



# GrainCorp Australian Crop Report

2020-2021



GrainCorp



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# FOREWORD

## Dear Valued Customer,

Growing conditions across Australia's east coast in 2020 were some of the best recorded, with new marks set for yields in many areas of New South Wales (NSW) and Victoria.

This was in stark contrast to the devastating drought conditions Australia's east coast endured in 2018 and 2019.

Much-needed rainfall continued through most of the 2020 growing season, producing record quantities of wheat, barley and canola in NSW and Victoria.

Central Queensland producers enjoyed average to above-average wheat yields and chickpeas.

The wheat crop was eagerly accepted by Australia's drought-affected northern feedlot industry, still leaving ample supplies for export from our northern Queensland ports.

Crops in Queensland and NSW produced very high proteins, with Prime Hard Wheat and Hard Wheat dominating receivals in Queensland and northern NSW.

The knock-on effect of such high protein was limited production of APW and ASW compared with normal seasons.

And while some untimely rainfall produced feed wheat, world demand for feed grains strengthened due to international supply and demand dynamics.

Such ideal growing conditions were also suited to a build-up in mice and locust numbers, creating challenges for their control.

And it wouldn't be a foreword to this truly historic Crop Report without making mention of the wonderful work our operations teams performed, adhering to state border closures and lockdown restrictions enacted in response to the COVID-19 pandemic.

Many businesses in our rural towns were challenged by the pandemic, so it was a welcome relief to see such large grain production take place.

After two years of serious drought, a rejuvenated local agricultural industry will undoubtedly inject new life into our rural towns as we emerge from the pandemic.

I would like to thank our teams across many parts of our business.

Our trading teams worked tirelessly to source new markets for wheat, barley and canola and were backed by our up-country storage network and logistics, and our quality, ports, ocean freight and documentation teams.

Adapting to new conditions and circumstances is something the agricultural industry does well around the world and at GrainCorp, we're committed to leading the effort to deliver value for our customers and rural communities through innovation and expertise.

Finally, I'd like to thank our customers for their business and continued support.

With trust and open communication, our relationship remains strong, a source of pride for all of us at GrainCorp.

Best Regards,

**Klaus Pamminger**  
Chief Operating Officer





**HIGH CAPACITY  
FULLY  
INTEGRATED  
CANADIAN  
SUPPLY CHAIN**

**1 NATA\*  
ACCREDITED  
LABORATORY**  
\*NATIONAL  
ASSOCIATION OF  
TESTING AUTHORITY  
AUSTRALIA

**7 BULK  
GRAIN  
PORTS**

**LARGEST  
EASTERN  
AUSTRALIAN  
GRAIN STORAGE  
AND TRANSPORT  
NETWORK**

## OUR OPERATIONS AT A GLANCE

Our integrated, unique mix of assets and businesses allow us to deliver high quality assurance, competitive prices, scale and confidence of supply.

**DIVERSE RANGE  
OF OPERATIONS  
SPANNING FOUR  
CONTINENTS**

**EXPORTING TO  
30+  
COUNTRIES**

**ORIGINATION  
FOOTPRINT IN  
ALL  
AUSTRALIAN  
GROWING  
REGIONS**

**AUSTRALIA'S  
LARGEST  
INTEGRATED  
EDIBLE OILS  
BUSINESS**

### Accumulation



Largest regional accumulation network

### Storage



Over 20mmt of country storage and handling capacity

### Marketing



Marketing to local and global markets

### Road & Rail



Full freight connectivity for rapid turnaround

### Ports



7 bulk grain ports with 15mmt elevation capacity 14 bulk liquid terminals

### Processing



A key end producer of malt and oil



# THE 2020/21 WHEAT GROWING SEASON

## GRAIN QUALITY

The protein content in our wheat crop was at record high levels after the two drought years of 2018 and 2019. With higher-than-average proteins from the 2020/21 crop, our stacks were filled with large quantities of good quality Australian Prime Hard wheat and hard wheat across many areas, particularly the northern cropping zone. With a good supply of Prime Hard wheat (APH), demand from overseas buyers was at a record high.

Milling and Baking tests we conducted, and the resultant report here, shows average to above-average test data for dough rheology and flour strength, due largely to the good formations of quality and quantity of proteins in the wheat. Our wheat is also of low moisture content, ideal for millers. Milling extractions were average to above average and our flour tests recorded low ash. Our wheat has an early indication of good dough stabilities and strength in general and shows excellent white flour colour, desired by many millers and bakers around the world with average to above average bread volumes in our baking tests. The Prime Hard wheat variety Lancer dominates production in most Prime Hard and Hard wheat areas of Queensland and New South Wales with Spitfire variety proving to still be popular in Central Queensland. With our high proteins, demand for our wheat has come from many buyers further away than our usual markets in Asia with larger ships being secured to deliver our wheat across greater ocean distances. Initial feedback on milling and dough results from buyers has been very favorable with repeat business being sought for later in 2021 due to port space being booked up quickly. Our durum crop is also of excellent quality with record tonnages being shipped to Europe. With our Victorian wheat crop coming in with large quantities from good production, we have seen average to above

average proteins with early indications of milling tests showing excellent dough rheology with water absorptions and extensibilities showing average to above average results, despite our milling being conducted early for this report.

## GRAINCORP QUALITY CAPABILITY

GrainCorp's quality assurance system covers the spectrum from silo receipt to shipping, with harvest assessment, post-harvest monitoring, quality testing on outloading from country sites, quality testing during vessel loading and Independent Superintendent Quality certification of shipping samples. Contract/vessel quality risk assessments are undertaken for all shipments. This ensures delivery of a product that meets customer expectations. As part of our quality assurance system, GrainCorp operates an ISO9001 based food safety system with a focus on crop surveillance, and chemical and toxin management, thus assuring that both regulatory and customer requirements are met.

## SAMPLES ANALYSED FOR THIS REPORT

All wheat samples have been tested and milled early where possible in order to produce this report and provide early indicative results. We also conduct extractions at relatively high levels around 78 for comparison purposes. Please note that dough rheology in general including dough strength improves over storage time. Flour produced has been analysed in accordance with practices set out by AACC International, Australasian Grain Science Association and the International Association for Cereal Science and Technology.

**Results presented in this Crop Report should not be taken as minimum shipping standards as they are based on composite samples and are subject to sampling and testing errors. Certain quality results may alter on outturn due to environmental and biochemical factors such as natural grain maturing, site selections and through normal storage and handling practices.**



## AUSTRALIAN PRIME HARD (APH)

	QLD	NSW	
Port	Brisbane	Newcastle	Port Kembla
<b>Wheat</b>			
Moisture (%)	10.4	10.7	9.7
Protein (Nx5.7, 11% mb)	13.6	13.4	13.8
Test weight (kg/hL)	82.4	82.6	80.0
Falling number (sec)	431	388	466
Screenings, 2mm (%)	1.7	1.5	2.5
Foreign material (%)	0.10	0.00	0.40
1000 kernel weight (g)	36.3	37.6	34.8
Ash (%; 11% mb)	1.30	1.39	1.36
Grain hardness (PSI)	13	14	13
Flour extraction (%)	78.8	78.2	77.9
<b>Flour</b>			
Protein (Nx5.7, 14% mb)	12.6	12.5	13.0
Flour ash (%)	0.42	0.44	0.44
Flour ash (% db)	0.49	0.51	0.51
Starch damage (%)	9.3	9.0	9.1
Wet gluten (%)	35.2	34.4	35.5
Gluten index	92	95	92
Minolta Flour L - brightness	92.27	92.29	92.04
Minolta Flour b - yellowness	8.94	8.95	9.01
Colour Grade	-1.2	-1.1	-0.3
Diastatic activity (mg/10g)	302	308	288
<b>Farinogram</b>			
Water absorption (%)	64.2	64.2	64.2
Development time (min)	6.2	4.9	5.9
Stability (min)	7.2	7.4	6.7
<b>Extensogram</b>			
Extensibility (cm) 45 min pull	25.5	22.4	23.0
Maximum height (BU) 45 min pull	360	390	385
Area (cm <sup>2</sup> ) 45 min pull	149	128	132
Extensibility (cm) 135 min pull	21.0	21.8	21.4
Maximum height (BU) 135 min pull	490	430	500
Area (cm <sup>2</sup> ) 135 min pull	132	129	137
<b>Alveograph</b>			
P (mm)	101	107	122
L (mm)	117	98	111
W (joules x 10 <sup>-4</sup> )	367	337	419
P/L	0.86	1.09	1.10
<b>Viscogram</b>			
Peak viscosity (BU)	480	330	320
<b>RVA</b>			
Peak viscosity (cP)	2423	1962	1848
<b>Baking test (straight dough)</b>			
Volume (cm <sup>3</sup> )	925	890	980
Score (%)	89	87	82
<b>Baking test (sponge and dough)</b>			
Volume (cm <sup>3</sup> )	725	745	700
Score (%)	81	82	78
<b>Yellow alkaline noodle test - colour</b>			
<b>Raw noodle sheet</b>			
Minolta L (T=30 min)	82.0	79.1	77.9
Minolta b (T=30 min)	25.6	28.8	30.7
Minolta L (T=24 hour)	71.6	73.0	71.0
Minolta b (T=24 hour)	30.7	31.1	31.7
Colour stability	10.4	9.29	9.3
<b>Cooked noodle</b>			
Minolta L	73.6	72.1	77.5
Minolta b	30.1	29.4	31.8



## AUSTRALIAN HARD (AH)

	QLD			NSW			VIC			
Port	Mackay	Gladstone	Brisbane	Newcastle	Port Kembla	Port Kembla	Geelong	Geelong	Portland	Portland
Minimum Protein (%)	11.5	11.5	11.5	11.5	11.5	13.0	11.5	13.0	11.5	13.0
<b>Wheat</b>										
Moisture (%)	10.7	10.5	10.3	10.8	10.3	9.56	9.9	9.6	10.2	10.4
Protein (Nx5.7, 11% mb)	12.2	12.3	12.6	12.6	12.5	13.23	12.3	13.7	12.1	13.6
Test weight (kg/hL)	83.6	84.0	83.2	83.2	80.7	80.5	82.7	83.1	82.7	82.6
Falling number (sec)	400	440	383	403	403	364	449	447	474	502
Screenings, 2mm (%)	3.7	1.9	2.1	1.7	2.5	2.5	1.1	1.1	0.8	0.8
Foreign material (%)	0.10	0.20	0.00	0.10	0.20	0.20	0.10	0.1	0.20	0.1
1000 kernel weight (g)	34.0	37.1	36.1	37.3	34.7	34.7	39.4	39.8	43.7	43.3
Ash (% 11% mb)	1.25	1.38	1.27	1.39	1.33	1.33	1.29	1.32	1.31	1.38
Grain hardness (PSI)	12	12	14	13	13	13	12	13	14	14
Flour extraction (%)	79.5	80.1	78.9	78.5	78.1	78.1	78.8	78.8	78.9	78.0
<b>Flour</b>										
Protein (Nx5.7, 14% mb)	11.3	11.4	11.5	11.4	11.5	11.5	11.3	12.9	11.3	12.4
Flour ash (%)	0.47	0.47	0.44	0.47	0.45	0.45	0.43	0.43	0.43	0.41
Flour ash (% db)	0.55	0.55	0.51	0.54	0.51	0.51	0.49	0.50	0.50	0.47
Starch damage (%)	10.3	10.7	10.0	9.8	9.7	9.7	10.4	9.8	10.6	9.8
Wet gluten (%)	31.8	31.2	32.7	31.9	32.3	32.3	31.4	36.3	32.2	35.9
Gluten index	93	94	95	96	96	96	94	84	91	82
Minolta Flour L - brightness	92.40	92.21	92.36	92.39	92.10	92.10	92.21	91.85	92.14	91.89
Minolta Flour b - yellowness	9.51	9.68	9.12	9.01	9.10	9.10	8.94	9.04	8.63	8.62
Colour Grade	-1.0	-0.4	-1.1	-1.2	-0.4	-0.4	-0.6	-0.2	-0.9	-0.6
Diastatic activity (mg/10g)	328	334	347	334	315	315	334	302	328	302
<b>Farinogram</b>										
Water absorption (%)	63.7	64.5	63.6	63.4	63.3	63.3	63.8	64.5	66.0	67.2
Development time (min)	4.3	5.0	5.5	4.6	5.1	5.1	4.8	5.8	5.2	5.9
Stability (min)	5.2	6.0	7.3	7.5	6.3	6.3	6.1	6.1	6.6	6.1
<b>Extensogram</b>										
Extensibility (cm) 45 min pull	21.4	22.7	22.7	21.2	21.7	21.7	20.0	22.1	20.5	20.8
Maximum height (BU) 45 min pull	360	360	390	370	380	380	350	350	315	330
Area (cm <sup>2</sup> ) 45 min pull	115	126	131	115	121	121	103	120	101	106
Extensibility (cm) 135 min pull	20.8	19.4	20.5	19.8	18.6	18.6	18.5	20.5	17.2	18.8
Maximum height (BU) 135 min pull	470	420	480	450	430	430	400	400	320	360
Area (cm <sup>2</sup> ) 135 min pull	127	108	126	116	103	103	98	114	75	94
<b>Alveograph</b>										
P (mm)	98	110	110	109	103	103	97	97	112	113
L (mm)	104	94	98	90	100	100	86	102	70	91
W (joules x 10 <sup>-4</sup> )	302	314	358	312	318	318	253	290	256	313
P/L	0.94	1.17	1.12	1.21	1.03	1.03	1.13	0.95	1.60	1.24
<b>Viscogram</b>										
Peak viscosity (BU)	810	540	550	390	360	360	440	380	520	580
<b>RVA</b>										
Peak viscosity (cP)	2785	2476	2455	2113	2168	2168	2321	2038	2417	2455
<b>Baking test (straight dough)</b>										
Volume (cm <sup>3</sup> )	980	870	870	840	920	920	750	900	795	780
Score (%)	90	86	86	83	80	80	75	84	78	78
<b>Baking test (rapid dough)</b>										
Volume (cm <sup>3</sup> )	765	795	820	800	780	780	800	-	800	-
Score (%)	80	82	77	72	78	78	76	-	75	-
<b>Baking test (Arabic bread)</b>										
Score (%)	83	82	85	82	84	84	77	-	80	-
<b>Yellow alkaline noodle test - colour</b>										
<b>Raw noodle sheet</b>										
Minolta L (T=30 min)	81.1	80.7	80.2	80.7	78.6	78.6	79.2	77.2	79.6	78.1
Minolta b (T=30 min)	28.4	28.3	28.1	27.3	29.9	29.9	29.5	29.9	29.5	28.7
Minolta L (T=24 hour)	73.1	72.9	72.3	73.7	71.2	71.2	71.2	69.4	70.8	69.6
Minolta b (T=24 hour)	31.5	31.3	29.7	29.4	31.7	31.7	30.9	30.8	32.0	30.7
Colour stability	10.5	10.6	10.8	10.1	10.3	10.3	10.7	10.7	11.3	11.5
<b>Cooked noodle</b>										
Minolta L	71.2	72.0	73.0	75.5	73.7	73.7	75.0	73.1	72.9	73.2
Minolta b	33.5	31.5	31.6	31.8	31.8	31.8	32.1	31.0	30.7	28.7



## AUSTRALIAN HARD (AH) CONTINUED

	SA						
Port	Port Adelaide	Port Adelaide	Port Giles	Port Lincoln	Port Lincoln	Thevenard	Wallaroo
<b>Minimum Protein (%)</b>	<b>11.5</b>	<b>13.0</b>	<b>11.5</b>	<b>11.5</b>	<b>13.0</b>	<b>13.0</b>	<b>11.5</b>
<b>Wheat</b>							
Moisture (%)	10.3	10.4	11.8	11.0	11.3	10.8	11.0
Protein (Nx5.7, 11% mb)	12.0	13.8	11.9	12.1	13.4	13.5	12.0
Test weight (kg/hL)	83.4	82.9	82.5	82.5	82.2	82.2	83.1
Falling number (sec)	436	436	465	361	368	430	431
Screenings, 2mm (%)	1.1	1.6	1.2	2.0	2.1	1.8	1.6
Foreign material (%)	0.00	0.00	0.40	0.10	0.00	0.10	0.10
1000 kernel weight (g)	42.2	41.2	45.8	38.6	38.7	35.5	43.8
Ash (% 11% mb)	1.34	1.43	1.31	1.43	1.50	1.32	1.31
Grain hardness (PSI)	13	14	14	15	14	16	13
Flour extraction (%)	78.7	78.5	80.4	79.5	78.0	78.7	79.8
<b>Flour</b>							
Protein (Nx5.7, 14% mb)	11.1	12.9	10.8	11.0	12.6	12.5	11.1
Flour ash (%)	0.44	0.47	0.44	0.51	0.48	0.42	0.46
Flour ash (% db)	0.52	0.55	0.52	0.60	0.55	0.48	0.53
Starch damage (%)	11.0	9.9	12.4	11.4	10.3	9.3	11.0
Wet gluten (%)	30.4	37.0	30.7	31.5	36.4	34.8	31.3
Gluten index	89	82	89	94	87	94	92
Minolta Flour L - brightness	92.24	91.98	92.88	92.18	92.10	92.12	91.96
Minolta Flour b - yellowness	8.56	8.63	8.01	8.55	8.52	9.15	8.37
Colour Grade	-0.9	-0.3	-0.4	0.1	0.0	-0.6	-0.6
Diastatic activity (mg/10g)	385	353	425	412	373	315	392
<b>Farinogram</b>							
Water absorption (%)	65.6	65.4	67.0	65.5	65.6	62.5	65.6
Development time (min)	4.6	5.5	4.4	4.2	5.3	5.1	4.4
Stability (min)	5.5	5.4	4.4	4.2	5.1	5.4	4.5
<b>Extensogram</b>							
Extensibility (cm) 45 min pull	20.7	22.7	21.5	21.1	23.0	23.3	22.0
Maximum height (BU) 45 min pull	300	310	240	250	260	340	230
Area (cm <sup>2</sup> ) 45 min pull	101	118	98	96	113	128	101
Extensibility (cm) 135 min pull	16.8	20.9	17.5	20.0	21.0	20.0	21.0
Maximum height (BU) 135 min pull	355	370	210	260	280	420	255
Area (cm <sup>2</sup> ) 135 min pull	78	113	61	89	100	113	96
<b>Alveograph</b>							
P (mm)	117	102	109	101	97	87	101
L (mm)	84	113	70	87	125	113	90
W (joules x 10 <sup>-4</sup> )	303	328	235	247	323	288	261
P/L	1.39	0.90	1.56	1.16	0.78	0.77	1.12
<b>Viscogram</b>							
Peak viscosity (BU)	460	480	440	320	300	440	390
<b>RVA</b>							
Peak viscosity (cP)	2346	2186	2235	2035	1897	2267	2130
<b>Baking test (straight dough)</b>							
Volume (cm <sup>3</sup> )	750	890	845	860	1000	890	885
Score (%)	76	84	80	81	87	83	82
<b>Baking test (rapid dough)</b>							
Volume (cm <sup>3</sup> )	695	-	725	740	-	-	810
Score (%)	76	-	73	75	-	-	77
<b>Baking test (Arabic bread)</b>							
Score (%)	83	-	73	79	-	-	82
<b>Yellow alkaline noodle test - colour</b>							
<b>Raw noodle sheet</b>							
Minolta L (T=30 min)	79.5	77.4	78.5	78.6	77.2	77.9	79.5
Minolta b (T=30 min)	29.3	29.5	29.3	29.6	29.1	30.7	28.7
Minolta L (T=24 hour)	71.2	68.7	69.4	69.5	68.8	70.0	70.4
Minolta b (T=24 hour)	31.5	30.9	31.1	31.3	30.6	32.1	31.2
Colour stability	10.8	11.7	12.4	12.2	11.4	11.1	11.4
<b>Cooked noodle</b>							
Minolta L	76.1	72.3	74.6	72.4	73.8	74.5	73.0
Minolta b	32.0	29.9	31.4	31.0	29.7	30.8	31.4



## AUSTRALIAN HARD (AH) CONTINUED

	WA						
Port	Esperance	Esperance	Albany	Kwinana	Kwinana	Geraldton	Geraldton
<b>Minimum Protein (%)</b>	<b>11.5</b>	<b>13.0</b>	<b>11.5</b>	<b>11.5</b>	<b>13.0</b>	<b>11.5</b>	<b>13.0</b>
<b>Wheat</b>							
Moisture (%)	11.8	11.6	12.0	10.3	9.1	10.6	10.4
Protein (Nx5.7, 11% mb)	11.9	13.7	11.6	12.2	13.5	12.0	13.0
Test weight (kg/hL)	78.2	78.1	80.0	80.6	79.9	78.8	78.8
Falling number (sec)	445	460	481	467	527	498	483
Screenings, 2mm (%)	2.9	2.3	2.7	2.9	3.3	3.1	3.4
Foreign material (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1000 kernel weight (g)	38.3	35.5	37.8	35.2	32.9	36.5	36.1
Ash (% 11% mb)	1.29	1.29	1.28	1.33	1.36	1.30	1.40
Grain hardness (PSI)	15	16	12	12	13	13	16
Flour extraction (%)	77.5	77.7	77.4	77.1	76.6	78.8	78.2
<b>Flour</b>							
Protein (Nx5.7, 14% mb)	10.8	12.4	10.8	11.4	12.5	10.9	12.2
Flour ash (%)	0.43	0.41	0.48	0.51	0.48	0.49	0.50
Flour ash (% db)	0.50	0.48	0.56	0.59	0.56	0.57	0.58
Starch damage (%)	9.2	8.7	10.5	11.0	13.5	10.5	10.8
Wet gluten (%)	30.4	36.0	30.5	31.3	35.3	30.2	34.4
Gluten index	85	85	85	97	93	93	92
Minolta Flour L - brightness	92.29	92.21	92.27	92.27	92.13	92.20	92.15
Minolta Flour b - yellowness	8.10	8.74	8.47	9.68	9.35	8.86	9.61
Colour Grade	-0.5	-0.3	-0.1	-1.2	-0.8	-0.3	0.1
Diastatic activity (mg/10g)	308	276	373	341	288	315	315
<b>Farinogram</b>							
Water absorption (%)	62.3	63.8	63.8	63.6	64.1	63.3	64.6
Development time (min)	4.9	6.0	4.0	5.0	6.0	4.8	5.6
Stability (min)	5.9	7.4	4.6	6.3	8.0	5.9	6.4
<b>Extensogram</b>							
Extensibility (cm) 45 min pull	19.5	22.1	21.0	22.0	25.4	22.0	22.4
Maximum height (BU) 45 min pull	300	300	290	380	410	330	340
Area (cm <sup>2</sup> ) 45 min pull	91	112	102	123	155	116	121
Extensibility (cm) 135 min pull	18.8	21.1	17.0	21.0	21.8	19.0	20.5
Maximum height (BU) 135 min pull	360	350	330	480	470	380	415
Area (cm <sup>2</sup> ) 135 min pull	94	112	75	130	135	99	117
<b>Alveograph</b>							
P (mm)	92	92	113	105	104	94	94
L (mm)	64	76	62	95	122	94	112
W (joules x 10 <sup>-4</sup> )	188	221	230	289	352	247	280
P/L	1.44	1.21	1.82	1.11	0.85	1.00	0.84
<b>Viscogram</b>							
Peak viscosity (BU)	400	600	510	570	630	520	520
<b>RVA</b>							
Peak viscosity (cP)	2332	2444	2522	2534	2597	2446	2393
<b>Baking test (straight dough)</b>							
Volume (cm <sup>3</sup> )	840	870	750	905	930	880	910
Score (%)	81	83	75	82	84	81	83
<b>Baking test (rapid dough)</b>							
Volume (cm <sup>3</sup> )	795	-	765	845	-	805	-
Score (%)	81	-	79	81	-	78	-
<b>Baking test (Arabic bread)</b>							
Score (%)	83	-	85	80	-	82	-
<b>Yellow alkaline noodle test - colour</b>							
<b>Raw noodle sheet</b>							
Minolta L (T=30 min)	78.6	78.0	78.0	78.5	78.4	79.6	78.1
Minolta b (T=30 min)	29.7	30.1	30.5	33.2	31.8	30.6	32.0
Minolta L (T=24 hour)	73.2	72.7	70.8	71.6	71.0	71.8	71.3
Minolta b (T=24 hour)	29.5	29.6	31.3	35.2	34.2	31.8	33.0
Colour stability	8.1	8.0	10.1	9.8	10.2	10.3	9.9
<b>Cooked noodle</b>							
Minolta L	71.0	73.4	70.5	73.9	71.2	73.0	75.0
Minolta b	28.5	30.4	30.9	35.1	31.2	32.3	32.4



## AUSTRALIAN PREMIUM WHITE (APW)

	QLD		NSW		VIC	
Port	Mackay	Brisbane	Newcastle	Port Kembla	Geelong	Portland
<b>Wheat</b>						
Moisture (%)	10.7	10.1	9.8	9.9	10.1	10.2
Protein (Nx5.7, 11% mb)	11.4	11.5	11.0	11.0	11.2	10.9
Test weight (kg/hL)	84.3	80.4	82.0	81.4	82.4	82.4
Falling number (sec)	396	360	371	445	408	420
Screenings, 2mm (%)	2.4	3.2	2.2	2.5	1.3	1.0
Foreign material (%)	0.20	0.90	0.50	0.10	0.10	0.20
1000 kernel weight (g)	35.9	37.1	37.6	36.3	41.5	43.7
Ash (% 11% mb)	1.19	1.12	1.40	1.30	1.42	1.32
Grain hardness (PSI)	12	13	13	13	13	13
Flour extraction (%)	79.6	79.2	77.6	78.2	79.1	78.7
<b>Flour</b>						
Protein (Nx5.7, 14% mb)	10.5	10.3	10.0	10.1	10.2	9.9
Flour ash (%)	0.46	0.44	0.48	0.41	0.42	0.48
Flour ash (% db)	0.53	0.52	0.56	0.48	0.48	0.56
Starch damage (%)	11.0	10.1	10.9	9.4	10.4	11.1
Wet gluten (%)	29.0	27.2	26.2	27.2	27.9	27.2
Gluten index	92	98	96	97	91	94
Minolta Flour L - brightness	92.57	92.40	92.30	92.35	92.25	92.34
Minolta Flour b - yellowness	9.43	8.21	9.70	9.08	8.96	8.85
Colour Grade	-1.1	-2.6	-0.9	-0.9	-1.1	-1.2
Diastatic activity (mg/10g)	367	367	379	322	341	341
<b>Farinogram</b>						
Water absorption (%)	65.0	62.1	62.8	61.8	62.7	64.2
Development time (min)	4.4	5.7	3.7	4.3	4.2	5.2
Stability (min)	5.1	9.0	6.0	6.7	6.2	6.8
<b>Extensogram</b>						
Extensibility (cm) 45 min pull	21.0	22.5	19.6	18.0	18.5	17.8
Maximum height (BU) 45 min pull	380	390	340	355	320	320
Area (cm²) 45 min pull	115	129	98	87	86	80
Extensibility (cm) 135 min pull	17.5	19.2	19.0	17.4	17.6	17.0
Maximum height (BU) 135 min pull	410	550	390	430	370	390
Area (cm²) 135 min pull	91	126	101	94	86	84
<b>Alveograph</b>						
P (mm)	112	120	109	104	94	110
L (mm)	78	76	75	79	78	58
W (joules x 10 <sup>-4</sup> )	278	315	261	262	218	219
P/L	1.44	1.58	1.45	1.32	1.21	1.90
<b>Viscogram</b>						
Peak viscosity (BU)	790	490	360	360	420	480
<b>RVA</b>						
Peak viscosity (cP)	2962	2309	2152	2147	2314	2402
<b>Baking test (straight dough)</b>						
Volume (cm³)	980	920	780	820	725	705
Score (%)	86	88	81	74	74	72
<b>Baking test (rapid dough)</b>						
Volume (cm³)	765	695	755	790	750	795
Score (%)	77	73	77	78	78	82
<b>Baking test (Arabic bread)</b>						
Score (%)	82	85	86	83	84	83
<b>Yellow alkaline noodle test - colour</b>						
<b>Raw noodle sheet</b>						
Minolta L (T=30 min)	82.0	81.9	82.0	79.6	79.8	80.1
Minolta b (T=30 min)	28.2	25.2	26.7	29.6	29.5	30.2
Minolta L (T=24 hour)	74.5	73.9	75.2	71.9	71.8	72.2
Minolta b (T=24 hour)	32.0	26.7	27.7	31.	31.3	31.8
Colour stability	10.0	10.7	9.7	10.4	10.7	10.6
<b>Cooked noodle</b>						
Minolta L	74.3	75.2	74.2	72.4	73.3	73.6
Minolta b	33.8	30.4	33.7	32.9	32.0	32.7



## AUSTRALIAN PREMIUM WHITE (APW) CONTINUED

	SA			
Port	Port Adelaide	Port Giles	Port Lincoln	Wallaroo
<b>Wheat</b>				
Moisture (%)	10.5	11.7	10.9	10.8
Protein (Nx5.7, 11% mb)	10.9	11.0	11.2	11.2
Test weight (kg/hL)	83.4	82.1	82.9	83.2
Falling number (sec)	429	436	384	410
Screenings, 2mm (%)	1.2	1.5	1.9	1.4
Foreign material (%)	0.00	0.30	0.10	0.10
1000 kernel weight (g)	42.7	44.8	39.7	43.0
Ash (% 11% mb)	1.33	1.25	1.35	1.33
Grain hardness (PSI)	13	15	15	13
Flour extraction (%)	78.5	78.7	78.7	80.3
<b>Flour</b>				
Protein (Nx5.7, 14% mb)	9.9	10.0	10.3	10.2
Flour ash (%)	0.44	0.44	0.50	0.46
Flour ash (% db)	0.51	0.52	0.58	0.54
Starch damage (%)	11.9	11.4	11.4	12.0
Wet gluten (%)	27.4	28.6	28.0	28.5
Gluten index	90	85	91	91
Minolta Flour L - brightness	92.39	92.48	92.03	92.19
Minolta Flour b - yellowness	8.56	8.27	9.13	8.73
Colour Grade	-1.3	-1.4	-0.4	-0.5
Diastatic activity (mg/10g)	406	392	412	412
<b>Farinogram</b>				
Water absorption (%)	65.3	66.0	64.6	65.5
Development time (min)	3.7	4.4	3.8	4.2
Stability (min)	5.4	5.8	4.9	5.2
<b>Extensogram</b>				
Extensibility (cm) 45 min pull	18.5	19.0	19.2	21.1
Maximum height (BU) 45 min pull	280	260	220	240
Area (cm²) 45 min pull	80	81	77	95
Extensibility (cm) 135 min pull	17.0	17.0	17.9	18.5
Maximum height (BU) 135 min pull	355	240	250	275
Area (cm²) 135 min pull	79	62	71	79
<b>Alveograph</b>				
P (mm)	116	118	99	107
L (mm)	51	65	67	68
W (joules x 10 <sup>-4</sup> )	209	250	208	229
P/L	2.27	1.82	1.48	1.57
<b>Viscogram</b>				
Peak viscosity (BU)	460	520	330	350
<b>RVA</b>				
Peak viscosity (cP)	2308	2323	2108	1978
<b>Baking test (straight dough)</b>				
Volume (cm³)	720	750	790	740
Score (%)	74	77	76	75
<b>Baking test (rapid dough)</b>				
Volume (cm³)	725	720	750	760
Score (%)	77	74	77	76
<b>Baking test (Arabic bread)</b>				
Score (%)	83	84	83	86
<b>Yellow alkaline noodle test - colour</b>				
<b>Raw noodle sheet</b>				
Minolta L (T=30 min)	79.1	80.4	79.4	79.8
Minolta b (T=30 min)	29.6	29.5	30.2	29.6
Minolta L (T=24 hour)	72.1	73.1	70.4	71.6
Minolta b (T=24 hour)	30.6	31.2	31.6	30.6
Colour stability	10.9	9.7	12.0	11.2
<b>Cooked noodle</b>				
Minolta L	75.4	73.8	72.8	76.6
Minolta b	32.9	33.7	32.0	32.7



## AUSTRALIAN PREMIUM WHITE (APW) CONTINUED

	WA			
Port	Geraldton	Kwinana	Albany	Esperance
<b>Wheat</b>				
Moisture (%)	10.4	9.9	11.1	11.9
Protein (Nx5.7, 11% mb)	10.9	11.2	10.7	10.7
Test weight (kg/hL)	79.7	80.8	81.6	78.7
Falling number (sec)	492	482	440	442
Screenings, 2mm (%)	3.2	2.3	1.6	2.2
Foreign material (%)	0.00	0.00	0.00	0.00
1000 kernel weight (g)	36.9	36.1	39.0	38.7
Ash (% 11% mb)	1.30	1.25	1.25	1.27
Grain hardness (PSI)	15	13	13	15
Flour extraction (%)	78.6	77.2	77.5	78.0
<b>Flour</b>				
Protein (Nx5.7, 14% mb)	9.8	10.0	9.8	9.8
Flour ash (%)	0.49	0.49	0.45	0.44
Flour ash (% db)	0.57	0.56	0.52	0.51
Starch damage (%)	11.2	11.3	11.3	9.4
Wet gluten (%)	26.8	26.8	26.4	26.8
Gluten index	93	97	91	89
Minolta Flour L - brightness	92.40	92.41	92.50	92.41
Minolta Flour b - yellowness	9.06	9.31	8.61	8.19
Colour Grade	-1.3	-1.6	-0.8	-0.9
Diastatic activity (mg/10g)	328	341	379	308
<b>Farinogram</b>				
Water absorption (%)	62.5	63.4	63.8	61.4
Development time (min)	4.3	4.6	4.0	4.1
Stability (min)	5.4	5.3	5.0	5.4
<b>Extensogram</b>				
Extensibility (cm) 45 min pull	18.6	19.7	18.2	19.3
Maximum height (BU) 45 min pull	335	350	300	280
Area (cm²) 45 min pull	89	100	81	86
Extensibility (cm) 135 min pull	16.3	18.0	17.0	17.8
Maximum height (BU) 135 min pull	370	400	330	310
Area (cm²) 135 min pull	76	94	75	79
<b>Alveograph</b>				
P (mm)	109	110	116	91
L (mm)	64	78	61	52
W (joules x 10 <sup>-4</sup> )	234	264	241	157
P/L	1.70	1.41	1.90	1.75
<b>Viscogram</b>				
Peak viscosity (BU)	550	520	510	400
<b>RVA</b>				
Peak viscosity (cP)	2501	2536	2552	2435
<b>Baking test (straight dough)</b>				
Volume (cm³)	810	850	750	765
Score (%)	76	79	74	76
<b>Baking test (rapid dough)</b>				
Volume (cm³)	770	775	745	770
Score (%)	76	77	78	78
<b>Baking test (Arabic bread)</b>				
Score (%)	85	85	84	85
<b>Yellow alkaline noodle test - colour</b>				
<b>Raw noodle sheet</b>				
Minolta L (T=30 min)	80.0	80.1	80.0	79.5
Minolta b (T=30 min)	31.3	32.0	30.3	29.8
Minolta L (T=24 hour)	71.9	71.8	71.9	72.7
Minolta b (T=24 hour)	31.6	34.3	32.2	30.1
Colour stability	10.8	10.6	10.8	9.6
<b>Cooked noodle</b>				
Minolta L	73.9	70.4	71.8	71.6
Minolta b	34.8	33.9	32.7	31.2



## AUSTRALIAN STANDARD WHITE (ASW)

	VIC		SA	
Port	Geelong	Portland	Port Adelaide	Port Giles
<b>Wheat</b>				
Moisture (%)	10.3	10.3	10.5	11.9
Protein (Nx5.7, 11% mb)	9.8	9.6	9.4	10.1
Test weight (kg/hL)	83.3	82.0	83.5	82.4
Falling number (sec)	379	460	459	433
Screenings, 2mm (%)	1.2	0.9	1.4	1.5
Foreign material (%)	0.20	0.30	0.00	0.20
1000 kernel weight (g)	40.1	41.3	43.1	42.5
Ash (% 11% mb)	1.29	1.36	1.36	1.29
Grain hardness (PSI)	13	13	13	15
Flour extraction (%)	78.6	78.1	79.6	79.9
<b>Flour</b>				
Protein (Nx5.7, 14% mb)	8.8	8.6	8.5	9.0
Flour ash (%)	0.44	0.46	0.51	0.51
Flour ash (% db)	0.52	0.53	0.59	0.59
Starch damage (%)	10.2	11.2	13.0	12.3
Wet gluten (%)	22.8	21.8	22.0	24.4
Gluten index	94	98	96	90
Minolta Flour L - brightness	92.40	92.51	92.34	92.34
Minolta Flour b - yellowness	8.90	8.73	8.39	8.02
Colour Grade	-1.6	-1.6	-0.8	-0.9
Diastatic activity (mg/10g)	315	328	438	431
<b>Farinogram</b>				
Water absorption (%)	61.6	62.7	66.5	65.8
Development time (min)	2.0	1.9	2.0	3.4
Stability (min)	5.4	5.6	3.3	4.1
<b>Extensogram</b>				
Extensibility (cm) 45 min pull	16.9	18.2	15.6	17.8
Maximum height (BU) 45 min pull	320	330	260	230
Area (cm²) 45 min pull	73	85	53	67
Extensibility (cm) 135 min pull	14.4	16.2	13.0	14.6
Maximum height (BU) 135 min pull	400	420	200	170
Area (cm²) 135 min pull	65	82	23	32
<b>Alveograph</b>				
P (mm)	90	112	130	117
L (mm)	54	42	25	44
W (joules x 10 <sup>-4</sup> )	166	179	151	190
P/L	1.67	2.67	5.20	2.66
<b>Viscogram</b>				
Peak viscosity (BU)	470	460	460	490
<b>RVA</b>				
Peak viscosity (cP)	2382	2306	2330	2418
<b>Baking test (straight dough)</b>				
Volume (cm³)	610	590	600	670
Score (%)	64	58	60	71
<b>Yellow alkaline noodle test - colour colour</b>				
<b>Raw noodle sheet</b>				
Minolta L (T=30 min)	80.9	81.4	81.3	81.7
Minolta b (T=30 min)	29.5	28.8	29.1	27.2
Minolta L (T=24 hour)	73.9	73.2	72.4	74.1
Minolta b (T=24 hour)	30.5	30.5	30.0	28.33
Colour stability	9.4	10.5	11.2	9.8
<b>Cooked noodle</b>				
Minolta L	73.1	75.3	76.1	72.7
Minolta b	32.9	32.9	35.2	32.3



## AUSTRALIAN STANDARD WHITE (ASW) CONTINUED

	WA			
Port	Geraldton	Kwinana	Albany	Esperance
<b>Wheat</b>				
Moisture (%)	10.6	10.1	10.5	12.0
Protein (Nx5.7, 11% mb)	9.6	9.0	8.8	9.3
Test weight (kg/hL)	81.0	81.5	81.5	79.0
Falling number (sec)	462	402	419	438
Screenings, 2mm (%)	2.8	3.2	2.2	2.1
Foreign material (%)	0.00	0.00	0.00	0.00
1000 kernel weight (g)	38.8	35.1	38.0	41.0
Ash (% 11% mb)	1.26	1.19	1.23	1.25
Grain hardness (PSI)	13	13	13	15
Flour extraction (%)	77.5	76.9	70.6	77.6
<b>Flour</b>				
Protein (Nx5.7, 14% mb)	8.5	8.0	7.5	8.3
Flour ash (%)	0.49	0.49	0.39	0.45
Flour ash (% db)	0.57	0.57	0.46	0.52
Starch damage (%)	11.1	11.2	9.9	9.3
Wet gluten (%)	22.6	18.5	17.8	21.5
Gluten index	94	92	97	91
Minolta Flour L - brightness	92.68	92.66	93.28	92.63
Minolta Flour b - yellowness	9.18	9.84	7.86	8.23
Colour Grade	-1.7	-2.8	-3.0	-1.4
Diastatic activity (mg/10g)	379	341	295	295
<b>Farinogram</b>				
Water absorption (%)	61.2	60.2	58.1	59.2
Development time (min)	2.0	1.8	2.0	3.6
Stability (min)	6.2	4.6	4.4	5.4
<b>Extensogram</b>				
Extensibility (cm) 45 min pull	16.0	15.0	16.7	15.0
Maximum height (BU) 45 min pull	330	270	370	230
Area (cm²) 45 min pull	67	50	79	44
Extensibility (cm) 135 min pull	14.9	14.5	13.0	14.4
Maximum height (BU) 135 min pull	400	320	535	280
Area (cm²) 135 min pull	69	54	74	47
<b>Alveograph</b>				
P (mm)	112	101	122	84
L (mm)	47	39	34	46
W (joules x 10 <sup>-4</sup> )	192	153	178	131
P/L	2.38	2.59	3.59	1.83
<b>Viscogram</b>				
Peak viscosity (BU)	570	430	620	440
<b>RVA</b>				
Peak viscosity (cP)	2592	2436	2542	2606
<b>Baking test (straight dough)</b>				
Volume (cm³)	700	620	600	590
Score (%)	71	60	61	55
<b>Yellow alkaline noodle test - colour</b>				
<b>Raw noodle sheet</b>				
Minolta L (T=30 min)	81.7	81.5	83.2	81.0
Minolta b (T=30 min)	29.9	32.9	28.9	28.4
Minolta L (T=24 hour)	74.7	73.7	77.4	74.0
Minolta b (T=24 hour)	30.7	34.3	30.7	28.6
Colour stability	9.4	10.0	7.9	9.9
<b>Cooked noodle</b>				
Minolta L	72.7	73.9	73.5	73.9
Minolta b	35.1	36.9	32.7	32.9



## RAMEN NOODLE WHEAT

	QLD	NSW	
Port	Brisbane	Newcastle	Port Kembla
<b>Wheat</b>			
Moisture (%)	10.4	10.7	9.7
Protein (Nx5.7, 11% mb)	13.6	13.4	13.8
Test weight (kg/hL)	82.4	82.6	80.0
Falling number (sec)	431	388	466
Screenings, 2mm (%)	1.7	1.5	2.5
Foreign material (%)	0.1	0.0	0.4
1000 kernel weight (g)	36.3	37.6	34.8
Ash (% , 11% mb)	1.30	1.39	1.36
Grain hardness (PSI)	13	14	13
Flour extraction (%)	60	60	60
<b>Flour</b>			
Protein (Nx5.7, 14% mb)	12.6	12.2	12.8
Flour ash (%)	0.36	0.39	0.35
Flour ash (% db)	0.41	0.45	0.41
Starch damage (%)	8.5	9.5	8.3
Wet gluten (%)	34.7	34.0	35.8
Gluten index	93	91	95
Minolta Flour L - brightness	92.65	92.65	92.31
Minolta Flour b - yellowness	8.96	8.68	9.11
Colour Grade	-2.2	-1.8	-1.2
Diastatic activity (mg/10g)	276	315	244
<b>Farinogram</b>			
Water absorption (%)	62.1	63.3	62.4
Development time (min)	8.6	5.8	10.1
Stability (min)	16.0	9.0	16.2
<b>Extensogram</b>			
Extensibility (cm) 45 min pull	26.0	22.5	25.0
Maximum height (BU) 45 min pull	470	420	450
Area (cm²) 45 min pull	169	133	158
Extensibility (cm) 135 min pull	22.0	20.6	21.7
Maximum height (BU) 135 min pull	660	490	610
Area (cm²) 135 min pull	166	129	156
<b>Viscogram</b>			
Peak viscosity (BU)	490	350	340
Gelatinisation time (min)	23	24	33
Gelatinisation temp (°C)	64.5	66.0	79.5
Breakdown (BU)	70	80	50
<b>Yellow alkaline noodle test - colour</b>			
<b>Raw noodle sheet</b>			
Minolta L (T=30 min)	81.5	81.2	79.8
Minolta b (T=30 min)	27.2	26.7	28.8
Minolta L (T=24 hour)	74.8	75.6	74.1
Minolta b (T=24 hour)	30.3	30.4	31.4
Colour stability	9.0	8.5	8.5
<b>Cooked noodle</b>			
Minolta L	79.4	77.3	73.9
Minolta b	28.9	30.3	29.8



# AUSTRALIAN DURUM

An amber coloured, high protein, very hard grained, high vitreous durum.

Grown mainly in northern NSW with some grown in southern Queensland.

Free milling, producing semolina with an excellent colour.

Suitable for a range of wet and dry pasta, couscous and other similar products.

## AUSTRALIAN DURUM (ADR)

	NSW Newcastle
Port	
<b>Wheat</b>	
Test weight (kg/hL)	81.8
1000 kernel weight (g)	41.8
Grain hardness (PSI)	5
Protein (Nx5.7, 11% mb)	14.9
Moisture (%)	9.9
Ash (% , 11% mb)	1.54
Falling number (sec)	529
Screenings, 2mm (%)	1.6
Foreign material (%)	0.2
Vitreous kernels (%)	94
Semolina extraction (%)	61.1
<b>Semolina</b>	
Protein (Nx5.7, 14% mb)	14.2
Wet gluten (%)	37.5
Gluten index	89
Semolina ash (%)	1.01
Semolina ash (% db)	1.19
Yellow pigment (µg/g)	14.1
Minolta L - brightness (sieved)	86.83
Minolta b - yellowness (sieved)	26.31
Minolta L - brightness	84.06
Minolta b - yellowness	30.82
<b>Alveograph</b>	
P (mm)	101
L (mm)	60
W (joules x 10 <sup>-4</sup> )	192
P/L	2



# WHEAT TEST METHODS

All grain and oilseed quality data in this Crop Report has been reported from the analysis of composite samples taken directly from farmer harvest receivals and should therefore be used as a guide only.

Results should not be taken as minimum shipping standards as they are based on composite samples within a grade and port zone and are subject to sampling and testing errors. Certain quality results may alter on outturn due to environmental and biochemical factors such as natural grain maturing, site selections and through normal storage and handling practices.

The **Alveograph** test is conducted according to AACC method 54-30A. It provides information relating to the rheological properties of dough. Unlike the Farinograph and Extensograph, a constant amount of water is added to form a dough in the Alveograph mixer. The Alveograph curve provides a record over time of the pressure inside a bubble formed by inflating a dough test piece to the point of rupture.

The Alveograph test results are detailed below:

- › **Deformation energy** (W) is the area under the Alveograph curve and represents the energy necessary to inflate the dough bubble to the point of rupture. Deformation energy is expressed in joules  $\times 10^{-4}$  and provides a measure of dough strength. It is also referred to as the 'baking strength value'.
- › **Length** (L) is determined in millimetres from the origin to the point of rupture of the dough bubble. This provides a measure of the extensibility of the dough.
- › **Overpressure** (P) is a measure of the maximum pressure required to deform the test piece in the process of inflating the

dough bubble. It is obtained by multiplying the maximum height of the alveogram by a factor of 1.1. This provides a measure of dough stability.

- › **Configuration ratio** (P/L) is the ratio of the curve height to length and indicates the balance between dough strength and extensibility.

**Ash content** of wheat and flour is the mineral residue remaining after incineration of the sample according to AACC method 08-01.01. It is expressed on an 11% moisture basis for wheat and a 14% moisture basis for flour. Flour ash is related to the milling performance and is used as a measure of flour purity as it indicates the level of non-endosperm material present in the flour.

The **Baking test** is reported by four methods, chosen according to the wheat class and protein content. Loaf volume and total score are reported for the pan breads. Results are expressed as a percentage of the total bread score.

The straight dough baking test is conducted according to AGSA method 07-02, and with a bromate-free formulation. Test loaves are scored for volume (maximum 36 points), external appearance (maximum 20 points), crumb structure (maximum 20 points), softness and resilience (maximum 10 points) and crumb colour (maximum 14 points).

The sponge and dough baking test is conducted according to AACC method 10-11.01 with modifications. Test loaves are scored for volume (maximum 30 points), external appearance (maximum 10 points), oven spring (maximum 10 points), crumb texture (maximum 20 points), crumb structure (maximum 20 points) and crumb colour (maximum 10 points).





**Perten Dough Lab conducting a farinogram.**

The rapid dough baking test is conducted according to AGSA method 07-03. Test loaves are scored for volume (maximum 30 points), external appearance (maximum 15 points), oven spring (maximum 15 points), cell structure and distribution (maximum 20 points), softness and resilience (maximum 10 points) and crumb colour (maximum 10 points).

The Arabic bread baking test reports total score as a percentage. This test is conducted using an 'in-house' developed method which is in accordance with the commercial bread making practice within the Middle East. Baking absorption is taken as Farinograph - 5% and a specially designed flat bread oven is used to conduct this test. Test loaves are scored for shape (maximum 15 points), crust colour (maximum 5 points), smoothness/cracks (maximum 15 points), roll/fold (maximum 15 points), layer separation (maximum 10 points), crumb colour/texture (maximum 10 points), tearing/

chewing (maximum 15 points) and taste (maximum 15 points).

**Diastatic activity** provides a measure of starch degradation by the naturally occurring amylase enzymes. It is determined according to AACC method 22-15.01 and is expressed in milligrams of maltose produced per 10 grams of flour per hour. Diastatic activity is related to starch damage and enzyme concentration and varies with grain hardness in sound wheat.

The **Extensogram** is a force-time curve, recorded by an Extensograph instrument as a dough test piece is subjected to controlled stretching to breaking point. The test is carried out according to AACC method 54-10.01 and AGSA method 06-01, with the Extensograph adjusted to record 80 BU for every 100 gram load. Dough test pieces are prepared in the Farinograph by adding the required volume of distilled water, a known amount of salt to pre-weighed flour (corrected to a 14% moisture basis), and mixing for a fixed time to a dough consistency of 500 BU. The dough is scaled, moulded and proofed for 45 minutes prior to the first stretching operation. The rounding, moulding and incubation steps are repeated between subsequent stretching operations. Results are reported at 45 and 135 minutes.

Measurements taken from the Extensogram curve are the extensibility (cm), the maximum height or 'resistance to extension' (BU) and the area beneath the curve or energy value (cm<sup>2</sup>).

**Extensograph** results are particularly useful for evaluating dough strength and observing changes in dough properties over an extended timeframe and for characterising the dough strength and extensibility of different flour types.

**Falling number** is measured on a sample of wheat which has been ground using a Falling Number 3100 mill. The test is conducted according to ICC method 107/1, but without moisture adjustment. The falling number provides a measure of alpha amylase enzyme activity in the grain. A high falling number indicates low enzyme activity, while a low falling number indicates high enzyme activity, which commonly occurs due to weather damage.

The **Farinograph** is a recording dough mixer that measures the water absorption and resistance to mixing of a dough mixed under standard conditions. Dough mixing parameters determined



from the Farinogram or mixing curve are useful in characterising different flour types and provide a guide to dough strength. They may also be used to predict certain processing requirements of a flour. The farinograph test is conducted according to AACC method 54-21.02 and AGSA method 06-02, using the 'constant flour weight' procedure, in which the flour weight is adjusted on a 14% moisture basis.

The Farinograph test results reported are:

- ▶ Water absorption, which is the amount of water required to be added to the flour to produce a dough consistency of 500 BU at peak dough development. Water absorption is expressed as a percentage of the flour weight on 14% moisture basis.
- ▶ Development time is the time in minutes required for the dough to reach maximum consistency centred on the 500 BU line. The development time is an indication of dough strength.
- ▶ Stability is the time in minutes during which the farinogram shades the 500 BU line. The stability provides a measure of the mixing tolerance of the dough and is also related to the dough strength.

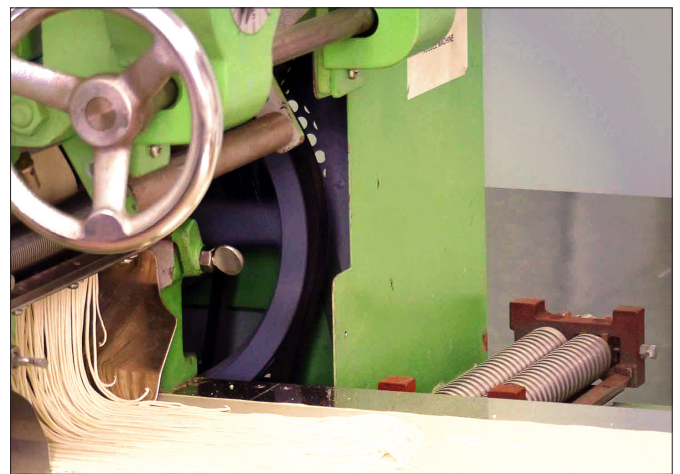
**Foreign material** is defined as all matter other than wheat grains which may be physically separated from the sample. The foreign material is expressed as a percentage by weight of the total sample.

**Grain hardness** is determined by measuring wheatmeal granularity, expressed as the Particle Size Index (PSI). In this test, wheat is ground in a Falling Number 3303 Mill set at its finest setting. Using a planetary action sifter, 10 grams of ground wheat is sieved over a number 15 nylon screen for two minutes. The material passing through the screen is measured, and then expressed as a PSI value.

**Milling Test.** Wheat is conditioned for 24 hours prior to milling, following the addition of a calculated amount of water, as determined by the natural grain moisture. Test milling is carried out on a Buhler MLU-202 Laboratory Mill, using appropriate roller mill settings and sieve covers. The flour obtained by combining all flour streams is reported as straight run flour extraction. For noodle quality assessment, a 60% extraction flour is produced by excluding a calculated quantity of reduction flour from the final product. Flour extractions are expressed on a total milled

products basis.

**Minolta colour** values are measured using a Minolta CR300 Series Chroma Meter calibrated according to the manufacturer's instructions. The Minolta L-value indicates whiteness and brightness on a scale of 0 to 100 the whitest flours having the highest L-values. Minolta b-values indicate yellow hue on a scale of 0 to 60 with yellower flour having higher b-values.



**Noodles being cut from the noodle sheet.**

**Noodle sheet** colour is determined using a Minolta CR300 Series Chroma Meter fitted with a 50 mm diameter measuring aperture. Noodle sheets are prepared and measured according to AGSA method 07-06. Measurements are reported at 30 minutes and at 24 hours after sheeting the dough. The colour of cooked noodles is also measured. Colour stability is the difference in brightness of the noodle sheet readings taken at 0 and 24 hours.

**Protein** is measured using NIT for whole grain and NIR and Dumas method for flour. Protein content is an important consideration when assessing the suitability of wheat for different end products. It is expressed on an 11% moisture basis for wheat and a 14% moisture basis for flour. A nitrogen conversion factor of  $N \times 5.7$  is used for wheat and flour.

The **Rapid Visco Analyser (RVA)** is a rotational viscometer that is able to measure the viscosity of a sample under programmed temperature conditions. Peak viscosity of a flour/water slurry is determined using AACC method 76-21.02 and the STD1 profile.

**Screenings** is the total material passing through a 2 mm slotted screen using 40 shakes of the sieve





**Prepared dough ball ready for extensograph testing.**

and is expressed as a percentage by weight of the total sample.

**Starch damage** is measured according to AACC method 76-31.01, and results converted to be compatible with method 76-30.02. It is an indication of the mechanical damage to starch during the milling process. Damaged starch is more susceptible to enzyme attack and absorbs more water than undamaged starch.

**Test weight** is obtained by weighing a fixed volume of grain using a chondrometer and is expressed in units of kilograms/hectolitre (kg/hL). Test weight provides a measure of the bulk density of the grain. It is also useful as a guide to grain soundness and potential milling yield.

**Thousand kernel weight** is the weight in grams of 1,000 kernels of wheat and provides a measure of grain size and density. The thousand kernel weight is independent of some factors that influence the measurement of bulk density; therefore, it is sometimes preferred to test weight as a measure of grain quality.

The **Viscogram** is a recording of the variation in paste viscosity of a flour and water mixture over a fixed time/temperature profile. In this test, the measured amount of flour (adjusted to 14% moisture basis) is combined with distilled water. The Viscograph is fitted with a pin sensor and a 250cmg sensitivity cartridge. The viscosity is recorded in Brabender units, as the temperature is raised from 30 to 92°C at a rate of 1.5°C per minute. The test is conducted according to AGSA method 06-03. The peak flour paste viscosity is reported.

For ramen noodle flours, the Japanese procedure is followed, using 65 grams flour (13.5% moisture basis) and 450mL distilled water. In addition to peak viscosity, starch gelatinisation temperature, time to starch gelatinisation, and the starch gel breakdown from peak viscosity are reported.

**Wet gluten** is determined using a Glutomatic Gluten Washing Unit model GM2200. The test is conducted according to AACC method 38-12.02 and ICC method 137/1, with wet gluten being expressed as a percentage of the sample weight. Gluten forming proteins are primarily responsible for the functional properties of wheat flour and the wet gluten test provides a quantitative measure of these proteins. The gluten index is an indication of gluten quality.

#### Methods Cited

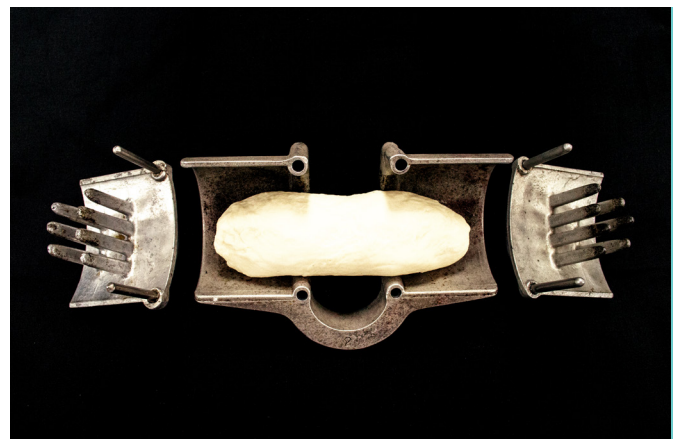
AACC (2000), Method 54-30A. Approved methods of the American Association of Cereal Chemists, 10th edn, St Paul, MN, USA, AACC International.

AACC International. Approved methods of Analysis, 11th edn., St Paul, MN, USA. doi:10.1094/AACCIntMethod.

AGSA (formerly RACI), 2003. Official Testing Methods of the Australasian Grain Science Association, 4th edition. Australasian Grain Science Association, Narrabri, NSW, Australia.

AGSA (formerly RACI), 2010. Supplement 4th edition Official Testing Methods of the Australasian Grain Science Association. Australasian Grain Science Association, Narrabri, NSW, Australia.

ICC (2003), Standard Methods of the International Association for Cereal Science and Technology (ICC), Vienna, Austria.



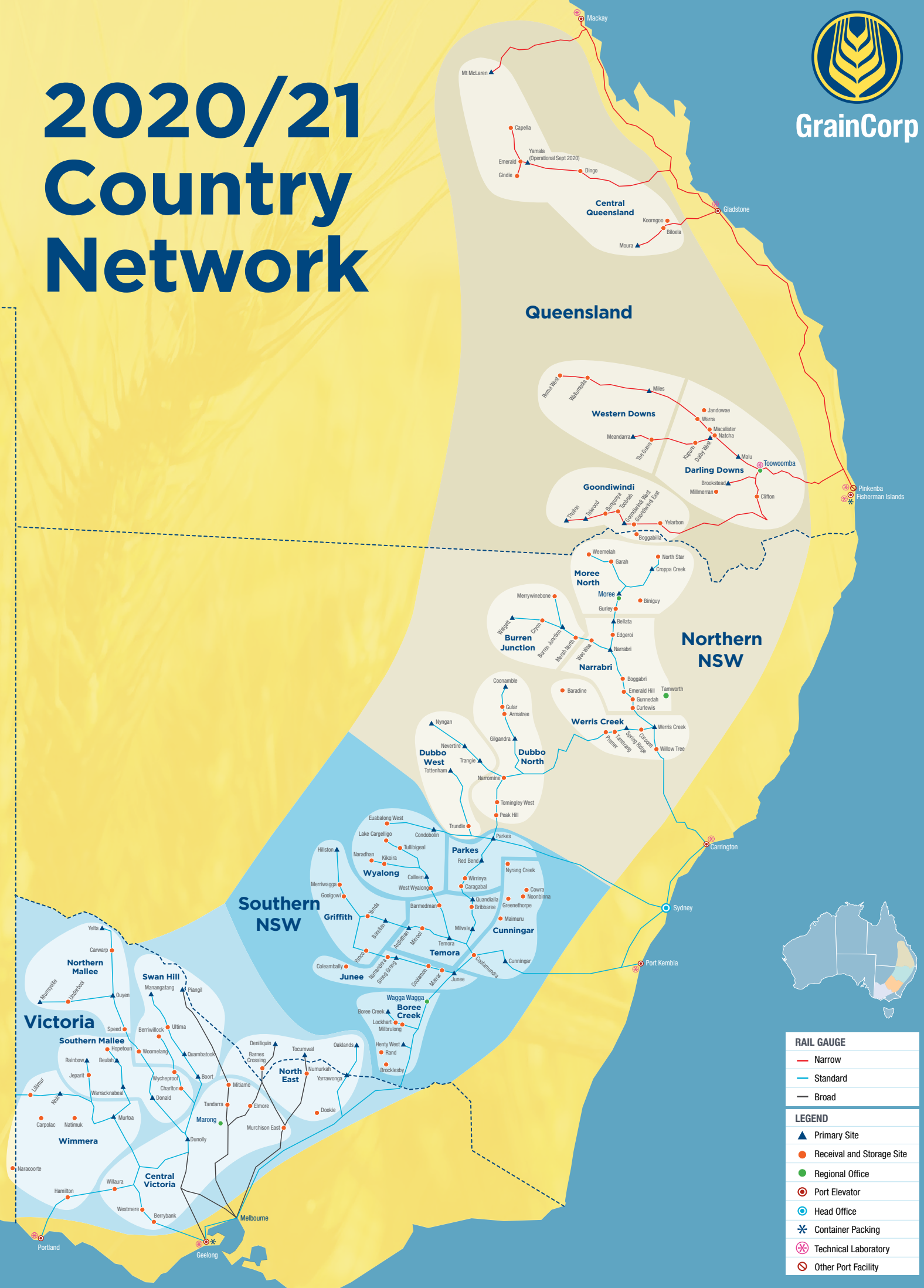
**Dough piece in an extensograph cradle.**



# 2020/21 Country Network



GrainCorp



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