



GrainCorp Australian Crop Report

2021-2022



GrainCorp

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Photo Credit:
 Fiorella Bello Bermudez
 COONAMBLE

FOREWORD

Dear Valued Customer,

Growing conditions across Australia's east coast during 2021 practically mirrored those of 2020's exceptional season.

Large yields from crops were eagerly anticipated throughout all areas, due to consistent rains during the growing season.

But the rainfall that enabled large crops to develop continued into the November harvest across many areas in Central and Southern Queensland and across New South Wales, resulting in higher proportions of feed wheat and feed barley.

Victoria wasn't as affected by those late and prolonged rain events, resulting in high yielding wheat and barley crops.

Such growing-season rainfall produced record-setting grain volumes across east coast Australia, from central Queensland through to southern Victoria.

Proteins were lower than the record highs of the previous season but there remained adequate supplies of prime hard wheat, although in much larger proportions were APW and ASW.

Feed wheat was in abundance across NSW, a rare occurrence because Australia's east coast grain regions don't often produce such large proportions of feed wheat.

Our sample stand receival staff conducted more than 137,000 Falling Number Sample Tests on individual grower loads, to ensure correct crop classification and segregation.

There now exists very high export demand of both milling and feed grain, as well as malting barley, feed barley and canola.

This increased demand is a result of many global factors including, but not limited to, low grain supply from North America due to their 2021 drought, flooding rains across large parts of European growing regions in 2021, and world markets replenishing low stocks during the COVID-19 crisis as vaccines helped countries open up.

China emerged as a large buyer of wheat and barley from around the world, drawing stocks away from other countries and leaving a void in these markets, creating new market opportunities, particularly in malting barley.

The war in Ukraine is impacting availability and supply chains for grains and oilseeds, increasing uncertainty and volatility in global markets.

As the world strives for cleaner fuel on commitments to scaling back the use of fossil fuels, demand for Australian and Canadian canola has continued to grow.

While 2020 and early-2021 brought mice in historically high numbers, heavy rain during the 2021 growing and ripening period played a big part in helping control numbers.

As we emerge from COVID, I wish to mention the incredible work our teams across our network have undertaken to receive another record harvest in very difficult circumstances.

Teams across our receival sites and ports embraced the challenges that our Australian environment brings, remaining committed to delivering grain to our domestic and global customers in a safe way.

As we enter an era of significant investment in which GrainCorp undertakes new, exciting projects to complement our core strength in grain, we thank all our customers for your continued support and look forward to an exciting 2022 season.

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 2021/22 WHEAT GROWING SEASON

GRAIN QUALITY

The protein content in our wheat crop was at average to above average levels after the very high proteins of the previous season (coming out of two prior droughts in the two years prior). Consequently, our stacks were filled with good quantities, and a balanced quantity of Australian Prime Hard wheat (APH), hard wheat (AH) and the medium protein APW and lower protein ASW grades in their respective areas. A good supply of Prime Hard wheat (APH) demand from overseas buyers was high. This demand was also aided by good carryover quantities of wheat from the 20/21 crop, particularly in northern New South Wales. However, significant and prolonged untimely rainfall did see a wide proportion of the wheat crop in Queensland and New South Wales being downgraded to feed wheat. This included the durum crop in northern New South Wales that negatively impacted potential durum exports. All in all, our company conducted more than 137,000 sample stand falling number tests; (56,000 in our northern area and 81,000 in our southern areas, though the majority of these tests focussed on New South Wales, and also Queensland where untimely rainfall was most prominent). This ensured correct classification and segregations preserving the qualities of crops that were not negatively impacted from harvest rainfall.

Milling and Baking tests we conducted, and the resultant report here, shows average to good test data for dough rheology and flour strength in our segregated grades. Our wheat is generally of low moisture content, ideal for millers, of around 10.5% +/-1, however it was noted that average moistures of the 21/22 crop were around 1% above normal levels. Milling extractions were average to good levels and our flour tests recorded low ash. With our good to above average 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. This is expected to continue given the events in Ukraine. Initial feedback on the qualities of shipments to date from buyers has been positive, showing our harvest classification and segregations worked extremely well given the high harvest rainfall. One note of all the rain was a marked reduction in mice numbers post-harvest. Our early milling tests, which is the basis of our Crop Report, showed good dough rheology with water absorptions and extensibilities being regarded as good to average, noting that our milling being is conducted generally 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)

Port	QLD			NSW
	Mackay	Gladstone	Brisbane	Newcastle
Wheat				
Moisture (%)	10.4	10.9	10.2	10.7
Protein (Nx5.7, 11% mb)	13.6	13.6	13.8	13.5
Test weight (kg/hL)	84.1	83.2	82.9	82.0
Falling number (sec)	375	433	419	394
Screenings, 2mm (%)	1.2	1.9	1.4	1.2
Foreign material (%)	0.1	0.0	0.0	0.0
1000 kernel weight (g)	40.2	38.6	37.4	38.9
Ash (% , 11% mb)	1.36	1.45	1.32	1.38
Grain hardness (PSI)	13	13	14	14
Flour extraction (%)	79.0	78.6	76.7	79.2
Flour				
Protein (Nx5.7, 14% mb)	12.4	12.2	12.7	12.4
Flour ash (%)	0.40	0.44	0.41	0.45
Flour ash (% db)	0.46	0.52	0.48	0.52
Starch damage (%)	10.5	9.8	10.1	9.7
Wet gluten (%)	36.7	34.9	37.6	34.9
Gluten index	93	93	93	92
Minolta Flour L - brightness	92.71	92.23	92.70	92.34
Minolta Flour b - yellowness	9.76	10.56	9.55	9.04
Colour Grade	-0.8	-0.7	-1.4	-0.5
Diastatic activity (mg/10g)	425	360	367	328
Farinogram				
Water absorption (%)	65.6	64.5	65.9	65.3
Development time (min)	5.4	6.7	6.2	5.4
Stability (min)	6.6	10.1	8.5	6.6
Extensogram				
Extensibility (cm) 45 min pull	24.0	23.8	24.6	22.7
Maximum height (BU) 45 min pull	330	390	440	350
Area (cm ²) 45 min pull	132	139	153	124
Extensibility (cm) 135 min pull	23.0	21.5	18.8	20.0
Maximum height (BU) 135 min pull	430	490	540	420
Area (cm ²) 135 min pull	139	136	122	113
Alveograph				
P (mm)	109	101	108	104
L (mm)	114	119	129	108
W (joules x 10 ⁻⁴)	380	368	424	352
P/L	0.96	0.85	0.84	0.96
Viscogram				
Peak viscosity (BU)	530	570	480	280
RVA				
Peak viscosity (cP)	2349	2371	2326	1668
Baking test (straight dough)				
Volume (cm ³)	925	950	900	910
Score (%)	86	87	84	84
Baking test (sponge and dough)				
Volume (cm ³)	745	740	695	680
Score (%)	78	78	79	76
Yellow alkaline noodle test - colour				
Raw noodle sheet				
Minolta L (T=30 min)	80.0	76.7	79.7	77.4
Minolta b (T=30 min)	28.6	29.8	28.9	29.8
Minolta L (T=24 hour)	72.6	72.6	72.7	70.4
Minolta b (T=24 hour)	31.8	33.5	31.1	29.5
Colour stability	9.4	10.0	9.9	9.5
Cooked noodle				
Minolta L	74.3	72.8	75.6	72.5
Minolta b	30.3	31.7	31.2	29.2

AUSTRALIAN HARD (AH)

	QLD			NSW		VIC			
Port	Mackay	Gladstone	Brisbane	Newcastle	Port Kembla	Geelong	Geelong	Portland	Portland
Minimum Protein (%)	11.5	11.5	11.5	11.5	11.5	11.5	13.0	11.5	13.0
Wheat									
Moisture (%)	10.3	10.5	10.3	11.1	11.3	11.3	10.6	11.3	10.1
Protein (Nx5.7, 11% mb)	12.2	12.4	12.2	12.1	11.9	11.9	13.7	12.2	13.6
Test weight (kg/hL)	84.4	84.1	83.2	81.1	81.3	81.8	82.9	83.1	82.5
Falling number (sec)	388	403	393	347	368	365	375	373	425
Screenings, 2mm (%)	1.4	2.3	1.3	2.3	1.5	1.1	1.1	0.8	0.9
Foreign material (%)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.10	0.0
1000 kernel weight (g)	39.6	39.2	40.0	39.7	42.2	46.5	44.8	47.7	45.1
Ash (% , 11% mb)	1.34	1.35	1.30	1.35	1.50	1.24	1.26	1.32	1.38
Grain hardness (PSI)	12	14	12	12	15	15	17	15	13
Flour extraction (%)	79.5	79.3	78.0	79.0	77.0	77.9	77.5	78.2	77.3
Flour									
Protein (Nx5.7, 14% mb)	11.3	11.3	11.0	10.9	10.9	10.9	12.4	11.0	12.5
Flour ash (%)	0.42	0.45	0.44	0.45	0.48	0.39	0.42	0.45	0.44
Flour ash (% db)	0.48	0.52	0.51	0.52	0.56	0.46	0.49	0.53	0.52
Starch damage (%)	10.7	10.6	10.5	9.9	9.8	9.4	9.8	10.8	9.7
Wet gluten (%)	33.1	33.3	32.8	31.5	30.7	31.3	37.6	32.3	37.4
Gluten index	89	94	93	95	89	86	84	82	76
Minolta Flour L - brightness	92.98	92.70	92.73	92.51	92.51	92.61	92.45	92.47	92.28
Minolta Flour b - yellowness	9.79	9.82	9.60	9.23	8.99	8.59	8.80	8.67	8.38
Colour Grade	-1.3	-1.2	-1.2	-0.7	-0.5	-1.1	-0.3	-0.7	-0.7
Diastatic activity (mg/10g)	385	398	385	308	347	288	308	347	308
Farinogram									
Water absorption (%)	64.6	64.2	65.5	64.2	64.8	63.5	66.4	66.8	67.0
Development time (min)	4.9	4.9	5.4	4.6	4.6	5.4	5.4	4.4	5.6
Stability (min)	5.4	6.1	7.7	6.4	6.0	6.6	4.8	5.4	5.5
Extensogram									
Extensibility (cm) 45 min pull	21.6	21.0	21.5	21.0	21.0	20.8	22.0	20.2	24.0
Maximum height (BU) 45 min pull	360	390	420	335	350	370	390	320	310
Area (cm ²) 45 min pull	117	117	125	108	111	112	125	100	129
Extensibility (cm) 135 min pull	21.2	19.4	19.8	18.8	19.0	18.6	21.0	18.6	22.5
Maximum height (BU) 135 min pull	410	435	580	380	420	500	470	390	390
Area (cm ²) 135 min pull	121	111	136	97	105	114	129	97	129
Alveograph									
P (mm)	97	95	118	104	106	100	102	114	106
L (mm)	121	116	89	95	100	91	116	83	105
W (joules x 10 ⁻⁴)	339	319	337	308	320	278	343	290	327
P/L	0.80	0.82	1.33	1.09	1.06	1.10	0.88	1.37	1.01
Viscogram									
Peak viscosity (BU)	610	580	450	270	260	360	380	340	360
RVA									
Peak viscosity (cP)	2661	2442	2272	1685	1736	2238	2159	2134	2100
Baking test (straight dough)									
Volume (cm ³)	1010	1000	990	920	995	930	1010	910	950
Score (%)	89	88	88	85	85	85	88	85	87
Baking test (rapid dough)									
Volume (cm ³)	780	795	785	840	690	740	-	805	-
Score (%)	79	82	78	78	73	73	-	74	-
Baking test (Arabic bread)									
Score (%)	81	81	81	82	81	82	-	85	-
Yellow alkaline noodle test - colour									
Raw noodle sheet									
Minolta L (T=30 min)	80.8	80.5	80.6	79.8	79.4	81.2	79.8	80.7	78.5
Minolta b (T=30 min)	29.1	29.2	28.6	28.2	27.4	25.1	26.1	26.2	26.6
Minolta L (T=24 hour)	73.2	72.8	73.0	73.2	72.3	72.9	70.9	72.3	69.5
Minolta b (T=24 hour)	32.1	31.1	31.2	31.9	29.7	27.9	29.7	29.3	28.8
Colour stability	10.1	10.6	10.6	9.5	10.2	11.3	12.0	11.4	12.1
Cooked noodle									
Minolta L	74.0	72.3	74.4	71.8	74.0	74.1	73.4	73.6	73.2
Minolta b	32.0	31.7	32.3	31.7	32.2	29.6	29.6	31.0	28.4

AUSTRALIAN HARD (AH) CONTINUED

Port	SA				
	Port Adelaide	Port Giles	Port Lincoln	Thevenard	Walleroo
Minimum Protein (%)	11.5	11.5	11.5	11.5	11.5
Wheat					
Moisture (%)	10.8	11.7	11.6	11.6	11.1
Protein (Nx5.7, 11% mb)	11.9	12.2	11.7	12.0	12.0
Test weight (kg/hL)	82.3	82.0	81.0	80.2	81.6
Falling number (sec)	453	465	401	351	453
Screenings, 2mm (%)	1.5	1.9	1.3	1.3	1.2
Foreign material (%)	0.1	0.3	0.2	0.2	0.2
1000 kernel weight (g)	41.4	42.6	43.4	40.1	42.5
Ash (% , 11% mb)	1.24	1.26	1.21	1.03	1.22
Grain hardness (PSI)	15	13	15	15	13
Flour extraction (%)	78.0	78.2	78.2	78.4	77.9
Flour					
Protein (Nx5.7, 14% mb)	10.7	10.8	10.5	10.6	10.8
Flour ash (%)	0.44	0.41	0.42	0.41	0.42
Flour ash (% db)	0.51	0.48	0.49	0.48	0.49
Starch damage (%)	10.7	9.9	9.3	9.7	9.9
Wet gluten (%)	30.2	32.0	30.0	31.2	31.1
Gluten index	88	83	90	91	91
Minolta Flour L - brightness	92.85	92.78	92.83	92.90	92.93
Minolta Flour b - yellowness	8.94	9.30	9.50	9.34	8.75
Colour Grade	-1.4	-1.0	-1.7	-1.5	-1.6
Diastatic activity (mg/10g)	353	308	295	302	328
Farinogram					
Water absorption (%)	65.1	64.1	62.6	63.1	64.3
Development time (min)	5.7	4.8	4.9	5.1	5.9
Stability (min)	6.6	5.8	5.4	5.8	7.6
Extensogram					
Extensibility (cm) 45 min pull	21.2	22.2	22.7	21.8	22.5
Maximum height (BU) 45 min pull	340	270	330	350	390
Area (cm ²) 45 min pull	111	108	121	117	129
Extensibility (cm) 135 min pull	18.9	19.0	20.6	18.4	18.0
Maximum height (BU) 135 min pull	430	320	360	425	490
Area (cm ²) 135 min pull	106	90	109	101	108
Alveograph					
P (mm)	107	93	86	98	105
L (mm)	95	93	111	102	92
W (joules x 10 ⁻⁴)	310	240	252	283	290
P/L	1.13	1.00	0.77	0.96	1.14
Viscogram					
Peak viscosity (BU)	410	430	340	370	420
RVA					
Peak viscosity (cP)	2316	2395	2185	2347	2519
Baking test (straight dough)					
Volume (cm ³)	970	985	930	985	950
Score (%)	87	87	85	87	86
Baking test (rapid dough)					
Volume (cm ³)	755	790	740	740	795
Score (%)	76	77	74	75	76
Baking test (Arabic bread)					
Score (%)	84	82	83	84	82
Yellow alkaline noodle test - colour					
Raw noodle sheet					
Minolta L (T=30 min)	81.4	80.9	80.6	81.9	81.2
Minolta b (T=30 min)	26.6	28.0	28.3	26.8	27.0
Minolta L (T=24 hour)	73.3	73.7	73.3	73.2	73.6
Minolta b (T=24 hour)	28.7	30.6	30.1	30.5	29.8
Colour stability	11.2	10.1	10.4	11.4	10.2
Cooked noodle					
Minolta L	76.8	75.2	73.1	74.1	73.2
Minolta b	37.8	31.7	31.9	31.8	30.3

AUSTRALIAN HARD (AH) CONTINUED

Port	WA						
	Esperance	Esperance	Albany	Kwinana	Kwinana	Geraldton	Geraldton
Minimum Protein (%)	11.5	13.0	11.5	11.5	13.0	11.5	13.0
Wheat							
Moisture (%)	11.5	11.4	10.8	9.3	8.6	10.7	11.2
Protein (Nx5.7, 11% mb)	12.0	13.2	11.8	11.9	13.6	11.7	13.8
Test weight (kg/hL)	82.1	82.1	81.4	81.6	81.7	78.8	78.0
Falling number (sec)	401	465	416	478	533	405	409
Screenings, 2mm (%)	1.0	0.9	0.9	2.6	1.8	2.9	3.4
Foreign material (%)	0.2	0.3	0.3	0.2	0.2	0.3	0.3
1000 kernel weight (g)	47.0	43.8	46.1	38.3	40.6	39.1	36.6
Ash (% , 11% mb)	1.28	1.27	1.31	1.33	1.42	1.31	1.49
Grain hardness (PSI)	14	15	13	11	14	13	14
Flour extraction (%)	78.2	77.6	77.0	76.5	75.5	76.3	74.2
Flour							
Protein (Nx5.7, 14% mb)	10.8	12.0	10.6	10.8	12.4	10.6	12.5
Flour ash (%)	0.44	0.43	0.46	0.46	0.45	0.47	0.48
Flour ash (% db)	0.52	0.50	0.54	0.53	0.52	0.55	0.56
Starch damage (%)	10.8	10.3	12.9	11.2	10.2	10.2	8.4
Wet gluten (%)	31.3	36.0	30.8	30.9	36.4	30.2	37.4
Gluten index	84	85	81	92	81	87	82
Minolta Flour L - brightness	92.45	92.34	92.21	92.76	82.59	92.69	92.86
Minolta Flour b - yellowness	8.33	8.59	8.66	9.28	8.96	9.16	9.26
Colour Grade	-0.8	-0.7	0.2	-0.8	-0.7	-0.5	0.0
Diastatic activity (mg/10g)	353	334	406	373	328	322	257
Farinogram							
Water absorption (%)	66.2	67.2	69.2	65.4	66.9	63.7	63.1
Development time (min)	4.4	5.2	4.2	4.8	5.9	4.4	6.2
Stability (min)	4.2	5.0	4.5	6.8	5.9	5.4	7.3
Extensogram							
Extensibility (cm) 45 min pull	19.5	23.3	20.0	20.0	22.0	21.1	24.0
Maximum height (BU) 45 min pull	290	310	280	360	350	320	370
Area (cm ²) 45 min pull	90	123	92	104	119	107	138
Extensibility (cm) 135 min pull	18.6	19.8	18.6	17.3	19.0	19.5	21.5
Maximum height (BU) 135 min pull	350	355	300	430	400	390	450
Area (cm ²) 135 min pull	91	102	84	93	102	105	130
Alveograph							
P (mm)	119	118	129	117	120	101	81
L (mm)	61	95	56	69	82	78	123
W (joules x 10 ⁻⁴)	250	333	252	269	321	238	257
P/L	1.95	1.24	2.30	1.70	1.46	1.29	0.66
Viscogram							
Peak viscosity (BU)	420	470	260	490	630	470	360
RVA							
Peak viscosity (cP)	2352	2371	1924	2419	2493	2260	1962
Baking test (straight dough)							
Volume (cm ³)	890	1000	865	945	1000	960	1000
Score (%)	83	88	82	86	89	87	87
Baking test (rapid dough)							
Volume (cm ³)	740	-	750	795	-	780	-
Score (%)	73	-	71	75	-	77	-
Baking test (Arabic bread)							
Score (%)	82	-	80	81	-	78	-
Yellow alkaline noodle test - colour							
Raw noodle sheet							
Minolta L (T=30 min)	81.5	79.4	79.7	81.1	79.7	80.1	77.7
Minolta b (T=30 min)	25.2	26.6	25.0	27.7	27.6	27.9	29.0
Minolta L (T=24 hour)	73.4	70.0	71.5	73.4	70.8	71.3	68.8
Minolta b (T=24 hour)	27.9	30.1	25.5	29.4	30.1	30.1	31.7
Colour stability	11.2	12.6	11.6	10.6	11.7	11.6	11.5
Cooked noodle							
Minolta L	70.2	72.2	70.6	71.1	72.5	70.4	75.4
Minolta b	29.6	29.3	30.4	31.4	29.7	30.5	29.1

AUSTRALIAN PREMIUM WHITE (APW)

Port	QLD			NSW		VIC	
	Mackay	Gladstone	Brisbane	Newcastle	Port Kembla	Geelong	Portland
Wheat							
Moisture (%)	10.3	10.5	10.7	11.0	11.0	11.7	10.1
Protein (Nx5.7, 11% mb)	11.3	11.4	11.3	11.2	10.9	11.4	11.2
Test weight (kg/hL)	84.7	83.4	83.1	83.1	80.9	81.3	83.1
Falling number (sec)	382	455	372	332	382	336	385
Screenings, 2mm (%)	1.3	3.2	2.2	1.8	1.8	1.3	1.0
Foreign material (%)	0.0	0.0	0.0	0.0	0.0	0.1	0.1
1000 kernel weight (g)	40.8	10.8	41.8	40.0	41.9	47.0	46.8
Ash (%; 11% mb)	1.39	1.37	1.34	1.39	1.60	1.25	1.24
Grain hardness (PSI)	12	12	14	13	14	14	13
Flour extraction (%)	79.2	79.1	78.0	78.3	75.8	77.4	77.9
Flour							
Protein (Nx5.7, 14% mb)	10.2	10.5	10.1	10.0	9.7	9.9	9.8
Flour ash (%)	0.42	0.47	0.45	0.45	0.52	0.39	0.46
Flour ash (% db)	0.49	0.55	0.52	0.52	0.61	0.46	0.53
Starch damage (%)	11.1	10.9	11.1	11.5	11.6	10.7	12.8
Wet gluten (%)	29.3	30.1	28.8	28.6	28.4	28.2	28.1
Gluten index	94	94	95	93	91	84	83
Minolta Flour L - brightness	93.07	92.69	92.83	92.59	92.49	92.60	92.68
Minolta Flour b - yellowness	9.64	10.20	9.56	9.24	9.11	8.74	9.32
Colour Grade	-1.6	-0.9	-1.3	-1.0	-0.1	-0.8	-0.9
Diastatic activity (mg/10g)	406	412	392	367	425	341	406
Farinogram							
Water absorption (%)	64.3	64.0	65.2	64.3	64.4	64.8	67.6
Development time (min)	4.2	5.2	4.7	3.7	4.2	4.6	3.4
Stability (min)	5.5	7.2	8.1	6.2	5.4	5.7	5.4
Extensogram							
Extensibility (cm) 45 min pull	20.8	19.6	19.4	19.0	20.0	18.3	16.0
Maximum height (BU) 45 min pull	330	380	400	320	330	340	290
Area (cm ²) 45 min pull	106	104	105	90	100	87	61
Extensibility (cm) 135 min pull	19.7	18.8	17.7	18.6	18.8	16.1	15.4
Maximum height (BU) 135 min pull	400	460	485	410	390	435	395
Area (cm ²) 135 min pull	108	110	104	100	99	84	72
Alveograph							
P (mm)	104	114	117	113	110	116	133
L (mm)	99	89	84	85	68	63	46
W (joules x 10 ⁻⁴)	316	329	320	302	252	247	236
P/L	1.05	1.28	1.39	1.33	1.62	1.84	2.89
Viscogram							
Peak viscosity (BU)	650	650	450	210	370	360	420
RVA							
Peak viscosity (cP)	2622	2621	2344	1918	1749	2318	2289
Baking test (straight dough)							
Volume (cm ³)	980	970	920	895	920	860	780
Score (%)	88	88	85	84	82	80	73
Baking test (rapid dough)							
Volume (cm ³)	780	820	805	780	710	740	740
Score (%)	79	84	80	75	74	73	71
Baking test (Arabic bread)							
Score (%)	82	80	79	76	85	83	84
Yellow alkaline noodle test - colour							
Raw noodle sheet							
Minolta L (T=30 min)	82.1	81.1	81.9	81.3	81.5	81.6	82.6
Minolta b (T=30 min)	28.6	29.3	27.1	27.0	24.4	24.3	25.0
Minolta L (T=24 hour)	75.0	74.0	74.1	74.2	73.7	73.9	75.1
Minolta b (T=24 hour)	32.0	31.7	29.5	30.1	24.1	26.7	27.0
Colour stability	9.6	9.9	10.4	10.0	10.7	10.8	10.3
Cooked noodle							
Minolta L	73.9	72.2	74.0	73.4	69.3	70.4	72.2
Minolta b	32.7	33.3	32.3	32.8	32.3	30.4	32.1

AUSTRALIAN PREMIUM WHITE (APW) CONTINUED

Port	SA			
	Port Adelaide	Port Giles	Port Lincoln	Wallaroo
Wheat				
Moisture (%)	10.6	11.7	11.6	11.1
Protein (Nx5.7, 11% mb)	10.9	10.9	10.8	11.0
Test weight (kg/hL)	82.4	83.0	81.6	82.1
Falling number (sec)	412	415	387	399
Screenings, 2mm (%)	1.6	1.3	1.3	1.2
Foreign material (%)	0.2	0.3	0.1	0.1
1000 kernel weight (g)	44.1	43.0	43.1	41.6
Ash (%; 11% mb)	1.20	1.15	1.14	1.13
Grain hardness (PSI)	11	15	16	14
Flour extraction (%)	78.1	78.1	78.3	78.4
Flour				
Protein (Nx5.7, 14% mb)	9.8	9.6	9.5	9.7
Flour ash (%)	0.44	0.41	0.41	0.40
Flour ash (% db)	0.52	0.48	0.48	0.47
Starch damage (%)	11.4	10.7	9.5	10.3
Wet gluten (%)	27.3	27.7	26.7	27.9
Gluten index	90	91	91	90
Minolta Flour L - brightness	92.92	92.95	92.90	93.01
Minolta Flour b - yellowness	9.01	9.25	9.66	9.00
Colour Grade	-1.3	-1.4	-2.0	-1.6
Diastatic activity (mg/10g)	385	347	302	328
Farinogram				
Water absorption (%)	64.7	64.0	62.1	63.3
Development time (min)	3.9	4.3	4.4	4.8
Stability (min)	5.8	4.8	5.2	5.5
Extensogram				
Extensibility (cm) 45 min pull	20.2	20.5	19.3	20.0
Maximum height (BU) 45 min pull	315	270	270	355
Area (cm ²) 45 min pull	99	95	85	103
Extensibility (cm) 135 min pull	18.1	18.5	18.8	18.0
Maximum height (BU) 135 min pull	415	320	340	385
Area (cm ²) 135 min pull	97	86	91	92
Alveograph				
P (mm)	114	97	87	111
L (mm)	60	73	80	63
W (joules x 10 ⁻⁴)	234	214	203	241
P/L	1.90	1.33	1.09	1.76
Viscogram				
Peak viscosity (BU)	410	480	340	440
RVA				
Peak viscosity (cP)	2290	2568	2219	2428
Baking test (straight dough)				
Volume (cm ³)	835	850	825	855
Score (%)	80	80	81	82
Baking test (rapid dough)				
Volume (cm ³)	755	730	715	815
Score (%)	73	74	73	75
Baking test (Arabic bread)				
Score (%)	83	81	84	84
Yellow alkaline noodle test - colour				
Raw noodle sheet				
Minolta L (T=30 min)	82.9	82.7	82.0	82.9
Minolta b (T=30 min)	25.2	26.9	27.3	26.1
Minolta L (T=24 hour)	75.7	75.9	74.4	75.7
Minolta b (T=24 hour)	25.9	29.2	29.7	27.8
Colour stability	10.0	9.5	10.1	9.8
Cooked noodle				
Minolta L	73.1	74.3	72.3	73.4
Minolta b	32.8	33.2	33.1	31.9

AUSTRALIAN PREMIUM WHITE (APW) CONTINUED

Port	WA			
	Geraldton	Kwinana	Albany	Esperance
Wheat				
Moisture (%)	10.7	9.5	11.2	11.5
Protein (Nx5.7, 11% mb)	10.6	10.7	10.3	10.5
Test weight (kg/hL)	79.4	82.2	83.4	82.9
Falling number (sec)	479	448	417	448
Screenings, 2mm (%)	2.5	2.1	1.2	1.4
Foreign material (%)	0.5	0.2	0.3	0.0
1000 kernel weight (g)	39.5	41.1	46.0	46.5
Ash (%; 11% mb)	1.32	1.26	1.31	1.19
Grain hardness (PSI)	14	12	13	11
Flour extraction (%)	76.6	76.4	78.4	78.5
Flour				
Protein (Nx5.7, 14% mb)	9.5	9.6	9.3	9.3
Flour ash (%)	0.48	0.45	0.50	0.45
Flour ash (% db)	0.56	0.52	0.58	0.53
Starch damage (%)	10.6	11.7	13.2	11.3
Wet gluten (%)	26.2	26.0	27.6	26.7
Gluten index	91	92	81	85
Minolta Flour L - brightness	92.88	92.76	92.46	92.81
Minolta Flour b - yellowness	9.58	9.68	8.55	8.38
Colour Grade	-0.9	-0.8	-0.4	-1.0
Diastatic activity (mg/10g)	328	398	406	353
Farinogram				
Water absorption (%)	61.8	65.0	68.6	65.0
Development time (min)	4.2	3.7	4.0	3.9
Stability (min)	6.0	5.6	4.8	6.1
Extensogram				
Extensibility (cm) 45 min pull	19.0	18.4	18.4	17.6
Maximum height (BU) 45 min pull	360	310	230	290
Area (cm ²) 45 min pull	96	84	72	74
Extensibility (cm) 135 min pull	16.5	16.5	17.6	16.2
Maximum height (BU) 135 min pull	420	370	260	310
Area (cm ²) 135 min pull	85	77	70	66
Alveograph				
P (mm)	98	117	130	119
L (mm)	53	53	42	49
W (joules x 10 ⁻⁴)	179	223	209	212
P/L	1.85	2.21	3.10	2.43
Viscogram				
Peak viscosity (BU)	450	450	460	470
RVA				
Peak viscosity (cP)	2333	2428	2363	2429
Baking test (straight dough)				
Volume (cm ³)	810	815	725	780
Score (%)	78	78	74	78
Baking test (rapid dough)				
Volume (cm ³)	800	780	790	730
Score (%)	72	72	72	71
Baking test (Arabic bread)				
Score (%)	83	82	82	84
Yellow alkaline noodle test - colour				
Raw noodle sheet				
Minolta L (T=30 min)	81.8	82.5	82.0	81.9
Minolta b (T=30 min)	27.7	27.0	25.5	25.6
Minolta L (T=24 hour)	74.0	75.0	74.9	74.1
Minolta b (T=24 hour)	29.4	28.0	25.6	27.5
Colour stability	10.6	9.9	10.0	10.6
Cooked noodle				
Minolta L	74.0	71.8	73.5	71.6
Minolta b	33.5	32.2	33.0	30.8

AUSTRALIAN STANDARD WHITE (ASW)

	NSW	VIC		SA	
Port	Port Kembla	Geelong	Portland	Port Adelaide	Port Giles
Wheat					
Moisture (%)	11.1	11.5	10.9	10.6	11.7
Protein (Nx5.7, 11% mb)	10.1	9.7	9.5	9.8	9.9
Test weight (kg/hL)	80.8	80.7	82.5	82.5	83.5
Falling number (sec)	390	370	354	376	409
Screenings, 2mm (%)	1.5	1.2	0.9	1.6	0.9
Foreign material (%)	0.2	0.1	0.1	0.2	0.2
1000 kernel weight (g)	37.7	48.4	47.9	44.9	46.1
Ash (% , 11% mb)	1.60	1.25	1.31	1.24	1.15
Grain hardness (PSI)	15	14	12	14	13
Flour extraction (%)	75.4	77.2	76.7	77.4	78.7
Flour					
Protein (Nx5.7, 14% mb)	8.8	8.2	8.3	8.5	8.7
Flour ash (%)	0.45	0.40	0.47	0.45	0.44
Flour ash (% db)	0.53	0.47	0.54	0.52	0.51
Starch damage (%)	11.7	11.2	12.9	11.7	11.1
Wet gluten (%)	26.6	22.0	22.2	22.9	24.7
Gluten index	89	93	95	95	88
Minolta Flour L - brightness	92.34	92.76	92.89	92.94	92.95
Minolta Flour b - yellowness	9.32	8.32	9.14	8.84	9.06
Colour Grade		-1.4	-1.8	-1.4	-1.6
Diastatic activity (mg/10g)		367	392	392	360
Farinogram					
Water absorption (%)	64.8	63.9	66.8	64.1	63.6
Development time (min)	2.4	2.0	2.1	2.1	3.9
Stability (min)	4.0	6.6	4.6	5.1	5.5
Extensogram					
Extensibility (cm) 45 min pull	18.0	15.6	15.0	16.0	18.2
Maximum height (BU) 45 min pull	265	330	290	320	265
Area (cm ²) 45 min pull	74	64	53	66	75
Extensibility (cm) 135 min pull	17.0	13.6	14.2	14.8	17.3
Maximum height (BU) 135 min pull	320	410	380	310	290
Area (cm ²) 135 min pull	74	60	60	55	72
Alveograph					
P (mm)	104	120	139	116	103
L (mm)	61	39	33	43	54
W (joules x 10 ⁻⁴)	200	187	198	190	186
P/L	1.70	3.08	4.21	2.70	1.91
Viscogram					
Peak viscosity (BU)	220	410	470	392	500
RVA					
Peak viscosity (cP)	1622	2344	2441	2330	2489
Baking test (straight dough)					
Volume (cm ³)	810	700	675	720	785
Score (%)	74	70	63	74	76
Yellow alkaline noodle test - colour colour					
Raw noodle sheet					
Minolta L (T=30 min)	80.3	84.1	84.1	83.9	83.0
Minolta b (T=30 min)	26.0	22.4	24.1	24.9	26.6
Minolta L (T=24 hour)	72.4	77.8	77.8	77.5	76.9
Minolta b (T=24 hour)	27.9	23.1	24.6	25.6	28.1
Colour stability	11.0	8.7	8.9	8.7	8.9
Cooked noodle					
Minolta L	69.4	71.9	71.4	71.1	73.5
Minolta b	30.9	31.6	33.0	32.8	34.0

AUSTRALIAN STANDARD WHITE (ASW) CONTINUED

Port	WA			
	Geraldton	Kwinana	Albany	Esperance
Wheat				
Moisture (%)	10.0	9.8	10.7	11.3
Protein (Nx5.7, 11% mb)	9.2	8.9	9.0	9.3
Test weight (kg/hL)	80.7	82.4	83.7	82.6
Falling number (sec)	420	388	403	358
Screenings, 2mm (%)	2.1	2.0	1.0	1.4
Foreign material (%)	0.20	0.20	0.30	0.20
1000 kernel weight (g)	41.1	44.3	47.3	46.7
Ash (% , 11% mb)	1.23	1.20	1.23	1.20
Grain hardness (PSI)	12	11	12	13
Flour extraction (%)	77.1	77.6	77.2	77.6
Flour				
Protein (Nx5.7, 14% mb)	8.1	7.8	7.7	8.0
Flour ash (%)	0.47	0.46	0.43	0.44
Flour ash (% db)	0.54	0.54	0.50	0.51
Starch damage (%)	11.1	11.4	12.4	11.7
Wet gluten (%)	20.1	19.9	22.1	22.1
Gluten index	97	96	89	86
Minolta Flour L - brightness	93.02	92.84	92.79	92.99
Minolta Flour b - yellowness	9.61	8.52	8.97	8.58
Colour Grade	-1.3	-1.4	-1.5	-1.0
Diastatic activity (mg/10g)	341	379	406	373
Farinogram				
Water absorption (%)	61.2	62.5	65.5	64.0
Development time (min)	2.0	2.0	2.0	1.9
Stability (min)	5.3	3.8	3.6	4.0
Extensogram				
Extensibility (cm) 45 min pull	16.0	15.1	14.4	15.0
Maximum height (BU) 45 min pull	300	280	270	260
Area (cm ²) 45 min pull	63	52	45	49
Extensibility (cm) 135 min pull	14.7	14.5	13.4	14.7
Maximum height (BU) 135 min pull	420	330	310	315
Area (cm ²) 135 min pull	70	55	43	54
Alveograph				
P (mm)	105	85	121	118
L (mm)	38	46	30	39
W (joules x 10 ⁻⁴)	157	141	152	176
P/L	2.76	1.85	4.03	3.03
Viscogram				
Peak viscosity (BU)	480	410	500	330
RVA				
Peak viscosity (cP)	2382	2452	2322	2302
Baking test (straight dough)				
Volume (cm ³)	680	655	600	660
Score (%)	70	70	64	67
Yellow alkaline noodle test - colour				
Raw noodle sheet				
Minolta L (T=30 min)	83.6	83.7	84.4	83.7
Minolta b (T=30 min)	26.4	26.8	25.3	24.5
Minolta L (T=24 hour)	76.6	77.0	78.4	77.1
Minolta b (T=24 hour)	27.0	27.0	25.6	25.3
Colour stability	9.5	9.1	8.3	9.3
Cooked noodle				
Minolta L	74.6	72.4	73.3	72.7
Minolta b	34.4	35.0	33.5	32.7

RAMEN NOODLE WHEAT

			QLD	NSW
	Port	Mackay	Brisbane	Newcastle
Wheat				
Moisture (%)		10.4	10.9	10.2
Protein (Nx5.7, 11% mb)		13.6	13.6	13.8
Test weight (kg/hL)		84.1	83.2	82.9
Falling number (sec)		375	433	419
Screenings, 2mm (%)		1.2	1.9	1.4
Foreign material (%)		0.1	0	0
1000 kernel weight (g)		40.2	38.6	37.4
Ash (% , 11% mb)		1.36	1.45	1.32
Grain hardness (PSI)		13	13	14
Flour extraction (%)		60.0	60.0	60.0
Flour				
Protein (Nx5.7, 14% mb)		12.2	12.1	12.8
Flour ash (%)		0.33	0.37	0.36
Flour ash (% db)		0.38	0.43	0.42
Starch damage (%)		9.6	9.4	8.7
Wet gluten (%)		36.0	34.9	37.1
Gluten index		95	92	93
Minolta Flour L - brightness		92.96	92.62	92.83
Minolta Flour b - yellowness		9.88	10.51	9.72
Colour Grade		-1.7	-1.6	-2.0
Diastatic activity (mg/10g)		353	328	288
Farinogram				
Water absorption (%)		64.0	62.8	64.5
Development time (min)		7.2	7.5	10.5
Stability (min)		15.2	16.9	16.0
Extensogram				
Extensibility (cm) 45 min pull		24.8	23.0	23.5
Maximum height (BU) 45 min pull		400	480	470
Area (cm ²) 45 min pull		149	147	149
Extensibility (cm) 135 min pull		21.6	19.5	24.0
Maximum height (BU) 135 min pull		560	730	700
Area (cm ²) 135 min pull		147	156	188
Viscogram				
Peak viscosity (BU)		480	520	450
Gelatinisation time (min)		26	29	28
Gelatinisation temp (°C)		69	73.5	72
Breakdown (BU)		60	60	40
Yellow alkaline noodle test - colour				
Raw noodle sheet				
Minolta L (T=30 min)		81.7	81.0	80.7
Minolta b (T=30 min)		27.9	29.3	28.2
Minolta L (T=24 hour)		75.6	74.9	74.3
Minolta b (T=24 hour)		32.8	34.2	31.1
Colour stability		8.4	8.6	8.9
Cooked noodle				
Minolta L		73.7	76.4	75.7
Minolta b		29.7	31.7	30.4

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
Wheat	
Test weight (kg/hL)	78.2
1000 kernel weight (g)	44.3
Grain hardness (PSI)	7
Protein (Nx5.7, 11% mb)	14.4
Moisture (%)	10.7
Ash (% , 11% mb)	1.74
Falling number (sec)	319
Screenings, 2mm (%)	1.5
Foreign material (%)	0.3
Vitreous kernels (%)	97
Semolina extraction (%)	53.5
Semolina	
Protein (Nx5.7, 14% mb)	11.4
Wet gluten (%)	32.3
Gluten index	70
Semolina ash (%)	0.61
Semolina ash (% db)	0.69
Yellow pigment (µg/g)	15.9
Minolta L - brightness (sieved)	87.73
Minolta b - yellowness (sieved)	30.35
Minolta L - brightness	85.91
Minolta b - yellowness	33.62
Alveograph	
P (mm)	96
L (mm)	58
W (joules x 10 ⁻⁴)	182
P/L	1.66

WHEAT TEST METHODS

All grain 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 (cm²).

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.

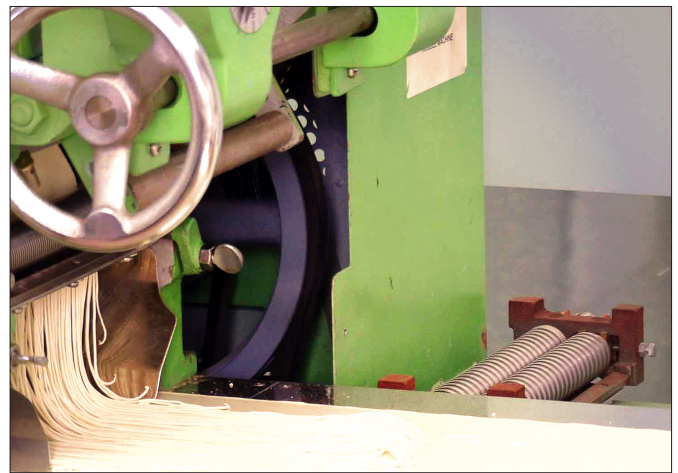
Foreign material is defined as all matter other than wheat grains which may be physically separated from the sample. The foreign material is expressed as a percentage by weight of the total sample.

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

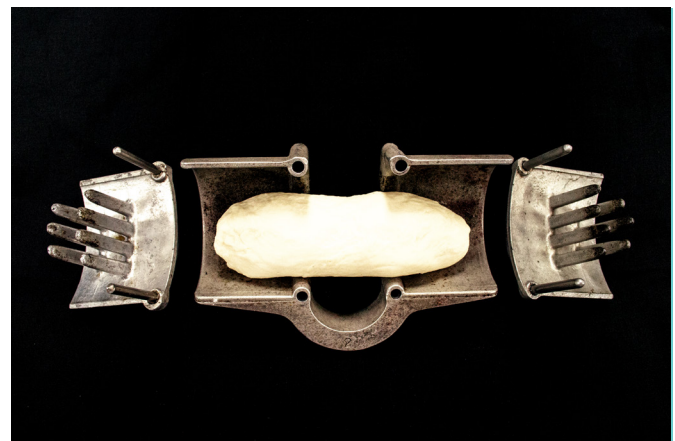
AACC (2000), Method 54-30A. Approved methods of the American Association of Cereal Chemists, 10th edn, St Paul, MN, USA, AACC International.

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.

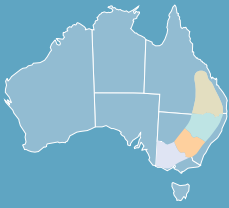
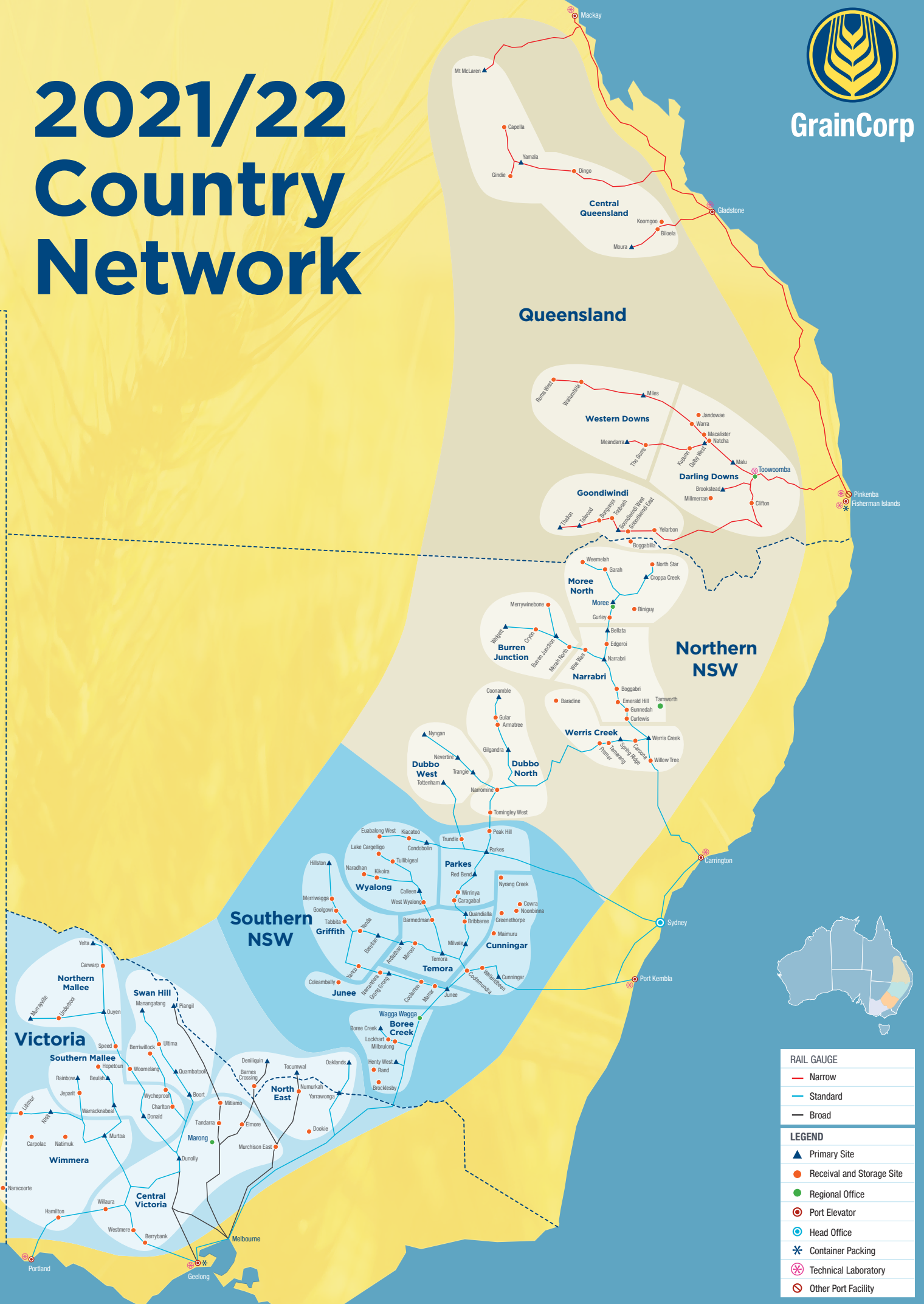


Dough piece in an extensograph cradle.

2021/22 Country Network



GrainCorp



RAIL GAUGE	
—	Narrow
—	Standard
—	Broad

LEGEND	
▲	Primary Site
●	Receival and Storage Site
●	Regional Office
⊙	Port Elevator
⊙	Head Office
✱	Container Packing
✱	Technical Laboratory
⊙	Other Port Facility

Map not to scale