



SOUTH AFRICAN

Wheat Crop
Quality Report
2010/2011 Season

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SOUTH AFRICAN

COMMERCIAL WHEAT QUALITY FOR THE 2010/2011 SEASON

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Introduction

The final wheat production of 1 430 000 tons for the 2010/2011 season, was 27 % lower than the previous season's 1 958 000 tons. This is 26,6 % lower than the 10 year average of 1 948 591 tons (2001/2002 to 2010/2011 seasons). A total area of 558 100 hectares was utilized for wheat production. (Figures obtained from the Crop Estimates Committee).

The whole wheat protein average was 12.1 % compared to the 11.7 % of the previous season and the ten year average of 12.0 %. The average hectolitre mass was 80.3 kg/hl. The hectolitre mass of this season's samples was determined according to ISO 7971-3 by means of the Kern 222 instrument. This method was accredited by SANAS during 2010. The average mixogram peak time of 3.0 minutes was similar to the previous two seasons' 2.9 minutes.

The percentage of samples in this survey graded as B1 increased from 33 % the previous season to 44 % this season. The main contributing factors being the change in instrument for the hectolitre mass determination and higher protein levels. The low rainfall experienced during the planting and growing periods in parts of the production regions like the Southern Cape and Free State resulted in lower yields and higher protein levels. Preharvest sprouting and low falling numbers observed in parts of the Free State was due to late rains towards the end of October 2010.

Differences in the flour and dough qualities between the winter rainfall, summer rainfall and irrigation areas were observed as in previous seasons. The overall flour and dough quality were good.

During the harvesting season, a representative sample of each delivery of wheat is taken

A sub-sample of each of these grading samples is collected in a bin according to grade and class per silo bin at each silo. This composite bin sample is then divided and a 3 kg sample is sent to the Southern African Grain Laboratory (SAGL) for the annual wheat crop quality survey. SAGL analysed all 372 samples received, to represent the production of wheat in all the different production regions. The number of samples analysed was significantly less than in previous seasons (480 samples) due to the decrease in wheat production.

The samples were fully graded and thousand kernel mass was done. Small samples were milled on the Quadromat mill, followed by a mixograph analysis.

Cultivar identification was done on these samples and sales figures of seed sold by the commercial grain silo owners were obtained.

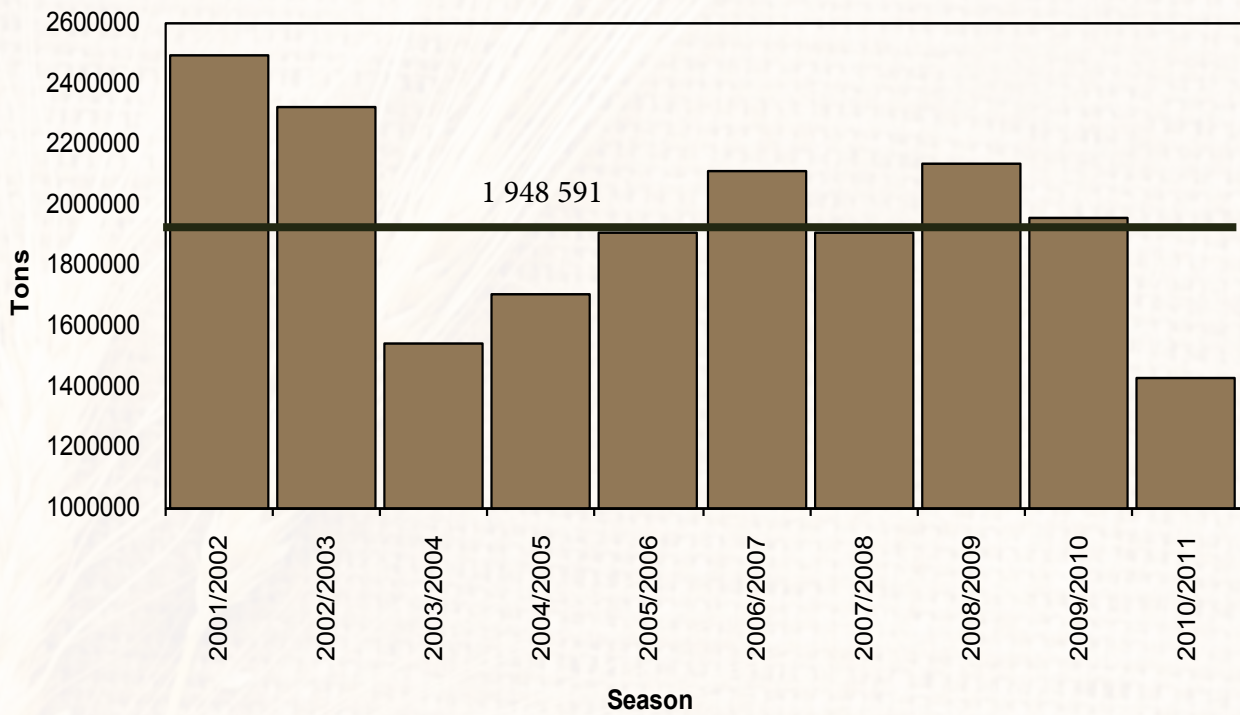
Composite samples were made up per class and grade for each production region and milled on the Bühler mill. Rheological tests, namely gluten, mixogram, farinogram, alveogram, extensogram and 100-gram baking tests, were then performed.

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 interested parties and can also be downloaded from the website.

Summaries comparing the quality of the local wheat for the 2008/2009 and 2010/2011 as well as the 2009/2010 and 2010/2011 seasons are provided.

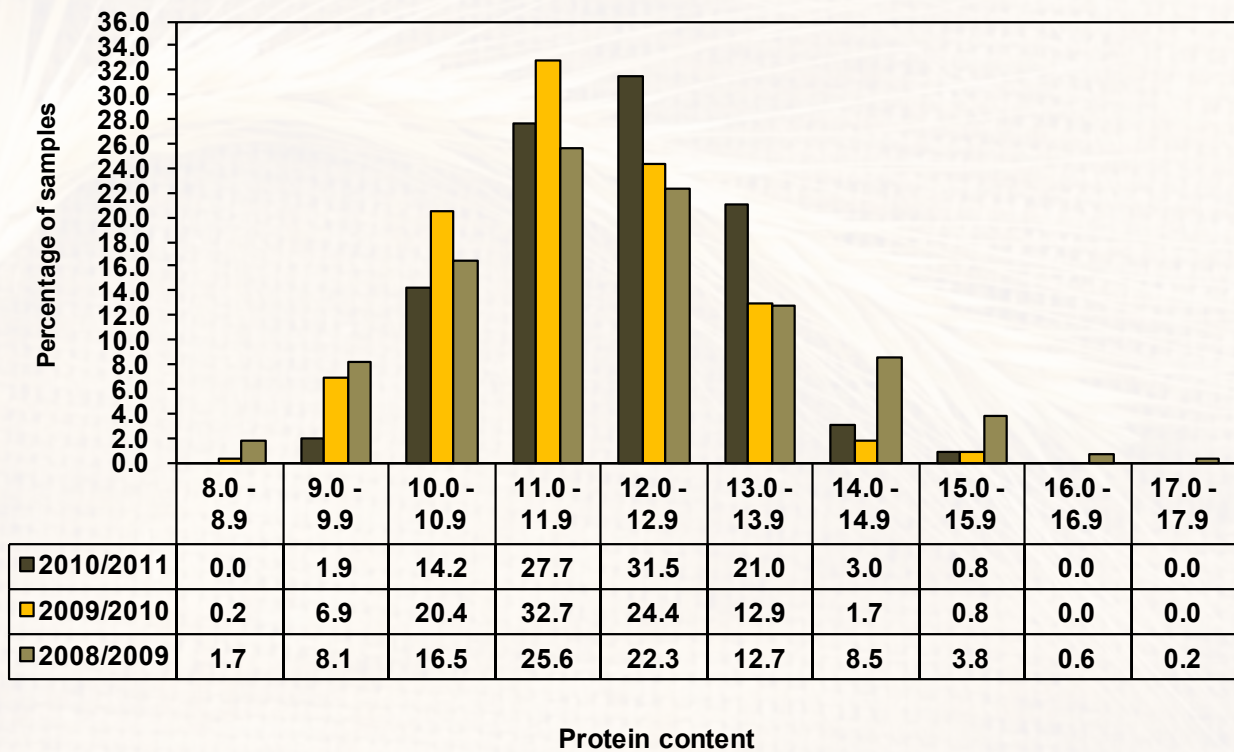
WHEAT PRODUCTION IN THE RSA OVER THE LAST 10 SEASONS

Wheat Production RSA



DIFFERENCES IN THE DISTRIBUTION OF PROTEIN CONTENT OVER THE LAST 3 SEASONS

Distribution of protein content



Crop quality of the 2010/2011 season

The protein graph of the wheat produced in the 2010/2011 season showed a normal distribution around the 12.0 - 12.9 % protein level (see page 2). The highest percentage of samples (31.5 %) had protein contents ranging from 12.0 - 12.9 %. The second highest percentage of 27.7 % was for protein contents 11.0 - 11.9 % and thirdly 21.0 % for 13.0 - 13.9 % protein content. The Summer rainfall area (Free State) had the highest average protein content of 12.6 % and the Winter rainfall and other Summer rainfall and Irrigation areas the lowest with 11.8 %.

The Winter (Western Cape) and Summer (Free State) rainfall areas had similar average hectolitre masses of 79.8 and 79.7 kg/hl respectively. The Irrigation (81.3 kg/hl) and Other Summer rainfall and Irrigation areas (81.6 kg/hl) also had similar average hectolitre masses but tested approximately 1.7 kg/hl higher than the Winter and Summer rainfall areas.

The weighted average thousand kernel mass of 39.5 g was 0.4 g higher than the previous season. The weighted average screenings (1.8 mm sieve) of 1.68 % was similar to the 1.63 % in the 2009/2010 season.

The weighted average falling number was 372 seconds. Twenty five samples gave falling number values of less than 250 seconds and of these, twenty two had falling number values lower than 220 seconds. These samples were mainly from the Free State (96 %).

The weighted mixogram peak time on flour from the Quadromat mill averaged 3.0 minutes, similar to the ten year average (2.9 minutes). The weighted mixogram peak time of the flour from the Bühler mill averaged 2.8 minutes.

The weighted average Bühler extraction was 74.9 %, with a weighted average Kent Jones colour of -1.8 KJ.

The farinogram had a weighted average water absorption of 63.2 % (61.0 % the previous season) and a weighted average development time of 5.5 minutes (3.5 minutes previous season). The weighted average alveogram strength was 36.2 cm² and the weighted average P/L value 1.29 (35.5 cm² and 1.17 the previous season). The weighted average extensogram strength was 97 cm² (83 cm² previous season).

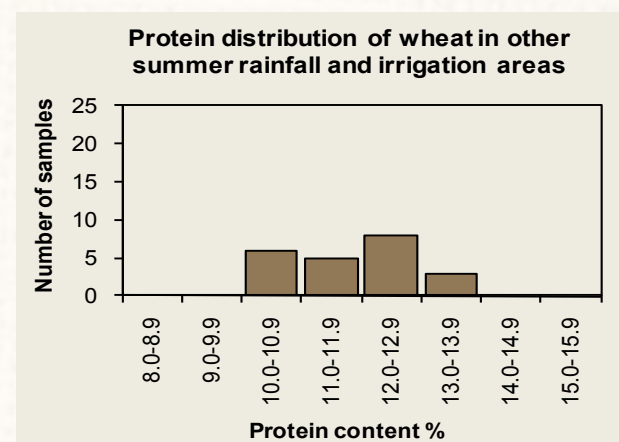
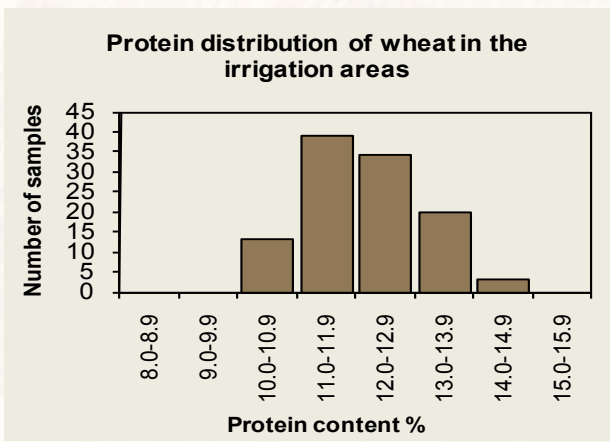
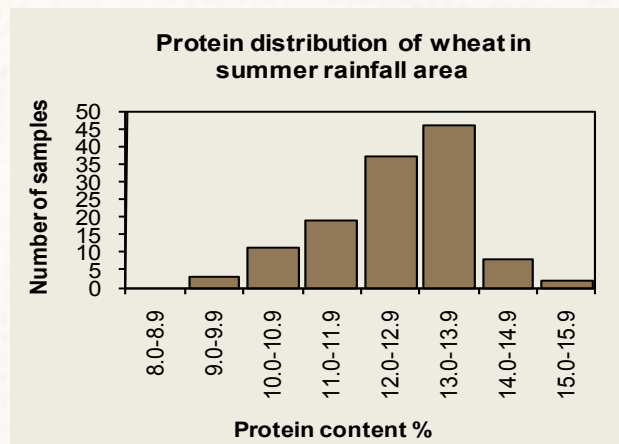
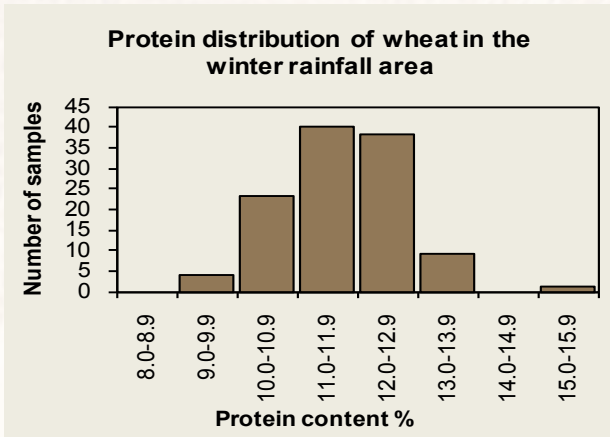
The loaves baked using the 100 g straight-dough optimized bread making method, which refers to the relationship between the protein content and the bread volume, was evaluated and scored from “Excellent” to “Extremely Poor” (one sample). The average scores were “Very Good” to “Good”.

Wheat grades

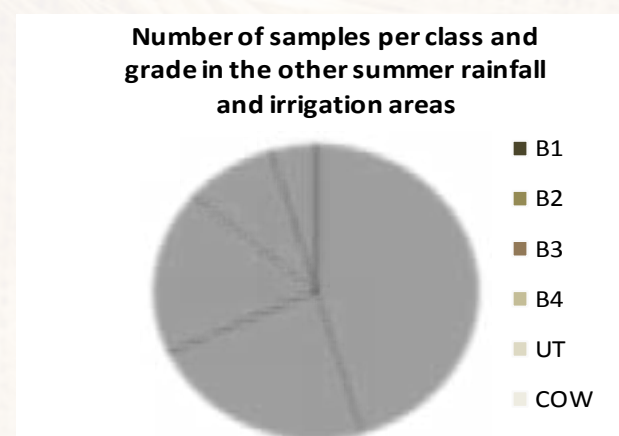
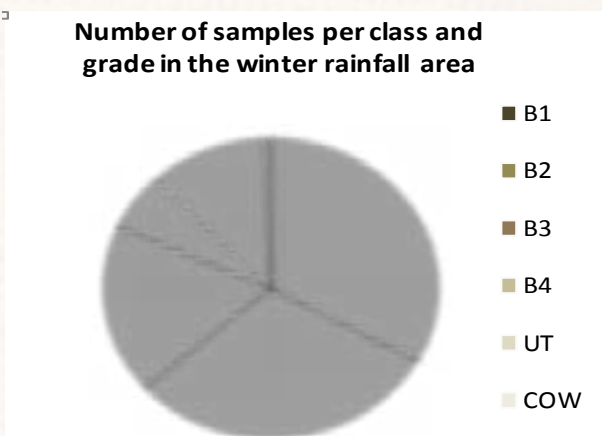
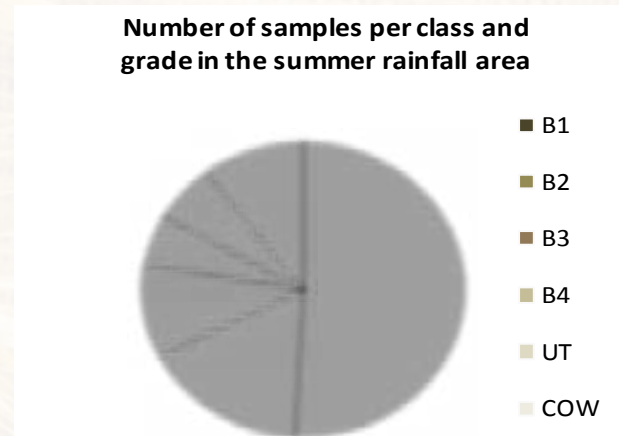
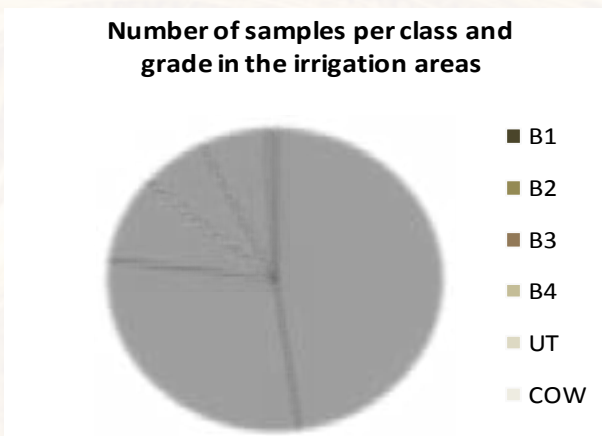
The 372 representative crop samples were graded as follows: 44 % was graded B1, 25 % was graded B2, 13 % was graded B3, 6 % was graded B4, 8 % UT (Utility Grade) and 4 % COW (Class Other Wheat). The determination of the hectolitre mass according to ISO 7971-3 by means of the Kern 222 instrument (please see Methods page 59), contributed to the increase in the percentage samples graded B1, compared to the 2008/2009 and earlier seasons.

Grade B1 wheat in the Free State province amounted to 51 % (45 % the previous season) and grade B1 in other summer rainfall and irrigation areas amounted to 45 % (36 % in the previous season). In the irrigation areas 48 % (43 % in the previous season) of the wheat graded as B1 and in the Western Cape Province 33 % graded as B1 (15 % in the previous season).

Protein distribution graphs per production area



Wheat class and grades per production area



Cultivars

In the Western Cape, SST 88 dominated the market (35 %). SST 027 (29 %) and SST 015 (26 %) were also popular cultivars. The Western Cape produced 38 % of all wheat grown in South Africa during the 2010/2011 season.

Regions 21 to 24 of the Free State were dominated by PAN 3120 (26 %) and SST 835 (23 %). Elands dominated regions 25 to 28 (40 %). Matlabas and SST 356 were also popular cultivars with 16 % and 13 % respectively.

Farmers in the Vaal and Orange River areas preferred SST 835 (34 %), Duzi (30 %) and SST 843 (15 %).

The most preferred cultivar in the North West was SST 835 (36 %), followed by SST 843 (27 %) and Duzi (8 %).

In Limpopo, Gauteng, Mpumalanga and KwaZulu-Natal, SST 835 (42 %) was the dominant cultivar followed by SST 843 (22 %), Kariega (19 %) and Duzi (10 %).

The above information was calculated from the cultivar identification done on all 372 crop samples.

Mycotoxins

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.

During 2010 SAGL implemented a multi-mycotoxin screening method using UPLC-MS/MS. With this technique simultaneous quantification and confirmation of Aflatoxin G₁; B₁; G₂; B₂, Fumonisin B₁ and B₂, Deoxynivalenol, T2-toxin, Zearalenone and Ochratoxin A are possible in one run.

Thirty samples (representing different regions as well as different classes and grades) were selected randomly for mycotoxin analyses.

All ten mycotoxins were not detected on all thirty samples tested.

BREAD WHEAT GRADING TABLE

2010/2011

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	3	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	-

Mycotoxin results for the 2010/2011 season

Region	Grade	Aflatoxin µg/kg				Fumonisin µg/kg		DON µg/kg	Ochratoxin A µg/kg	Zearalenone µg/kg	T2 - Toxin µg/kg
		G ₁	B ₁	G ₂	B ₂	B ₁	B ₂				
		LOD									
		4 µg/kg	2 µg/kg	4 µg/kg	4 µg/kg	100 µg/kg	100 µg/kg	100 µg/kg	20 µg/kg	20 µg/kg	20 µg/kg
1	B1	0	0	0	0	0	0	0	0	0	0
2	UT	0	0	0	0	0	0	0	0	0	0
3	B2	0	0	0	0	0	0	0	0	0	0
4	B3	0	0	0	0	0	0	0	0	0	0
5	B2	0	0	0	0	0	0	0	0	0	0
6	B1	0	0	0	0	0	0	0	0	0	0
10	B1	0	0	0	0	0	0	0	0	0	0
11	B1	0	0	0	0	0	0	0	0	0	0
12	B1	0	0	0	0	0	0	0	0	0	0
14	B4	0	0	0	0	0	0	0	0	0	0
15	B2	0	0	0	0	0	0	0	0	0	0
16	B2	0	0	0	0	0	0	0	0	0	0
17	B1	0	0	0	0	0	0	0	0	0	0
18	B1	0	0	0	0	0	0	0	0	0	0
19	B1	0	0	0	0	0	0	0	0	0	0
20	B2	0	0	0	0	0	0	0	0	0	0
21	B2	0	0	0	0	0	0	0	0	0	0
22	B1	0	0	0	0	0	0	0	0	0	0
23	B3	0	0	0	0	0	0	0	0	0	0
24	B1	0	0	0	0	0	0	0	0	0	0
25	B1	0	0	0	0	0	0	0	0	0	0
26	B1	0	0	0	0	0	0	0	0	0	0
27	B1	0	0	0	0	0	0	0	0	0	0
28	B1	0	0	0	0	0	0	0	0	0	0
29	B1	0	0	0	0	0	0	0	0	0	0
30	COW	0	0	0	0	0	0	0	0	0	0
32	B1	0	0	0	0	0	0	0	0	0	0
34	B2	0	0	0	0	0	0	0	0	0	0
35	B1	0	0	0	0	0	0	0	0	0	0
36	B1	0	0	0	0	0	0	0	0	0	0
Average		0	0	0	0	0	0	0	0	0	0
Number of samples		30	30	30	30	30	30	30	30	30	30

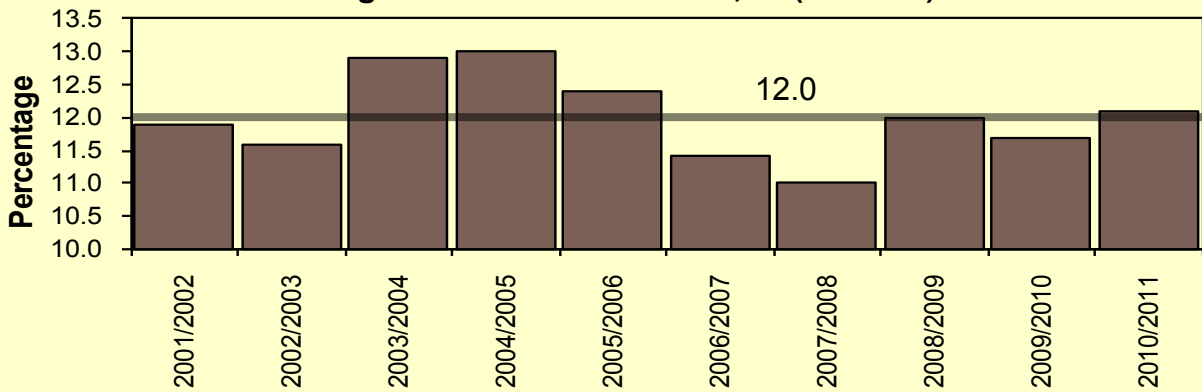
Note: All results <LOD and non detected are reported as 0
 LOD: Limit of detection, see table
 µg/kg = ppb (parts per billion)

WEIGHTED AVERAGE RESULTS FOR THE LAST THREE SEASONS

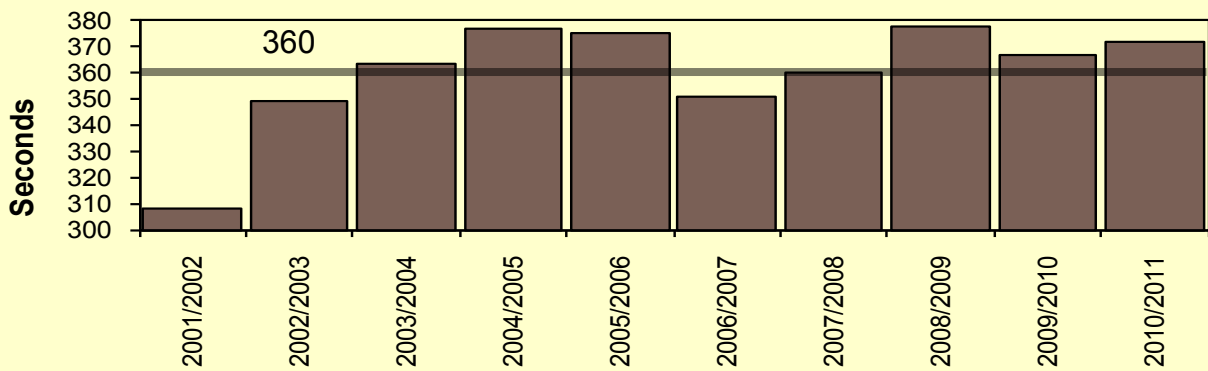
Region	2010/2011					2009/2010					2008/2009				
	Protein (12% mb), %	FN, sec	Hlm, kg/hl	Mixo PT, min	n	Protein (12% mb), %	FN, sec	Hlm, kg/hl	Mixo PT, min	n	Protein (12% mb), %	FN, sec	Hlm, kg/hl	Mixo PT, min	n
1	12.2	393	79.7	2.9	3	11.2	299	78.7	2.9	4	11.2	435	79.7	2.7	4
2	12.3	422	77.7	2.7	12	11.4	314	77.8	2.6	30	10.3	390	76.7	3.0	24
3	11.7	410	79.7	2.7	44	10.9	351	79.5	2.5	63	10.5	395	77.7	2.7	71
4	11.2	387	81.2	2.7	25	10.6	382	80.1	2.5	23	10.3	377	79.4	2.7	14
5	11.8	355	79.6	2.7	20	11.1	379	80.0	2.5	30	11.7	304	77.6	2.4	19
6	12.5	355	80.2	2.6	11	11.8	355	79.3	2.4	24	11.8	339	78.0	2.5	34
7	12.9	401	81.7	2.4	1	12.2	375	79.5	2.7	2	-	-	-	-	-
8	-	-	-	-	-	-	-	-	-	-	13.1	397	76.4	2.9	4
9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10	12.4	413	82.4	2.5	32	12.1	421	82.6	2.2	27	11.6	430	79.0	2.6	23
11	11.9	395	80.9	2.7	14	12.5	454	80.6	2.8	26	11.8	446	77.5	2.8	24
12	12.8	405	81.4	3.1	5	13.1	414	79.2	2.6	7	13.5	446	75.8	3.0	7
13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
14	11.6	415	79.7	2.9	4	12.4	369	78.6	2.5	7	-	-	-	-	-
15	11.9	375	81.2	3.0	9	12.1	400	81.2	2.9	6	12.9	467	76.0	2.6	9
16	11.8	434	78.9	2.6	3	12.3	418	76.4	2.4	3	-	-	-	-	-
17	11.9	416	80.6	2.9	8	11.7	361	79.3	2.5	8	13.8	344	74.1	2.8	6
18	12.7	386	79.6	4.2	2	12.3	361	80.7	2.6	2	12.3	329	77.6	2.7	3
19	11.9	389	81.2	3.4	8	11.4	361	79.8	2.6	10	12.2	396	76.2	2.6	13
20	11.6	411	80.3	3.1	15	11.3	393	79.4	2.9	10	11.6	411	76.4	3.3	25
21	11.8	397	81.7	3.1	5	12.0	384	81.4	2.5	5	11.5	426	77.8	2.8	2
22	11.7	357	81.4	3.4	6	12.1	367	82.6	3.0	8	14.1	320	76.8	2.9	10
23	11.4	362	81.4	3.1	22	11.6	325	81.5	3.1	15	12.9	379	77.2	2.9	23
24	12.0	356	80.1	3.4	16	11.8	322	80.8	3.0	29	13.4	347	76.1	3.3	17
25	13.1	240	78.2	3.8	25	11.7	361	78.8	3.5	35	13.5	314	77.6	3.4	31
26	13.3	305	80.2	3.7	13	12.2	348	79.9	3.5	22	14.0	320	77.2	3.6	25
27	13.6	328	79.1	3.7	8	12.0	411	79.8	3.3	7	12.8	370	77.9	3.4	3
28	13.1	298	78.8	3.4	31	12.2	372	79.0	3.7	34	13.2	376	78.5	3.2	29
29	12.6	421	85.0	2.8	1	-	-	-	-	-	-	-	-	-	-
30	13.0	407	76.9	4.2	1	-	-	-	-	-	12.6	438	80.0	2.3	3
31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
32	12.2	396	82.6	3.5	1	11.5	278	81.6	2.9	5	11.9	321	78.9	3.0	7
33	-	-	-	-	-	11.8	372	78.6	3.5	9	11.1	372	78.4	2.9	10
34	11.5	436	82.3	2.2	11	12.3	416	80.3	2.6	5	11.9	346	77.2	3.0	18
35	11.9	415	80.6	2.9	8	11.8	386	79.7	3.2	14	11.3	468	79.3	3.1	17
36	12.7	432	82.2	2.9	8	12.8	348	81.2	3.1	10	12.5	367	79.2	2.9	5
Ave.	12.1	372	80.3	3.0	372	11.7	367	79.9	2.9	480	12.0	378	77.6	2.9	480

WEIGHTED AVERAGE QUALITY OVER 10 SEASONS

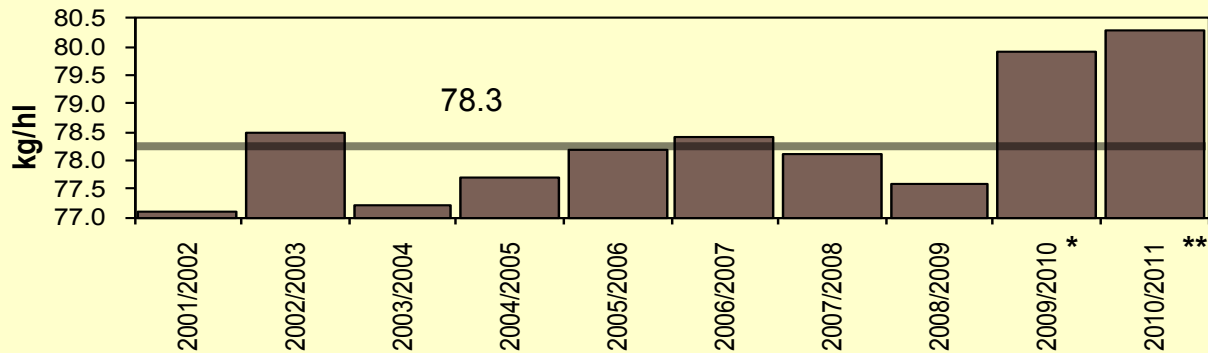
Average Whole Wheat Protein, % (12% mb)



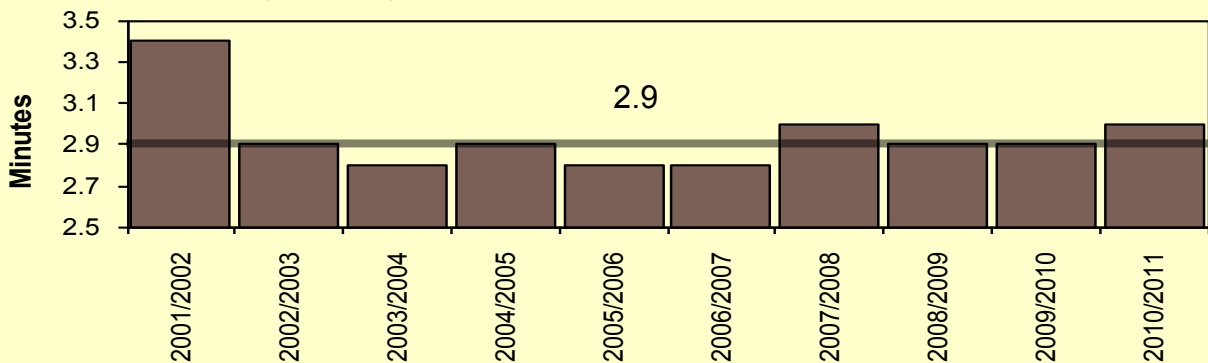
Average Falling Number, seconds



Average Hectolitre mass, kg/hl



Average Mixogram peak time (Quadromat mill), minutes



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

** Hectolitre mass determined using Kern 222 instrument.

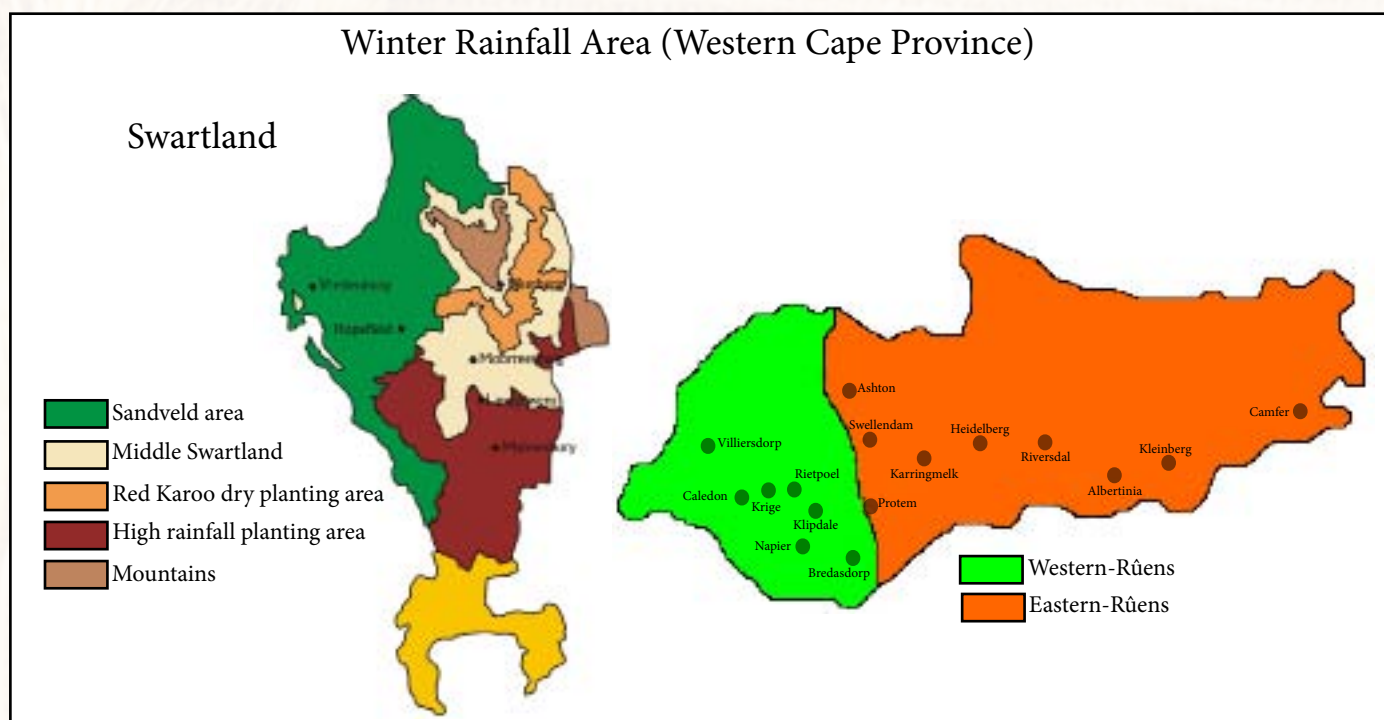
REGIONAL QUALITY

WINTER RAINFALL AREA (Western Cape)

Production regions 1 to 6 fall within the winter rainfall area (Western Cape Province). Region 1 is Namaqualand, regions 2 - 4 are the Swartland area and regions 5 and 6 the Rûens area. The Western Cape had the highest production of all the provinces this season, namely 556 500 tons (38 %) (CEC).

The hectolitre mass averaged 79.8 kg/hl. The thousand kernel mass averaged 39.9 gram, which is equal to the previous season. The average falling number was 391 seconds. The average protein content of 11.75 % (12 % mb) was the lowest of the different production areas.

Fairly favourable climatic conditions were experienced in the Swartland. Growing conditions in the Rûens were the worst experienced over a period of four years.



The screenings of 1.82 % was lower than the previous season's 2.02 %. The Bühler extraction averaged 74.7 % (average of wheat grades B1 to B4, UT and COW) and the average colour of the flour was -2.2 KJ units. This colour indicates a very white flour that is preferred by millers and bakers.

The mixogram peak time (Quadromat mill) averaged 2.7 minutes. The average farinogram absorption was 61.9 %. The average alveogram strength was 30.3 cm² and the average strength on the extensogram was 85 cm². The alveogram strength in the Free State was 41.2 cm² and in the irrigation areas 36.0 cm².

The 100-gram baking test showed a very good relationship between protein content and bread volume.

SUMMER RAINFALL AREA

(Free State)

Production regions 21 to 28, which fall within the Free State Province, had the second highest production, namely 377 400 tons (26 %) (CEC).

The 1.9 tons/ha average yield in the Free State was lower than the 2.7 tons/ha of the previous season.

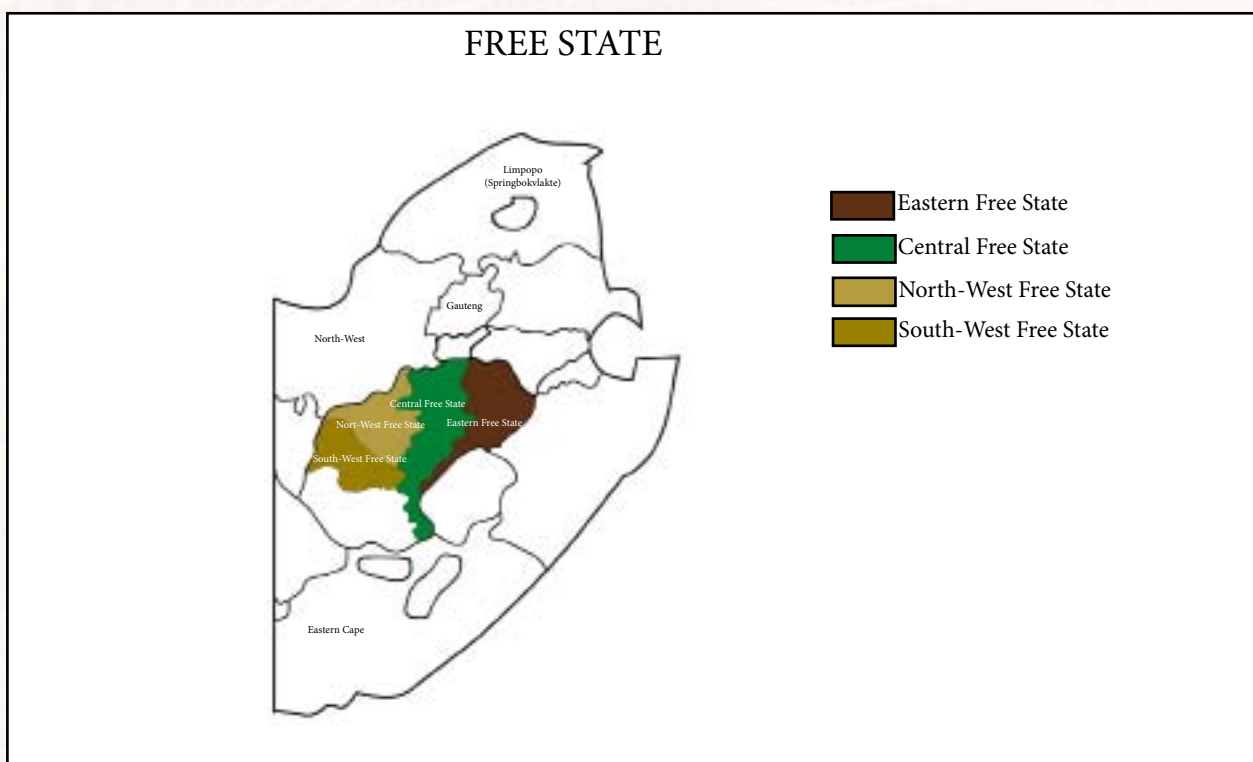
The average hectolitre mass was 79.7 kg/hl. The physical characteristic thousand kernel mass (38.1 g) was lower than the previous season's 38.4 g. The average screenings was 1.51 %. The average protein content increased from 11.93 % the previous season to 12.59 % (12 % mb) this season. Although the average falling number was 314 seconds, twenty four samples gave falling numbers lower than 250 seconds and twenty one samples were below 220 seconds. These low falling numbers were caused by preharvest sprouting due to late rains.

The mixogram (Quadromat) peak time of 3.5 minutes was similar to the previous season, giving the Free State the longest average mixogram peak time of the different production areas.

The average Bühler extraction percentage in the Free State was 73.7 % (75.6 % previous season). The Kent Jones flour colour was -0.9 KJ units (-2.3 KJ units in the previous season).

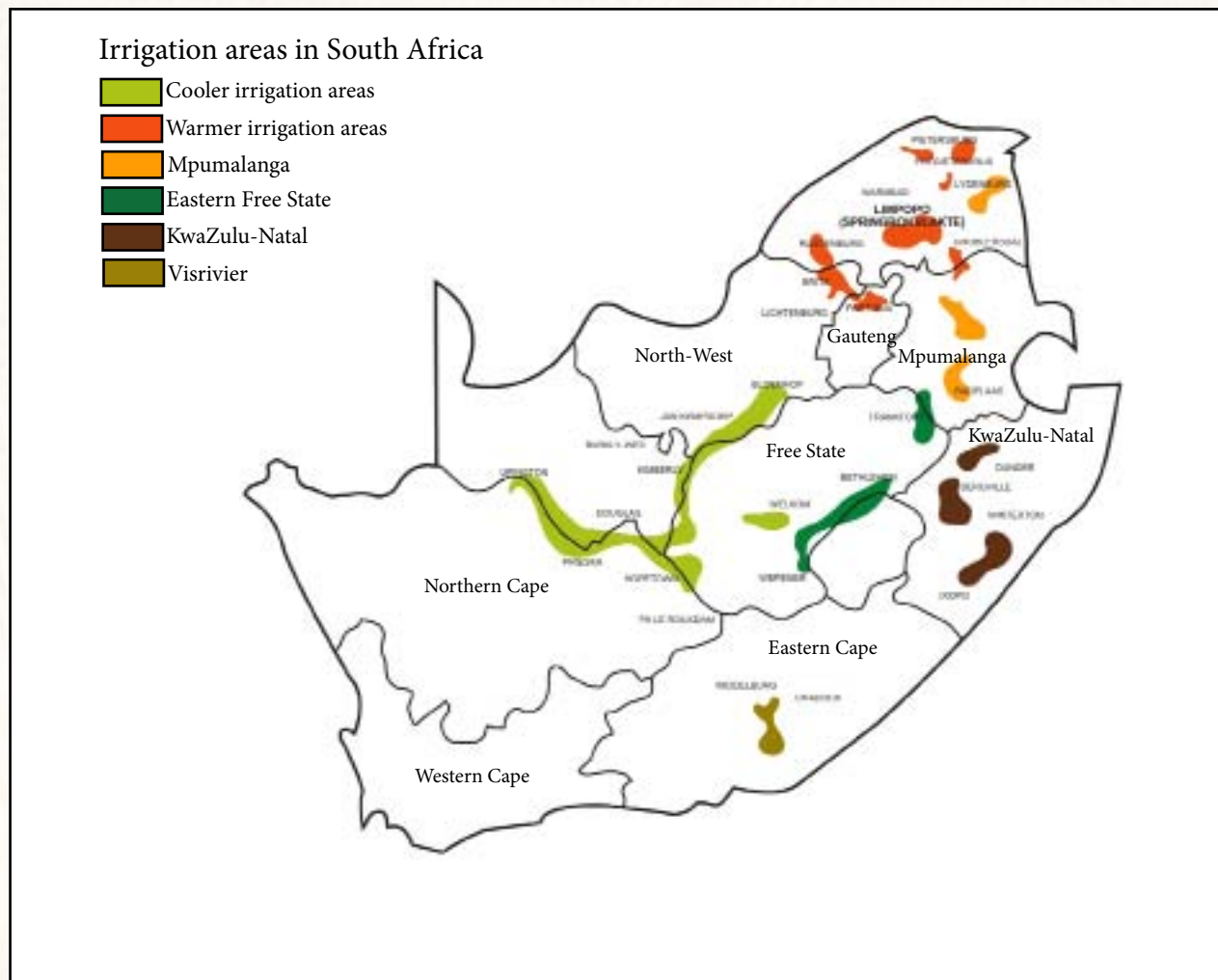
The average farinogram water absorption was 64.3 %, the highest of all four areas. The average alveogram strength of 41.1 cm² and extensogram strength of 107 cm² were also the highest reported for all four areas.

The 100-gram baking test showed that the relationship between protein content and bread volume was good on average between the different grades.



IRRIGATION AREAS

(Northern Cape, North West (plus other irrigation areas))



Production regions 7, 10 - 12, 14 - 20 and 36 falls within the irrigation areas. These areas produced 428 420 tons of wheat this season (29 % of total production) with an average yield of 5.4 tons/hectare.

Due to the significant decrease in wheat produced under dryland conditions over the past ten years, the stable production situation of wheat under irrigation has proven to be an increasingly important stabilising factor in the total production of wheat in the RSA.

The average hectolitre mass was 81.3 kg/hl and the thousand kernel mass was 40.3 g (38.6 g the previous season). The average falling number was 407 seconds. The average screenings was 1.69 % and the protein averaged 12.11 % (12 % mb).

The average mixogram (Quadromat) peak time was 2.8 minutes which was more or less the same as the previous season.

The average Bühler extraction percentage was 76.0 (73.9 % during the previous season), with an average flour colour of -2.4 KJ units.

The average farinogram water absorption was 62.8 % (61.6 % during previous season), with an average farinogram development time of 5.7 minutes.

The average alveogram strength was 36.0 cm² and the average P/L 1.01 (40.0 cm² and 1.68 respectively the previous season).

The average extensogram strength was 100 cm². The relationship between protein content and bread volume (with the 100-gram baking test) was shown to be very good.

OTHER SUMMER RAINFALL AND IRRIGATION AREAS

(Mpumalanga, Limpopo and Gauteng)

Other summer rainfall regions, excluding the Free State, are mainly regions 29, 30, 32, 33 (Mpumalanga), 34 (Gauteng) and 35 (Limpopo). They produced in total 102 650 tons during this season (7 % of the total production).

The average hectolitre mass was 81.6 kg/hl, the highest of the four production areas. The average thousand kernel mass was 41.4 g (40.6 g the previous season), also the highest of the four areas.

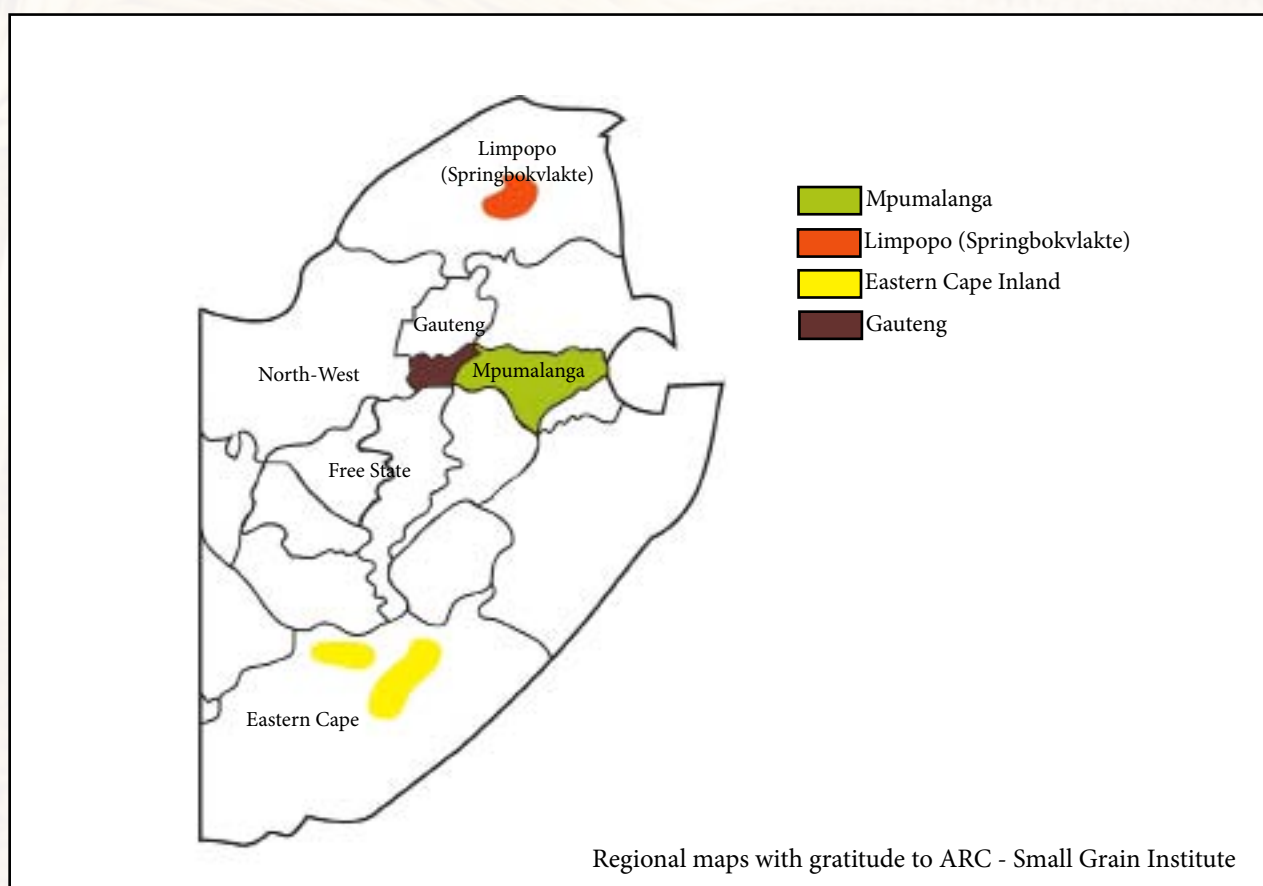
The average falling number was 425 seconds, with the average percentage screenings 1.89 %. The average protein content was 11.78 % (12 % mb), which is similar to the previous year.

The average mixogram (Quadromat) peak time was 2.6 minutes (3.1 minutes the previous season).

The average Bühler extraction was 76.0 %, with an average colour of -2.0 KJ units (76.2 % and -2.1 KJ units the previous season). The farinogram average water absorption was 63.3 % (60.1 % the previous season) and had an average development time of 5.0 minutes.

The average alveogram strength was 31.9 cm² and the average extensogram strength 78 cm².

The 100-gram baking test showed a good relationship between protein content and bread volume.



REGIONAL QUALITY WEIGHTED AVERAGES

	Winter rainfall area (Western Cape)			Summer rainfall area (Free State)			Irrigation areas			Other Summer rainfall and Irrigation areas			RSA average		
<i>Individual samples n</i>	115			126			109			22			372		
Regions	1 - 6			21 - 28			7, 10 - 12, 14 - 20, 36			29 - 35			All		
Hectolitre mass dirty, kg/hl	79.8			79.7			81.3			81.6			80.3		
1000 kernel mass (13% mb), g	39.9			38.1			40.3			41.4			39.5		
Falling number, sec	391			314			407			425			372		
Screenings (1,8 mm), %	1.82			1.51			1.69			1.89			1.68		
Protein (12% mb), % (ww)	11.75			12.59			12.11			11.78			12.14		
Mixogram peak time, min (Quadromat)	2.7			3.5			2.8			2.6			3.0		
<i>Individual samples per class and grade, n</i>	38	35	21	64	21	13	52	32	10	10	5	4	164	93	48
	7	13	1	7	8	13	7	7	1	2	0	1	23	28	16
<i>Composite samples per class and grade, n = 100</i>	B1	B2	B3	B1	B2	B3	B1	B2	B3	B1	B2	B3	B1	B2	B3
	B4	UT	COW	B4	UT	COW	B4	UT	COW	B4	UT	COW	B4	UT	COW
<i>Composite samples, n</i>	6	5	3	8	7	6	11	10	6	4	2	2	29	24	17
	3	3	1	4	4	5	3	3	1	1	0	1	11	10	8
Bühler extraction, %	74.5	74.6	75.1	74.1	74.1	73.7	75.8	76.0	75.8	75.9	75.6	76.5	75.1	75.1	75.0
	75.1	74.9	72.7	73.2	72.8	73.3	76.2	76.2	77.0	75.3	-	77.0	74.7	74.5	74.2
Flour colour, KJ	-2.2	-2.3	-2.4	-1.5	-1.7	-1.3	-2.2	-2.4	-2.5	-2.1	-2.1	-2.5	-2.0	-2.2	-2.1
	-2.4	-2.1	-0.7	-0.9	-0.2	1.1	-2.6	-2.6	-1.8	-2.5	-	0.3	-1.9	-1.5	0.4
Flour protein (12% mb), %	11.8	10.4	9.4	12.3	10.7	10.3	12.1	10.5	9.5	11.7	10.2	9.5	12.0	10.5	9.8
	9.0	10.6	11.9	9.9	12.7	12.5	10.7	11.1	10.2	9.5	-	11.9	9.8	11.6	12.1
Wet gluten (14% mb), %	32.6	27.9	24.3	32.8	28.4	26.6	32.8	28.7	25.3	32.1	28.3	26.2	32.7	28.4	25.7
	25.9	28.4	33.4	27.6	33.7	32.5	30.4	31.2	28.0	26.5	-	25.1	27.8	31.4	31.1
Dry gluten (14% mb), %	11.9	10.0	8.7	11.8	9.9	9.5	11.5	9.9	8.8	11.2	9.6	8.7	11.6	9.9	9.0
	9.2	10.2	11.8	9.4	12.0	11.7	10.2	10.7	9.5	8.9	-	8.7	9.5	11.1	11.1
Farinogram:	63.2	62.3	60.7	65.1	63.5	63.1	64.0	62.4	60.9	64.5	63.1	61.5	64.2	62.8	61.7
Water absorption (14% mb), %	59.6	61.9	63.1	63.3	66.0	64.9	63.6	62.8	62.0	63.0	-	62.4	62.3	63.8	64.0
Farinogram:	5.8	5.1	4.6	7.6	6.0	5.6	7.3	5.1	4.8	6.6	4.0	4.4	7.0	5.3	5.0
Development time, min	3.1	5.2	4.7	4.0	5.0	5.3	4.8	5.5	4.2	4.0	-	2.5	4.0	5.2	4.7
Alveogram:	34.7	30.8	27.1	46.5	35.6	35.8	45.7	32.6	29.2	41.4	27.0	24.0	43.1	32.6	30.5
Strength (S), cm²	24.0	29.5	32.1	33.4	51.1	45.6	31.6	34.0	24.6	20.9	-	30.6	29.2	39.5	39.4
Alveogram:	0.86	1.15	1.10	1.44	1.53	2.02	0.96	1.06	1.20	1.03	0.97	0.98	1.08	1.21	1.45
P/L	1.07	1.16	0.85	2.39	1.76	1.35	0.96	0.75	0.73	1.42	-	4.21	1.55	1.28	1.57
Extensogram:	93	86	75	114	101	100	121	94	85	104	57	60	111	91	86
Strength, cm²	67	89	102	97	112	117	84	98	74	56	-	-	82	101	95
Mixogram peak time, min	2.5	2.5	2.3	3.1	2.8	3.1	2.8	2.7	2.8	2.8	2.3	2.3	2.8	2.7	2.8
	2.4	2.7	2.3	3.3	3.3	3.5	2.3	2.3	2.3	2.0	-	3.5	2.7	2.8	3.2
Relationship between protein and bread volume	VG	EX	EX	Q	G	Q	VG	EX	VG	VG	EX	EX	G	VG	VG
	EX = Excellent			G	Q	VG	VG = Very Good			EX = Excellent		EP	VG = Good		

Q = Questionable

EP = Extremely Poor

RSA WHEAT PRODUCTION AREAS



WHEAT SEED SOLD BY COMMERCIAL GRAIN SILO OWNERS TO WHEAT PRODUCERS FOR THE 2010 PLANTING SEASON

<u>Cultivar</u>	<u>%</u>	<u>Cultivar</u>	<u>%</u>
SST 027	16.20	SST 347	0.25
SST 835	13.14	PAN 3355	0.23
SST 88	12.77	PAN 3349	0.22
SST 843	9.30	Buffels	0.214
SST 015	8.72	SST 334	0.205
Duzi	8.43	SST 966	0.146
Elands	6.17	PAN 3377	0.106
SST 047	5.28	Gariep	0.105
SST 356	4.72	Olifants	0.103
CRN 826	4.17	SST 399	0.090
SST 822	2.15	Kariega	0.084
Krokodil	1.15	PAN 3368	0.082
SST 877	0.94	Baviaans	0.067
SST 806	0.73	Komati	0.038
SST 056	0.68	PAN 3144	0.030
Matlabas	0.66	Betta DN	0.027
SST 876	0.64	SST 322	0.012
SST 363	0.62	SST 825	0.007
PAN 3120	0.43	PAN 3364	0.006
Tugela	0.39	Inia	0.002
PAN 3118	0.34	SST 935	0.0019
PAN 3434	0.33	SST 367	0.0004
			<u>100</u>

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

South African Winter Cereal Production

Wheat is by far the biggest winter cereal crop planted in South Africa. Other winter crops are barley for malting purposes and canola. Summer field crops are better suited for the South African climatic conditions. Maize has the largest crop size of the different crops, followed by wheat, then sunflower seed, soya-beans, sorghum, barley, groundnuts, dry beans and canola.

South Africa (made up of nine provinces) is divided into 36 crop production regions with wheat planted in about 32 of these regions. These production regions are described on pages 23 to 54 (in the header of the left page) giving the specific intake silo names for each region.

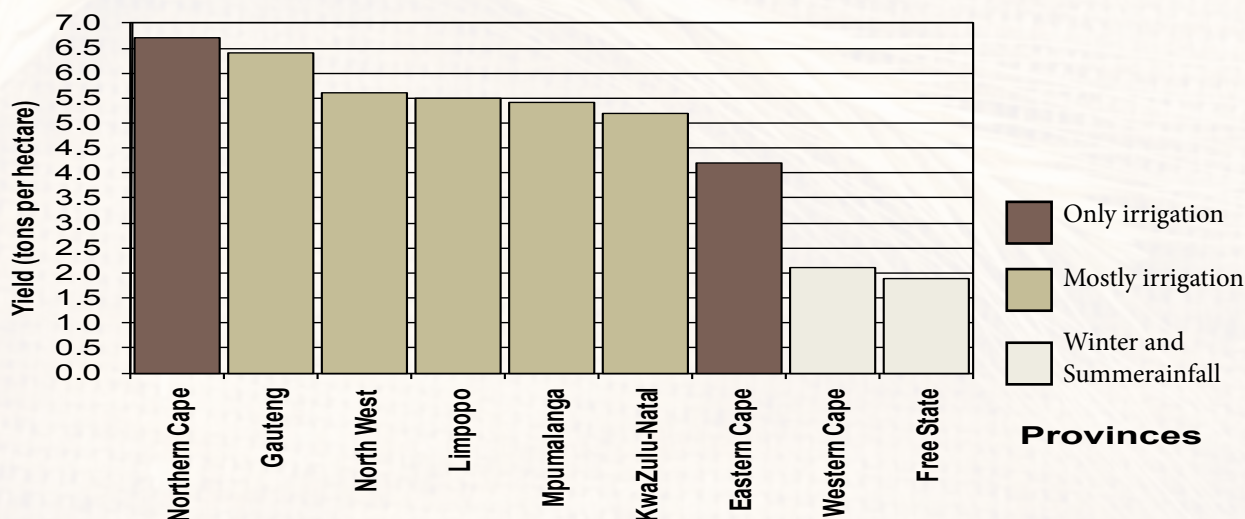
The three main wheat producing provinces are Western Cape (winter rainfall), Free State (summer rainfall) and the Northern Cape (irrigation). A fourth province worth mentioning is the North-West (mainly irrigation). The local production is not sufficient for domestic requirements and South Africa has to import wheat to meet its domestic consumption.

The Western Cape province produced 556 500 tons and the Free State province followed with 377 400 tons. (Seventh estimate by the Crop Estimates Committee, CEC). These two provinces were responsible for 64 % of the total wheat produced. The Northern Cape produced 254 600 tons and North West 123 200 tons.

The yield in the main production areas ranged from 6.7 tons per hectare in the Northern Cape (irrigation area), 1.9 tons per hectare in the Free State and 2.1 tons per hectare for the Western Cape. Gauteng gave a yield of 6.4 tons per hectare, followed by North West with 5.6 tons per hectare, Limpopo 5.5 tons per hectare and Mpumalanga with 5.4 tons per hectare. KwaZulu-Natal and the Eastern Cape yielded 5.2 and 4.2 tons per hectare respectively. See graph on page 13.

South Africa has three major wheat-breeding programs. The South African breeders can only release a new cultivar or an introduction cultivar if it has better agronomical as well as better flour quality characteristics than the cultivars planted commercially in a specific area. 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.

**Average yield per province
(Irrigation versus summer and winter rainfall areas)**



(Based on figures obtained from the CEC)

Comparison of Flour Quality over the last four seasons

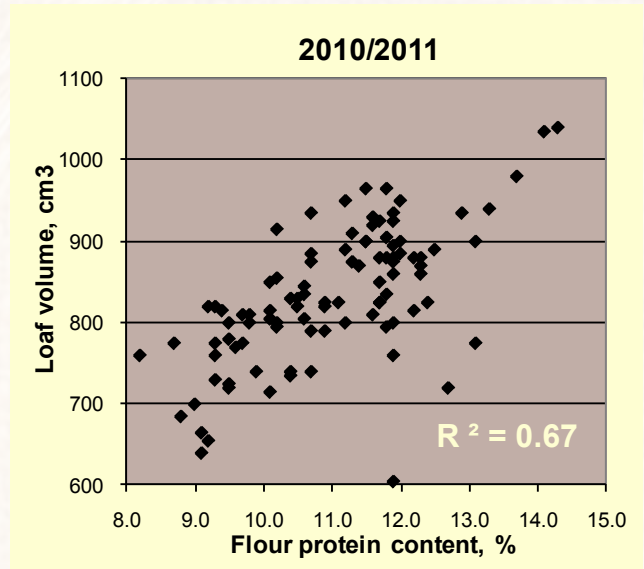
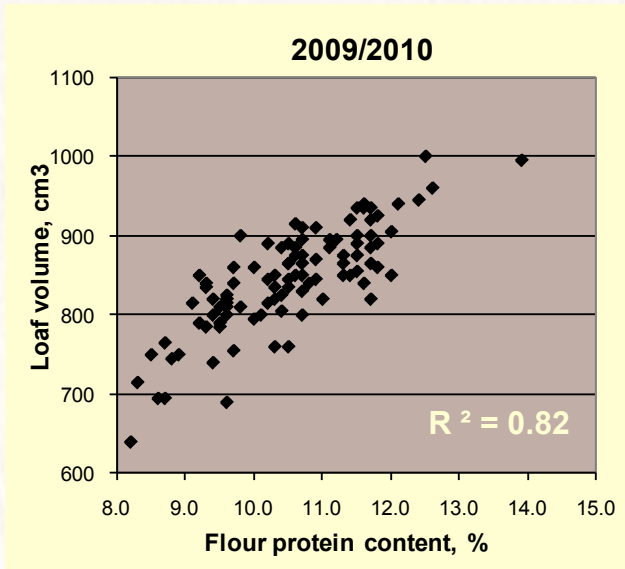
Flour Quality 2010/2011 season			
Flour protein (12% mb) (%)	11.0	Farinogram abs. (14% mb) (%)	63.2
Bread volume 100g (cm ³)	832	Farinogram dev. time (min.)	5.5
Mixogram (Bühler) peak time (min)	2.8	Alveogram strength (cm ²)	36.2
Wet gluten (14% mb) (%)	29.7	Alveogram P/L	1.29
Dry gluten (14% mb) (%)	10.4	Extensogram strength (cm ²)	97

Flour Quality 2009/2010 season			
Flour protein (12% mb) (%)	10.5	Farinogram abs. (14% mb) (%)	61.0
Bread volume 100g (cm ³)	843	Farinogram dev. time (min.)	3.5
Mixogram (Bühler) peak time (min)	2.6	Alveogram strength (cm ²)	35.5
Wet gluten (14% mb) (%)	28.6	Alveogram P/L	1.17
Dry gluten (14% mb) (%)	10.0	Extensogram strength (cm ²)	83

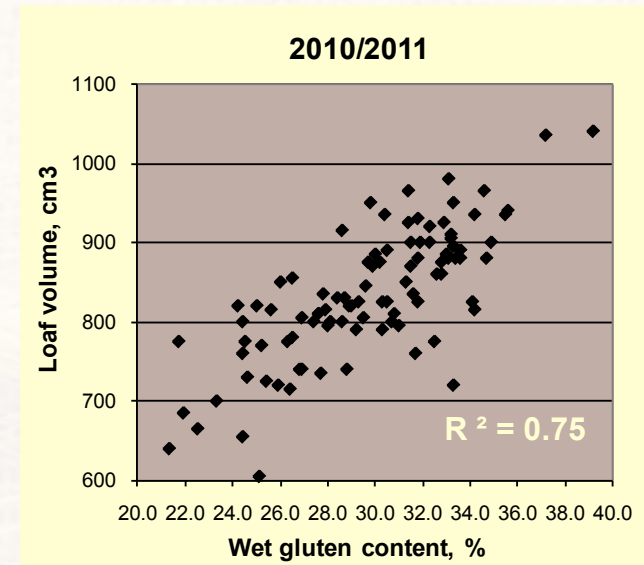
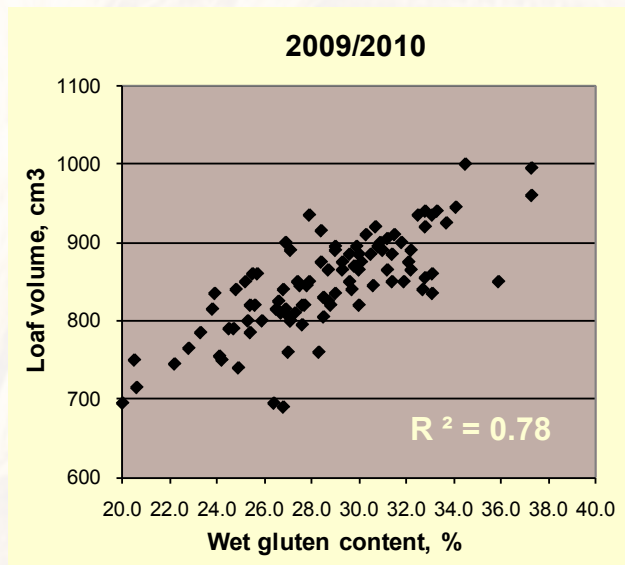
Flour Quality 2008/2009 season			
Flour protein (12% mb) (%)	11.1	Farinogram abs. (14% mb) (%)	61.1
Bread volume 100g (cm ³)	902	Farinogram dev. time (min.)	4.0
Mixogram (Bühler) peak time (min)	2.6	Alveogram strength (cm ²)	38.0
Wet gluten (14% mb) (%)	-	Alveogram P/L	0.90
Dry gluten (14% mb) (%)	-	Extensogram strength (cm ²)	90

Flour Quality 2007/2008 season			
Flour protein (12% mb) (%)	10.8	Farinogram abs. (14% mb) (%)	60.8
Bread volume 100g (cm ³)	827	Farinogram dev. time (min.)	3.6
Mixogram (Bühler) peak time (min)	2.8	Alveogram strength (cm ²)	41.9
Wet gluten (14% mb) (%)	-	Alveogram P/L	0.94
Dry gluten (14% mb) (%)	-	Extensogram strength (cm ²)	97

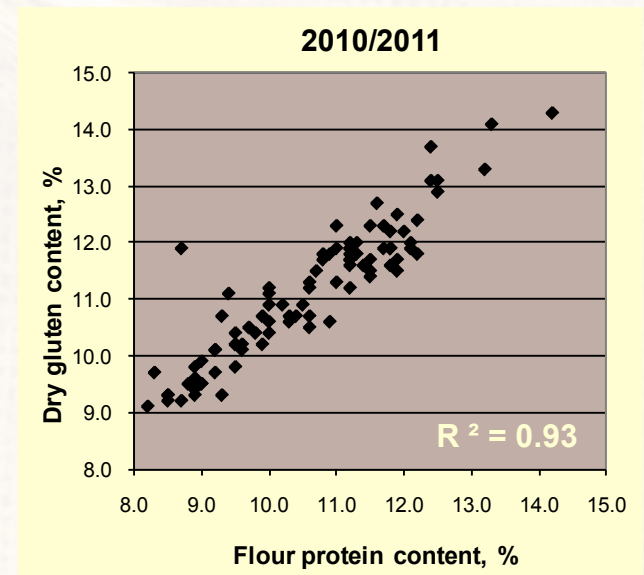
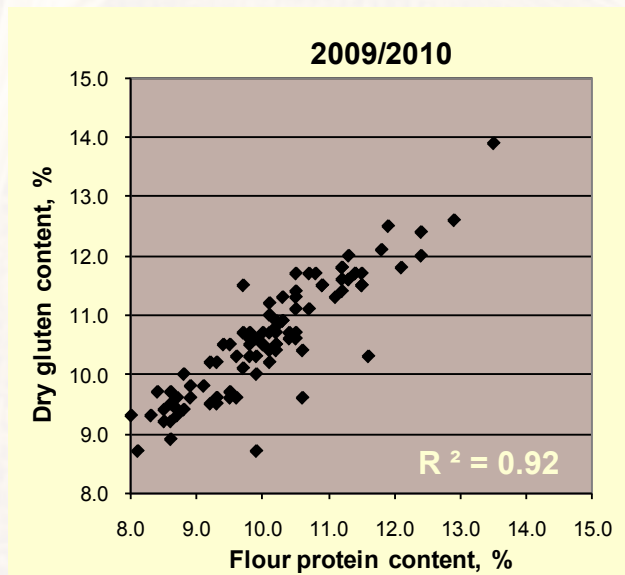
Comparison of protein content vs loaf volume



Comparison of wet gluten content vs loaf volume



Comparison of protein content vs dry gluten content





WHEAT IMPORTS / EXPORTS

2009/10 Season

Progressive: 2009/10/03 - 2010/10/01

Updated: 2010/11/26

Imported from:	Total Tons	Destined for:		
		RSA	Africa	Overseas
Overseas	1387813	1277972	109841	0
RSA	0	0	0	0
Africa	0	0	0	0
	1387813	1277972	109841	0
Less: RSA for RSA		0	0	n/a
	1387813	1277972	109841	0

Exported from:	Total Tons	Destined for:		
		RSA	Africa	Overseas
Overseas	116392	0	116392	0
RSA	204127	0	204127	0
Africa	0	0	0	0
	320519	0	320519	0
Less: RSA for RSA	0	0	n/a	n/a
	320519	0	320519	0

Information updated due to:

- i) Revised information received from importers/exporters.
- ii) Grain originally allocated for RSA but finally exported to Africa or vice versa.

WHEAT IMPORTS / EXPORTS

2010/11 Season

Progressive: 2010/10/02 - 2011/05/13

Published: 2011/05/17

Imported from:	Total Tons	Destined for:		
		RSA	Africa	Overseas
Overseas	1005172	964340	34429	6403
RSA	0	0	0	0
Africa	0	0	0	0
	1005172	964340	34429	6403
Less: RSA for RSA		0	0	n/a
	1005172	964340	34429	6403

Exported from:	Total Tons	Destined for:		
			Africa	Overseas
Overseas	36899	0	36899	0
RSA	100393	0	100393	0
Africa	0	0	0	0
	137292	0	137292	0
Less: RSA for RSA	0	0	n/a	n/a
	137292	0	137292	0

2009/10 Season

Progressive: 2009/10/03 - 2010/10/01

Updated: 2010/11/26

WHEAT EXPORTS

COUNTRY	AFRICA TONS	RSA TONS	OVERSEAS TONS
Botswana	95164		
Mozambique	1991		
Lesotho	61699		
Namibia	21630		
Swaziland	38538		
Zimbabwe	101497		
	320519		

WHEAT IMPORTS

FROM COUNTRY	FOR AFRICA TONS	FOR RSA TONS	FOR OVERSEAS TONS
Germany	80487	809934	
Ukraine		41230	
USA	2454	173030	
Australia	3080	55312	
Canada		72911	
Brazil	12691	123944	
Lithuania	11129	1611	
	109841	1277972	

Information updated due to:

- i) Revised information received from importers/exporters.
- ii) Grain originally allocated for RSA but finally exported to Africa or vice versa.

2010/11 Season

Progressive: 2010/10/02 - 2011/05/13

Published: 2011/05/17

WHEAT EXPORTS

COUNTRY	AFRICA TONS	COUNTRY	OVERSEAS TONS
Botswana	52723	Madagascar	6403
Lesotho	50004		
Mozambique	6		
Namibia	8147		
Swaziland	13944		
Zambia	4124		
Zimbabwe	1941		
	130889		6403

WHEAT IMPORTS

FROM COUNTRY	FOR AFRICA TONS	FOR RSA TONS	FOR OVERSEAS TONS
Argentina	12430	510115	0
Australia	5116	53198	0
Brazil	5808	28600	0
Canada	0	47415	0
Germany	0	62186	0
Uruguay	0	25249	0
USA	11075	237577	6403
	34429	964340	6403

WHEAT

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Updated:

	Oct - Sep	1997/98	1998/99	1999/00	2000/01	2001/02	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	'2010/11	
															Projection Months: 12	Actual Oct-Apr 7
Opening stock		578.0	1241.0	771.0	507.0	551.0	580.0	897.0	598.0	574.0	582.0	376.0	509.0	694.0	579.0	579.0
Prod deliveries (a)		2449.0	1644.0	1725.0	2353.0	2415.0	2387.0	1512.0	1670.0	1893.0	2045.0	1876.0	2130.0	1910.0		1371.0
Crop estimate (b)		2283.5	1531.0	1725.0	2349.0	2492.9	2320.7	1540.0	1680.0	1905.0	2105.0	1905.0	2130.0	1958.0	1430.0	
Imports		469.0	484.0	624.0	308.0	407.0	747.0	1042.0	1227.0	1055.0	777.0	1396.0	1192.0	1285.0	936.0	936.0
Surplus		0.0	0.0	0.0	0.0	0.0	0.0	6.0	6.0	9.0	32.0	0.0	13.0	0.0	9.0	9.0
Available		3496.0	3369.0	3120.0	3168.0	3373.0	3714.0	3457.0	3501.0	3531.0	3436.0	3648.0	3844.0	3889.0	2954.0	2895.0
Processed		2181.0	2400.0	2371.0	2427.0	2541.0	2577.0	2653.0	2736.0	2793.0	2820.0	2845.0	2857.0	3017.0	2849.1	1662.0
-human		2138.0	2348.0	2345.0	2424.0	2519.0	2575.0	2652.0	2734.0	2781.0	2818.0	2844.0	2849.0	2991.0	2847.4	1661.0
-animal		43.0	52.0	24.0	2.0	22.0	2.0	1.0	2.0	12.0	2.0	1.0	8.0	26.0	1.7	1.0
-gristing		0.0	0.0	2.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
-bio-fuel		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Producers		0.0	0.0	43.0	33.0	31.0	24.0	13.0	7.0	10.0	7.0	12.0	12.0	14.0	5.0	5.0
End consumers		2.0	5.0	12.0	4.0	7.0	5.0	2.0	2.0	4.0	4.0	2.0	5.0	3.0	2.0	2.0
Seed		0.0	16.0	26.0	24.0	27.0	20.0	21.0	16.0	26.0	17.0	22.0	26.0	17.0	10.0	10.0
Net receipts(-)/dispatch(+)		-7.0	76.0	37.0	9.0	15.0	11.0	12.0	6.0	5.0	1.0	26.0	19.0	15.0	-1.0	-1.0
Deficit		0.0	60.0	52.0	17.0	23.0	1.0	0.0	0.0	0.0	0.0	9.0	0.0	4.0	0.0	0.0
Exports		79.0	75.0	72.0	103.0	149.0	179.0	158.0	158.0	111.0	211.0	223.0	231.0	240.0	108.0	108.0
Utilised:		2255.0	2632.0	2613.0	2617.0	2793.0	2817.0	2859.0	2925.0	2949.0	3060.0	3139.0	3150.0	3310.0	2973.1	1786.0
Stock		1241.0	737.0	507.0	551.0	580.0	897.0	598.0	576.0	582.0	376.0	509.0	694.0	579.0	-19.1	1109.0
- processed p/month		181.8	200.0	197.6	202.3	211.8	214.8	221.1	228.0	232.8	235.0	237.1	238.1	251.4	237.4	237.4
- 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	-0.1	4.7

(a) 1998/1999 and 1999/2000 Includes storage on behalf of producers

(b) Estimates of Department of Agriculture's (DAFF) Crop Estimates Committee

Last report:

5 May 2011

**SOUTH AFRICAN
WINTER RAINFALL WHEAT
Western Cape Province**

PRODUCTION REGION	(1) Namaqualand						(2) Swartland Western Region					
	Intake silos											
	Bitterfontein Graafwater Landplaas Vanrhynsdorp Vredendal						Bergrivier Darling Koperfontein Vredenburg					
WHEAT												
	ave	min	max	stdev		ave	min	max	stdev			
Protein (12% mb), %	12.2	11.3	13.3	1.01		12.3	11.6	13.0	0.44			
Falling number, sec	393	377	407	15.10		422	395	458	19.96			
1000 Kernel mass (13% mb), g	43.2	40.2	48.9	4.91		37.9	34.4	38.9	1.25			
Hectolitre mass (dirty), kg/hl	79.7	79.4	80.0	0.31		77.7	74.5	81.2	1.95			
Screenings (<1.8mm), %	2.40	2.20	2.54	0.18		2.67	1.78	4.72	0.81			
Total damaged kernels, %	1.15	1.08	1.28	0.12		0.63	0.18	0.84	0.21			
Number of samples	3						12					
CULTIVARS												
	SST 88						SST 027					
	SST 015						SST 015					
cultivars with highest % occurrence	SST 027						SST 88					
	SST 047						SST 047					
	PAN 3492						SST 056					
Number of samples	3						12					
MIXOGRAM (Quadromat)												
	ave	min	max	stdev		ave	min	max	stdev			
Peak time, min	2.9	2.6	3.3	0.38		2.7	2.5	2.8	0.11			
Tail height (6min), mm	50	49	51	1.00		48	45	50	1.73			
Number of samples	3						12					
BÜHLER EXTRACTION, %												
	B1	B2	B3	B4	UT	COW	B1	B2	B3	B4	UT	COW
	74.4	74.0	-	-	-	-	74.5	-	-	-	73.7	-
FLOUR												
Protein (12% mb), %	11.4	9.7	-	-	-	-	11.7	-	-	-	11.2	-
Colour, KJ	-2.3	-2.2	-	-	-	-	-2.4	-	-	-	-2.0	-
GLUTEN												
Wet gluten (14% mb), %	31.5	24.5	-	-	-	-	31.8	-	-	-	30.5	-
Dry gluten (14% mb), %	11.5	8.3	-	-	-	-	11.9	-	-	-	11.2	-
FARINOGRAM												
Water absorption (14% mb), %	63.6	63.0	-	-	-	-	62.6	-	-	-	61.1	-
Development time, min	6.2	2.7	-	-	-	-	5.7	-	-	-	5.3	-
Stability, min	7.3	9.2	-	-	-	-	7.7	-	-	-	6.8	-
Mixing tolerance index, BU	45	13	-	-	-	-	34	-	-	-	38	-
EXTENSOGRAM (45 min pull)												
Area, cm2	97	88	-	-	-	-	87	-	-	-	86	-
Maximum height, BU	335	400	-	-	-	-	330	-	-	-	325	-
Extensibility, mm	202	156	-	-	-	-	186	-	-	-	184	-
ALVEOGRAM												
Strength (S), cm2	37.0	34.1	-	-	-	-	32.3	-	-	-	29.4	-
Stability (P), mm	91	107	-	-	-	-	82	-	-	-	81	-
Distensibility (L), mm	93	63	-	-	-	-	92	-	-	-	84	-
Configuration ratio (P/L)	0.98	1.70	-	-	-	-	0.89	-	-	-	0.96	-
MIXOGRAM												
Peak time, min	2.7	2.7	-	-	-	-	2.5	-	-	-	2.8	-
100g BAKING TEST												
Loaf volume, cm3	870	775	-	-	-	-	880	-	-	-	890	-
Evaluation	1	0	-	-	-	-	1	-	-	-	0	-

RHEOLOGICAL GRAPHS PER PRODUCTION REGION



**SOUTH AFRICAN
WINTER RAINFALL WHEAT
Western Cape Province**

PRODUCTION REGION	(3) Swartland Central Region					(4) Swartland Eastern Region						
	Intake silos											
	Eendekuil					Ceres						
	Klipheuwel					Gouda						
	Koringberg					Halfmanshof						
	Malmesbury					Leliedam						
	Moorreesburg					Porterville						
	Moravia					Riebeeck-Wes						
	Piketberg											
	Pools											
	Ruststasie											
WHEAT												
	ave	min	max	stdev		ave	min	max	stdev			
Protein (12% mb), %	11.7	9.7	13.5	1.00		11.2	9.3	13.2	0.93			
Falling number, sec	410	350	475	28.72		387	331	451	30.13			
1000 Kernel mass (13% mb), g	40.6	34.0	45.6	2.41		39.9	35.8	44.0	2.10			
Hectolitre mass (dirty), kg/hl	79.7	76.2	83.6	1.47		81.2	77.5	84.1	1.31			
Screenings (<1.8mm), %	2.02	0.30	6.64	0.99		1.09	0.04	5.45	1.37			
Total damaged kernels, %	0.32	0.00	0.72	0.17		0.43	0.08	1.36	0.32			
Number of samples	44					25						
CULTIVARS												
		SST 015	34.3			SST 88	29.3					
cultivars		SST 027	27.3			SST 027	26.2					
with highest %		SST 88	24.0			SST 015	22.9					
occurrence		SST 835	4.7			SST 57	11.8					
		SST 047	4.1			SST 047	7.5					
Number of samples	44					25						
MIXOGRAM (Quadromat)												
	ave	min	max	stdev		ave	min	max	stdev			
Peak time, min	2.7	2.2	3.8	0.27		2.7	2.1	3.3	0.25			
Tail height (6min), mm	48	42	55	3.06		47	42	51	2.78			
Number of samples	44					25						
BÜHLER EXTRACTION, %												
	B1	B2	B3	B4	UT	COW	B1	B2	B3	B4	UT	COW
	74.5	74.7	75.1	75.7	74.9	-	74.3	74.4	74.6	73.9	76.1	-
FLOUR												
Protein (12% mb), %	12.0	10.5	9.3	9.5	11.5	-	11.8	10.7	9.3	9.3	9.0	-
Colour, KJ	-2.4	-2.5	-2.6	-2.4	-2.3	-	-2.6	-2.7	-2.6	-2.6	-2.1	-
GLUTEN												
Wet gluten (14% mb), %	33.0	28.4	24.4	25.4	31.5	-	33.6	29.2	24.2	26.3	23.3	-
Dry gluten (14% mb), %	12.1	10.6	8.9	9.0	11.5	-	12.2	10.3	8.5	9.3	7.8	-
FARINOGRAM												
Water absorption (14% mb), %	63.8	62.1	60.8	61.7	62.7	-	62.8	61.6	60.4	60.7	61.9	-
Development time, min	6.2	5.4	4.8	3.3	5.7	-	5.9	6.0	4.8	3.9	4.5	-
Stability, min	7.4	7.0	6.1	6.2	6.8	-	7.4	7.4	6.1	5.4	5.5	-
Mixing tolerance index, BU	35	43	50	35	39	-	35	38	43	45	47	-
EXTENSOGRAM (45 min pull)												
Area, cm2	96	94	79	62	92	-	95	85	73	73	-	-
Maximum height, BU	315	350	310	290	330	-	320	325	320	310	-	-
Extensibility, mm	210	189	175	147	191	-	209	183	161	157	-	-
ALVEOGRAM												
Strength (S), cm2	37.3	32.3	27.7	26.3	32.6	-	32.3	29.4	26.8	25.7	26.6	-
Stability (P), mm	85	86	83	87	84	-	77	79	77	80	94	-
Distensibility (L), mm	107	86	76	66	90	-	100	82	80	73	59	-
Configuration ratio (P/L)	0.79	1.00	1.09	1.32	0.93	-	0.77	0.96	0.96	1.10	1.59	-
MIXOGRAM												
Peak time, min	2.5	2.4	2.3	2.5	2.5	-	2.5	2.4	2.2	2.2	2.8	-
100g BAKING TEST												
Loaf volume, cm3	885	830	760	725	900	-	880	790	820	775	700	-
Evaluation	1	0	0	2	0	-	1	2	0	0	2	-

RHEOLOGICAL GRAPHS PER PRODUCTION REGION

MIXOGRAM

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FARINOGRAM

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EXTENSOGRAM

3

4

ALVEOGRAM

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**SOUTH AFRICAN
WINTER RAINFALL WHEAT
Western Cape Province**

PRODUCTION REGION	(5) Rüens Western Region				(6) Rüens Eastern Region							
	ave	min	max	stdev	ave	min	max	stdev				
Intake silos	Bredasdorp Caledon Klipdale Krige Napier Protem Rietpoel Villiersdorp				Albertinia Ashton Camfer Heidelberg Karringmelksrivier Kleinberg Protem Riversdal Swellendam							
WHEAT												
Protein (12% mb), %	11.8	9.8	13.1	0.88	12.5	10.9	15.1	1.08				
Falling number, sec	355	81	417	73.63	355	321	407	26.00				
1000 Kernel mass (13% mb), g	39.8	36.6	43.5	2.14	38.7	35.7	42.4	2.30				
Hectolitre mass (dirty), kg/hl	79.6	76.2	80.8	1.41	80.2	78.2	82.0	1.05				
Screenings (<1.8mm), %	1.79	0.60	2.54	0.49	1.64	0.48	2.80	0.79				
Total damaged kernels, %	0.68	0.00	2.02	0.59	0.53	0.12	1.28	0.39				
Number of samples	20				11							
CULTIVARS												
cultivars	SST 88 56.7				SST 88 41.7							
with highest % occurrence	SST 027 25.1				SST 027 34.0							
	SST 015 15.5				SST 015 21.5							
	SST 047 1.8				SST 57 1.1							
	PAN 3492 0.6				PAN 3492 0.9							
Number of samples	20				11							
MIXOGRAM (Quadromat)												
Peak time, min	ave	min	max	stdev	ave	min	max	stdev				
Tail height (6min), mm	2.7	2.3	3.0	0.18	2.6	2.3	3.3	0.29				
Number of samples	20				11							
BÜHLER EXTRACTION, %												
	B1	B2	B3	B4	UT	COW	B1	B2	B3	B4	UT	COW
	74.2	74.8	75.7	75.8	-	72.7	75.3	75.1	-	-	-	-
FLOUR												
Protein (12% mb), %	11.9	10.6	9.5	8.2	-	11.9	11.9	10.6	-	-	-	-
Colour, KJ	-2.2	-2.1	-1.9	-2.3	-	-0.7	-1.5	-1.8	-	-	-	-
GLUTEN												
Wet gluten (14% mb), %	32.6	27.8	24.4	-	-	33.4	32.8	29.6	-	-	-	-
Dry gluten (14% mb), %	11.8	10.0	8.8	-	-	11.8	11.8	10.9	-	-	-	-
FARINOGRAM												
Water absorption (14% mb), %	62.4	61.5	60.8	56.4	-	63.1	63.9	63.1	-	-	-	-
Development time, min	6.2	6.0	4.3	2.2	-	4.7	4.8	5.4	-	-	-	-
Stability, min	7.4	7.0	6.7	5.5	-	5.2	6.3	6.3	-	-	-	-
Mixing tolerance index, BU	39	41	38	40	-	64	38	38	-	-	-	-
EXTENSOGRAM (45 min pull)												
Area, cm2	93	78	74	67	-	102	87	86	-	-	-	-
Maximum height, BU	325	295	320	315	-	360	325	295	-	-	-	-
Extensibility, mm	201	172	160	137	-	201	195	190	-	-	-	-
ALVEOGRAM												
Strength (S), cm2	34.4	29.4	26.9	20.0	-	32.1	34.6	28.9	-	-	-	-
Stability (P), mm	81	84	86	63	-	79	89	85	-	-	-	-
Distensibility (L), mm	105	80	69	79	-	93	94	81	-	-	-	-
Configuration ratio (P/L)	0.77	1.05	1.25	0.80	-	0.85	0.95	1.05	-	-	-	-
MIXOGRAM												
Peak time, min	2.5	2.4	2.5	2.5	-	2.3	2.3	2.4	-	-	-	-
100g BAKING TEST												
Loaf volume, cm3	860	835	800	760	-	880	875	845	-	-	-	-
Evaluation	2	0	0	0	-	1	1	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 IRRIGATION WHEAT Eastern Cape and Vaal and Orange river area

PRODUCTION REGION	(7) Eastern Cape Southern Region					(10) Griqualand-West								
	Intake silos					Britstown Douglas Havenga Brug Marydale Modderrivier Oranjerivierstasie Prieska Rietrivier Upington								
WHEAT	ave	min	max	stdev		ave	min	max	stdev					
Protein (12% mb), %	12.9	-	-	-		12.4	10.5	14.6	0.92					
Falling number, sec	401	-	-	-		413	372	514	24.92					
1000 Kernel mass (13% mb), g	39.4	-	-	-		42.1	37.5	48.6	3.09					
Hectolitre mass (dirty), kg/hl	81.7	-	-	-		82.4	78.4	85.6	1.95					
Screenings (<1.8mm), %	1.46	-	-	-		1.30	0.28	4.12	0.99					
Total damaged kernels, %	0.34	-	-	-		0.14	0.00	0.40	0.09					
Number of samples	1					32								
CULTIVARS	SST 835 100.0					SST 835 40.0								
cultivars with highest % occurrence						Duzi 24.9								
						SST 843 13.4								
						Baviaans 7.5								
						PAN 3434 3.4								
Number of samples	1					32								
MIXOGRAM (Quadromat)	ave	min	max	stdev		ave	min	max	stdev					
Peak time, min	2.4	-	-	-		2.5	1.8	4.6	0.53					
Tail height (6min), mm	51	-	-	-		49	43	54	2.71					
Number of samples	1					32								
BÜHLER EXTRACTION, %	B1	B2	B3	B4	UT	COW	B1	B2	B3	B4	UT	COW		
	76.1	-	-	-	-	-	76.1	75.6	76.2	76.6	78.3	-		
FLOUR														
Protein (12% mb), %	11.7	-	-	-	-	-	11.9	10.7	9.4	11.3	11.5	-		
Colour, KJ	-1.8	-	-	-	-	-	-2.4	-2.3	-2.6	-2.8	-2.7	-		
GLUTEN														
Wet gluten (14% mb), %	32.9	-	-	-	-	-	34.2	30.4	25.6	33.2	34.6	-		
Dry gluten (14% mb), %	11.5	-	-	-	-	-	12.1	10.6	8.9	11.0	11.9	-		
FARINOGRAM														
Water absorption (14% mb), %	64.9	-	-	-	-	-	64.8	64.3	61.1	64.4	64.6	-		
Development time, min	4.8	-	-	-	-	-	5.8	4.7	4.2	5.3	5.3	-		
Stability, min	5.7	-	-	-	-	-	6.5	6.5	6.3	4.7	5.0	-		
Mixing tolerance index, BU	60	-	-	-	-	-	41	43	45	55	53	-		
EXTENSOGRAM (45 min pull)														
Area, cm2	-	-	-	-	-	-	101	87	75	92	95	-		
Maximum height, BU	-	-	-	-	-	-	320	345	325	330	350	-		
Extensibility, mm	-	-	-	-	-	-	215	184	163	198	192	-		
ALVEOGRAM														
Strength (S), cm2	39.0	-	-	-	-	-	37.5	35.6	29.1	33.5	33.6	-		
Stability (P), mm	100	-	-	-	-	-	90	95	78	85	82	-		
Distensibility (L), mm	85	-	-	-	-	-	92	80	87	92	103	-		
Configuration ratio (P/L)	1.18	-	-	-	-	-	0.98	1.19	0.90	0.92	0.80	-		
MIXOGRAM														
Peak time, min	2.3	-	-	-	-	-	2.2	2.7	2.4	2.0	2.0	-		
100g BAKING TEST														
Loaf volume, cm3	925	-	-	-	-	-	935	935	815	910	965	-		
Evaluation	0	-	-	-	-	-	0	0	0	0	0	-		

RHEOLOGICAL GRAPHS PER PRODUCTION REGION



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**SOUTH AFRICAN
IRRIGATION WHEAT
Vaal and Orange river area**

**MAINLY IRRIGATION WHEAT
North-West Province**

PRODUCTION REGION	(11) Vaalharts					(12) North-West Western Region						
Intake silos	Barkly-West Hartswater Jan Kemp Magogong Taung					Bloubank Buhmannsdrif Kameel Kraaipan Madibogo Mafikeng Mareetsane Piet Plessis Springbokpan Vergeleë Vryburg Vryhof						
WHEAT												
	ave	min	max	stdev		ave	min	max	stdev			
Protein (12% mb), %	11.9	10.9	12.6	0.53		12.8	11.4	14.8	1.33			
Falling number, sec	395	381	423	12.7		405	375	440	26.86			
1000 Kernel mass (13% mb), g	41.9	31.8	46.2	3.34		38.8	34.1	40.6	2.68			
Hectolitre mass (dirty), kg/hl	80.9	79.2	82.4	0.99		81.4	80.3	81.9	0.66			
Screenings (<1.8mm), %	2.30	1.46	3.32	0.55		1.32	0.87	1.99	0.51			
Total damaged kernels, %	0.30	0.06	0.66	0.16		0.37	0.22	0.64	0.17			
Number of samples	14					5						
CULTIVARS												
		Duzi	36.0			SST 835	39.0					
cultivars		SST 835	28.3			SST 843	36.0					
with highest %		SST 843	16.6			Duzi	15.4					
occurrence		PAN 3434	6.5			CRN 826	8.4					
		Baviaans	6.0			SST 825	1.2					
Number of samples	14					5						
MIXOGRAM (Quadromat)												
	ave	min	max	stdev		ave	min	max	stdev			
Peak time, min	2.7	2.5	2.8	0.13		3.1	2.4	4.3	0.78			
Tail height (6min), mm	49	47	52	1.44		55	49	67	7.22			
Number of samples	14					5						
BÜHLER EXTRACTION, %												
	B1	B2	B3	B4	UT	COW	B1	B2	B3	B4	UT	COW
	76.8	76.5	76.3	75.9	-	-	76.1	76.0	-	-	-	-
FLOUR												
Protein (12% mb), %	11.5	10.5	9.7	10.9	-	-	13.1	10.7	-	-	-	-
Colour, KJ	-2.3	-2.5	-2.6	-2.3	-	-	-2.5	-2.6	-	-	-	-
GLUTEN												
Wet gluten (14% mb), %	31.9	28.9	27.6	30.5	-	-	34.9	29.7	-	-	-	-
Dry gluten (14% mb), %	10.7	9.7	9.2	10.2	-	-	12.5	9.9	-	-	-	-
FARINOGRAM												
Water absorption (14% mb), %	63.2	62.6	62.9	64.2	-	-	64.8	62.6	-	-	-	-
Development time, min	5.5	4.7	4.8	4.5	-	-	10.2	4.8	-	-	-	-
Stability, min	6.2	5.5	6.3	5.1	-	-	12.4	6.1	-	-	-	-
Mixing tolerance index, BU	38	52	43	48	-	-	26	43	-	-	-	-
EXTENSOGRAM (45 min pull)												
Area, cm2	89	79	81	76	-	-	145	96	-	-	-	-
Maximum height, BU	290	300	310	285	-	-	400	335	-	-	-	-
Extensibility, mm	218	179	170	187	-	-	252	199	-	-	-	-
ALVEOGRAM												
Strength (S), cm2	35.6	31.6	28.0	32.0	-	-	57.6	31.2	-	-	-	-
Stability (P), mm	78	81	92	87	-	-	103	80	-	-	-	-
Distensibility (L), mm	114	92	64	86	-	-	113	88	-	-	-	-
Configuration ratio (P/L)	0.68	0.88	1.44	1.01	-	-	0.91	0.91	-	-	-	-
MIXOGRAM												
Peak time, min	2.3	2.3	2.3	2.2	-	-	3.0	2.5	-	-	-	-
100g BAKING TEST												
Loaf volume, cm3	900	820	810	825	-	-	900	875	-	-	-	-
Evaluation	0	0	0	1	-	-	3	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
MAINLY IRRIGATION WHEAT
North-West Province**

PRODUCTION REGION	(14) North-West Southern Region				(15) North-West South-Eastern Region							
	ave	min	max	stdev	ave	min	max	stdev				
Intake silos	Amalia Barberspan Delareyville Excelsior Geysdorp Hallat's Hope Migdol Nooitgedacht Schweizer-Reneke Taaibospan				Bloemhof Christiana Hertzogville Hoopstad Kingwood							
WHEAT												
Protein (12% mb), %	11.6	10.8	13.7	1.43	11.9	10.5	13.0	0.75				
Falling number, sec	415	410	420	4.20	375	267	460	74.42				
1000 Kernel mass (13% mb), g	39.1	26.7	47.5	9.22	38.1	33.3	46.8	3.98				
Hectolitre mass (dirty), kg/hl	79.7	74.1	84.3	4.20	81.2	79.7	82.8	0.98				
Screenings (<1.8mm), %	4.28	3.18	6.54	1.57	1.19	0.44	2.37	0.78				
Total damaged kernels, %	0.14	0.00	0.24	0.10	0.08	0.00	0.20	0.08				
Number of samples	4				9							
CULTIVARS												
cultivars	SST 835		39.3		SST 835		23.4					
with highest % occurrence	Baviaans		26.3		PAN 3120		15.6					
	PAN 3434		11.0		Gariiep		15.1					
	SST 843		9.3		Duzi		12.4					
	CRN 826		7.8		SST 843		9.7					
Number of samples	4				9							
MIXOGRAM (Quadromat)												
Peak time, min	ave	min	max	stdev	ave	min	max	stdev				
Tail height (6min), mm	2.9	2.3	3.3	0.48	3.0	2.2	3.7	0.46				
Number of samples	4				9							
BÜHLER EXTRACTION, %	B1	B2	B3	B4	UT	COW	B1	B2	B3	B4	UT	COW
	-	-	-	76.0	74.3	-	74.4	74.9	74.1	-	-	-
FLOUR												
Protein (12% mb), %	-	-	-	9.8	11.3	-	11.9	10.4	10.1	-	-	-
Colour, KJ	-	-	-	-2.7	-2.5	-	-2.2	-2.4	-2.6	-	-	-
GLUTEN												
Wet gluten (14% mb), %	-	-	-	27.6	30.2	-	33.3	28.7	26.4	-	-	-
Dry gluten (14% mb), %	-	-	-	9.5	10.6	-	11.7	9.8	9.2	-	-	-
FARINOGRAM												
Water absorption (14% mb), %	-	-	-	62.2	61.7	-	65.7	63.9	62.0	-	-	-
Development time, min	-	-	-	4.5	6.0	-	5.7	4.9	5.7	-	-	-
Stability, min	-	-	-	5.9	7.8	-	7.2	6.2	11.3	-	-	-
Mixing tolerance index, BU	-	-	-	47	41	-	34	43	21	-	-	-
EXTENSOGRAM (45 min pull)												
Area, cm2	-	-	-	84	123	-	97	84	105	-	-	-
Maximum height, BU	-	-	-	325	400	-	340	320	425	-	-	-
Extensibility, mm	-	-	-	178	213	-	201	186	177	-	-	-
ALVEOGRAM												
Strength (S), cm2	-	-	-	29.4	39.3	-	39.6	33.3	39.8	-	-	-
Stability (P), mm	-	-	-	80	81	-	103	94	98	-	-	-
Distensibility (L), mm	-	-	-	83	116	-	79	73	83	-	-	-
Configuration ratio (P/L)	-	-	-	0.96	0.70	-	1.30	1.29	1.18	-	-	-
MIXOGRAM												
Peak time, min	-	-	-	2.6	2.7	-	2.5	2.5	3.5	-	-	-
100g BAKING TEST												
Loaf volume, cm3	-	-	-	810	875	-	895	830	715	-	-	-
Evaluation	-	-	-	0	0	-	1	0	3	-	-	-

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
MAINLY IRRIGATION WHEAT
North-West Province**

PRODUCTION REGION	(16) North-West Central Eastern Region					(17) North-West Central Northern Region (Ottosdal)						
	ave	min	max	stdev		ave	min	max	stdev			
Intake silos	Bamboesspruit Klerksdorp Leeudoringstad Makwassie Regina Strydpoort Wolmaranstad					Bospoort Lethabong (Hartbeesfontein) Kleinharts Melliadora Ottosdal Rostrataville Vermaas Werda						
WHEAT												
Protein (12% mb), %	11.8	11.2	12.5	0.67		11.9	10.2	13.0	0.94			
Falling number, sec	434	428	444	8.96		416	371	455	32.73			
1000 Kernel mass (13% mb), g	39.8	37.5	41.4	2.03		40.8	34.3	50.7	5.85			
Hectolitre mass (dirty), kg/hl	78.9	76.9	80.1	1.74		80.6	79.2	82.2	1.12			
Screenings (<1.8mm), %	2.17	1.88	2.54	0.34		1.12	0.52	1.40	0.29			
Total damaged kernels, %	0.17	0.12	0.20	0.04		0.19	0.06	0.32	0.11			
Number of samples	3					8						
CULTIVARS												
cultivars	SST 835 42.0					SST 835 48.6						
with highest % occurrence	SST 843 33.7					Baviaans 20.8						
	Duzi 15.3					SST 843 15.4						
	CRN 826 9.0					Duzi 6.8						
						CRN 826 5.1						
Number of samples	3					8						
MIXOGRAM (Quadromat)												
Peak time, min	ave	min	max	stdev		ave	min	max	stdev			
Tail height (6min), mm	2.6	2.3	3.2	0.52		2.9	2.3	3.3	0.36			
Number of samples	3					8						
BÜHLER EXTRACTION, %	B1	B2	B3	B4	UT	COW	B1	B2	B3	B4	UT	COW
	75.2	75.7	-	-	-	-	75.4	77.4	76.3	-	-	-
FLOUR												
Protein (12% mb), %	11.8	10.1	-	-	-	-	11.7	10.2	8.7	-	-	-
Colour, KJ	-2.1	-2.3	-	-	-	-	-2.2	-2.6	-2.7	-	-	-
GLUTEN												
Wet gluten (14% mb), %	33.2	26.9	-	-	-	-	31.8	28.1	21.7	-	-	-
Dry gluten (14% mb), %	11.3	9.2	-	-	-	-	11.2	9.5	7.8	-	-	-
FARINOGRAM												
Water absorption (14% mb), %	62.5	60.5	-	-	-	-	63.3	61.9	57.5	-	-	-
Development time, min	5.0	4.8	-	-	-	-	5.7	4.5	3.0	-	-	-
Stability, min	5.4	5.5	-	-	-	-	8.1	6.4	7.4	-	-	-
Mixing tolerance index, BU	48	47	-	-	-	-	37	49	26	-	-	-
EXTENSOGRAM (45 min pull)												
Area, cm ²	-	87	-	-	-	-	119	86	76	-	-	-
Maximum height, BU	-	335	-	-	-	-	375	345	405	-	-	-
Extensibility, mm	-	177	-	-	-	-	219	175	135	-	-	-
ALVEOGRAM												
Strength (S), cm ²	34.1	26.6	-	-	-	-	41.9	30.9	22.2	-	-	-
Stability (P), mm	74	73	-	-	-	-	87	90	70	-	-	-
Distensibility (L), mm	119	86	-	-	-	-	111	73	63	-	-	-
Configuration ratio (P/L)	0.62	0.85	-	-	-	-	0.78	1.23	1.11	-	-	-
MIXOGRAM												
Peak time, min	2.3	2.5	-	-	-	-	2.7	2.7	2.9	-	-	-
100g BAKING TEST												
Loaf volume, cm ³	905	805	-	-	-	-	825	800	775	-	-	-
Evaluation	0	0	-	-	-	-	2	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
MAINLY IRRIGATION WHEAT
North-West Province**

PRODUCTION REGION	(18) North-West Central Region (Ventersdorp)				(19) North-West Central Region (Lichtenburg)							
	Intake silos				Intake silos							
	Bodenstein Buckingham Coligny Enselspruit Makokskraal Potchefstroom Ventersdorp				Grootpan Halfpad Hibernia Lichtenburg Lottiehalte Lusthof							
WHEAT	ave	min	max	stdev	ave	min	max	stdev				
Protein (12% mb), %	12.7	11.2	14.2	2.12	11.9	10.3	12.8	0.79				
Falling number, sec	386	360	411	36.06	389	333	413	26.17				
1000 Kernel mass (13% mb), g	38.7	38.6	38.7	0.07	37.5	36.0	39.7	1.15				
Hectolitre mass (dirty), kg/hl	79.6	78.5	80.6	1.48	81.2	79.6	82.1	0.92				
Screenings (<1.8mm), %	1.31	1.22	1.40	0.13	1.88	1.48	2.15	0.27				
Total damaged kernels, %	0.35	0.30	0.40	0.07	0.26	0.12	0.60	0.15				
Number of samples	2				8							
CULTIVARS	SST 843 61.5				SST 835 52.5							
cultivars	SST 88 38.5				SST 843 37.0							
with highest %					CRN 826 6.4							
occurrence					Olifants 3.4							
					SST 876 0.8							
Number of samples	2				8							
MIXOGRAM (Quadromat)	ave	min	max	stdev	ave	min	max	stdev				
Peak time, min	4.2	3.2	5.2	1.41	3.4	2.8	5.0	0.81				
Tail height (6min), mm	59	48	69	14.85	52	43	60	5.01				
Number of samples	2				8							
BÜHLER EXTRACTION, %	B1	B2	B3	B4	UT	COW	B1	B2	B3	B4	UT	COW
	75.4	75.4	-	-	-	-	75.6	75.7	75.6	-	-	-
FLOUR												
Protein (12% mb), %	13.7	10.1	-	-	-	-	11.9	10.9	9.5	-	-	-
Colour, KJ	-2.3	-2.2	-	-	-	-	-2.3	-2.4	-2.1	-	-	-
GLUTEN												
Wet gluten (14% mb), %	33.1	26.0	-	-	-	-	31.7	29.0	25.9	-	-	-
Dry gluten (14% mb), %	12.4	9.6	-	-	-	-	11.0	10.1	9.0	-	-	-
FARINOGRAM												
Water absorption (14% mb), %	64.9	60.5	-	-	-	-	63.8	63.0	62.4	-	-	-
Development time, min	16.4	4.7	-	-	-	-	7.8	6.5	5.5	-	-	-
Stability, min	17.6	9.0	-	-	-	-	12.7	8.2	7.2	-	-	-
Mixing tolerance index, BU	-	25	-	-	-	-	20	35	34	-	-	-
EXTENSOGRAM (45 min pull)												
Area, cm ²	139	108	-	-	-	-	148	119	-	-	-	-
Maximum height, BU	475	435	-	-	-	-	430	390	-	-	-	-
Extensibility, mm	204	184	-	-	-	-	239	217	-	-	-	-
ALVEOGRAM												
Strength (S), cm ²	81.0	33.5	-	-	-	-	51.5	37.6	26.9	-	-	-
Stability (P), mm	136	85	-	-	-	-	96	93	94	-	-	-
Distensibility (L), mm	102	83	-	-	-	-	112	84	55	-	-	-
Configuration ratio (P/L)	1.33	1.02	-	-	-	-	0.86	1.11	1.71	-	-	-
MIXOGRAM												
Peak time, min	4.8	3.2	-	-	-	-	3.2	2.7	2.7	-	-	-
100g BAKING TEST												
Loaf volume, cm ³	980	850	-	-	-	-	760	820	720	-	-	-
Evaluation	2	0	-	-	-	-	5	1	2	-	-	-

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
MAINLY IRRIGATION WHEAT
North-West Province**

**SUMMER RAINFALL WHEAT
(AND IRRIGATION)
Free State Province (Central)**

PRODUCTION REGION	(20) North-West Eastern Region				(21) Free State North-Western Region (Viljoenskroon)							
	ave	min	max	stdev	ave	min	max	stdev				
Intake silos	Battery Boons Brits Derby Koster Rustenburg Swartruggens Syferbult				Attie Groenebloem Heuningspruit Koppies Rooiwal Vierfontein Viljoenskroon Vredefort Weiveld							
WHEAT												
Protein (12% mb), %	11.6	10.6	13.2	0.81	11.8	10.6	13.5	1.07				
Falling number, sec	411	357	521	40.75	397	351	437	30.58				
1000 Kernel mass (13% mb), g	39.7	33.9	46.1	2.75	37.8	32.7	42.7	3.76				
Hectolitre mass (dirty), kg/hl	80.3	73.0	84.0	2.94	81.7	79.8	82.6	1.19				
Screenings (<1.8mm), %	2.42	0.27	5.84	1.86	1.91	1.49	2.52	0.42				
Total damaged kernels, %	0.31	0.00	0.88	0.25	0.18	0.08	0.32	0.09				
Number of samples	15				5							
CULTIVARS												
cultivars	SST 835 40.3				SST 835 50.8							
with highest % occurrence	Duzi 17.3				SST 843 25.6							
	SST 843 16.5				Elands 16.4							
	Kariega 12.8				CRN 826 4.0							
	CRN 826 4.7				SST 347, Baviaans 1.6							
Number of samples	15				5							
MIXOGRAM (Quadromat)												
Peak time, min	ave	min	max	stdev	ave	min	max	stdev				
Tail height (6min), mm	3.1	2.3	4.8	0.72	3.1	2.3	4.5	0.87				
Number of samples	15				5							
BÜHLER EXTRACTION, %	B1	B2	B3	B4	UT	COW	B1	B2	B3	B4	UT	COW
	75.8	76.5	76.4	-	76.0	77.0	74.8	76.0	75.2	-	-	-
FLOUR												
Protein (12% mb), %	11.6	10.6	9.3	-	10.4	10.2	13.1	10.9	9.6	-	-	-
Colour, KJ	-2.3	-2.3	-2.2	-	-2.5	-1.8	-2.2	-1.6	-2.0	-	-	-
GLUTEN												
Wet gluten (14% mb), %	30.8	29.5	24.6	-	28.8	28.0	32.5	30.3	25.2	-	-	-
Dry gluten (14% mb), %	11.2	10.3	8.5	-	9.5	9.5	12.4	10.5	8.9	-	-	-
FARINOGRAM												
Water absorption (14% mb), %	61.5	62.3	59.7	-	62.2	62.0	63.4	64.3	61.4	-	-	-
Development time, min	7.0	6.0	5.5	-	5.2	4.2	10.5	5.5	5.7	-	-	-
Stability, min	10.5	7.7	7.2	-	5.2	4.3	16.5	5.9	6.8	-	-	-
Mixing tolerance index, BU	30	44	42	-	50	56	15	46	47	-	-	-
EXTENSOGRAM (45 min pull)												
Area, cm ²	148	103	88	-	75	74	126	99	101	-	-	-
Maximum height, BU	475	400	370	-	285	260	465	360	435	-	-	-
Extensibility, mm	218	185	176	-	188	193	197	194	160	-	-	-
ALVEOGRAM												
Strength (S), cm ²	45.1	35.2	28.9	-	29.1	24.6	57.6	36.7	28.3	-	-	-
Stability (P), mm	89	89	75	-	74	69	104	95	92	-	-	-
Distensibility (L), mm	106	85	89	-	99	95	104	84	60	-	-	-
Configuration ratio (P/L)	0.84	1.05	0.84	-	0.75	0.73	1.00	1.13	1.53	-	-	-
MIXOGRAM												
Peak time, min	3.3	2.8	2.8	-	2.3	2.3	3.8	2.5	2.8	-	-	-
100g BAKING TEST												
Loaf volume, cm ³	810	805	730	-	740	795	775	790	770	-	-	-
Evaluation	3	1	1	-	3	1	6	2	0	-	-	-

RHEOLOGICAL GRAPHS PER PRODUCTION REGION



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SOUTH AFRICAN

SUMMER RAINFALL WHEAT (AND IRRIGATION)

Free State Province (Central)

PRODUCTION REGION	(26) Free State South-Eastern Region (Senekal)					(27) Free State Northern Region						
	ave	min	max	stdev	ave	min	max	stdev				
Intake silos	Arlington Kaallaagte Libertas Marquard Meets Monte Video Senekal Steynsrus					Gottenburg Heilbron Hoogte Mooigeleë Petrus Steyn Wolwehoek						
WHEAT												
Protein (12% mb), %	13.2	12.2	14.6	0.63	13.6	11.7	14.7	1.19				
Falling number, sec	305	104	466	104.21	328	114	498	112.80				
1000 Kernel mass (13% mb), g	39.1	35.4	42.2	1.98	37.8	35.6	40.1	1.86				
Hectolitre mass (dirty), kg/hl	80.2	74.3	82.2	2.40	79.1	75.7	81.0	1.60				
Screenings (<1.8mm), %	1.22	0.47	2.49	0.69	1.10	0.24	1.81	0.57				
Total damaged kernels, %	0.88	0.00	6.48	1.71	0.85	0.50	1.24	0.22				
Number of samples	13					8						
CULTIVARS												
cultivars	Elands 44.6					Elands 50.4						
with highest % occurrence	Matlabas 14.8					SST 347 15.7						
	SST 356 13.2					Matlabas 6.3						
	PAN 3120 6.1					SST 835 5.7						
	Gariep 5.5					PAN 3120 5.6						
Number of samples	13					8						
MIXOGRAM (Quadromat)												
Peak time, min	ave	min	max	stdev	ave	min	max	stdev				
Tail height (6min), mm	3.7	2.8	4.7	0.62	3.7	3.2	4.5	0.40				
Number of samples	13					8						
BÜHLER EXTRACTION, %	B1	B2	B3	B4	UT	COW	B1	B2	B3	B4	UT	COW
	74.8	-	-	-	72.8	74.7	74.7	-	-	-	-	73.5
FLOUR												
Protein (12% mb), %	12.3	-	-	-	12.7	12.3	13.3	10.7	-	-	-	14.1
Colour, KJ	-0.9	-	-	-	1.7	2.7	0.3	-1.4	-	-	-	2.8
GLUTEN												
Wet gluten (14% mb), %	32.8	-	-	-	33.0	29.9	35.6	26.9	-	-	-	37.2
Dry gluten (14% mb), %	11.5	-	-	-	11.6	11.0	13.2	9.3	-	-	-	13.3
FARINOGRAM												
Water absorption (14% mb), %	65.6	-	-	-	64.5	63.9	66.5	62.3	-	-	-	67.2
Development time, min	8.0	-	-	-	3.0	2.0	7.2	6.7	-	-	-	8.8
Stability, min	11.3	-	-	-	10.6	7.6	11.8	10.4	-	-	-	10.9
Mixing tolerance index, BU	28	-	-	-	24	33	20	25	-	-	-	32
EXTENSOGRAM (45 min pull)												
Area, cm ²	110	-	-	-	90	110	140	106	-	-	-	119
Maximum height, BU	390	-	-	-	480	440	445	450	-	-	-	365
Extensibility, mm	193	-	-	-	143	183	215	163	-	-	-	225
ALVEOGRAM												
Strength (S), cm ²	42.7	-	-	-	39.6	45.0	50.3	35.2	-	-	-	48.6
Stability (P), mm	122	-	-	-	134	120	128	107	-	-	-	106
Distensibility (L), mm	61	-	-	-	46	63	69	62	-	-	-	85
Configuration ratio (P/L)	2.00	-	-	-	2.91	1.90	1.86	1.73	-	-	-	1.25
MIXOGRAM												
Peak time, min	3.1	-	-	-	3.5	4.4	3.3	3.3	-	-	-	3.4
100g BAKING TEST												
Loaf volume, cm ³	860	-	-	-	720	870	940	740	-	-	-	1035
Evaluation	2	-	-	-	6	2	2	3	-	-	-	1

RHEOLOGICAL GRAPHS PER PRODUCTION REGION



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SOUTH AFRICAN

SUMMER RAINFALL WHEAT (AND IRRIGATION)

Free State Province (North-Western)

PRODUCTION REGION	(22) Free-State North-Western Region (Bothaville)				(23) Free-State North-Western Region (Bultfontein)							
	ave	min	max	stdev	ave	min	max	stdev				
Intake silos	Allanridge Bothaville Mirage Odendaalsrus Schoonspruit Schuttendraai				Bultfontein Losdoorns Protespan Tierfontein Wesselsbron Willemsrust							
WHEAT												
Protein (12% mb), %	11.7	9.5	13.6	1.61	11.4	9.7	13.6	1.13				
Falling number, sec	357	316	404	39.78	362	285	510	57.39				
1000 Kernel mass (13% mb), g	36.3	34.8	38.3	1.47	36.5	30.9	41.8	3.39				
Hectolitre mass (dirty), kg/hl	81.4	80.0	82.4	0.87	81.4	77.7	84.1	1.49				
Screenings (<1.8mm), %	1.51	0.85	2.03	0.40	1.75	0.23	3.17	0.77				
Total damaged kernels, %	0.16	0.00	0.26	0.10	0.27	0.08	0.80	0.15				
Number of samples	6				22							
CULTIVARS												
cultivars	PAN 3120 34.3				PAN 3120 29.1							
with highest % occurrence	SST 835 16.8				SST 835 20.4							
	SST 347 10.0				CRN 826 11.0							
	PAN 3355 9.2				PAN 3118 10.2							
	Gariep 8.3				Gariep 7.4							
Number of samples	6				22							
MIXOGRAM (Quadromat)												
Peak time, min	ave	min	max	stdev	ave	min	max	stdev				
Tail height (6min), mm	3.4	2.5	4.7	0.88	3.1	2.4	3.8	0.42				
Number of samples	6				22							
BÜHLER EXTRACTION, %												
	B1	B2	B3	B4	UT	COW	B1	B2	B3	B4	UT	COW
	74.1	72.6	73.3	72.0	-	-	73.8	73.2	73.8	73.7	-	-
FLOUR												
Protein (12% mb), %	12.2	9.9	9.1	7.8	-	-	11.8	10.4	9.2	8.8	-	-
Colour, KJ	-2.0	-2.3	-1.6	-2.2	-	-	-2.3	-2.4	-2.3	-2.1	-	-
GLUTEN												
Wet gluten (14% mb), %	34.2	26.8	21.3	-	-	-	31.0	27.7	24.4	21.9	-	-
Dry gluten (14% mb), %	12.0	9.0	7.6	-	-	-	11.2	10.0	8.7	7.6	-	-
FARINOGRAM												
Water absorption (14% mb), %	67.1	62.8	63.4	62.6	-	-	63.0	63.4	62.0	61.5	-	-
Development time, min	7.2	5.5	1.9	1.7	-	-	7.2	6.0	5.5	3.7	-	-
Stability, min	8.4	7.7	1.6	1.3	-	-	10.1	8.0	8.6	7.4	-	-
Mixing tolerance index, BU	35	42	62	73	-	-	32	38	33	33	-	-
EXTENSOGRAM (45 min pull)												
Area, cm2	108	-	-	-	-	-	119	95	80	80	-	-
Maximum height, BU	330	-	-	-	-	-	410	390	355	380	-	-
Extensibility, mm	223	-	-	-	-	-	202	172	162	143	-	-
ALVEOGRAM												
Strength (S), cm2	43.9	32.6	28.7	21.3	-	-	40.8	34.9	29.7	26.3	-	-
Stability (P), mm	110	102	129	125	-	-	96	107	104	108	-	-
Distensibility (L), mm	83	64	35	28	-	-	85	63	54	41	-	-
Configuration ratio (P/L)	1.33	1.59	3.69	4.46	-	-	1.13	1.70	1.93	2.63	-	-
MIXOGRAM												
Peak time, min	2.7	2.5	3.0	3.7	-	-	3.0	2.8	2.8	2.8	-	-
100g BAKING TEST												
Loaf volume, cm3	815	740	640	570	-	-	795	735	655	685	-	-
Evaluation	4	2	4	5	-	-	4	3	4	2	-	-

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
SUMMER RAINFALL WHEAT (AND IRRIGATION)
Free State Province (Eastern)**

PRODUCTION REGION	(25) Free State South-Western Region (Bethlehem)				(28) Free State Eastern Region							
	Intake silos				Intake silos							
	Bethlehem				Afrikaskop			Tweeling				
	Clocolan				Ascent			Villiers				
	De Wetsdorp				Cornelia			Vrede				
	Ficksburg				Daniëlsrus			Warden				
	Fouriesburg				Eeram			Windfield				
	Marseilles				Frankfort							
	Modderpoort				Harrismith							
	Slabberts				Jim Fouché							
	Tweespruit				Kransfontein							
	Westminster				Memel							
	Zastron				Reitz							
WHEAT												
	ave	min	max	stdev	ave	min	max	stdev				
Protein (12% mb), %	13.1	11.2	15.3	0.79	13.1	11.5	15.3	0.85				
Falling number, sec	240	89	379	84.88	298	63	439	92.58				
1000 Kernel mass (13% mb), g	39.4	31.8	43.4	3.04	39.5	35.0	45.3	2.41				
Hectolitre mass (dirty), kg/hl	78.2	72.4	82.0	2.42	78.8	72.9	83.3	2.46				
Screenings (<1.8mm), %	1.72	0.22	4.74	0.98	1.24	0.26	3.72	0.77				
Total damaged kernels, %	0.74	0.08	3.64	0.76	0.58	0.08	5.68	0.99				
Number of samples	25				31							
CULTIVARS												
	Elands			28.7	Elands			37.5				
cultivars	SST 356			25.5	Matlabas			18.2				
with highest %	Matlabas			24.3	SST 835			15.8				
occurrence	SST 835			7.6	SST 356			13.0				
	SST 347			5.4	Duzi			3.9				
Number of samples	25				31							
MIXOGRAM (Quadromat)												
	ave	min	max	stdev	ave	min	max	stdev				
Peak time, min	3.8	2.6	6.8	0.99	3.4	2.4	4.5	0.48				
Tail height (6min), mm	54	42	65	4.60	54	46	61	3.90				
Number of samples	25				31							
BÜHLER EXTRACTION, %												
	B1	B2	B3	B4	UT	COW	B1	B2	B3	B4	UT	COW
	73.7	73.8	73.1	74.5	74.0	73.1	74.0	74.5	73.4	72.7	73.5	72.9
FLOUR												
Protein (12% mb), %	12.3	11.7	11.9	12.0	11.2	11.9	11.8	11.1	12.9	11.1	14.3	12.5
Colour, KJ	-1.6	-1.1	-0.3	-1.2	-0.1	0.7	-1.4	-0.5	1.6	1.8	-0.6	0.7
GLUTEN												
Wet gluten (14% mb), %	33.1	31.3	30.7	32.3	28.6	31.4	31.6	29.3	35.5	28.6	39.2	33.6
Dry gluten (14% mb), %	11.7	10.8	11.2	11.3	10.0	11.2	10.9	10.0	12.5	9.4	14.2	11.9
FARINOGRAM												
Water absorption (14% mb), %	65.1	66.2	63.7	65.1	64.4	63.4	65.2	63.4	67.8	64.0	67.2	65.3
Development time, min	7.5	6.2	6.2	8.3	2.4	3.2	7.0	6.2	7.0	2.2	6.7	4.2
Stability, min	13.4	9.2	11.2	11.1	7.8	6.4	9.4	9.0	11.6	9.0	14.7	7.9
Mixing tolerance index, BU	18	22	21	29	29	39	32	36	22	16	21	33
EXTENSOGRAM (45 min pull)												
Area, cm2	117	98	105	122	126	124	92	98	110	89	121	103
Maximum height, BU	420	350	405	410	435	375	350	410	410	350	365	400
Extensibility, mm	198	188	185	210	195	230	188	172	195	185	236	184
ALVEOGRAM												
Strength (S), cm2	50.3	37.3	42.8	50.6	48.0	42.8	42.5	37.3	49.2	35.5	67.9	43.9
Stability (P), mm	113	107	105	111	124	89	113	101	126	94	110	105
Distensibility (L), mm	86	67	74	92	70	93	72	74	74	74	121	78
Configuration ratio (P/L)	1.31	1.60	1.42	1.21	1.77	0.96	1.57	1.36	1.70	1.27	0.91	1.35
MIXOGRAM												
Peak time, min	3.3	2.4	3.5	3.3	3.8	3.5	2.7	3.2	3.0	3.3	3.2	3.2
100g BAKING TEST												
Loaf volume, cm3	880	850	800	900	800	925	835	825	935	935	1040	890
Evaluation	2	2	4	1	2	0	2	1	1	0	1	2

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

SUMMER RAINFALL WHEAT (AND IRRIGATION) Free State Province (South-Western)

OTHER SUMMER RAINFALL AND IRRIGATION WHEAT

Mpumalanga

(29)
Mpumalanga
Southern Region

PRODUCTION REGION	(24) Free State Central Region				(29) Mpumalanga Southern Region							
Intake silos	Bloemfontein Brandfort De Brug Geneva Hennenman Koffiefontein Kroonstad Petrusburg Theunissen Van Tonder	Welgeleë Winburg			Balfour Greylingstad Grootvlei Harvard Holmdene Leeuspruit Platrand Standerton Val							
WHEAT	ave	min	max	stdev	ave	min	max	stdev				
Protein (12% mb), %	12.0	10.0	13.6	1.08	12.6	-	-	-				
Falling number, sec	356	276	408	40.76	421	-	-	-				
1000 Kernel mass (13% mb), g	35.5	29.4	46.3	3.92	39.7	-	-	-				
Hectolitre mass (dirty), kg/hl	80.1	76.6	81.6	1.46	85.0	-	-	-				
Screenings (<1.8mm), %	1.66	0.53	4.04	0.91	0.96	-	-	-				
Total damaged kernels, %	0.45	0.08	1.46	0.40	0.16	-	-	-				
Number of samples	16				1							
CULTIVARS												
cultivars with highest % occurrence	PAN 3120		38.7		SST 843		55.0					
	PAN 3118		16.8		SST 835		45.0					
	Gariep		11.6									
	SST 835		5.8									
	PAN 3355		5.6									
Number of samples	16				1							
MIXOGRAM (Quadromat)	ave	min	max	stdev	ave	min	max	stdev				
Peak time, min	3.4	2.8	4.2	0.48	2.8	-	-	-				
Tail height (6min), mm	52	49	56	2.19	48	-	-	-				
Number of samples	16				1							
BÜHLER EXTRACTION, %	B1	B2	B3	B4	UT	COW	B1	B2	B3	B4	UT	COW
	73.2	73.9	73.4	-	70.8	72.4	76.8	-	-	-	-	-
FLOUR												
Protein (12% mb), %	11.6	10.2	9.1	-	12.4	11.7	11.6	-	-	-	-	-
Colour, KJ	-2.1	-2.3	-2.9	-	-1.7	-1.3	-2.3	-	-	-	-	-
GLUTEN												
Wet gluten (14% mb), %	31.8	26.5	22.5	-	34.1	30.3	32.3	-	-	-	-	-
Dry gluten (14% mb), %	11.8	9.6	8.2	-	12.2	11.2	11.4	-	-	-	-	-
FARINOGRAM												
Water absorption (14% mb), %	64.9	62.1	60.3	-	67.8	64.8	65.4	-	-	-	-	-
Development time, min	6.4	6.2	7.5	-	7.8	8.3	6.7	-	-	-	-	-
Stability, min	10.0	9.1	12.5	-	10.7	9.7	6.6	-	-	-	-	-
Mixing tolerance index, BU	24	34	23	-	31	39	43	-	-	-	-	-
EXTENSOGRAM (45 min pull)												
Area, cm2	100	112	103	-	-	131	101	-	-	-	-	-
Maximum height, BU	375	430	470	-	-	445	365	-	-	-	-	-
Extensibility, mm	195	179	160	-	-	204	199	-	-	-	-	-
ALVEOGRAM												
Strength (S), cm2	43.9	35.0	35.8	-	48.8	47.9	41.9	-	-	-	-	-
Stability (P), mm	109	102	110	-	120	110	101	-	-	-	-	-
Distensibility (L), mm	82	65	59	-	82	85	89	-	-	-	-	-
Configuration ratio (P/L)	1.33	1.57	1.86	-	1.46	1.29	1.13	-	-	-	-	-
MIXOGRAM												
Peak time, min	2.8	3.2	3.6	-	2.5	2.8	2.7	-	-	-	-	-
100g BAKING TEST												
Loaf volume, cm3	930	855	665	-	825	825	920	-	-	-	-	-
Evaluation	0	0	3	-	4	2	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
OTHER SUMMER RAINFALL WHEAT AND IRRIGATION
Mpumalanga**

PRODUCTION REGION	(30) Mpumalanga Eastern Region				(32) Mpumalanga Western Region							
	ave	min	max	stdev	ave	min	max	stdev				
Intake silos	Amersfoort Badplaas Carolina Davel Ermelo Estancia Lothair Maizefield Mkondo Morgenzon Overvaal Panbult				Argent Dryden Endicott Elof Hawerklip Kendal Ogies							
WHEAT												
Protein (12% mb), %	13.0	-	-	-	12.2	-	-	-				
Falling number, sec	407	-	-	-	396	-	-	-				
1000 Kernel mass (13% mb), g	42.7	-	-	-	41.1	-	-	-				
Hectolitre mass (dirty), kg/hl	76.9	-	-	-	82.6	-	-	-				
Screenings (<1.8mm), %	0.32	-	-	-	1.31	-	-	-				
Total damaged kernels, %	0.32	-	-	-	0.18	-	-	-				
Number of samples	1				1							
CULTIVARS												
cultivars with highest % occurrence	Kariega 100.0				SST 835 90.0 SST 843 10.0							
Number of samples	1				1							
MIXOGRAM (Quadromat)												
Peak time, min	ave	min	max	stdev	ave	min	max	stdev				
Tail height (6min), mm	4.2	-	-	-	3.5	-	-	-				
Number of samples	1				1							
BÜHLER EXTRACTION, %												
	B1	B2	B3	B4	UT	COW	B1	B2	B3	B4	UT	COW
	-	-	-	-	-	77.0	76.8	-	-	-	-	-
FLOUR												
Protein (12% mb), %	-	-	-	-	-	11.9	11.2	-	-	-	-	-
Colour, KJ	-	-	-	-	-	0.3	-2.1	-	-	-	-	-
GLUTEN												
Wet gluten (14% mb), %	-	-	-	-	-	25.1	29.8	-	-	-	-	-
Dry gluten (14% mb), %	-	-	-	-	-	8.7	10.6	-	-	-	-	-
FARINOGRAM												
Water absorption (14% mb), %	-	-	-	-	-	62.4	62.5	-	-	-	-	-
Development time, min	-	-	-	-	-	2.5	7.7	-	-	-	-	-
Stability, min	-	-	-	-	-	8.4	9.8	-	-	-	-	-
Mixing tolerance index, BU	-	-	-	-	-	24	37	-	-	-	-	-
EXTENSOGRAM (45 min pull)												
Area, cm2	-	-	-	-	-	-	124	-	-	-	-	-
Maximum height, BU	-	-	-	-	-	-	460	-	-	-	-	-
Extensibility, mm	-	-	-	-	-	-	200	-	-	-	-	-
ALVEOGRAM												
Strength (S), cm2	-	-	-	-	-	30.6	45.6	-	-	-	-	-
Stability (P), mm	-	-	-	-	-	139	97	-	-	-	-	-
Distensibility (L), mm	-	-	-	-	-	33	102	-	-	-	-	-
Configuration ratio (P/L)	-	-	-	-	-	4.21	0.95	-	-	-	-	-
MIXOGRAM												
Peak time, min	-	-	-	-	-	3.5	3.3	-	-	-	-	-
100g BAKING TEST												
Loaf volume, cm3	-	-	-	-	-	605	950	-	-	-	-	-
Evaluation	-	-	-	-	-	6	0	-	-	-	-	-

RHEOLOGICAL GRAPHS PER PRODUCTION REGION

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ALVEOGRAM

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**SOUTH AFRICAN
OTHER SUMMER RAINFALL WHEAT AND IRRIGATION
Gauteng and Limpopo Provinces**

PRODUCTION REGION	(34) Gauteng						(35) Limpopo					
	Intake silos						Alma Bela-Bela (Warmbad) Crecy Immerpan Lehau Modimolle (Nylstroom) Mokopane (Potgietersrus) Naboomspruit Northam Nutfield Pienaarsrivier Polokwane (Pietersburg) Roedtan Settlers Tzaneen Vaalwater					
WHEAT	ave	min	max	stdev			ave	min	max	stdev		
Protein (12% mb), %	11.5	10.6	13.0	0.93			11.9	10.1	13.1	1.05		
Falling number, sec	436	401	474	23.05			415	371	469	33.54		
1000 Kernel mass (13% mb), g	41.2	36.3	45.2	30.4			41.7	36.8	46.5	3.99		
Hectolitre mass (dirty), kg/hl	82.3	80.9	83.3	0.70			80.6	77.7	82.5	1.95		
Screenings (<1.8mm), %	2.41	1.72	3.22	0.53			1.56	0.38	2.82	0.87		
Total damaged kernels, %	0.32	0.12	0.80	0.18			0.51	0.12	0.90	0.25		
Number of samples	11						8					
CULTIVARS												
cultivars		SST 835	34.4					Duzi	32.5			
with highest %		Duzi	28.6					SST 835	28.1			
occurrence		SST 876	12.6					SST 843	21.1			
		SST 843	6.7					Kariega	11.0			
		CRN 826	6.4					SST 876	7.3			
Number of samples	11						8					
MIXOGRAM (Quadromat)	ave	min	max	stdev			ave	min	max	stdev		
Peak time, min	2.2	1.8	2.3	0.16			2.9	2.4	4.3	0.60		
Tail height (6min), mm	46	41	51	2.73			50	46	59	3.92		
Number of samples	11						8					
BÜHLER EXTRACTION, %	B1	B2	B3	B4	UT	COW	B1	B2	B3	B4	UT	COW
	74.6	76.0	75.3	75.3	-	-	75.3	75.1	77.7	-	-	-
FLOUR												
Protein (12% mb), %	12.2	10.1	9.8	9.5	-	-	11.8	10.2	9.2	-	-	-
Colour, KJ	-1.8	-2.1	-2.5	-2.5	-	-	-2.3	-2.0	-2.4	-	-	-
GLUTEN												
Wet gluten (14% mb), %	34.7	27.9	27.4	26.5	-	-	31.4	28.6	25.0	-	-	-
Dry gluten (14% mb), %	11.8	9.2	8.9	8.9	-	-	10.8	9.9	8.5	-	-	-
FARINOGRAM												
Water absorption (14% mb), %	65.8	63.4	61.5	63.0	-	-	64.1	62.8	61.4	-	-	-
Development time, min	5.2	3.3	4.0	4.0	-	-	6.7	4.7	4.8	-	-	-
Stability, min	6.5	5.0	4.6	4.7	-	-	8.1	5.5	5.9	-	-	-
Mixing tolerance index, BU	29	43	48	47	-	-	35	44	48	-	-	-
EXTENSOGRAM (45 min pull)												
Area, cm2	74	57	60	56	-	-	115	-	59	-	-	-
Maximum height, BU	290	240	250	235	-	-	425	-	265	-	-	-
Extensibility, mm	176	158	159	153	-	-	192	-	149	-	-	-
ALVEOGRAM												
Strength (S), cm2	34.6	26.6	23.1	20.9	-	-	43.4	27.4	24.8	-	-	-
Stability (P), mm	92	84	72	81	-	-	96	75	76	-	-	-
Distensibility (L), mm	89	75	78	57	-	-	97	91	74	-	-	-
Configuration ratio (P/L)	1.03	1.12	0.92	1.42	-	-	0.99	0.82	1.03	-	-	-
MIXOGRAM												
Peak time, min	2.3	2.2	2.3	2.0	-	-	2.8	2.3	2.3	-	-	-
100g BAKING TEST												
Loaf volume, cm3	880	815	800	780	-	-	965	915	820	-	-	-
Evaluation	2	0	0	0	-	-	0	0	0	-	-	-

RHEOLOGICAL GRAPHS PER PRODUCTION REGION

MIXOGRAM

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**SOUTH AFRICAN
OTHER SUMMER RAINFALL WHEAT AND IRRIGATION
KwaZulu-Natal Province**

PRODUCTION REGION		(36) KwaZulu-Natal					
Intake silos		Bergville Bloedrivier Dannhauser Dundee Mizpah New Amalfi Paulpietersburg Vryheid Winterton					
WHEAT		ave	min	max	stdev		
Protein (12% mb), %		12.7	11.1	13.9	0.93		
Falling number, sec		432	373	475	37.31		
1000 Kernel mass (13% mb), g		39.1	33.0	42.7	3.11		
Hectolitre mass (dirty), kg/hl		82.2	80.6	83.9	1.02		
Screenings (<1.8mm), %		0.64	0.49	0.81	0.11		
Total damaged kernels, %		0.16	0.00	0.76	0.25		
Number of samples		8					
CULTIVARS							
cultivars		SST 835		53.6			
with highest % occurrence		SST 843		42.0			
		SST 877		2.3			
		Kariega		2.1			
Number of samples		8					
MIXOGRAM (Quadromat)		ave	min	max	stdev		
Peak time, min		2.9	2.0	3.3	0.42		
Tail height (6min), mm		49	44	52	3.04		
Number of samples		8					
BÜHLER EXTRACTION, %		B1	B2	B3	B4	UT	COW
		76.4	76.4	-	-	-	-
FLOUR							
Protein (12% mb), %		12.0	10.7	-	-	-	-
Colour, KJ		-2.0	-1.9	-	-	-	-
GLUTEN							
Wet gluten (14% mb), %		33.3	30.0	-	-	-	-
Dry gluten (14% mb), %		11.2	10.4	-	-	-	-
FARINOGRAM							
Water absorption (14% mb), %		64.8	62.2	-	-	-	-
Development time, min		6.3	5.8	-	-	-	-
Stability, min		6.7	6.6	-	-	-	-
Mixing tolerance index, BU		37	41	-	-	-	-
EXTENSOGRAM (45 min pull)							
Area, cm2		102	95	-	-	-	-
Maximum height, BU		375	350	-	-	-	-
Extensibility, mm		191	182	-	-	-	-
ALVEOGRAM							
Strength (S), cm2		40.2	30.7	-	-	-	-
Stability (P), mm		97	86	-	-	-	-
Distensibility (L), mm		91	80	-	-	-	-
Configuration ratio (P/L)		1.07	1.08	-	-	-	-
MIXOGRAM							
Peak time, min		2.7	2.8	-	-	-	-
100g BAKING TEST							
Loaf volume, cm3		950	885	-	-	-	-
Evaluation		0	0	-	-	-	-

RHEOLOGICAL GRAPHS PER PRODUCTION REGION



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RSA WHEAT CROP QUALITY SUMMARY

RSA Crop Quality 2008/2009 and 2010/2011 Seasons

Country of origin	RSA Crop Average 2008/2009							RSA Crop Average 2010/2011						
Class and Grade bread wheat	B1	B2	B3	B4	UT	COW	Average	B1	B2	B3	B4	UT	COW	Average
No. of samples	126	121	101	49	16	67	480	164	93	48	23	16	28	372
WHEAT GRADING														
Protein (12% mb), %	13.27	12.00	11.25	10.69	12.69	11.54	12.00	12.91	11.53	10.69	11.20	13.31	12.28	12.14
Moisture, %	11.5	11.1	11.0	10.9	11.6	11.0	11.2	11.8	11.7	11.6	11.6	12.2	11.8	11.8
Falling number, sec	364	395	382	346	364	393	378	385	389	371	359	180	358	372
1000 Kernel mass (13% mb), g	37.5	38.5	39.1	40.6	36.6	37.4	38.3	39.1	40.0	39.9	40.8	39.3	38.5	39.5
Hlm (dirty), kg/hl	78.6	77.8	77.2	77.4	76.0	76.4	77.6	80.9	80.4	80.6	80.8	76.6	78.1	80.3
Screenings (<1,8mm), %	1.36	1.52	1.74	1.33	2.76	2.77	1.72	1.34	1.61	1.51	2.66	1.49	3.48	1.68
Gravel, stones, turf and glass, %	0.00	0.00	0.00	0.01	0.13	0.00	0.01	0.00	0.00	0.00	0.00	0.07	0.00	0.01
Foreign matter, %	0.09	0.09	0.08	0.10	0.29	0.17	0.11	0.07	0.08	0.07	0.10	0.42	0.18	0.10
Other grain & unthreshed ears, %	0.20	0.24	0.29	0.26	0.32	0.34	0.26	0.28	0.34	0.33	0.43	0.26	0.85	0.35
Heat damaged kernels, %	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00
Immature kernels, %	0.12	0.07	0.04	0.05	0.04	0.06	0.07	0.06	0.02	0.02	0.02	0.10	0.06	0.04
Insect damaged kernels, %	0.27	0.42	0.46	0.54	4.02	1.13	0.62	0.24	0.28	0.29	0.27	0.28	0.35	0.27
Heavily frost damaged kernels, %	0.00	0.00	0.00	0.02	0.00	0.01	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.01
Sprouted kernels, %	0.10	0.09	0.11	0.10	1.01	0.14	0.13	0.04	0.03	0.03	0.06	1.43	0.15	0.11
Total damaged kernels, %	0.49	0.58	0.62	0.75	5.07	1.40	0.85	0.34	0.33	0.35	0.35	1.83	0.56	0.42
Combined deviations, %	2.14	2.42	2.71	2.27	8.44	4.49	2.88	2.03	2.36	2.26	3.55	3.99	5.07	2.55
Field fungi, %	0.08	0.12	0.09	0.04	0.23	0.12	0.10	0.18	0.12	0.10	0.14	1.12	0.29	0.20
Storage fungi, %	0.01	0.01	0.01	0.00	0.04	0.01	0.01	0.02	0.01	0.01	0.02	0.14	0.03	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 (<i>Crotalaria spp.</i> , <i>Datura spp.</i>)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Noxious seeds (<i>Argemone mexicana</i>)	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	22	23	22	12	5	16	100	29	24	17	11	8	10	99
BÜHLER EXTRACTION, %	76.0	76.1	75.7	75.2	75.1	75.2	75.7	75.1	75.1	75.0	74.7	74.2	74.4	74.9
FLOUR														
Colour, KJ	-1.3	-1.7	-1.7	-1.6	-0.9	-1.5	-1.5	-2.0	-2.1	-2.0	-1.9	0.4	-1.5	-1.8
Protein (12% mb), %	12.1	11.1	10.6	10.5	11.3	11.0	11.1	12.0	10.5	9.7	9.8	12.1	11.5	11.0
Wet Gluten (14% mb), %	-	-	-	-	-	-	-	32.7	28.4	25.7	28.0	31.1	31.4	29.7
Dry Gluten (14% mb), %	-	-	-	-	-	-	-	11.6	9.9	9.0	9.6	11.1	11.1	10.4
100g BAKING TEST														
Baking water absorption, %	61.9	60.8	60.0	60.0	60.1	60.3	60.7	62.3	60.5	59.6	59.9	62.4	61.8	61.1
Loaf volume, cm ³	956	909	870	849	926	892	902	882	824	766	789	853	846	832
Evaluation	1	0	0	1	0	0	0	2	1	1	1	2	2	1
FARINOGRAM														
Water absorption, %	62.2	61.1	60.4	60.9	60.6	60.7	61.1	64.2	62.7	61.7	62.3	64.0	63.8	63.2
Development time, min	5.0	4.1	3.6	3.1	3.7	3.8	4.0	7.0	5.3	5.0	4.0	4.7	5.2	5.5
Stability, mm	8.6	7.7	7.3	6.8	7.4	7.4	7.6	9.1	7.3	7.5	6.0	7.6	8.1	7.8
Mixing tolerance index, BU	42	42	44	46	43	45	43	33	39	38	43	40	37	37

RSA Crop Quality of 2008/2009 and 2010/2011 Seasons

Country of origin	RSA Crop Average 2008/2009							RSA Crop Average 2010/2011						
Class and Grade bread wheat	B1	B2	B3	B4	UT	COW	Average	B1	B2	B3	B4	UT	COW	Average
No. of samples	22	23	22	12	5	16	100	164	93	48	23	16	28	372
ALVEOGRAM														
Strength (S) , cm ²	42.4	38.0	35.6	35.8	36.6	37.2	38.0	43.1	32.6	30.5	29.2	39.4	39.5	36.2
Stability (P), mm	85	83	82	87	78	82	83	98	91	92	91	102	98	95
Distensibility (L), mm	111	103	95	88	114	101	101	94	78	69	70	78	87	81
P/L	0.80	0.86	0.93	1.10	0.91	0.94	0.90	1.08	1.21	1.44	1.55	1.57	1.28	1.29
EXTENSOGRAM														
Strength, cm ²	101	89	83	85	89	90	90	110	93	85	80	109	101	97
Max. height, BU	348	330	330	337	325	340	336	381	357	358	323	378	371	362
Extensibility, mm	201	184	172	174	187	179	183	204	181	166	170	203	193	187
MIXOGRAM														
Peak time, min	2.5	2.6	2.7	2.7	2.8	2.7	2.6	2.8	2.6	2.8	2.6	3.2	2.8	2.8
Absorption, %	62.3	61.0	60.6	60.6	61.4	61.1	61.2	62.2	60.4	59.6	59.8	62.3	61.7	61.0
MYCOTOXINS														
Aflatoxin, ppb [max.value]	1.23 [3.00]							0 [0]						
Deoxynivalenol, ppm [max. value]	0.47 [3.00]							0 [0]						
Ochratoxin A, ppb [max. value]	0.03 [1.00]							0 [0]						
No. of samples	30							30						

RSA WHEAT CROP QUALITY SUMMARY

RSA Crop Quality 2009/2010 and 2010/2011 Seasons

Country of origin	RSA Crop Average 2009/2010							RSA Crop Average 2010/2011						
Class and Grade bread wheat	B1	B2	B3	B4	UT	COW	Average	B1	B2	B3	B4	UT	COW	Average
No. of samples	159	138	79	30	16	58	480	164	93	48	23	16	28	372
WHEAT GRADING														
Protein (12% mb), %	12.84	11.50	10.62	9.64	11.29	11.51	11.68	12.91	11.53	10.69	11.20	13.31	12.28	12.14
Moisture, %	11.5	11.3	11.3	10.8	11.0	11.0	11.3	11.8	11.7	11.6	11.6	12.2	11.8	11.8
Falling number, sec	382	375	359	339	240	365	367	385	389	371	359	180	358	372
1000 Kernel mass (13% mb), g	38.7	39.5	40.4	40.2	36.6	38.1	39.2	39.1	40.0	39.9	40.8	39.3	38.5	39.5
Hlm (dirty), kg/hl	80.8	80.0	79.5	79.7	75.2	79.0	79.9	80.9	80.4	80.6	80.8	76.6	78.1	80.3
Screenings (<1,8mm), %	1.36	1.30	1.47	1.44	3.36	3.03	1.63	1.34	1.61	1.51	2.66	1.49	3.48	1.68
Gravel, stones, turf and glass, %	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.00	0.01
Foreign matter, %	0.05	0.05	0.09	0.09	0.12	0.11	0.07	0.07	0.08	0.07	0.10	0.42	0.18	0.10
Other grain & unthreshed ears, %	0.25	0.26	0.30	0.35	0.64	0.65	0.33	0.28	0.34	0.33	0.43	0.26	0.85	0.35
Heat damaged kernels, %	0.00	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00
Immature kernels, %	0.07	0.05	0.04	0.03	0.01	0.06	0.05	0.06	0.02	0.02	0.02	0.10	0.06	0.04
Insect damaged kernels, %	0.19	0.26	0.29	0.27	1.10	0.52	0.30	0.24	0.28	0.29	0.27	0.28	0.35	0.27
Heavily frost damaged kernels, %	0.00	0.00	0.00	0.00	0.13	0.00	0.01	0.02	0.00	0.00	0.00	0.00	0.00	0.01
Sprouted kernels, %	0.09	0.11	0.16	0.14	2.73	0.36	0.23	0.04	0.03	0.03	0.06	1.43	0.15	0.11
Total damaged kernels, %	0.36	0.43	0.50	0.44	3.96	0.96	0.60	0.34	0.33	0.35	0.35	1.83	0.56	0.42
Combined deviations, %	2.02	2.04	2.34	2.32	8.07	4.76	2.63	2.03	2.36	2.26	3.55	3.99	5.07	2.55
Field fungi, %	0.19	0.19	0.21	0.15	0.54	0.16	0.20	0.18	0.12	0.10	0.14	1.12	0.29	0.20
Storage fungi, %	0.01	0.01	0.01	0.00	0.03	0.01	0.01	0.02	0.01	0.01	0.02	0.14	0.03	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 (<i>Crotalaria spp.</i> , <i>Datura spp.</i>)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Noxious seeds (<i>Argemone mexicana</i>)	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	26	28	20	10	5	11	100	29	24	17	11	8	10	99
BÜHLER EXTRACTION, %	74.8	75.1	74.8	73.8	74.1	74.9	74.7	75.1	75.1	75.0	74.7	74.2	74.4	74.9
FLOUR														
Colour, KJ	-2.2	-2.3	-2.3	-2.3	-1.7	-2.2	-2.2	-2.0	-2.1	-2.0	-1.9	0.4	-1.5	-1.8
Protein (12% mb), %	11.7	10.6	9.6	8.6	10.4	10.6	10.5	12.0	10.5	9.7	9.8	12.1	11.5	11.0
Wet Gluten (14% mb), %	32.1	29.0	25.9	22.2	28.3	29.1	28.6	32.7	28.4	25.7	28.0	31.1	31.4	29.7
Dry Gluten (14% mb), %	11.3	10.1	9.0	7.9	9.6	10.2	10.0	11.6	9.9	9.0	9.6	11.1	11.1	10.4
100g BAKING TEST														
Baking water absorption, %	61.5	60.3	59.3	58.2	59.5	60.4	60.2	62.3	60.5	59.6	59.9	62.4	61.8	61.1
Loaf volume, cm ³	902	853	803	727	868	847	843	882	824	766	789	853	846	832
Evaluation	1	0	0	0	0	0	0	2	1	1	1	2	2	1
FARINOGRAM														
Water absorption, %	62.3	61.3	60.5	59.3	58.3	60.6	61.0	64.2	62.7	61.7	62.3	64.0	63.8	63.2
Development time, min	4.8	3.4	2.9	2.0	2.7	3.7	3.5	7.0	5.3	5.0	4.0	4.7	5.2	5.5
Stability, mm	8.4	6.8	5.7	3.8	4.9	6.9	6.6	9.1	7.3	7.5	6.0	7.6	8.1	7.8
Mixing tolerance index, BU	39	44	52	71	71	48	49	33	39	38	43	40	37	37

RSA Crop Quality of 2009/2010 and 2010/2011 Seasons

Country of origin	RSA Crop Average 2009/2010							RSA Crop Average 2010/2011						
Class and Grade bread wheat	B1	B2	B3	B4	UT	COW	Average	B1	B2	B3	B4	UT	COW	Average
No. of samples	26	28	20	10	5	11	100	164	93	48	23	16	28	372
ALVEOGRAM														
Strength (S) , cm ²	42.4	36.5	32.7	25.0	26.8	35.4	35.5	43.1	32.6	30.5	29.2	39.4	39.5	36.2
Stability (P), mm	93	90	90	87	61	83	89	98	91	92	91	102	98	95
Distensibility (L), mm	97	86	75	58	101	90	85	94	78	69	70	78	87	81
P/L	1.03	1.13	1.31	1.80	0.61	0.97	1.17	1.08	1.21	1.44	1.55	1.57	1.28	1.29
EXTENSOGRAM														
Strength, cm ²	96	85	74	61	71	87	83	110	93	85	80	109	101	97
Max. height, BU	355	344	327	304	295	345	337	381	357	358	323	378	371	362
Extensibility, mm	187	174	158	139	171	173	170	204	181	166	170	203	193	187
MIXOGRAM														
Peak time, min	2.6	2.6	2.7	2.8	2.8	2.5	2.6	2.8	2.6	2.8	2.6	3.2	2.8	2.8
Absorption, %	61.8	60.4	59.4	58.5	60.3	60.6	60.4	62.2	60.4	59.6	59.8	62.3	61.7	61.0
MYCOTOXINS														
Aflatoxin, ppb [max.value]	1.00 [4.00]							0 [0]						
Deoxynivalenol, ppm [max. value]	0.05 [0.48]							0 [0]						
Ochratoxin A, ppb [max. value]	0.17 [1.00]							0 [0]						
No. of samples	30							30						

METHODS

GRADING:

Full grading was done in accordance with the Regulations relating to the grading, packing and marking of wheat intended for sale in the Republic of South Africa (No. R. 1186 of 17 December 2010).

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 previous 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.

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 78 - 79 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.

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.

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.

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 AACC method 46-30.01, latest edition.

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

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 alpha-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.

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 AACC method 54-40.02, latest edition is followed.

Mixogram peak time is the time measured in minutes that a 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.

BÜHLER MILLING:

Cleaned wheat samples are damped to between 15,0 % and 16,0 % moisture according to the wheat moisture and kernel hardness and allowed to stand for 20 hours. Samples are then milled on a standard 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 AACC method 26-21.02, latest edition.

COLOUR:

The Kent Jones colour is determined by following FTP Method No. 0007/3, 7/1991. This method determines the influence of the branny material present in flour by measuring reflectance with a light source in the green band of the light spectrum. The lower the Kent Jones colour, the lighter the flour.

GLUTEN:

Wheat gluten is the water-insoluble complex protein fraction separated from wheat flours. The ability of wheat flour to produce dough with good gas retaining properties is attributed to gluten.

The gluten content of wheat flour is determined by means of AACC Method 38-12.02, latest edition. Wet gluten is washed from meal or flour by an automatic washing apparatus (Glutomatic). Wet gluten is a plastic elastic substance composed principally of two protein fractions. Glutenin, the higher molecular weight fraction, contributes elasticity and Gliadin, the lower molecular weight fraction, provides extensibility.

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.

FARINOGRAPH:

AACC method 54-21.01, 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. The dough is subjected to a prolonged, relatively gentle mixing action at a constant temperature.

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 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 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 value is the difference,

in Brabender units, 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:

ICC Standard No. 114/1, latest edition is followed.

The strength 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 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 is the mean length at the base of the 2 curves and indicates the stretchability 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.

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.

Distensibility (L): The length of the curve, measured along the base line, gives an indication of the extensibility of the dough and also predicts the handling characteristics 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.

100 g BAKING TEST:

This procedure, according to Industry Accepted Method 022 based on AACC 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, produced by moulds or fungi, are natural contaminants of food and feedstuffs with serious implications for public health and economics, in particular with relation to the international food trade.

During 2010 SAGL implemented a multi-mycotoxin screening method using UPLC - MS/MS. 30 of the 372 wheat crop samples were tested for Aflatoxin G₁; B₁; G₂; B₂, Fumonisin B₁ and B₂, Deoxynivalenol, T₂ - Toxin, Zearalenone and Ochratoxin A.

Quantity of imported wheat for the 2009/2010 season (Previous season)

During the 2009/2010 season, 1 277 972 tons of wheat were imported for RSA. The biggest quantity was imported from Germany, namely 809 934 tons, followed by USA with 173 030 tons, Brazil with 123 944 tons, Canada with 72 911 tons, Australia with 55 312 tons, Ukraine with 41 230 tons and Lithuania with 1 611 tons (SAGIS).

For grading as well as dough and baking quality of the imported wheat, please refer to pages 63 to 72. No samples were received for analysis from Ukraine and Lithuania.

Imported wheat (1 October 2009 - 30 September 2010) (Previous season)

The quality of all wheat imported into South Africa is also monitored by the SAGL. The range of analyses done on the local crop for the purpose of this survey are also done on the imported wheat. These results may only be made available at the end of each season.

Pages 63 to 72 of this report contain summaries of wheat imported from specific countries during the 2009/2010 season. This imported wheat quality is compared to a summary of the local crop quality for the same season.

The quality of the Australian and Canadian flour milled from wheat imported during the 2009/2010 season were better than the local wheat flour quality. The German and American flour were not as good as the quality of the local flour of the 2009/2010 season, while the Brazilian flour were noticeably weaker than the local flour.

Average quality data of imported wheat during the 2009/2010 season (previous season)

	Australia	Brazil	Canada	Germany	USA	RSA
Protein, % (12 % mb)	12.23	12.28	14.09	11.18	11.43	11.68
Hlm, kg/hl	79.9	76.9	82.4	78.7	80.7	79.9
Screenings, %	1.87	3.05	2.11	1.56	2.50	1.63
Number of samples	5	10	5	70	10	480
Extraction, %	72.2	69.8	74.4	74.2	73.0	74.7
Flour colour, KJ	-2.6	0.5	-1.9	-1.3	-1.0	-2.2
Farinogram						
Water absorption, %	61.0	64.0	63.3	59.2	56.7	61.0
Development time, %	2.7	1.8	5.4	1.9	2.0	3.5
Alveogram						
Strength, cm²	40.6	26.2	52.2	33.2	31.7	35.5
P/L	1.80	1.95	0.69	1.63	1.03	1.17
Extensogram						
Strength, cm²	101	50	120	84	98	83
Mixogram (Bühler)						
Peak time, min	3.4	2.7	2.9	3.5	4.6	2.6
100 g Baking test						
Volume, cm³	780	723	988	757	782	843
Evaluation	3	4	1	2	1	0
Number of samples	5	10	5	70	10	100

2009/2010 IMPORTED WHEAT QUALITY - AUSTRALIA (1 Oct 2009 to 30 Sep 2010)

2009/2010 Imported Wheat Quality Versus 2009/2010 RSA Wheat Quality

Country of origin	Australia							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	159	138	79	30	16	58	480
WHEAT GRADING														
Protein (12% mb), %	12.23	-	-	-	-	-	12.23	12.84	11.50	10.62	9.64	11.29	11.51	11.68
Moisture, %	10.0	-	-	-	-	-	10.0	11.5	11.3	11.3	10.8	11.0	11.0	11.3
Falling number, sec	510	-	-	-	-	-	510	382	375	359	339	240	365	367
1000 Kernel mass (13% mb), g	35.2	-	-	-	-	-	35.2	38.7	39.5	40.4	40.2	36.6	38.1	39.2
Hlm (dirty), kg/hl	79.9	-	-	-	-	-	79.9	80.8	80.0	79.5	79.7	75.2	79.0	79.9
Screenings (<1,8mm), %	1.87	-	-	-	-	-	1.87	1.36	1.30	1.47	1.44	3.36	3.03	1.63
Gravel, stones, turf and glass, %	0.00	-	-	-	-	-	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00
Foreign matter, %	0.01	-	-	-	-	-	0.01	0.05	0.05	0.09	0.09	0.12	0.11	0.07
Other grain & unthreshed ears, %	0.14	-	-	-	-	-	0.14	0.25	0.26	0.30	0.35	0.64	0.65	0.33
Heat damaged kernels, %	0.00	-	-	-	-	-	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.00
Immature kernels, %	0.00	-	-	-	-	-	0.00	0.07	0.05	0.04	0.03	0.01	0.06	0.05
Insect damaged kernels, %	0.00	-	-	-	-	-	0.00	0.19	0.26	0.29	0.27	1.10	0.52	0.30
Heavily frost damaged kernels, %	0.00	-	-	-	-	-	0.00	0.00	0.00	0.00	0.00	0.13	0.00	0.01
Sprouted kernels, %	0.02	-	-	-	-	-	0.02	0.09	0.11	0.16	0.14	2.73	0.36	0.23
Total damaged kernels, %	0.02	-	-	-	-	-	0.02	0.36	0.43	0.50	0.44	3.96	0.96	0.60
Combined deviations, %	2.04	-	-	-	-	-	2.04	2.02	2.04	2.34	2.32	8.07	4.76	2.63
Field fungi, %	0.23	-	-	-	-	-	0.23	0.19	0.19	0.21	0.15	0.54	0.16	0.20
Storage fungi, %	0.00	-	-	-	-	-	0.00	0.01	0.01	0.01	0.00	0.03	0.01	0.01
Ergot, %	0.00	-	-	-	-	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Noxious seeds (<i>Crotalaria spp.</i> , <i>Datura spp.</i>)	0	-	-	-	-	-	0	0	0	0	0	0	0	0
Noxious seeds (<i>Argemone mexicana</i>)	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	26	28	20	10	5	11	100
BÜHLER EXTRACTION, %	72.2	-	-	-	-	-	72.2	74.8	75.1	74.8	73.8	74.1	74.9	74.7
FLOUR														
Colour, KJ	-2.6	-	-	-	-	-	-2.6	-2.2	-2.3	-2.3	-2.3	-1.7	-2.2	-2.2
Protein (12% mb), %	11.2	-	-	-	-	-	11.2	11.7	10.6	9.6	8.6	10.4	10.6	10.5
Wet Gluten (14% mb), %	29.6	-	-	-	-	-	29.6	32.1	29.0	25.9	22.2	28.3	29.1	28.6
Dry Gluten (14% mb), %	10.3	-	-	-	-	-	10.3	11.3	10.1	9.0	7.9	9.6	10.2	10.0
100g BAKING TEST														
Baking water absorption, %	61.1	-	-	-	-	-	61.1	61.5	60.3	59.3	58.2	59.5	60.4	60.2
Loaf volume, cm ³	780	-	-	-	-	-	780	902	853	803	727	868	847	843
Evaluation	3	-	-	-	-	-	3	1	0	0	0	0	0	0
FARINOGRAM														
Water absorption, %	61.0	-	-	-	-	-	61.0	62.3	61.3	60.5	59.3	58.3	60.6	61.0
Development time, min	2.7	-	-	-	-	-	2.7	4.8	3.4	2.9	2.0	2.7	3.7	3.5
Stability, mm	8.6	-	-	-	-	-	8.6	8.4	6.8	5.7	3.8	4.9	6.9	6.6
Mixing tolerance index, BU	25	-	-	-	-	-	25	39	44	52	71	71	48	49

2009/2010 Imported Wheat Quality Versus 2009/2010 RSA Wheat Quality

Country of origin	Australia							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	26	28	20	10	5	11	100
ALVEOGRAM														
Strength (S) , cm ²	40.6	-	-	-	-	-	40.6	42.4	36.5	32.7	25.0	26.8	35.4	35.5
Stability (P), mm	113	-	-	-	-	-	113	93	90	90	87	61	83	89
Distensibility (L), mm	63	-	-	-	-	-	63	97	86	75	58	101	90	85
P/L	1.80	-	-	-	-	-	1.80	1.03	1.13	1.31	1.80	0.61	0.97	1.17
EXTENSOGRAM														
Strength, cm ²	101	-	-	-	-	-	101	96	85	74	61	71	87	83
Max. height, BU	457	-	-	-	-	-	457	355	344	327	304	295	345	337
Extensibility, mm	153	-	-	-	-	-	153	187	174	158	139	171	173	170
MIXOGRAM														
Peak time, min	3.4	-	-	-	-	-	3.4	2.6	2.6	2.7	2.8	2.8	2.5	2.6
Absorption, %	61.1	-	-	-	-	-	61.1	61.8	60.4	59.4	58.5	60.3	60.6	60.4
MYCOTOXINS														
Aflatoxin, ppb [max.value]	<2 [<2]							1.00 [4.00]						
Deoxynivalenol, ppm [max. value]	0.00 [0.00]							0.05 [0.48]						
Ochratoxin A, ppb [max. value]	0.00 [0.00]							0.17 [1.00]						
No. of samples	1							30						

2009/2010 IMPORTED WHEAT QUALITY - BRAZIL (1 Oct 2009 to 30 Sep 2010)

2009/2010 Imported Wheat Quality Versus 2009/2010 RSA Wheat Quality

Country of origin	Brazil							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	-	-	-	-	-	10	10	159	138	79	30	16	58	480
WHEAT GRADING														
Protein (12% mb), %	-	-	-	-	-	12.28	12.28	12.84	11.50	10.62	9.64	11.29	11.51	11.68
Moisture, %	-	-	-	-	-	12.2	12.2	11.5	11.3	11.3	10.8	11.0	11.0	11.3
Falling number, sec	-	-	-	-	-	274	274	382	375	359	339	240	365	367
1000 Kernel mass (13% mb), g	-	-	-	-	-	31.7	31.7	38.7	39.5	40.4	40.2	36.6	38.1	39.2
Hlm (dirty), kg/hl	-	-	-	-	-	76.9	76.9	80.8	80.0	79.5	79.7	75.2	79.0	79.9
Screenings (<1,8mm), %	-	-	-	-	-	3.05	3.05	1.36	1.30	1.47	1.44	3.36	3.03	1.63
Gravel, stones, turf and glass, %	-	-	-	-	-	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00
Foreign matter, %	-	-	-	-	-	0.29	0.29	0.05	0.05	0.09	0.09	0.12	0.11	0.07
Other grain & unthreshed ears, %	-	-	-	-	-	0.15	0.15	0.25	0.26	0.30	0.35	0.64	0.65	0.33
Heat damaged kernels, %	-	-	-	-	-	0.38	0.38	0.00	0.00	0.00	0.00	0.05	0.00	0.00
Immature kernels, %	-	-	-	-	-	0.01	0.01	0.07	0.05	0.04	0.03	0.01	0.06	0.05
Insect damaged kernels, %	-	-	-	-	-	0.32	0.32	0.19	0.26	0.29	0.27	1.10	0.52	0.30
Heavily frost damaged kernels, %	-	-	-	-	-	0.00	0.00	0.00	0.00	0.00	0.00	0.13	0.00	0.01
Sprouted kernels, %	-	-	-	-	-	2.99	2.99	0.09	0.11	0.16	0.14	2.73	0.36	0.23
Total damaged kernels, %	-	-	-	-	-	3.70	3.70	0.36	0.43	0.50	0.44	3.96	0.96	0.60
Combined deviations, %	-	-	-	-	-	7.19	7.19	2.02	2.04	2.34	2.32	8.07	4.76	2.63
Field fungi, %	-	-	-	-	-	0.98	0.98	0.19	0.19	0.21	0.15	0.54	0.16	0.20
Storage fungi, %	-	-	-	-	-	0.11	0.11	0.01	0.01	0.01	0.00	0.03	0.01	0.01
Ergot, %	-	-	-	-	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Noxious seeds (<i>Crotalaria spp.</i> , <i>Datura spp.</i>)	-	-	-	-	-	0	0	0	0	0	0	0	0	0
Noxious seeds (<i>Argemone mexicana</i>)	-	-	-	-	-	0	0	0	0	0	0	0	0	0
Live insects	-	-	-	-	-	Yes	Yes	No	No	No	No	No	No	No
Undesirable odour	-	-	-	-	-	Yes	Yes	No	No	No	No	No	No	No
	B1	B2	B3	B4	UT	COW	Average	B1	B2	B3	B4	UT	COW	Average
No. of samples	-	-	-	-	-	10	10	26	28	20	10	5	11	100
BÜHLER EXTRACTION, %	-	-	-	-	-	69.8	69.8	74.8	75.1	74.8	73.8	74.1	74.9	74.7
FLOUR														
Colour, KJ	-	-	-	-	-	0.5	0.5	-2.2	-2.3	-2.3	-2.3	-1.7	-2.2	-2.2
Protein (12% mb), %	-	-	-	-	-	10.6	10.6	11.7	10.6	9.6	8.6	10.4	10.6	10.5
Wet Gluten (14% mb), %	-	-	-	-	-	28.5	28.5	32.1	29.0	25.9	22.2	28.3	29.1	28.6
Dry Gluten (14% mb), %	-	-	-	-	-	9.5	9.5	11.3	10.1	9.0	7.9	9.6	10.2	10.0
100g BAKING TEST														
Baking water absorption, %	-	-	-	-	-	60.6	60.6	61.5	60.3	59.3	58.2	59.5	60.4	60.2
Loaf volume, cm ³	-	-	-	-	-	723	723	902	853	803	727	868	847	843
Evaluation	-	-	-	-	-	4	4	1	0	0	0	0	0	0
FARINOGRAM														
Water absorption, %	-	-	-	-	-	64.0	64.0	62.3	61.3	60.5	59.3	58.3	60.6	61.0
Development time, min	-	-	-	-	-	1.8	1.8	4.8	3.4	2.9	2.0	2.7	3.7	3.5
Stability, mm	-	-	-	-	-	2.7	2.7	8.4	6.8	5.7	3.8	4.9	6.9	6.6
Mixing tolerance index, BU	-	-	-	-	-	80	80	39	44	52	71	71	48	49

2009/2010 Imported Wheat Quality Versus 2009/2010 RSA Wheat Quality

Country of origin	Brazil							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	-	-	-	-	-	10	10	26	28	20	10	5	11	100
ALVEOGRAM														
Strength (S) , cm ²	-	-	-	-	-	26.2	26.2	42.4	36.5	32.7	25.0	26.8	35.4	35.5
Stability (P), mm	-	-	-	-	-	95	95	93	90	90	87	61	83	89
Distensibility (L), mm	-	-	-	-	-	50	50	97	86	75	58	101	90	85
P/L	-	-	-	-	-	1.95	1.95	1.03	1.13	1.31	1.80	0.61	0.97	1.17
EXTENSOGRAM														
Strength, cm ²	-	-	-	-	-	50	50	96	85	74	61	71	87	83
Max. height, BU	-	-	-	-	-	253	253	355	344	327	304	295	345	337
Extensibility, mm	-	-	-	-	-	141	141	187	174	158	139	171	173	170
MIXOGRAM														
Peak time, min	-	-	-	-	-	2.7	2.7	2.6	2.6	2.7	2.8	2.8	2.5	2.6
Absorption, %	-	-	-	-	-	60.5	60.5	61.8	60.4	59.4	58.5	60.3	60.6	60.4
MYCOTOXINS														
Aflatoxin, ppb [max. value]	<2 [<2]							1.00 [4.00]						
Deoxynivalenol, ppm [max. value]	2.90 [3.90]							0.05 [0.48]						
Ochratoxin A, ppb [max. value]	0.00 [0.00]							0.17 [1.00]						
No. of samples	2							30						

2009/2010 IMPORTED WHEAT QUALITY - CANADA (1 Oct 2009 to 30 Sep 2010)

2009/2010 Imported Wheat Quality Versus 2009/2010 RSA Season

Country of origin	Canada							RSA Crop Average						
	B1	B2	B3	B4	UT	COW	Average	B1	B2	B3	B4	UT	COW	Average
Class and Grade bread wheat														
No. of samples	5	-	-	-	-	-	5	159	138	79	30	16	58	480
WHEAT GRADING														
Protein (12% mb), %	14.09	-	-	-	-	-	14.09	12.84	11.50	10.62	9.64	11.29	11.51	11.68
Moisture, %	12.2	-	-	-	-	-	12.2	11.5	11.3	11.3	10.8	11.0	11.0	11.3
Falling number, sec	365	-	-	-	-	-	365	382	375	359	339	240	365	367
1000 Kernel mass (13% mb), g	34.6	-	-	-	-	-	34.6	38.7	39.5	40.4	40.2	36.6	38.1	39.2
Hlm (dirty), kg/hl	82.4	-	-	-	-	-	82.4	80.8	80.0	79.5	79.7	75.2	79.0	79.9
Screenings (<1,8mm), %	2.11	-	-	-	-	-	2.11	1.36	1.30	1.47	1.44	3.36	3.03	1.63
Gravel, stones, turf and glass, %	0.00	-	-	-	-	-	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00
Foreign matter, %	0.01	-	-	-	-	-	0.01	0.05	0.05	0.09	0.09	0.12	0.11	0.07
Other grain & unthreshed ears, %	0.15	-	-	-	-	-	0.15	0.25	0.26	0.30	0.35	0.64	0.65	0.33
Heat damaged kernels, %	0.00	-	-	-	-	-	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.00
Immature kernels, %	0.00	-	-	-	-	-	0.00	0.07	0.05	0.04	0.03	0.01	0.06	0.05
Insect damaged kernels, %	0.02	-	-	-	-	-	0.02	0.19	0.26	0.29	0.27	1.10	0.52	0.30
Heavily frost damaged kernels, %	0.00	-	-	-	-	-	0.00	0.00	0.00	0.00	0.00	0.13	0.00	0.01
Sprouted kernels, %	0.02	-	-	-	-	-	0.02	0.09	0.11	0.16	0.14	2.73	0.36	0.23
Total damaged kernels, %	0.04	-	-	-	-	-	0.04	0.36	0.43	0.50	0.44	3.96	0.96	0.60
Combined deviations, %	2.31	-	-	-	-	-	2.31	2.02	2.04	2.34	2.32	8.07	4.76	2.63
Field fungi, %	0.36	-	-	-	-	-	0.36	0.19	0.19	0.21	0.15	0.54	0.16	0.20
Storage fungi, %	0.05	-	-	-	-	-	0.05	0.01	0.01	0.01	0.00	0.03	0.01	0.01
Ergot, %	0.01	-	-	-	-	-	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Noxious seeds (<i>Crotalaria spp.</i> , <i>Datura spp.</i>)	0	-	-	-	-	-	0	0	0	0	0	0	0	0
Noxious seeds (<i>Argemone mexicana</i>)	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	26	28	20	10	5	11	100
BÜHLER EXTRACTION, %	74.4	-	-	-	-	-	74.4	74.8	75.1	74.8	73.8	74.1	74.9	74.7
FLOUR														
Colour, KJ	-1.9	-	-	-	-	-	-1.9	-2.2	-2.3	-2.3	-2.3	-1.7	-2.2	-2.2
Protein (12% mb), %	13.2	-	-	-	-	-	13.2	11.7	10.6	9.6	8.6	10.4	10.6	10.5
Wet Gluten (14% mb), %	36.6	-	-	-	-	-	36.6	32.1	29.0	25.9	22.2	28.3	29.1	28.6
Dry Gluten (14% mb), %	13.0	-	-	-	-	-	13.0	11.3	10.1	9.0	7.9	9.6	10.2	10.0
100g BAKING TEST														
Baking water absorption, %	63.5	-	-	-	-	-	63.5	61.5	60.3	59.3	58.2	59.5	60.4	60.2
Loaf volume, cm ³	988	-	-	-	-	-	988	902	853	803	727	868	847	843
Evaluation	1	-	-	-	-	-	1	1	0	0	0	0	0	0
FARINOGRAM														
Water absorption, %	63.3	-	-	-	-	-	63.3	62.3	61.3	60.5	59.3	58.3	60.6	61.0
Development time, min	5.4	-	-	-	-	-	5.4	4.8	3.4	2.9	2.0	2.7	3.7	3.5
Stability, mm	10.7	-	-	-	-	-	10.7	8.4	6.8	5.7	3.8	4.9	6.9	6.6
Mixing tolerance index, BU	31	-	-	-	-	-	31	39	44	52	71	71	48	49

2009/2010 Imported Wheat Quality Versus 2009/2010 RSA Wheat Quality

Country of origin	Canada							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	26	28	20	10	5	11	100
ALVEOGRAM														
Strength (S) , cm ²	52.2	-	-	-	-	-	52.2	42.4	36.5	32.7	25.0	26.8	35.4	35.5
Stability (P), mm	88	-	-	-	-	-	88	93	90	90	87	61	83	89
Distensibility (L), mm	128	-	-	-	-	-	128	97	86	75	58	101	90	85
P/L	0.69	-	-	-	-	-	0.69	1.03	1.13	1.31	1.80	0.61	0.97	1.17
EXTENSOGRAM														
Strength, cm ²	120	-	-	-	-	-	120	96	85	74	61	71	87	83
Max. height, BU	353	-	-	-	-	-	353	355	344	327	304	295	345	337
Extensibility, mm	238	-	-	-	-	-	238	187	174	158	139	171	173	170
MIXOGRAM														
Peak time, min	2.9	-	-	-	-	-	2.9	2.6	2.6	2.7	2.8	2.8	2.5	2.6
Absorption, %	63.9	-	-	-	-	-	63.9	61.8	60.4	59.4	58.5	60.3	60.6	60.4
MYCOTOXINS														
Aflatoxin, ppb [max.value]	<2 [<2]							1.00 [4.00]						
Deoxynivalenol, ppm [max. value]	1.40 [1.40]							0.05 [0.48]						
Ochratoxin A, ppb [max. value]	1.00 [1.00]							0.17 [1.00]						
No. of samples	1							30						

2009/2010 IMPORTED WHEAT QUALITY - GERMANY (1 Oct 2009 to 30 Sep 2010)

2009/2010 Imported Wheat Quality Versus 2009/2010 RSA Season

Country of origin	Germany							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	-	39	19	-	12	-	70	159	138	79	30	16	58	480
WHEAT GRADING														
Protein (12% mb), %	-	11.24	10.91	-	11.42	-	11.18	12.84	11.50	10.62	9.64	11.29	11.51	11.68
Moisture, %	-	12.3	12.6	-	12.5	-	12.4	11.5	11.3	11.3	10.8	11.0	11.0	11.3
Falling number, sec	-	383	356	-	399	-	378	382	375	359	339	240	365	367
1000 Kernel mass (13% mb), g	-	43.0	44.3	-	41.7	-	43.1	38.7	39.5	40.4	40.2	36.6	38.1	39.2
Hlm (dirty), kg/hl	-	79.2	78.7	-	77.2	-	78.7	80.8	80.0	79.5	79.7	75.2	79.0	79.9
Screenings (<1,8mm), %	-	1.60	1.40	-	1.67	-	1.56	1.36	1.30	1.47	1.44	3.36	3.03	1.63
Gravel, stones, turf and glass, %	-	0.00	0.00	-	0.00	-	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00
Foreign matter, %	-	0.06	0.05	-	0.08	-	0.06	0.05	0.05	0.09	0.09	0.12	0.11	0.07
Other grain & unthreshed ears, %	-	0.40	0.50	-	1.50	-	0.62	0.25	0.26	0.30	0.35	0.64	0.65	0.33
Heat damaged kernels, %	-	0.01	0.01	-	0.00	-	0.01	0.00	0.00	0.00	0.00	0.05	0.00	0.00
Immature kernels, %	-	0.02	0.00	-	0.02	-	0.01	0.07	0.05	0.04	0.03	0.01	0.06	0.05
Insect damaged kernels, %	-	0.02	0.03	-	0.02	-	0.02	0.19	0.26	0.29	0.27	1.10	0.52	0.30
Heavily frost damaged kernels, %	-	0.07	0.03	-	0.04	-	0.05	0.00	0.00	0.00	0.00	0.13	0.00	0.01
Sprouted kernels, %	-	0.04	0.02	-	0.03	-	0.03	0.09	0.11	0.16	0.14	2.73	0.36	0.23
Total damaged kernels, %	-	0.08	0.07	-	0.06	-	0.07	0.36	0.43	0.50	0.44	3.96	0.96	0.60
Combined deviations, %	-	2.14	2.02	-	3.31	-	2.31	2.02	2.04	2.34	2.32	8.07	4.76	2.63
Field fungi, %	-	0.12	0.09	-	0.09	-	0.10	0.19	0.19	0.21	0.15	0.54	0.16	0.20
Storage fungi, %	-	0.01	0.01	-	0.01	-	0.01	0.01	0.01	0.01	0.00	0.03	0.01	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
Noxious seeds (<i>Crotalaria spp.</i> , <i>Datura spp.</i>)	-	0	0	-	0	-	0	0	0	0	0	0	0	0
Noxious seeds (<i>Argemone mexicana</i>)	-	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	B1	UT	B1	Average	B1	B2	B3	B4	UT	COW	Average
No. of samples	-	39	19	-	12	-	70	26	28	20	10	5	11	100
BÜHLER EXTRACTION, %	-	74.3	74.2	-	73.6	-	74.2	74.8	75.1	74.8	73.8	74.1	74.9	74.7
FLOUR														
Colour, KJ	-	-1.2	-1.4	-	-1.3	-	-1.3	-2.2	-2.3	-2.3	-2.3	-1.7	-2.2	-2.2
Protein (12% mb), %	-	10.1	9.8	-	10.3	-	10.0	11.7	10.6	9.6	8.6	10.4	10.6	10.5
Wet Gluten (14% mb), %	-	27.2	26.5	-	27.5	-	27.0	32.1	29.0	25.9	22.2	28.3	29.1	28.6
Dry Gluten (14% mb), %	-	9.7	9.3	-	9.9	-	9.6	11.3	10.1	9.0	7.9	9.6	10.2	10.0
100g BAKING TEST														
Baking water absorption, %	-	59.8	59.5	-	60.1	-	59.7	61.5	60.3	59.3	58.2	59.5	60.4	60.2
Loaf volume, cm ³	-	759	726	-	799	-	757	902	853	803	727	868	847	843
Evaluation	-	2	2	-	1	-	2	1	0	0	0	0	0	0
FARINOGRAM														
Water absorption, %	-	59.4	59.0	-	58.9	-	59.2	62.3	61.3	60.5	59.3	58.3	60.6	61.0
Development time, min	-	1.9	1.9	-	2.1	-	1.9	4.8	3.4	2.9	2.0	2.7	3.7	3.5
Stability, mm	-	4.3	4.6	-	5.0	-	4.5	8.4	6.8	5.7	3.8	4.9	6.9	6.6
Mixing tolerance index, BU	-	58	58	-	54	-	57	39	44	52	71	71	48	49

2009/2010 Imported Wheat Quality Versus 2009/2010 RSA Wheat Quality

Country of origin	Germany							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	-	39	19	-	12	-	70	26	28	20	10	5	11	100
ALVEOGRAM														
Strength (S) , cm ²	-	33.9	31.1	-	34.3	-	33.2	42.4	36.5	32.7	25.0	26.8	35.4	35.5
Stability (P), mm	-	101	95	-	93	-	98	93	90	90	87	61	83	89
Distensibility (L), mm	-	61	61	-	68	-	62	97	86	75	58	101	90	85
P/L	-	1.70	1.62	-	1.39	-	1.63	1.03	1.13	1.31	1.80	0.61	0.97	1.17
EXTENSOGRAM														
Strength, cm ²	-	84	81	-	87	-	84	96	85	74	61	71	87	83
Max. height, BU	-	393	379	-	385	-	387	355	344	327	304	295	345	337
Extensibility, mm	-	147	146	-	154	-	148	187	174	158	139	171	173	170
MIXOGRAM														
Peak time, min	-	3.4	3.6	-	3.4	-	3.5	2.6	2.6	2.7	2.8	2.8	2.5	2.6
Absorption, %	-	59.9	59.6	-	60.1	-	59.9	61.8	60.4	59.4	58.5	60.3	60.6	60.4
MYCOTOXINS														
Aflatoxin, ppb [max.value]	1.41 [4.00]							1.00 [4.00]						
Deoxynivalenol, ppm [max. value]	0.00 [<0.25]							0.05 [0.48]						
Ochratoxin A, ppb [max. value]	0.15 [1.00]							0.17 [1.00]						
No. of samples	34							30						

2009/2010 IMPORTED WHEAT QUALITY - USA (1 Oct 2009 to 30 Sep 2010)

2009/2010 Imported Wheat Quality Versus 2009/2010 RSA Season

Country of origin	USA							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	1	5	3	-	1	-	10	159	138	79	30	16	58	480
WHEAT GRADING														
Protein (12% mb), %	12.16	11.59	10.73	-	11.98	-	11.43	12.84	11.50	10.62	9.64	11.29	11.51	11.68
Moisture, %	10.9	11.1	11.2	-	11.9	-	11.2	11.5	11.3	11.3	10.8	11.0	11.0	11.3
Falling number, sec	536	470	440	-	499	-	471	382	375	359	339	240	365	367
1000 Kernel mass (13% mb), g	31.1	31.3	31.7	-	28.9	-	31.2	38.7	39.5	40.4	40.2	36.6	38.1	39.2
Hlm (dirty), kg/hl	82.1	81.1	80.1	-	79.0	-	80.7	80.8	80.0	79.5	79.7	75.2	79.0	79.9
Screenings (<1,8mm), %	2.44	2.55	2.22	-	3.15	-	2.50	1.36	1.30	1.47	1.44	3.36	3.03	1.63
Gravel, stones, turf and glass, %	0.00	0.00	0.00	-	0.00	-	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00
Foreign matter, %	0.12	0.08	0.04	-	0.20	-	0.09	0.05	0.05	0.09	0.09	0.12	0.11	0.07
Other grain & unthreshed ears, %	0.16	0.24	0.33	-	0.00	-	0.24	0.25	0.26	0.30	0.35	0.64	0.65	0.33
Heat damaged kernels, %	0.00	0.10	0.08	-	0.00	-	0.08	0.00	0.00	0.00	0.00	0.05	0.00	0.00
Immature kernels, %	0.00	0.00	0.00	-	0.00	-	0.00	0.07	0.05	0.04	0.03	0.01	0.06	0.05
Insect damaged kernels, %	0.00	0.18	0.23	-	0.08	-	0.17	0.19	0.26	0.29	0.27	1.10	0.52	0.30
Heavily frost damaged kernels, %	0.00	0.00	0.00	-	0.00	-	0.00	0.00	0.00	0.00	0.00	0.13	0.00	0.01
Sprouted kernels, %	0.00	0.20	0.03	-	0.00	-	0.11	0.09	0.11	0.16	0.14	2.73	0.36	0.23
Total damaged kernels, %	0.00	0.46	0.34	-	0.08	-	0.34	0.36	0.43	0.50	0.44	3.96	0.96	0.60
Combined deviations, %	2.72	3.33	2.93	-	3.43	-	3.16	2.02	2.04	2.34	2.32	8.07	4.76	2.63
Field fungi, %	0.08	0.14	0.37	-	0.66	-	0.26	0.19	0.19	0.21	0.15	0.54	0.16	0.20
Storage fungi, %	0.08	0.00	0.00	-	0.08	-	0.02	0.01	0.01	0.01	0.00	0.03	0.01	0.01
Ergot, %	0.00	0.00	0.00	-	0.01	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Noxious seeds (<i>Crotalaria spp.</i> , <i>Datura spp.</i>)	0	0	0	-	0	-	0	0	0	0	0	0	0	0
Noxious seeds (<i>Argemone mexicana</i>)	0	0	0	-	0	-	0	0	0	0	0	0	0	0
Live insects	No	No	No	-	No	-	No	No	No	No	No	No	No	No
Undesirable odour	No	No	No	-	No	-	No	No	No	No	No	No	No	No
	B1	B2	B3	B4	UT	COW	Average	B1	B2	B3	B4	UT	COW	Average
No. of samples	1	5	3	-	1	-	10	26	28	20	10	5	11	100
BÜHLER EXTRACTION, %	73.7	72.8	72.8	-	73.6	-	73.0	74.8	75.1	74.8	73.8	74.1	74.9	74.7
FLOUR														
Colour, KJ	-1.3	-1.3	-0.4	-	-1.1	-	-1.0	-2.2	-2.3	-2.3	-2.3	-1.7	-2.2	-2.2
Protein (12% mb), %	11.0	10.4	9.5	-	10.7	-	10.2	11.7	10.6	9.6	8.6	10.4	10.6	10.5
Wet Gluten (14% mb), %	26.7	26.2	23.3	-	26.3	-	25.4	32.1	29.0	25.9	22.2	28.3	29.1	28.6
Dry Gluten (14% mb), %	9.7	9.4	8.1	-	9.7	-	9.1	11.3	10.1	9.0	7.9	9.6	10.2	10.0
100g BAKING TEST														
Baking water absorption, %	60.9	59.2	57.3	-	58.6	-	58.8	61.5	60.3	59.3	58.2	59.5	60.4	60.2
Loaf volume, cm ³	875	773	737	-	870	-	782	902	853	803	727	868	847	843
Evaluation	0	2	1	-	0	-	1	1	0	0	0	0	0	0
FARINOGRAM														
Water absorption, %	58.8	57.1	55.7	-	55.9	-	56.7	62.3	61.3	60.5	59.3	58.3	60.6	61.0
Development time, min	2.2	2.1	1.8	-	1.7	-	2.0	4.8	3.4	2.9	2.0	2.7	3.7	3.5
Stability, mm	8.0	7.3	4.1	-	8.7	-	6.6	8.4	6.8	5.7	3.8	4.9	6.9	6.6
Mixing tolerance index, BU	37	48	62	-	38	-	50	39	44	52	71	71	48	49

2009/2010 Imported Wheat Quality Versus 2009/2010 RSA Wheat Quality

Country of origin	USA							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	1	5	3	-	1	-	10	26	28	20	10	5	11	100
ALVEOGRAM														
Strength (S) , cm ²	38.2	33.1	27.8	-	29.5	-	31.7	42.4	36.5	32.7	25.0	26.8	35.4	35.5
Stability (P), mm	86	81	74	-	59	-	78	93	90	90	87	61	83	89
Distensibility (L), mm	84	75	74	-	99	-	78	97	86	75	58	101	90	85
P/L	1.02	1.08	1.08	-	0.60	-	1.03	1.03	1.13	1.31	1.80	0.61	0.97	1.17
EXTENSOGRAM														
Strength, cm ²	110	95	93	-	112	-	98	96	85	74	61	71	87	83
Max. height, BU	435	419	417	-	430	-	421	355	344	327	304	295	345	337
Extensibility, mm	174	161	154	-	186	-	163	187	174	158	139	171	173	170
MIXOGRAM														
Peak time, min	3.9	4.5	4.9	-	4.8	-	4.6	2.6	2.6	2.7	2.8	2.8	2.5	2.6
Absorption, %	60.9	60.2	59.3	-	60.6	-	60.1	61.8	60.4	59.4	58.5	60.3	60.6	60.4
MYCOTOXINS														
Aflatoxin, ppb [max.value]	0.40 [2.00]							1.00 [4.00]						
Deoxynivalenol, ppm [max. value]	0.29 [1.10]							0.05 [0.48]						
Ochratoxin A, ppb [max. value]	0.20 [1.00]							0.17 [1.00]						
No. of samples	5							30						

Accuracy Awards

SAGL participates in several international proficiency schemes including AACC International, BIPEA and FAPAS, as part of our quality assurance procedures to demonstrate technical competency. SAGL has received the 2009 AACC International Accuracy Award for Feed Analysis (also received in 2004) as well as the AACC International Accuracy Award for Mixograph analysis (also received in 2006, 2007 and 2008).





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
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 & PHYSICAL ANALYSIS

The facility is accredited in accordance with the recognised International Standard

ISO/IEC 17025:2005

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

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



Mr R Josias
Chief Executive Officer

Effective Date: 01 November 2009
Certificate Expires: 31 October 2014

ANNEXURE A

SCHEDULE OF ACCREDITATION

Testing Laboratory Number: T0116

Permanent Address of Laboratory: Southern African Grain Laboratory Grain Building 477 Witherte Road The Willows 0040		Technical Signatories : Ms J Nortjé (All) : Ms M Hammes (Chemical) : Ms M E Vorster (Physical) : Mr B van der Linde (Grading) : Ms A de Jager (Vitamins & Minerals) : Mrs M Henning (In House Method 11) : Ms H Schoeman (In House Method 24)
Postal Address: PostNet Suite # 391 Private Bag X 1 The Willows 0041		Nominated Representative : Mrs S du Preez Management Representative : Mrs W Louw
Tel : (012) 807-4019 Fax : (012) 807-4100 E-mail : info@sagl.co.za	Issue No : 15 Date of issue : 17 February 2011 Expiry date : 31 October 2014	
Materials/Products Tested	Types of Tests/Properties Measured, Range of Measurement	Standard Specifications, Equipment/ Techniques Used
CHEMICAL		
Ground barley	Moisture (Oven method)	Analytical EBC 3.2, 1997
Ground grains, semolina and flour	Moisture (Oven method)	ICC No 110/1, 1976
Whole and milled maize and soya beans	Moisture (Oven method)	AACC 44-15.02, 1999
All flours, cereal grains, oil seeds and animal feeds	Nitrogen and protein (Combustion method)	AACC 46-30.01, 1999
Food stuffs	Dietary fibre (total)	In-House Method 12
Food Stuff and Feeds	Carbohydrates (by difference) (calculation) Energy Value (calculation) Total Digestible Nutritional Value (calculation)	SOP MC 23
Food Stuffs and Feeds, Semolina and Milled Pasta	Determination of Ash	In-House Method 11
Wheat Kernels	Moisture (oven method)	Wheat Grading Regulation No. R905 including amendments
Flours of grains, e.g. barley, triticale, maize, rye, sorghum and wheat, oilseeds, feeds, mixed feeds and foodstuffs	Crude fat (Ether extraction by Soxhlet)	In-House Method 24

Original date of accreditation: 01 November 1999

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Field Manager

ANNEXURE A

Laboratory No: T0116
Date of issue: 17 February 2011
Expiry date: 31 October 2014

Materials/Products Tested	Types of Tests/Properties Measured, Range of Measurement	Standard Specifications, Equipment/ Techniques Used
VITAMINS & MINERALS		
Grain based vitamin-fortified food and feed products and fortification mixes	Vitamin A as all trans Retinol (Saponification)	In-House Method 1
	Thiamine Mononitrate	In-House Method 2
	Riboflavin (Vitamin B2)	In-House Method 2
	Nicotinamide	In-House Method 2
	Pyridoxine Hydrochloride	In-House Method 2
	Folic Acid	In-House Method 3
Grain based fortified food and feed products and fortification mixes	Iron and Zinc (total) by AA	In-House Method 10
GRADING		
Maize	Defective Kernels (white maize, yellow maize)	Government Gazette 32190 (08 May 2009) Regulation R.473 including amendments
Cereals as grain (Wheat, barley, rye and oats)	Hectolitre mass (Kern 222)	ISO 7971-3
Wheat	Screenings	Government Gazette No. 18036 (10 July 1998), Regulation No. R905 including amendments.
Meal and flour of wheat, rye, barley, other grains, starch containing and malted products	Falling Number	ICC No 107/1, 1995
PHYSICAL		
Wheat flour	Alveograph (Rheological properties)	ICC No 121, 1992
Wheat Flour and brown bread flour	Farinograph (Rheological properties)	AACC 54-21.01, 1999 – Constant Flour Weight Procedure
Wheat flour and whole wheat flour of hard/soft/durum wheat	Mixograph (Rheological properties)	Industry Accepted Method Q20 (Based on AACC 54-40.02, 1999)

Original date of accreditation: 01 November 1999

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Spurway
Field Manager

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 905 of 10 July 1998 as amended by R 1421 of 6 November 1998, R 878 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 -
 - iii) kernels in which blistering is confined to the back of the kernel, and
 - iii) 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.*, *Crotalaria spp.*, *Datura spp.*, *Ipomoea purpurea*, *Lolium temulentum*, *Ricinus communis* or *Xanthium spp.*

"**protein content**" means the percentage protein in wheat on a 12% moisture basis.

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

"**standard sieve**" 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, 1980 (Act No. 119 of 1980).

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

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

Restrictions on sale of wheat

- 2 (1) No person shall sell a consignment of wheat in the Republic of South Africa -
- (a) unless the wheat is sold according to the classes set out in regulation 3;
 - (b) unless the wheat complies with the standards for the classes set out in regulation 4;
 - (c) unless the wheat, where applicable, complies with the grades of wheat and the standards for grades set out in regulations 5 and 6 respectively;
 - (d) unless the wheat is packed in accordance with the packing requirements set out in regulation 7;
 - (e) unless the containers or sale documents, as the case may be, are marked in accordance with the marking requirements set out in regulation 8; and
 - (f) if such wheat contains a substance that renders it unfit for human consumption or for processing into or utilisation thereof as food or feed.

(2) The Executive Officer may grant written exemption, entirely or partially, to any person on such conditions as he or she may deem necessary from the provisions of 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 pests,
- (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 subregulation (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 subregulation (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 discharging 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**DÉTERMINATION OF CLASS, HECTOLITRE MASS, MOISTURE CONTENT, PROTEIN CONTENT AND FALLING NUMBER*****Determination of class***

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

- (a) Obtain a working sample of at least 500 g and screen the working sample in the manner prescribed in regulation 18.
- (b) Take at least 100 g of the screened wheat and remove all other grain, unthreshed ears and foreign matter by hand.
- (c) Obtain a working sample of at least 25 g each after all other grain, unthreshed ears and foreign matter have been removed and separate the different cultivars.
- (d) Determine the combined mass of all of the cultivars that belong 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 belong 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 of 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 ($\pm 0,3$ per cent) with the results obtained by the Cumas 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 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 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)					Utility Grade/ Utiliteit- graad
	Grade 1/ Graad 1	Grade 2/ Graad 2	Grade 3/ Graad 3	Grade 4/ Graad 4		
1	3	4	5	6	7	
(a) Heavily frost-damaged kernels/ Erg ryfbeskadigde korrels	5	5	5	5	10	
(b) Field fungi infected kernels/ Landswambesmette 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/S-fsets	3	3	3	4	10	
(e) Other grain and unthreshed ears/ Ander graan en ongedorsle are	1	1	1	1	4	
(f) Gravel stones turf and glass/ Gruis, klippies, 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 indivi- dually within the limits specified in item (f)/ Vreemde voorwerpe met inbegrip van gruis, klippies, turf en glas. Met dien verstande dat sodanige afwykings individueel binne die perke s in item (f) aan- gegee	1	1	1	1	3	
(h) Heat-damaged kernels/H tebe- skadigde 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)				Utility Grade/ Utiliteits- graad
	Grade 1/ Graad 1	Grade 2/ Graad 2	Grade 3/ Graad 3	Grade 4/ Graad 4	
1	3	4	5	6	7
(ii) Damaged kernels, including heat-damaged kernels. Provided that such deviations are individually within the limit specified in item (i) 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 (i) 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

