.7	78.5	76.4	79.5
Screenings (<1,8mm), %	-	1.68	1.98	-	-	-	1.89	1.25	1.19	1.43	1.88	2.56	2.58	1.58
Gravel, stones, turf and glass, %	-	0.00	0.00	-	-	-	0.00	0.01	0.01	0.00	0.00	0.00	0.07	0.01
Foreign matter, %	-	0.10	0.34	-	-	-	0.27	0.14	0.16	0.22	0.18	0.37	0.38	0.20
Other grain & unthreshed ears, %	-	0.22	0.44	-	-	-	0.38	0.30	0.35	0.47	0.40	0.77	0.67	0.43
Heat damaged kernels, %	-	0.00	0.00	-	-	-	0.00	0.00	0.00	0.01	0.00	0.01	0.01	0.00
Immature kernels, %	-	0.02	0.00	-	-	-	0.01	0.11	0.05	0.03	0.02	0.19	0.12	0.08
Insect damaged kernels, %	-	0.00	0.00	-	-	-	0.00	0.18	0.18	0.13	0.10	0.20	0.16	0.16
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	0.00	-	-	-	0.00	0.14	0.08	0.09	0.04	0.31	2.02	0.20
Total damaged kernels, %	-	0.02	0.00	-	-	-	0.01	0.43	0.31	0.26	0.17	0.71	2.32	0.44
Combined deviations, %	-	2.01	2.76	-	-	-	2.55	2.12	2.00	2.28	2.59	4.29	5.95	2.61
Field fungi, %	-	0.09	0.00	-	-	-	0.03	0.10	0.07	0.06	0.05	0.12	0.07	0.08
Storage fungi, %	-	0.00	0.04	-	-	-	0.03	0.03	0.02	0.01	0.01	0.02	0.10	0.02
Ergot, %	-	0.00	0.00	-	-	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Noxious seeds (*Crotalaria spp., etc.*)	-	0	0	-	-	-	0	0	0	0	0	0	0	0
Noxious 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	***-***	***2***	***5***	***-***	***-***	***-***	***7***	***23***	***18***	***11***	***8***	***8***	***2***	***70***
BÜHLER EXTRACTION, %	-	70.6	71.3	-	-	-	71.1	73.0	73.5	73.8	73.1	72.8	70.9	73.2
FLOUR														
Colour, KJ (wet)	-	-3.5	-3.2	-	-	-	-3.3	-2.8	-2.9	-3.1	-3.1	-2.8	-2.3	-2.9
Colour, Minolta CM5 (dry)														
L*	-	89.05	93.80	-	-	-	92.44	93.88	94.01	94.16	94.10	93.97	93.62	93.99
a*	-	0.43	0.43	-	-	-	0.43	0.42	0.41	0.36	0.37	0.38	0.34	0.40
b*	-	10.83	11.03	-	-	-	10.97	9.40	9.38	9.54	9.92	9.60	9.65	9.50
Protein (12% mb), %	-	10.1	9.6	-	-	-	9.7	11.8	10.5	9.7	8.9	10.9	12.9	10.7
Wet Gluten (14% mb), %	-	26.9	25.3	-	-	-	25.8	32.5	29.2	27.6	23.1	29.9	36.6	29.5
Dry Gluten (14% mb), %	-	9.3	8.7	-	-	-	8.9	11.5	10.1	9.9	8.1	10.5	12.9	10.4
Gluten Index	-	86	77	-	-	-	80	87	86	83	83	90	93	86
100g BAKING TEST														
Baking water absorption, %	-	60.0	59.4	-	-	-	59.6	61.6	60.2	59.3	58.7	60.8	62.7	60.5
Loaf volume, cm^3	-	796	790	-	-	-	791	917	854	820	764	886	1034	868
Evaluation	-	1	0	-	-	-	0	0	0	0	0	0	0	0
FARINOGRAM														
Water absorption, %	-	61.8	61.9	-	-	-	61.8	61.6	60.2	58.9	57.6	59.8	60.4	60.1
Development time, min	-	6.0	5.0	-	-	-	5.3	6.5	5.1	4.2	3.0	5.1	5.7	5.2
Stability, mm	-	9.0	7.5	-	-	-	8.0	9.7	7.4	6.3	6.1	8.1	8.8	8.0
Mixing tolerance index, BU	-	34	32	-	-	-	33	34	39	43	41	37	37	38

2013/2014 Imported Wheat Quality Versus 2013/2014 RSA Wheat Quality

Country of origin	Australia 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***	***5***	***-***	***-***	***-***	***7***	***23***	***18***	***11***	***8***	***8***	***2***	***70***
ALVEOGRAM														
Strength (S), cm²	-	40.3	35.6	-	-	-	36.9	44.7	35.8	30.1	27.4	39.8	45.7	37.6
Stability (P), mm	-	106	103	-	-	-	104	87	80	72	74	79	71	80
Distensibility (L), mm	-	79	75	-	-	-	76	122	113	110	94	125	156	116
P/L	-	1.35	1.36	-	-	-	1.36	0.75	0.74	0.69	0.91	0.69	0.47	0.74
EXTENSOGRAM														
Strength, cm²	-	86	74	-	-	-	78	110	85	71	72	99	129	92
Max. height, BU	-	365	307	-	-	-	323	374	325	284	317	364	425	341
Extensibility, mm	-	172	169	-	-	-	170	215	188	175	162	194	225	194
MIXOGRAM														
Peak time, min	-	3.0	2.7	-	-	-	2.8	2.8	2.7	2.7	3.0	3.0	2.9	2.8
Absorption, %	-	60.0	59.4	-	-	-	59.6	61.9	60.4	59.5	58.8	61.0	63.4	60.7
MYCOTOXINS														
Afla G_1 (µg/kg)	ND							ND						
Afla B_1 (µg/kg)	ND							ND						
Afla G_2 (µg/kg)	ND							ND						
Afla B_2 (µg/kg)	ND							ND						
Fum B_1 (µg/kg)	ND							ND						
Fum B_2 (µg/kg)	ND							ND						
Fum B_3 (µg/kg)	ND							ND						
Deoxynivalenol (µg/kg) [max. value]	ND							ND [151]						
15-ADON (µg/kg) [max. value]	ND							ND						
Ochratoxin A (µg/kg)	ND							ND						
Zearalenone (µg/kg)	ND							ND						
HT-2 (µg/kg)	ND							ND						
T-2 Toxin (µg/kg)	ND							ND						
No. of samples	***3***							***40***						

2013/2014 IMPORTED WHEAT QUALITY - CANADA (1 Oct 2013 to 30 Sep 2014)

2013/2014 Imported Wheat Quality Versus 2013/2014 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	***5***	***-***	***-***	***1***	***4***	***-***	***10***	***93***	***74***	***70***	***47***	***43***	***13***	***340***
WHEAT														
GRADING														
Protein (12% mb), %	13.45	-	-	13.02	12.97	-	13.21	12.90	11.49	10.62	9.77	12.06	12.80	11.58
Moisture, %	12.6	-	-	12.5	12.3	-	12.5	11.5	11.4	11.3	11.3	11.6	11.6	11.4
Falling number, sec	372	-	-	396	387	-	381	344	350	349	344	322	163	337
1000 Kernel mass (13% mb), g	35.9	-	-	37.4	36.0	-	36.1	38.3	40.6	40.3	39.7	37.3	38.4	39.3
Hlm (dirty), kg/hl	82.8	-	-	82.8	83.3	-	83.0	80.4	80.4	79.4	78.7	78.5	76.4	79.5
Screenings (<1,8mm), %	1.46	-	-	3.38	5.06	-	3.09	1.25	1.19	1.43	1.88	2.56	2.58	1.58
Gravel, stones, turf and glass, %	0.00	-	-	0.00	0.00	-	0.00	0.01	0.01	0.00	0.00	0.00	0.07	0.01
Foreign matter, %	0.05	-	-	0.21	0.22	-	0.13	0.14	0.16	0.22	0.18	0.37	0.38	0.20
Other grain & unthreshed ears, %	0.10	-	-	0.08	0.11	-	0.10	0.30	0.35	0.47	0.40	0.77	0.67	0.43
Heat damaged kernels, %	0.09	-	-	0.00	0.00	-	0.05	0.00	0.00	0.01	0.00	0.01	0.01	0.00
Immature kernels, %	0.00	-	-	0.00	0.04	-	0.02	0.11	0.05	0.03	0.02	0.19	0.12	0.08
Insect damaged kernels, %	0.06	-	-	0.00	0.00	-	0.03	0.18	0.18	0.13	0.10	0.20	0.16	0.16
Heavily frost damaged kernels, %	0.10	-	-	0.00	0.00	-	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sprouted kernels, %	0.06	-	-	0.00	0.00	-	0.03	0.14	0.08	0.09	0.04	0.31	2.02	0.20
Total damaged kernels, %	0.64	-	-	0.00	0.04	-	0.34	0.43	0.31	0.26	0.17	0.71	2.32	0.44
Combined deviations, %	1.39	-	-	3.67	5.43	-	3.23	2.12	2.00	2.28	2.59	4.29	5.95	2.61
Field fungi, %	0.19	-	-	0.15	0.10	-	0.15	0.10	0.07	0.06	0.05	0.12	0.07	0.08
Storage fungi, %	0.09	-	-	0.16	0.00	-	0.06	0.03	0.02	0.01	0.01	0.02	0.10	0.02
Ergot, %	0.01	-	-	0.00	0.00	-	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Noxious seeds (*Crotalaria spp., etc.*)	0	-	-	0	0	-	0	0	0	0	0	0	0	0
Noxious 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	***5***	***-***	***-***	***1***	***4***	***-***	***10***	***23***	***18***	***11***	***8***	***8***	***2***	***70***
BÜHLER EXTRACTION, %	72.1	-	-	73.0	73.0	-	72.6	73.0	73.5	73.8	73.1	72.8	70.9	73.2
FLOUR														
Colour, KJ	-2.7	-	-	-2.9	-2.9	-	-2.8	-2.8	-2.9	-3.1	-3.1	-2.8	-2.3	-2.9
Colour, Minolta CM5 (dry)														
L*	92.97	-	-	92.94	93.02	-	92.99	93.88	94.01	94.16	94.10	93.97	93.62	93.99
a*	0.56	-	-	0.62	0.62	-	0.59	0.42	0.41	0.36	0.37	0.38	0.34	0.40
b*	10.51	-	-	10.73	10.75	-	10.63	9.40	9.38	9.54	9.92	9.60	9.65	9.50
Protein (12% mb), %	12.2	-	-	12.2	12.2	-	12.2	11.8	10.5	9.7	8.9	10.9	12.9	10.7
Wet Gluten (14% mb), %	33.8	-	-	34.2	35.4	-	34.5	32.5	29.2	27.6	23.1	29.9	36.6	29.5
Dry Gluten (14% mb), %	11.9	-	-	11.8	12.1	-	12.0	11.5	10.1	9.9	8.1	10.5	12.9	10.4
Gluten Index	80	-	-	75	76	-	78	87	86	83	83	90	93	86
100g BAKING TEST														
Baking water absorption, %	62.5	-	-	62.4	62.5	-	62.5	61.6	60.2	59.3	58.7	60.8	62.7	60.5
Loaf volume, cm³	844	-	-	863	871	-	857	917	854	820	764	886	1034	868
Evaluation	3	-	-	2	2	-	3	0	0	0	0	0	0	0
FARINOGRAM														
Water absorption, %	63.7	-	-	63.9	63.7	-	63.7	61.6	60.2	58.9	57.6	59.8	60.4	60.1
Development time, min	7.5	-	-	4.2	5.0	-	6.2	6.5	5.1	4.2	3.0	5.1	5.7	5.2
Stability, mm	11.3	-	-	8.9	8.7	-	10.0	9.7	7.4	6.3	6.1	8.1	8.8	8.0
Mixing tolerance index, BU	28	-	-	23	29	-	28	34	39	43	41	37	37	38

2013/2014 Imported Wheat Quality Versus 2013/2014 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	***5***	***-***	***-***	***1***	***4***	***-***	***10***	***23***	***18***	***11***	***8***	***8***	***2***	***70***
ALVEOGRAM														
Strength (S), cm²	48.9	-	-	43.7	43.6	-	46.2	44.7	35.8	30.1	27.4	39.8	45.7	37.6
Stability (P), mm	102	-	-	93	91	-	97	87	80	72	74	79	71	80
Distensibility (L), mm	101	-	-	108	111	-	106	122	113	110	94	125	156	116
P/L	1.02	-	-	0.86	0.82	-	0.92	0.75	0.74	0.69	0.91	0.69	0.47	0.74
EXTENSOGRAM														
Strength, cm²	107	-	-	92	90	-	99	110	85	71	72	99	129	92
Max. height, BU	366	-	-	300	298	-	332	374	325	284	317	364	425	341
Extensibility, mm	216	-	-	215	216	-	216	215	188	175	162	194	225	194
MIXOGRAM														
Peak time, min	2.9	-	-	2.7	2.5	-	2.7	2.8	2.7	2.7	3.0	3.0	2.9	2.8
Absorption, %	62.4	-	-	62.4	62.5	-	62.4	61.9	60.4	59.5	58.8	61.0	63.4	60.7
MYCOTOXINS														
Afla G_1 (µg/kg)	ND							ND						
Afla B_1 (µg/kg)	ND							ND						
Afla G_2 (µg/kg)	ND							ND						
Afla B_2 (µg/kg)	ND							ND						
Fum B_1 (µg/kg)	ND							ND						
Fum B_2 (µg/kg)	ND							ND						
Fum B_3 (µg/kg)	ND							ND						
Deoxynivalenol (µg/kg) [max. value]	147 [242]							ND [151]						
15-ADON (µg/kg)	ND							ND						
Ochratoxin A (µg/kg)	ND							ND						
Zearalenone (µg/kg) [max. value]	ND							ND						
HT-2 (µg/kg)	ND							ND						
T-2 Toxin (µg/kg)	ND							ND						
No. of samples	***3***							***40***						

2013/2014 IMPORTED WHEAT QUALITY - GERMANY (1 Oct 2013 to 30 Sep 2014)

2013/2014 Imported Wheat Quality Versus 2013/2014 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	***2***	***15***	***2***	***-***	***2***	***2***	***23***	***93***	***74***	***70***	***47***	***43***	***13***	***340***
WHEAT														
GRADING														
Protein (12% mb), %	12.09	11.63	10.78	-	11.27	10.45	11.46	12.90	11.49	10.62	9.77	12.06	12.80	11.58
Moisture, %	11.3	12.2	12.9	-	12.2	12.7	12.2	11.5	11.4	11.3	11.3	11.6	11.6	11.4
Falling number, sec	371	351	378	-	316	369	354	344	350	349	344	322	163	337
1000 Kernel mass (13% mb), g	44.3	44.5	44.2	-	42.3	43.3	44.2	38.3	40.6	40.3	39.7	37.3	38.4	39.3
Hlm (dirty), kg/hl	82.9	81.0	80.2	-	79.8	74.2	80.4	80.4	80.4	79.4	78.7	78.5	76.4	79.5
Screenings (<1,8mm), %	1.80	1.78	1.43	-	1.76	1.57	1.73	1.25	1.19	1.43	1.88	2.56	2.58	1.58
Gravel, stones, turf and glass, %	0.00	0.00	0.00	-	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.07	0.01
Foreign matter, %	0.20	0.15	0.34	-	1.31	21.44	2.12	0.14	0.16	0.22	0.18	0.37	0.38	0.20
Other grain & unthreshed ears, %	0.40	0.27	0.53	-	0.54	0.47	0.35	0.30	0.35	0.47	0.40	0.77	0.67	0.43
Heat damaged kernels, %	0.00	0.00	0.00	-	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.01	0.01	0.00
Immature kernels, %	0.00	0.06	0.00	-	0.02	0.00	0.04	0.11	0.05	0.03	0.02	0.19	0.12	0.08
Insect damaged kernels, %	0.06	0.11	0.08	-	0.30	0.12	0.12	0.18	0.18	0.13	0.10	0.20	0.16	0.16
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	0.00
Sprouted kernels, %	0.00	0.02	0.04	-	0.00	0.08	0.02	0.14	0.08	0.09	0.04	0.31	2.02	0.20
Total damaged kernels, %	0.06	0.20	0.12	-	0.32	0.20	0.19	0.43	0.31	0.26	0.17	0.71	2.32	0.44
Combined deviations, %	2.46	2.41	2.42	-	3.92	23.68	4.39	2.12	2.00	2.28	2.59	4.29	5.95	2.61
Field fungi, %	0.10	0.13	0.29	-	0.10	0.37	0.16	0.10	0.07	0.06	0.05	0.12	0.07	0.08
Storage fungi, %	0.00	0.08	0.09	-	0.00	0.04	0.06	0.03	0.02	0.01	0.01	0.02	0.10	0.02
Ergot, %	0.00	0.00	0.07	-	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Noxious seeds (*Crotalaria spp., etc.*)	0	0	0	-	0	0	0	0	0	0	0	0	0	0
Noxious seeds (*Argemone mexicana, etc.*)	0	0	0	-	0	0	0	0	0	0	0	0	0	0
Live insects	No	No	No	-	No	No	No	No	No	No	No	No	No	No
Undesirable odour	No	No	No	-	No	No	No	No	No	No	No	No	No	No
	B1	**B2**	**B3**	**B4**	**UT**	**COW**	**Average**	**B1**	**B2**	**B3**	**B4**	**UT**	**COW**	**Average**
No. of samples	***2***	***15***	***2***	***-***	***2***	***2***	***23***	***23***	***18***	***11***	***8***	***8***	***2***	***70***
BÜHLER EXTRACTION, %	73.8	74.2	73.9	-	73.0	73.6	74.0	73.0	73.5	73.8	73.1	72.8	70.9	73.2
FLOUR														
Colour, KJ	-2.5	-2.3	-2.3	-	-2.3	-2.3	-2.3	-2.8	-2.9	-3.1	-3.1	-2.8	-2.3	-2.9
Colour, Minolta CM5 (dry)														
L*	93.28	93.35	93.43	-	93.57	93.41	93.37	93.88	94.01	94.16	94.10	93.97	93.62	93.99
a*	0.58	0.54	0.48	-	0.49	0.46	0.53	0.42	0.41	0.36	0.37	0.38	0.34	0.40
b*	10.73	10.23	10.23	-	9.99	10.62	10.28	9.40	9.38	9.54	9.92	9.60	9.65	9.50
Protein (12% mb), %	10.7	10.3	9.5	-	9.9	9.3	10.1	11.8	10.5	9.7	8.9	10.9	12.9	10.7
Wet Gluten (14% mb), %	29.5	27.9	25.6	-	27.2	24.0	27.4	32.5	29.2	27.6	23.1	29.9	36.6	29.5
Dry Gluten (14% mb), %	10.1	9.8	8.9	-	9.3	8.6	9.6	11.5	10.1	9.9	8.1	10.5	12.9	10.4
Gluten Index	86	82	85	-	81	88	83	87	86	83	83	90	93	86
100g BAKING TEST														
Baking water absorption, %	60.6	60.0	59.3	-	59.7	59.1	59.9	61.6	60.2	59.3	58.7	60.8	62.7	60.5
Loaf volume, cm^3	815	790	789	-	792	753	789	917	854	820	764	886	1034	868
Evaluation	1	1	0	-	0	0	1	0	0	0	0	0	0	0
FARINOGRAM														
Water absorption, %	60.1	59.2	58.5	-	59.8	58.4	59.2	61.6	60.2	58.9	57.6	59.8	60.4	60.1
Development time, min	2.9	2.3	2.0	-	2.2	1.7	2.3	6.5	5.1	4.2	3.0	5.1	5.7	5.2
Stability, mm	9.7	7.0	3.4	-	6.2	2.7	6.5	9.7	7.4	6.3	6.1	8.1	8.8	8.0
Mixing tolerance index, BU	17	33	48	-	33	56	35	34	39	43	41	37	37	38

2013/2014 Imported Wheat Quality Versus 2013/2014 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	***2***	***15***	***2***	***-***	***2***	***2***	***23***	***23***	***18***	***11***	***8***	***8***	***2***	***70***
ALVEOGRAM														
Strength (S), cm²	33.7	35.7	31.0	-	32.4	29.9	34.3	44.7	35.8	30.1	27.4	39.8	45.7	37.6
Stability (P), mm	100	101	101	-	101	97	100	87	80	72	74	79	71	80
Distensibility (L), mm	64	69	56	-	62	58	66	122	113	110	94	125	156	116
P/L	1.56	1.50	1.83	-	1.64	1.68	1.56	0.75	0.74	0.69	0.91	0.69	0.47	0.74
EXTENSOGRAM														
Strength, cm²	83	78	81	-	73	72	78	110	85	71	72	99	129	92
Max. height, BU	358	359	398	-	349	345	360	374	325	284	317	364	425	341
Extensibility, mm	168	157	146	-	149	147	155	215	188	175	162	194	225	194
MIXOGRAM														
Peak time, min	3.3	3.5	3.8	-	3.2	3.7	3.5	2.8	2.7	2.7	3.0	3.0	2.9	2.8
Absorption, %	60.6	60.1	59.3	-	59.7	59.1	60.0	61.9	60.4	59.5	58.8	61.0	63.4	60.7
MYCOTOXINS														
Afla G_1 (µg/kg)	ND							ND						
Afla B_1 (µg/kg)	ND							ND						
Afla G_2 (µg/kg)	ND							ND						
Afla B_2 (µg/kg)	ND							ND						
Fum B_1 (µg/kg)	ND							ND						
Fum B_2 (µg/kg)	ND							ND						
Fum B_3 (µg/kg)	ND							ND						
Deoxynivalenol (µg/kg) [max. value]	ND [151]							ND [151]						
15-ADON (µg/kg) [max. value]	ND							ND						
Ochratoxin A (µg/kg)	ND							ND						
Zearalenone (µg/kg) [max. value]	ND							ND						
HT-2 (µg/kg)	ND							ND						
T-2 Toxin (µg/kg)	ND							ND						
No. of samples	***11***							***40***						

2013/2014 IMPORTED WHEAT QUALITY - LATVIA (1 Oct 2013 to 30 Sep 2014)

2013/2014 Imported Wheat Quality Versus 2013/2014 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	***5***	***-***	***-***	***-***	***-***	***-***	***5***	***93***	***74***	***70***	***47***	***43***	***13***	***340***
WHEAT														
GRADING														
Protein (12% mb), %	12.41	-	-	-	-	-	12.41	12.90	11.49	10.62	9.77	12.06	12.80	11.58
Moisture, %	11.8	-	-	-	-	-	11.8	11.5	11.4	11.3	11.3	11.6	11.6	11.4
Falling number, sec	361	-	-	-	-	-	361	344	350	349	344	322	163	337
1000 Kernel mass (13% mb), g	40.8	-	-	-	-	-	40.8	38.3	40.6	40.3	39.7	37.3	38.4	39.3
Hlm (dirty), kg/hl	80.2	-	-	-	-	-	80.2	80.4	80.4	79.4	78.7	78.5	76.4	79.5
Screenings (<1,8mm), %	2.27	-	-	-	-	-	2.27	1.25	1.19	1.43	1.88	2.56	2.58	1.58
Gravel, stones, turf and glass, %	0.00	-	-	-	-	-	0.00	0.01	0.01	0.00	0.00	0.00	0.07	0.01
Foreign matter, %	0.11	-	-	-	-	-	0.11	0.14	0.16	0.22	0.18	0.37	0.38	0.20
Other grain & unthreshed ears, %	0.41	-	-	-	-	-	0.41	0.30	0.35	0.47	0.40	0.77	0.67	0.43
Heat damaged kernels, %	0.00	-	-	-	-	-	0.00	0.00	0.00	0.01	0.00	0.01	0.01	0.00
Immature kernels, %	0.00	-	-	-	-	-	0.00	0.11	0.05	0.03	0.02	0.19	0.12	0.08
Insect damaged kernels, %	0.06	-	-	-	-	-	0.06	0.18	0.18	0.13	0.10	0.20	0.16	0.16
Heavily frost damaged kernels, %	0.00	-	-	-	-	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sprouted kernels, %	0.00	-	-	-	-	-	0.00	0.14	0.08	0.09	0.04	0.31	2.02	0.20
Total damaged kernels, %	0.06	-	-	-	-	-	0.06	0.43	0.31	0.26	0.17	0.71	2.32	0.44
Combined deviations, %	2.83	-	-	-	-	-	2.83	2.12	2.00	2.28	2.59	4.29	5.95	2.61
Field fungi, %	0.23	-	-	-	-	-	0.23	0.10	0.07	0.06	0.05	0.12	0.07	0.08
Storage fungi, %	0.02	-	-	-	-	-	0.02	0.03	0.02	0.01	0.01	0.02	0.10	0.02
Ergot, %	0.00	-	-	-	-	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Noxious seeds (*Crotalaria spp., etc.*)	0	-	-	-	-	-	0	0	0	0	0	0	0	0
Noxious 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***	***23***	***18***	***11***	***8***	***8***	***2***	***70***
BÜHLER EXTRACTION, %	72.8	-	-	-	-	-	72.8	73.0	73.5	73.8	73.1	72.8	70.9	73.2
FLOUR														
Colour, KJ	-2.4	-	-	-	-	-	-2.4	-2.8	-2.9	-3.1	-3.1	-2.8	-2.3	-2.9
Colour, Minolta CM5 (dry)														
L*	93.60	-	-	-	-	-	93.60	93.88	94.01	94.16	94.10	93.97	93.62	93.99
a*	0.53	-	-	-	-	-	0.53	0.42	0.41	0.36	0.37	0.38	0.34	0.40
b*	9.63	-	-	-	-	-	9.63	9.40	9.38	9.54	9.92	9.60	9.65	9.50
Protein (12% mb), %	11.3	-	-	-	-	-	11.3	11.8	10.5	9.7	8.9	10.9	12.9	10.7
Wet Gluten (14% mb), %	30.5	-	-	-	-	-	30.5	32.5	29.2	27.6	23.1	29.9	36.6	29.5
Dry Gluten (14% mb), %	10.9	-	-	-	-	-	10.9	11.5	10.1	9.9	8.1	10.5	12.9	10.4
Gluten Index	90	-	-	-	-	-	90	87	86	83	83	90	93	86
100g BAKING TEST														
Baking water absorption, %	61.1	-	-	-	-	-	61.1	61.6	60.2	59.3	58.7	60.8	62.7	60.5
Loaf volume, cm^3	861	-	-	-	-	-	861	917	854	820	764	886	1034	868
Evaluation	1	-	-	-	-	-	1	0	0	0	0	0	0	0
FARINOGRAM														
Water absorption, %	57.6	-	-	-	-	-	57.6	61.6	60.2	58.9	57.6	59.8	60.4	60.1
Development time, min	2.9	-	-	-	-	-	2.9	6.5	5.1	4.2	3.0	5.1	5.7	5.2
Stability, mm	11.1	-	-	-	-	-	11.1	9.7	7.4	6.3	6.1	8.1	8.8	8.0
Mixing tolerance index, BU	26	-	-	-	-	-	26	34	39	43	41	37	37	38

2013/2014 Imported Wheat Quality Versus 2013/2014 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	***5***	***-***	***-***	***-***	***-***	***-***	***5***	***23***	***18***	***11***	***8***	***8***	***2***	***70***
ALVEOGRAM														
Strength (S), cm²	42.8	-	-	-	-	-	42.8	44.7	35.8	30.1	27.4	39.8	45.7	37.6
Stability (P), mm	76	-	-	-	-	-	76	87	80	72	74	79	71	80
Distensibility (L), mm	124	-	-	-	-	-	124	122	113	110	94	125	156	116
P/L	0.62	-	-	-	-	-	0.62	0.75	0.74	0.69	0.91	0.69	0.47	0.74
EXTENSOGRAM														
Strength, cm²	105	-	-	-	-	-	105	110	85	71	72	99	129	92
Max. height, BU	416	-	-	-	-	-	416	374	325	284	317	364	425	341
Extensibility, mm	186	-	-	-	-	-	186	215	188	175	162	194	225	194
MIXOGRAM														
Peak time, min	3.9	-	-	-	-	-	3.9	2.8	2.7	2.7	3.0	3.0	2.9	2.8
Absorption, %	61.3	-	-	-	-	-	61.3	61.9	60.4	59.5	58.8	61.0	63.4	60.7
MYCOTOXINS														
Afla G_1 (µg/kg)	ND							ND						
Afla B_1 (µg/kg)	ND							ND						
Afla G_2 (µg/kg)	ND							ND						
Afla B_2 (µg/kg)	ND							ND						
Fum B_1 (µg/kg)	ND							ND						
Fum B_2 (µg/kg)	ND							ND						
Fum B_3 (µg/kg)	ND							ND						
Deoxynivalenol (µg/kg) [max. value]	ND [<100]							ND [151]						
15-ADON (µg/kg)	ND							ND						
Ochratoxin A (µg/kg)	ND							ND						
Zearalenone (µg/kg)	ND							ND						
HT-2 (µg/kg) [max. value]	ND							ND						
T-2 Toxin (µg/kg)	ND							ND						
No. of samples	***3***							***40***						

2013/2014 IMPORTED WHEAT QUALITY - RUSSIA (1 Oct 2013 to 30 Sep 2014)

2013/2014 Imported Wheat Quality Versus 2013/2014 RSA Wheat Quality

Country of origin	Russia 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	***12***	***20***	***1***	***35***	***16***	***1***	***85***	***93***	***74***	***70***	***47***	***43***	***13***	***340***
WHEAT														
GRADING														
Protein (12% mb), %	13.50	11.35	10.96	11.40	11.07	11.38	11.62	12.90	11.49	10.62	9.77	12.06	12.80	11.58
Moisture, %	11.7	11.1	11.0	11.1	11.7	14.0	11.3	11.5	11.4	11.3	11.3	11.6	11.6	11.4
Falling number, sec	371	348	348	365	333	429	356	344	350	349	344	322	163	337
1000 Kernel mass (13% mb), g	35.3	35.6	37.1	35.4	36.3	35.5	35.6	38.3	40.6	40.3	39.7	37.3	38.4	39.3
Hlm (dirty), kg/hl	81.1	78.6	79.5	78.6	77.5	77.3	78.7	80.4	80.4	79.4	78.7	78.5	76.4	79.5
Screenings (<1,8mm), %	2.17	2.51	2.70	3.33	3.98	4.81	3.10	1.25	1.19	1.43	1.88	2.56	2.58	1.58
Gravel, stones, turf and glass, %	0.00	0.00	0.00	0.01	0.04	0.71	0.02	0.01	0.01	0.00	0.00	0.00	0.07	0.01
Foreign matter, %	0.22	0.17	0.18	0.18	0.24	0.96	0.21	0.14	0.16	0.22	0.18	0.37	0.38	0.20
Other grain & unthreshed ears, %	0.22	0.37	0.24	0.32	0.59	0.42	0.37	0.30	0.35	0.47	0.40	0.77	0.67	0.43
Heat damaged kernels, %	0.04	0.02	0.00	0.01	0.02	0.00	0.02	0.00	0.00	0.01	0.00	0.01	0.01	0.00
Immature kernels, %	0.03	0.03	0.00	0.01	0.02	0.00	0.02	0.11	0.05	0.03	0.02	0.19	0.12	0.08
Insect damaged kernels, %	0.09	0.15	0.24	0.22	0.14	0.00	0.17	0.18	0.18	0.13	0.10	0.20	0.16	0.16
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	0.00	0.00
Sprouted kernels, %	0.01	0.16	0.00	0.08	0.02	0.00	0.07	0.14	0.08	0.09	0.04	0.31	2.02	0.20
Total damaged kernels, %	0.17	0.36	0.24	0.32	0.19	0.00	0.28	0.43	0.31	0.26	0.17	0.71	2.32	0.44
Combined deviations, %	2.78	3.41	3.36	4.15	5.00	6.19	3.96	2.12	2.00	2.28	2.59	4.29	5.95	2.61
Field fungi, %	0.26	0.14	0.34	0.18	0.12	0.00	0.17	0.10	0.07	0.06	0.05	0.12	0.07	0.08
Storage fungi, %	0.05	0.03	0.00	0.05	0.05	0.00	0.04	0.03	0.02	0.01	0.01	0.02	0.10	0.02
Ergot, %	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Noxious seeds (*Crotalaria spp., etc.*)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Noxious 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	***12***	***20***	***1***	***35***	***16***	***1***	***85***	***23***	***18***	***11***	***8***	***8***	***2***	***70***
BÜHLER EXTRACTION, %	72.3	72.5	73.4	72.6	72.2	71.6	72.4	73.0	73.5	73.8	73.1	72.8	70.9	73.2
FLOUR														
Colour, KJ	-2.6	-2.2	-2.1	-2.1	-1.7	2.7	-2.1	-2.8	-2.9	-3.1	-3.1	-2.8	-2.3	-2.9
Colour, Minolta CM5 (dry)														
L*	93.19	93.27	93.00	93.19	93.25	91.99	93.20	93.88	94.01	94.16	94.10	93.97	93.62	93.99
a*	0.55	0.46	0.49	0.48	0.44	0.28	0.47	0.42	0.41	0.36	0.37	0.38	0.34	0.40
b*	10.72	10.84	11.33	10.85	10.56	9.98	10.77	9.40	9.38	9.54	9.92	9.60	9.65	9.50
Protein (12% mb), %	12.4	10.2	9.7	10.2	9.9	10.0	10.5	11.8	10.5	9.7	8.9	10.9	12.9	10.7
Wet Gluten (14% mb), %	34.1	25.9	25.5	26.1	24.6	24.0	26.9	32.5	29.2	27.6	23.1	29.9	36.6	29.5
Dry Gluten (14% mb), %	12.0	9.1	8.5	9.2	8.7	8.6	9.5	11.5	10.1	9.9	8.1	10.5	12.9	10.4
Gluten Index	82	93	94	94	95	99	92	87	86	83	83	90	93	86
100g BAKING TEST														
Baking water absorption, %	62.3	59.8	59.5	60.1	59.6	59.8	60.2	61.6	60.2	59.3	58.7	60.8	62.7	60.5
Loaf volume, cm^3	879	817	795	810	786	838	817	917	854	820	764	886	1034	868
Evaluation	2	1	0	1	1	0	1	0	0	0	0	0	0	0
FARINOGRAM														
Water absorption, %	61.5	56.8	56.9	57.3	56.6	55.2	57.6	61.6	60.2	58.9	57.6	59.8	60.4	60.1
Development time, min	4.8	2.2	2.0	2.3	2.1	2.0	2.6	6.5	5.1	4.2	3.0	5.1	5.7	5.2
Stability, mm	11.3	8.5	4.4	9.2	7.1	6.5	8.8	9.7	7.4	6.3	6.1	8.1	8.8	8.0
Mixing tolerance index, BU	23	33	47	34	42	44	34	34	39	43	41	37	37	38

2013/2014 Imported Wheat Quality Versus 2013/2014 RSA Wheat Quality

Country of origin	Russia 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	***12***	***20***	***1***	***35***	***16***	***1***	***85***	***23***	***18***	***11***	***8***	***8***	***2***	***70***
ALVEOGRAM														
Strength (S), cm²	48.2	36.5	32.4	37.9	34.9	37.2	38.4	44.7	35.8	30.1	27.4	39.8	45.7	37.6
Stability (P), mm	96	85	74	92	88	77	90	87	80	72	74	79	71	80
Distensibility (L), mm	106	84	90	78	72	92	83	122	113	110	94	125	156	116
P/L	0.95	1.04	0.82	1.21	1.24	0.84	1.13	0.75	0.74	0.69	0.91	0.69	0.47	0.74
EXTENSOGRAM														
Strength, cm²	111	96	86	100	97	112	100	110	85	71	72	99	129	92
Max. height, BU	404	443	442	457	446	504	444	374	325	284	317	364	425	341
Extensibility, mm	201	158	144	160	158	163	165	215	188	175	162	194	225	194
MIXOGRAM														
Peak time, min	3.2	4.2	4.0	4.3	4.5	5.3	4.2	2.8	2.7	2.7	3.0	3.0	2.9	2.8
Absorption, %	62.8	60.1	59.5	60.1	59.8	59.8	60.4	61.9	60.4	59.5	58.8	61.0	63.4	60.7
MYCOTOXINS														
Afla G_1 (µg/kg)	ND							ND						
Afla B_1 (µg/kg)	ND							ND						
Afla G_2 (µg/kg)	ND							ND						
Afla B_2 (µg/kg)	ND							ND						
Fum B_1 (µg/kg)	ND							ND						
Fum B_2 (µg/kg)	ND							ND						
Fum B_3 (µg/kg)	ND							ND						
Deoxynivalenol (µg/kg) [max. value]	ND [157]							ND [151]						
15-ADON (µg/kg)	ND							ND						
Ochratoxin A (µg/kg)	ND							ND						
Zearalenone (µg/kg)	ND							ND						
HT-2 (µg/kg)	ND [21]							ND						
T-2 Toxin (µg/kg)	ND							ND						
No. of samples	***28***							***40***						

2013/2014 IMPORTED WHEAT QUALITY - UKRAINE (1 Oct 2013 to 30 Sep 2014)

2013/2014 Imported Wheat Quality Versus 2013/2014 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	***14***	***20***	***3***	***2***	***4***	***-***	***43***	***93***	***74***	***70***	***47***	***43***	***13***	***340***
WHEAT														
GRADING														
Protein (12% mb), %	12.40	11.79	10.64	11.01	11.63	-	11.85	12.90	11.49	10.62	9.77	12.06	12.80	11.58
Moisture, %	12.0	12.0	11.2	11.9	11.9	-	11.9	11.5	11.4	11.3	11.3	11.6	11.6	11.4
Falling number, sec	341	302	363	322	335	-	323	344	350	349	344	322	163	337
1000 Kernel mass (13% mb), g	39.0	38.7	34.7	35.5	36.8	-	38.2	38.3	40.6	40.3	39.7	37.3	38.4	39.3
Hlm (dirty), kg/hl	80.2	79.6	77.9	79.1	77.6	-	79.5	80.4	80.4	79.4	78.7	78.5	76.4	79.5
Screenings (<1,8mm), %	2.40	1.94	2.89	3.27	2.32	-	2.25	1.25	1.19	1.43	1.88	2.56	2.58	1.58
Gravel, stones, turf and glass, %	0.00	0.00	0.01	0.00	0.00	-	0.00	0.01	0.01	0.00	0.00	0.00	0.07	0.01
Foreign matter, %	0.20	0.17	0.23	0.26	0.45	-	0.21	0.14	0.16	0.22	0.18	0.37	0.38	0.20
Other grain & unthreshed ears, %	0.27	0.32	0.51	0.46	0.76	-	0.37	0.30	0.35	0.47	0.40	0.77	0.67	0.43
Heat damaged kernels, %	0.00	0.00	0.00	0.00	0.00	-	0.00	0.00	0.00	0.01	0.00	0.01	0.01	0.00
Immature kernels, %	0.03	0.03	0.00	0.00	0.00	-	0.02	0.11	0.05	0.03	0.02	0.19	0.12	0.08
Insect damaged kernels, %	0.14	0.22	0.13	0.08	0.72	-	0.23	0.18	0.18	0.13	0.10	0.20	0.16	0.16
Heavily frost damaged kernels, %	0.00	0.00	0.06	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	0.06	0.06	0.00	-	0.06	0.14	0.08	0.09	0.04	0.31	2.02	0.20
Total damaged kernels, %	0.20	0.33	1.30	0.14	0.72	-	0.38	0.43	0.31	0.26	0.17	0.71	2.32	0.44
Combined deviations, %	3.07	2.77	2.66	4.13	4.25	-	3.06	2.12	2.00	2.28	2.59	4.29	5.95	2.61
Field fungi, %	0.28	0.24	0.20	0.18	0.27	-	0.25	0.10	0.07	0.06	0.05	0.12	0.07	0.08
Storage fungi, %	0.09	0.10	0.09	0.14	0.13	-	0.10	0.03	0.02	0.01	0.01	0.02	0.10	0.02
Ergot, %	0.00	0.00	0.00	0.00	0.00	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Noxious seeds (*Crotalaria spp., etc.*)	0	0	0	0	0	-	0	0	0	0	0	0	0	0
Noxious seeds (*Argemone mexicana, etc.*)	0	0	0	0	0	-	0	0	0	0	0	0	0	0
Live insects	No	No	No	No	No	-	No	No	No	No	No	No	No	No
Undesirable odour	No	No	No	No	No	-	No	No	No	No	No	No	No	No
	B1	**B2**	**B3**	**B4**	**UT**	**COW**	**Average**	**B1**	**B2**	**B3**	**B4**	**UT**	**COW**	**Average**
No. of samples	***14***	***20***	***3***	***2***	***4***	***-***	***43***	***23***	***18***	***11***	***8***	***8***	***2***	***70***
BÜHLER EXTRACTION, %	72.6	72.9	71.9	69.0	71.6	-	72.4	73.0	73.5	73.8	73.1	72.8	70.9	73.2
FLOUR														
Colour, KJ	-2.4	-2.2	-2.2	-2.4	-2.1	-	-2.3	-2.8	-2.9	-3.1	-3.1	-2.8	-2.3	-2.9
Colour, Minolta CM5 (dry)														
L*	93.44	93.41	93.92	93.93	93.56	-	93.49	93.88	94.01	94.16	94.10	93.97	93.62	93.99
a*	0.51	0.47	0.36	0.35	2.93	-	0.70	0.42	0.41	0.36	0.37	0.38	0.34	0.40
b*	10.26	10.44	10.17	9.24	9.81	-	10.25	9.40	9.38	9.54	9.92	9.60	9.65	9.50
Protein (12% mb), %	11.1	10.5	9.4	9.5	10.2	-	10.5	11.8	10.5	9.7	8.9	10.9	12.9	10.7
Wet Gluten (14% mb), %	29.5	26.9	23.9	25.1	26.3	-	27.4	32.5	29.2	27.6	23.1	29.9	36.6	29.5
Dry Gluten (14% mb), %	10.5	9.7	8.4	8.5	9.3	-	9.8	11.5	10.1	9.9	8.1	10.5	12.9	10.4
Gluten Index	89	94	92	82	90	-	91	87	86	83	83	90	93	86
100g BAKING TEST														
Baking water absorption, %	60.9	60.1	57.9	57.7	58.7	-	59.9	61.6	60.2	59.3	58.7	60.8	62.7	60.5
Loaf volume, cm^3	861	816	774	766	768	-	821	917	854	820	764	886	1034	868
Evaluation	1	1	1	0	2	-	1	0	0	0	0	0	0	0
FARINOGRAM														
Water absorption, %	58.2	57.3	54.9	53.2	55.9	-	57.1	61.6	60.2	58.9	57.6	59.8	60.4	60.1
Development time, min	3.1	2.4	1.6	1.7	3.3	-	2.6	6.5	5.1	4.2	3.0	5.1	5.7	5.2
Stability, mm	10.5	9.8	5.4	6.1	7.7	-	9.3	9.7	7.4	6.3	6.1	8.1	8.8	8.0
Mixing tolerance index, BU	25	26	44	55	40	-	30	34	39	43	41	37	37	38

2013/2014 Imported Wheat Quality Versus 2013/2014 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	***14***	***20***	***3***	***2***	***4***	***-***	***43***	***23***	***18***	***11***	***8***	***8***	***2***	***70***
ALVEOGRAM														
Strength (S), cm²	39.6	39.0	28.1	25.3	31.5	-	37.1	44.7	35.8	30.1	27.4	39.8	45.7	37.6
Stability (P), mm	88	88	74	58	81	-	85	87	80	72	74	79	71	80
Distensibility (L), mm	91	84	79	91	80	-	86	122	113	110	94	125	156	116
P/L	0.99	1.07	1.03	0.67	1.09	-	1.02	0.75	0.74	0.69	0.91	0.69	0.47	0.74
EXTENSOGRAM														
Strength, cm²	96	99	86	75	87	-	95	110	85	71	72	99	129	92
Max. height, BU	412	431	411	374	409	-	419	374	325	284	317	364	425	341
Extensibility, mm	169	171	149	142	153	-	166	215	188	175	162	194	225	194
MIXOGRAM														
Peak time, min	3.9	4.3	4.3	4.4	4.2	-	4.1	2.8	2.7	2.7	3.0	3.0	2.9	2.8
Absorption, %	61.0	60.4	59.2	59.4	60.2	-	60.4	61.9	60.4	59.5	58.8	61.0	63.4	60.7
MYCOTOXINS														
Afla G_1 (µg/kg)	ND							ND						
Afla B_1 (µg/kg)	ND							ND						
Afla G_2 (µg/kg)	ND							ND						
Afla B_2 (µg/kg)	ND							ND						
Fum B_1 (µg/kg)	ND							ND						
Fum B_2 (µg/kg)	ND							ND						
Fum B_3 (µg/kg)	ND							ND						
Deoxynivalenol (µg/kg) [max. value]	ND [185]							ND [151]						
15-ADON (µg/kg)	ND							ND						
Ochratoxin A (µg/kg)	ND							ND						
Zearalenone (µg/kg)	ND [20]							ND						
HT-2 (µg/kg)	ND							ND						
T-2 Toxin (µg/kg)	ND							ND						
No. of samples	***15***							***40***						

2013/2014 IMPORTED WHEAT QUALITY - USA (1 Oct 2013 to 30 Sep 2014)

2013/2014 Imported Wheat Quality Versus 2013/2014 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***	***3***	***5***	***-***	***11***	***93***	***74***	***70***	***47***	***43***	***13***	***340***
WHEAT														
GRADING														
Protein (12% mb), %	-	-	10.21	10.34	9.85	-	10.09	12.90	11.49	10.62	9.77	12.06	12.80	11.58
Moisture, %	-	-	12.3	11.9	11.7	-	11.9	11.5	11.4	11.3	11.3	11.6	11.6	11.4
Falling number, sec	-	-	323	300	305	-	308	344	350	349	344	322	163	337
1000 Kernel mass (13% mb), g	-	-	35.8	33.4	33.6	-	34.1	38.3	40.6	40.3	39.7	37.3	38.4	39.3
Hlm (dirty), kg/hl	-	-	78.9	78.6	76.7	-	77.8	80.4	80.4	79.4	78.7	78.5	76.4	79.5
Screenings (<1,8mm), %	-	-	2.67	3.22	3.24	-	3.08	1.25	1.19	1.43	1.88	2.56	2.58	1.58
Gravel, stones, turf and glass, %	-	-	0.00	0.00	0.00	-	0.00	0.01	0.01	0.00	0.00	0.00	0.07	0.01
Foreign matter, %	-	-	0.19	0.18	0.27	-	0.23	0.14	0.16	0.22	0.18	0.37	0.38	0.20
Other grain & unthreshed ears, %	-	-	0.50	0.53	0.83	-	0.66	0.30	0.35	0.47	0.40	0.77	0.67	0.43
Heat damaged kernels, %	-	-	0.00	0.00	0.05	-	0.02	0.00	0.00	0.01	0.00	0.01	0.01	0.00
Immature kernels, %	-	-	0.00	0.00	0.00	-	0.00	0.11	0.05	0.03	0.02	0.19	0.12	0.08
Insect damaged kernels, %	-	-	0.29	0.24	0.14	-	0.21	0.18	0.18	0.13	0.10	0.20	0.16	0.16
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, %	-	-	0.12	0.00	0.37	-	0.20	0.14	0.08	0.09	0.04	0.31	2.02	0.20
Total damaged kernels, %	-	-	0.41	0.24	0.56	-	0.43	0.43	0.31	0.26	0.17	0.71	2.32	0.44
Combined deviations, %	-	-	3.77	4.18	4.90	-	4.40	2.12	2.00	2.28	2.59	4.29	5.95	2.61
Field fungi, %	-	-	0.36	0.48	0.43	-	0.42	0.10	0.07	0.06	0.05	0.12	0.07	0.08
Storage fungi, %	-	-	0.25	0.20	0.22	-	0.23	0.03	0.02	0.01	0.01	0.02	0.10	0.02
Ergot, %	-	-	0.00	0.00	0.00	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Noxious seeds (*Crotalaria spp., etc.*)	-	-	0	0	0	-	0	0	0	0	0	0	0	0
Noxious 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	***-***	***-***	***3***	***3***	***5***	***-***	***11***	***23***	***18***	***11***	***8***	***8***	***2***	***70***
BÜHLER EXTRACTION, %	-	-	70.0	70.7	69.8	-	70.1	73.0	73.5	73.8	73.1	72.8	70.9	73.2
FLOUR														
Colour, KJ	-	-	-2.0	-2.1	-1.5	-	-1.8	-2.8	-2.9	-3.1	-3.1	-2.8	-2.3	-2.9
Colour, Minolta CM5 (dry)														
L*	-	-	94.28	94.50	94.46	-	94.42	93.88	94.01	94.16	94.10	93.97	93.62	93.99
a*	-	-	0.26	0.29	0.29	-	0.28	0.42	0.41	0.36	0.37	0.38	0.34	0.40
b*	-	-	8.35	8.76	8.44	-	8.50	9.40	9.38	9.54	9.92	9.60	9.65	9.50
Protein (12% mb), %	-	-	8.3	8.5	8.1	-	8.3	11.8	10.5	9.7	8.9	10.9	12.9	10.7
Wet Gluten (14% mb), %	-	-	21.9	22.1	18.8	-	20.5	32.5	29.2	27.6	23.1	29.9	36.6	29.5
Dry Gluten (14% mb), %	-	-	7.0	7.3	6.1	-	6.7	11.5	10.1	9.9	8.1	10.5	12.9	10.4
Gluten Index	-	-	78	78	86	-	82	87	86	83	83	90	93	86
100g BAKING TEST														
Baking water absorption, %	-	-	56.7	57.5	54.2	-	55.8	61.6	60.2	59.3	58.7	60.8	62.7	60.5
Loaf volume, cm^3	-	-	747	765	735	-	746	917	854	820	764	886	1034	868
Evaluation	-	-	0	0	0	-	0	0	0	0	0	0	0	0
FARINOGRAM														
Water absorption, %	-	-	50.7	50.9	50.4	-	50.6	61.6	60.2	58.9	57.6	59.8	60.4	60.1
Development time, min	-	-	1.5	1.5	1.2	-	1.3	6.5	5.1	4.2	3.0	5.1	5.7	5.2
Stability, mm	-	-	2.0	3.8	1.5	-	2.3	9.7	7.4	6.3	6.1	8.1	8.8	8.0
Mixing tolerance index, BU	-	-	73	60	93	-	78	34	39	43	41	37	37	38

2013/2014 Imported Wheat Quality Versus 2013/2014 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***	***3***	***5***	***-***	***11***	***23***	***18***	***11***	***8***	***8***	***2***	***70***
ALVEOGRAM														
Strength (S), cm²	-	-	15.7	17.5	15.3	-	16.0	44.7	35.8	30.1	27.4	39.8	45.7	37.6
Stability (P), mm	-	-	37	40	39	-	39	87	80	72	74	79	71	80
Distensibility (L), mm	-	-	103	102	89	-	96	122	113	110	94	125	156	116
P/L	-	-	0.36	0.40	0.47	-	0.42	0.75	0.74	0.69	0.91	0.69	0.47	0.74
EXTENSOGRAM														
Strength, cm²	-	-	55	59	57	-	57	110	85	71	72	99	129	92
Max. height, BU	-	-	305	313	336	-	321	374	325	284	317	364	425	341
Extensibility, mm	-	-	127	132	121	-	126	215	188	175	162	194	225	194
MIXOGRAM														
Peak time, min	-	-	4.3	4.4	4.8	-	4.6	2.8	2.7	2.7	3.0	3.0	2.9	2.8
Absorption, %	-	-	58.4	58.5	58.2	-	58.3	61.9	60.4	59.5	58.8	61.0	63.4	60.7
MYCOTOXINS														
Afla G_1 (µg/kg)	ND							ND						
Afla B_1 (µg/kg)	ND							ND						
Afla G_2 (µg/kg)	ND							ND						
Afla B_2 (µg/kg)	ND							ND						
Fum B_1 (µg/kg)	ND [<20]							ND						
Fum B_2 (µg/kg)	ND							ND						
Fum B_3 (µg/kg)	ND							ND						
Deoxynivalenol (µg/kg) [max. value]	346 [455]							ND [151]						
15-ADON (µg/kg)	ND							ND						
Ochratoxin A (µg/kg)	ND							ND						
Zearalenone (µg/kg) [max. value]	39 [214]							ND						
HT-2 (µg/kg)	ND							ND						
T-2 Toxin (µg/kg)	ND							ND						
No. of samples	***6***							***40***						

sanas
South African National Accreditation System

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 Joolas
Chief Executive Officer
Effective Date: 01 November 2014
Certificate Expiry: 31 October 2019

ANNEXURE A

SCHEDULE OF ACCREDITATION

Facility Number: T0116

Permanent Address of Laboratory: Southern African Grain Laboratory (NPC) Grain Building 477 Witherite Road The Willows 0040	**Technical Signatories:**	Ms J Nortjé (All) Ms M Fourie (In-house method 012) Ms M Hammes (Chemical) Ms A de Jager (Nutrients & Contaminants) Ms W Louw (In-House Methods 001, 002, 003, 010, and 026) Ms D Moleke (Rheological) Ms I Terblanche (Rheological) Ms H Meyer (Chemical, Nutrients, Contaminants & Grading) Ms J Kruger (Chemical, excluding In-house method 012) Mr L Badenhorst (Grading) Ms P Modiba (Chemical) Ms M Motlanthe (In-house method 001, 003)
Postal Address: Postnet Suite # 391 Private Bag X 1 The Willows 0041	**Nominated Representative:** **Management Representative:**	Ms S du Preez Ms W Louw
Tel: (012) 807-4019 Fax: (086) 216-7672 E-mail: info@sagl.co.za	Issue No.: Date of Issue: Expiry Date:	24 04 March 2015 31 October 2019

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

Field Manager

Facility No.: T0116
Date of Issue: 04 March 2015
Expiry Date: 31 October 2019

Materials / Products Tested	Type of Tests / Properties Measured, Range of Measurement	Standard Specifications, Equipment / Technique Used
All flours, cereal grains, oilseeds and animal feeds	Nitrogen and protein (Combustion method - Dumas)	AACCI 46-30.01, Latest Edition
Food stuff	Dietary fibre (total)	In-house method 012
Food stuff and feeds	Carbohydrates (by difference) (calculation) Energy value (calculation) Total digestible nutrition value (calculation)	SOP MC 23
Food stuff and feeds	Determination of ash	In-house method 011
Wheat kernels	Moisture (Oven method)	Government Gazette Wheat Grading Regulation, Latest Edition (72 hour, 103ºC)
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 No 107/1, Latest Edition
NUTRIENTS & CONTAMINANTS		
Vitamin fortified food and feed products and fortification mixes grain based	Vitamin A as all trans Retinol (Saponification) (HPLC)	In-house method 001
Vitamin fortified food and feed products and fortification mixes grain based	Thiamine Mononitrate (HPLC) Riboflavin (HPLC) Nicotinamide (HPLC) Pyridoxine Hydrochloride (HPLC)	In-house method 002
Vitamin fortified food and feed products and fortification mixes grain based	Folic Acid (HPLC)	In-house method 003

Field Manager

Facility No.: T0116
Date of Issue: 04 March 2015
Expiry Date: 31 October 2019

Materials / Products Tested	Type of Tests / Properties Measured, Range of Measurement	Standard Specifications, Equipment / Technique Used
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
Food and feed	Multi-Mycotoxin: - Aflatoxin G_1, B_1, G_2, B_2 and total - Deoxynivalenol (DON), 15-ADON - Fumonisin B_1, B_2, B_3 - Ochratoxin A - T2, HT-2 - Zearalenone	In-house method 026
GRADING		
Maize	Defective kernels (white maize/yellow maize)	Government Gazette Maize Regulation, Latest Edition
Cereal as grains (wheat, barley, rye and oats)	Hectolitre mass (Kern222)	ISO 7971-3, Latest Edition
Wheat	Screenings	Government Gazette Wheat Grading Regulation, Latest Edition
RHEOLOGICAL		
Wheat flour	Alveograph (Rheological properties)	ICC No 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)

ISSUED BY THE SOUTH AFRICAN NATIONAL ACCREDITATION SYSTEM

Field Manager

CERTIFICATE
SERTIFIKAAT

Southern African Grain Laboratory

Die Wilgers, Pretoria

Feeds / Voere

9 June 2014 *9 February 2015*

Ash *Crude Fibre* *Fat*

Moisture *Nx6.25-Protein* *Starch*

AfLASA

Bipea

CERTIFICATE OF PARTICIPATION

PROFICIENCY TESTING PROGRAMS

This certificate is awarded to:

SOUTHERN AFRICAN GRAIN LABORATORY

THE WILLOWS - PRETORIA - SOUTH AFRICA

for its participation in BIPEA interlaboratory comparisons for the annual series 2013-2014.

May 14, 2014 - Gennevilliers France

BIPEA Member

BIPEA Director

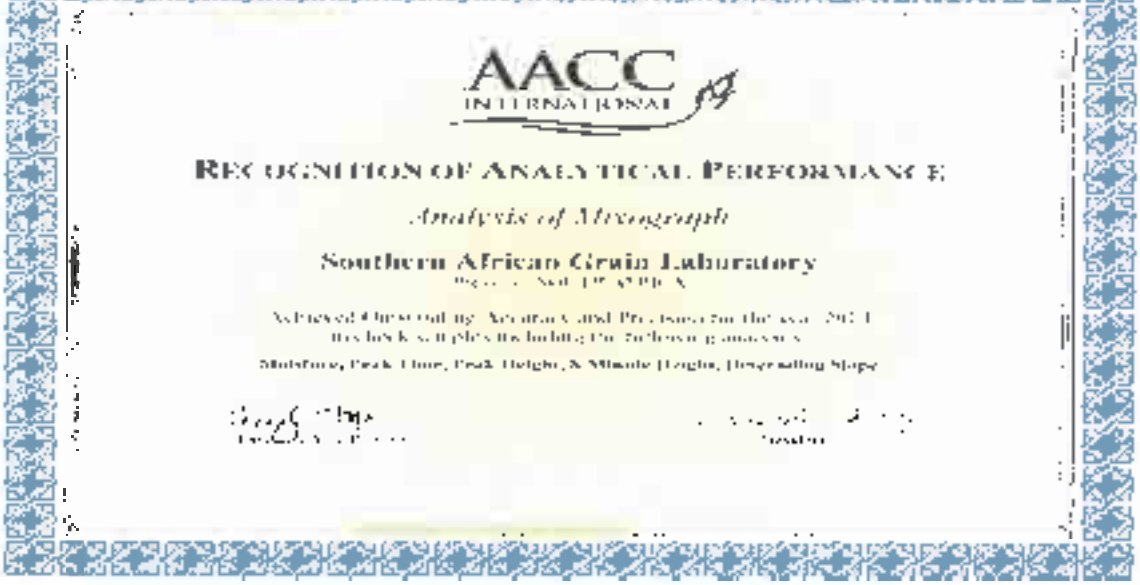
Certificate n° 13-14 / 11119

AACC INTERNATIONAL

RECOGNITION OF ANALYTICAL PERFORMANCE

Analysis of Hard Wheat Flour

Southern African Grain Laboratory

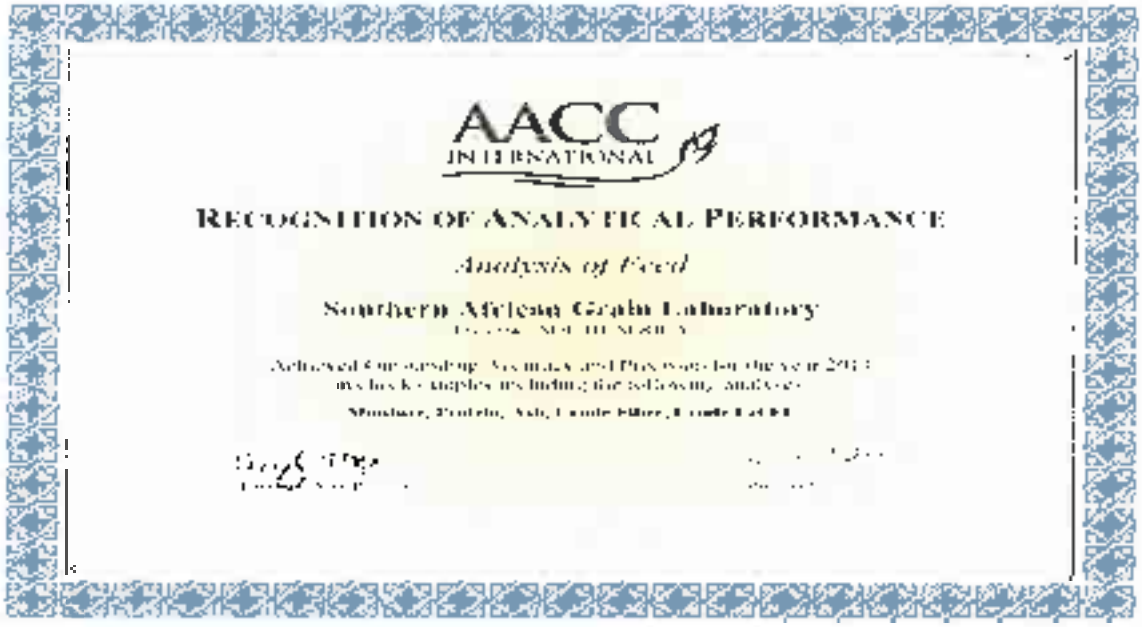


AACC INTERNATIONAL

RECOGNITION OF ANALYTICAL PERFORMANCE

Analysis of Farinograph

Southern African Grain Laboratory



AACC INTERNATIONAL

RECOGNITION OF ANALYTICAL PERFORMANCE

Analysis of Feed

Southern African Grain Laboratory

No. R. 1186 **17 December 2010**

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, 1990 (Act No. 119 of 1990), has

(a) made the regulations in the Schedule;

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

(c) repealed the regulations published in Government Notice No's R. 965 of 10 July 1998 as amended by R 1421 of 6 November 1998, R 876 of 14 September 2001, R 979 of 19 July 2002, and R.1210 of 29 August 2003

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 rests**" 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 SABS specification CKS632.

"**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;

"**cultivar list**" means the list of cultivars determined from time to time by the Executive Officer: Agricultural Product Standards and which is obtainable from the Executive Officer: Agricultural Product Standards, Private Bag X258, Pretoria, 0001

"**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;

(b) have a dull, lifeless, chalky or pinkish and shrunken appearance as a result of *Fusarium* infection;

"**foreign matter**" means all material excluding wheat, other grain and unthreshed ears

"**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**" in relation to wheat, means any live 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, 1972 (Act No. 54 of 1972) represent a hazard to human or animal health when consumed, including seeds of *Argemone mexicana, Convolvulus spp., Crotolaria 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**" is 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;

(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 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, 1990 (Act No. 119 of 1990);

"**unthreshed ears**" means ears and nuts 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 subregulation (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), all consignments of wheat must –

(a) be free from any toxin, chemical or other substances 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, 1972 (Act No. 54 of 1972)

(b) contain not more poisonous seeds or ergot sclerotia than permitted in terms of the Foodstuffs, Cosmetics and Disinfectants Act, 1972 (Act No. 54 of 1972).

(c) be free from organisms of phytosanitary importance as determined in terms of the Agricultural Pest Act, 1983 (Act No. 36 of 1983);

(d) be free from mould infected, sour and rancid other grain, foreign matter and any other matter.

(e) be free from any undesired odour, taste or colour not typical of undamaged and sound wheat.

(f) be free from animal rests,

(g) with the exception of Other Wheat, be free from insects.

(h) with the exception of Other Wheat, be free from stinking smut infection and

(i) with the exception of Other Wheat, have a moisture content not exceeding 13 per cent

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

(a) the wheat in the consignment consists of at least 95 per cent (m/m) of one or more of the bread wheat cultivars specified in the cultivar list, 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 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 Other Wheat

Standards for grades of wheat

5 (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 per-cent moisture basis) for the different grades shall be as follows

(a) Grade 1 - 12 per cent

(b) Grade 2 - 11 per cent.

(c) Grade 3 - 10 per cent

(d) Grade 4 - 9 per cent; and

(e) Utility Grade - 8 per cent.

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 subregulation (2), with --

(a) the class of the wheat, and

(b) the grade

(2) The symbols referred to in subregulation (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 per cent 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 subregulation (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 per cent 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 subregulation (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 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 sensorial assessed or chemically analysed in order to determine --

(a) whether it contains a substance that renders the wheat unfit for human consumption or for processing into or for utilisation as food or feed; and

(b) whether it has a musty, sour, rancid or other undesirable odour: Provided that a working sample of unscreened wheat that is ground in a grain mill to a fine meal may be used for the determination concerned.

PART V

DETERMINATION OF CLASS, HECTOLITRE MASS, MOISTURE CONTENT, PROTEIN CONTENT AND FALLING NUMBER

Determination of class

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

(a) Obtain a working sample of at least 500 g and screen the working sample in the manner prescribed in regulation 18.

(b) Take at least 100 g of the screened wheat and remove all other grain, unthreshed ears and foreign matter by hand.

(c) Obtain a working sample of at least 25 g each after all other grain, unthreshed ears and foreign matter have been removed and separate the different cultivars.

(d) Determine the combined mass of all of the cultivars that belongs according to the cultivar list 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 belongs according to the cultivar list 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 [AACC (American Association of Cereal Chemists) 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, unthreshed ears and foreign matter had been removed by hand, and

(b) the results thus obtained are in accordance (± 0,3 per cent) with the results obtained by the Dumas Combustion Analysis Method [AACC (American Association of Cereal Chemists) 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 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 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 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/AANHANGSEL

TABLE 1/TABEL 1

STANDARDS FOR GRADES OF BREAD WHEAT/ STANDAARDE VIR GRADE VAN BROODKORING

	Nature of deviation/ Aard van afwyking	Maximum percentage permissible deviation (m/m)/ Maksimum persentasie toelaatbare afwyking (m/m)				
		Grade 1/ Graad 1	Grade 2/ Graad 2	Grade 3/ Graad 3	Grade 4/ Graad 4	Utility Grade/ Utiliteit-graad
	1	3	4	5	6	7
(a)	Heavily frost-damaged kernels/ Erg rypbeskadigde korrels	5	5	5	5	10
(b)	Field fungi infected kernels/Land-swambesmette korrels	2	2	2	2	2
(c)	Storage fungi infected kernels/ Opbergingswambesmette korrels	0,5	0,5	0.5	0.5	0 5
(d)	Screenings/Sifsels	3	3	3	4	10
(e)	Other grain and unthreshed ears/ Ander graan en ongedorste are	1	1	1	1	4
(f)	Gravel stones turf and glass/ Gruis, kloppies, turf en glas	0 5	0,5	0.5	0.5	0 5
(g)	Foreign matter including gravel, stones turf and glass: Provided that such deviations are individually within the limits specified in item (f)/ Vreemde voorwerpe met inbegrip van gruis kloppies, turf en glas Met dien verstande dat sodanige afwykings individueel binne die perke s in item (f) aangegee	1	1	1	1	3
(h)	Heat-damaged kernels/Hittebeskadigde korrels	0,5	0,5	0,5	0 5	0 5

	Nature of deviation/ Aard van afwyking	Maximum percentage permissible deviation (m/m)/ Maksimum persentasie toelaatbare afwyking (m/m)				
		Grade 1/ Graad 1	Grade 2/ Graad 2	Grade 3/ Graad 3	Grade 4/ Graad 4	Utility Grade/ Utiliteit-graad
	1	3	4	5	6	7
(i)	Damaged kernels, including heat-damaged kernels: Provided that such deviations are individually within the limit specified in item (n) and provided further that the minimum falling number value prescribed in regulation 6(3) for the grade concerned is at least complied with/Beskadigde korrels met inbegrip van hitteBeskadigde korrels: Met dien verstande dat sodanige afwyking individueel binne die perke is in item (h) aangegee en met dien verstande voorts dat minstens aan die minimum valgetalwaarde in regulasie 6(3) vir die betrokke graad voorgeskryf, voldoen word	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/ Afwykings in items (d), (e), (g) en (i) gesamentlik: Met dien verstande dat sodanige afwykings individueel binne die perke van genoemde items is	5	5	5	5	10