

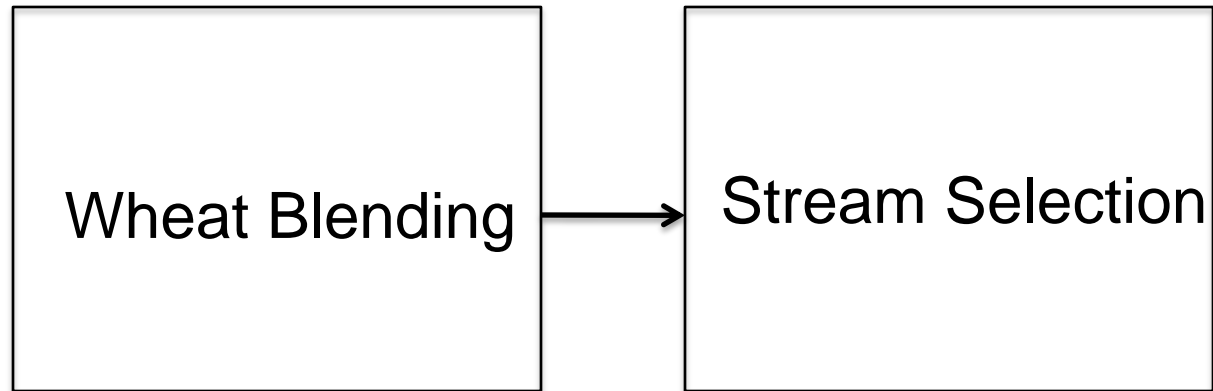


Evaluation of Milling and End Use Quality potential through testing

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Wheat Blending





Wheat Blending



Stream Selection



Flour Treatment



Evaluation of Milling and End Use Quality potential through testing



Evaluation of Milling and End Use Quality potential through testing

- Mill for 3 to 4 hours run in the flour mill



Evaluation of Milling and End Use Quality potential through testing

- Mill for 3 to 4 hours run in the flour mill
- Mill a small sample in a laboratory mill



Evaluation of Milling and End Use Quality potential through testing

- Quantity required in a 240 t / 24h is 30 t to 40 t
- Quantity required 5kg to 15kg to do a fairly comprehensive analytical and end product quality testing

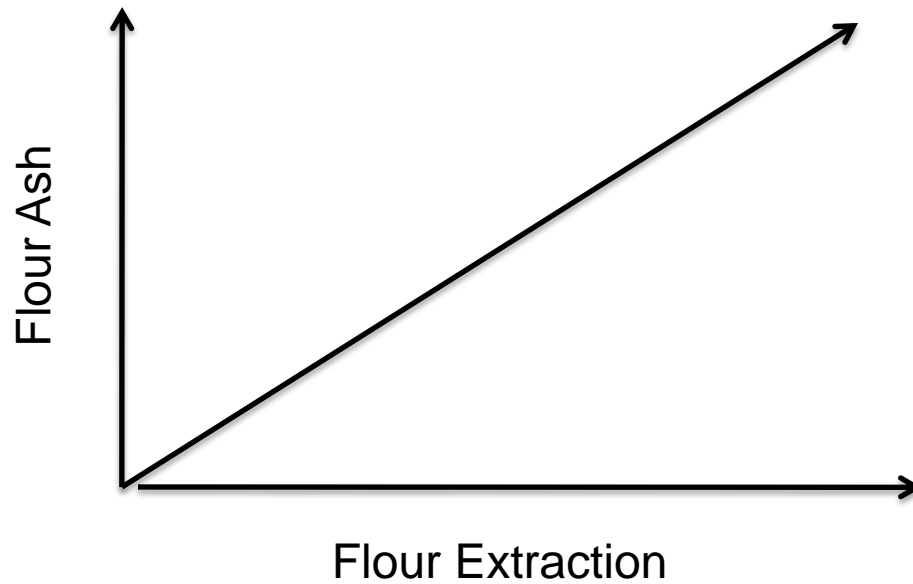


Evaluation of Milling and End Use Quality potential through testing

- Milling method should target expected flour yields to be achieved
- This provides more realistic assessment of quality



Flour Extraction Influences





Flour Extraction Influences

- Ash Content & Color in Flour
- Protein Content in Flour
- Starch Damage in Flour
- Amylograph Values
- Water Absorption



Flour Extraction Influences

Flour Type	Short Patent	Medium Patentt	StraightGrade	Lower Grade
Protein, %	13.1	13.7	14.3	15.7
Wet Gluten, %	37.1	39.3	40.5	43.0
Ash , %	0.36	0.39	0.51	0.63
Minolta Colour – L*	87.5	86.7	85.2	84.0
Starch Damage, UCD	23.7	25.3	26.6	25.8
Amylo. Peak Viscosity, BU	850	830	640	630



Flour Extraction Influences Farinograph Results

Flour Type	Short Patent	Medium Patentt	StraightGrade	Lower Grade
Water absorption, %	69.0	69.6	70.2	71.1
Development time, min	13.5	8.3	6.7	6.5
Stability, min	26.4	24.2	9.1	8.9
MTI, BU	3.00	8.00	27.00	23.00



Flour Extraction Influences Farinograph Results

Short Patent

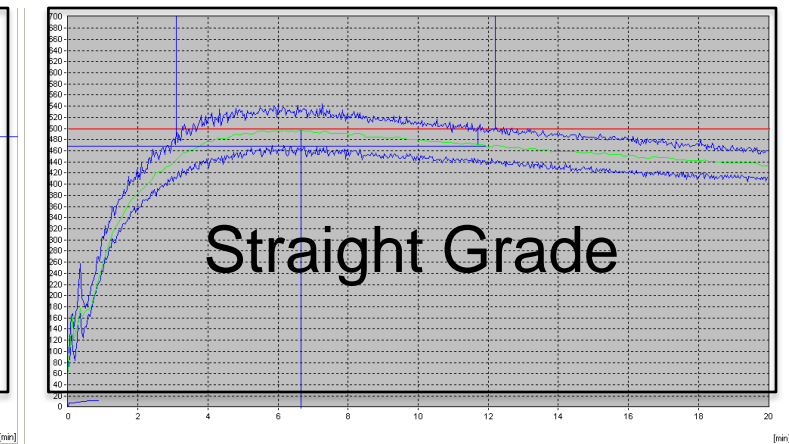
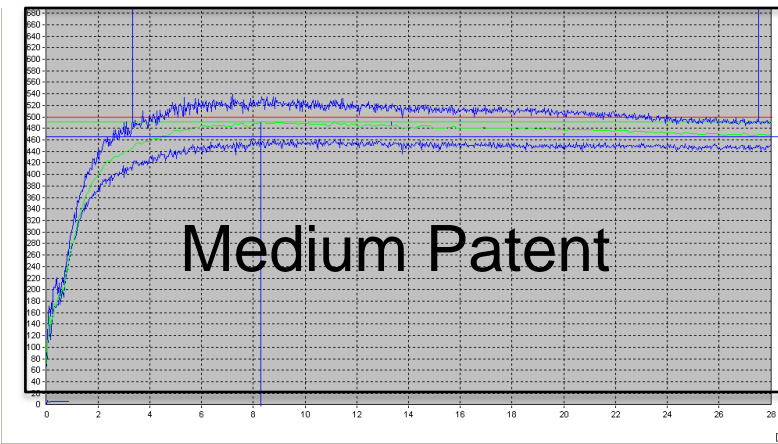
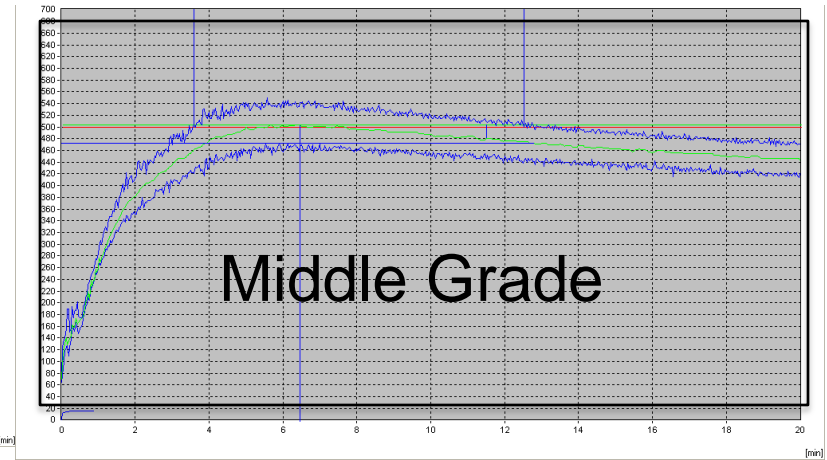
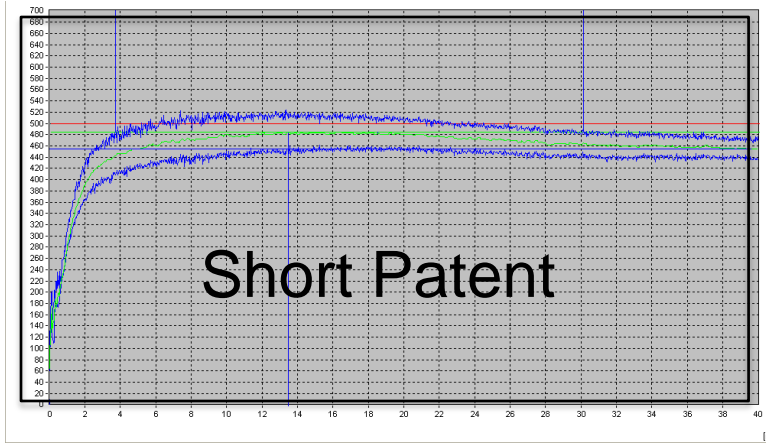
Middle Grade

Medium Patent

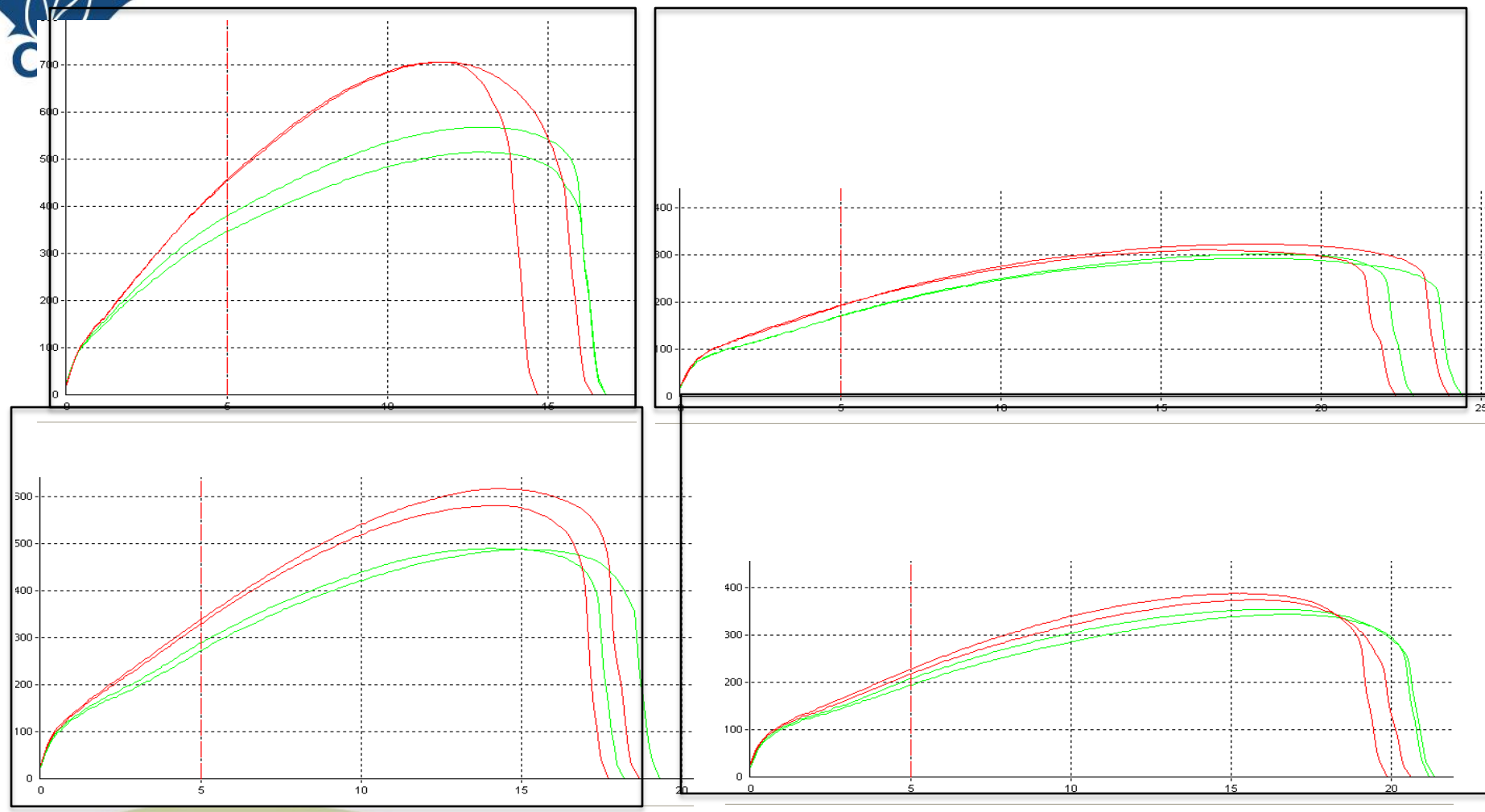
Straight Grade



Flour Extraction Influences Farinograph Results



Flour Extraction Influences Extensograph Results





Flour Extraction Influences End Use Quality (Baked Goods)

- Color
- Fermentation tolerance
- Mixing tolerance



Flour Extraction Influences End Use Quality (Noodle Products)

- Color
- Color stability
- Texture
- Cooking properties



Test Milling Procedures

Often some test milling procedures involve:

- Flour preparation at fixed extraction rate or
- Flour preparation at fixed ash content



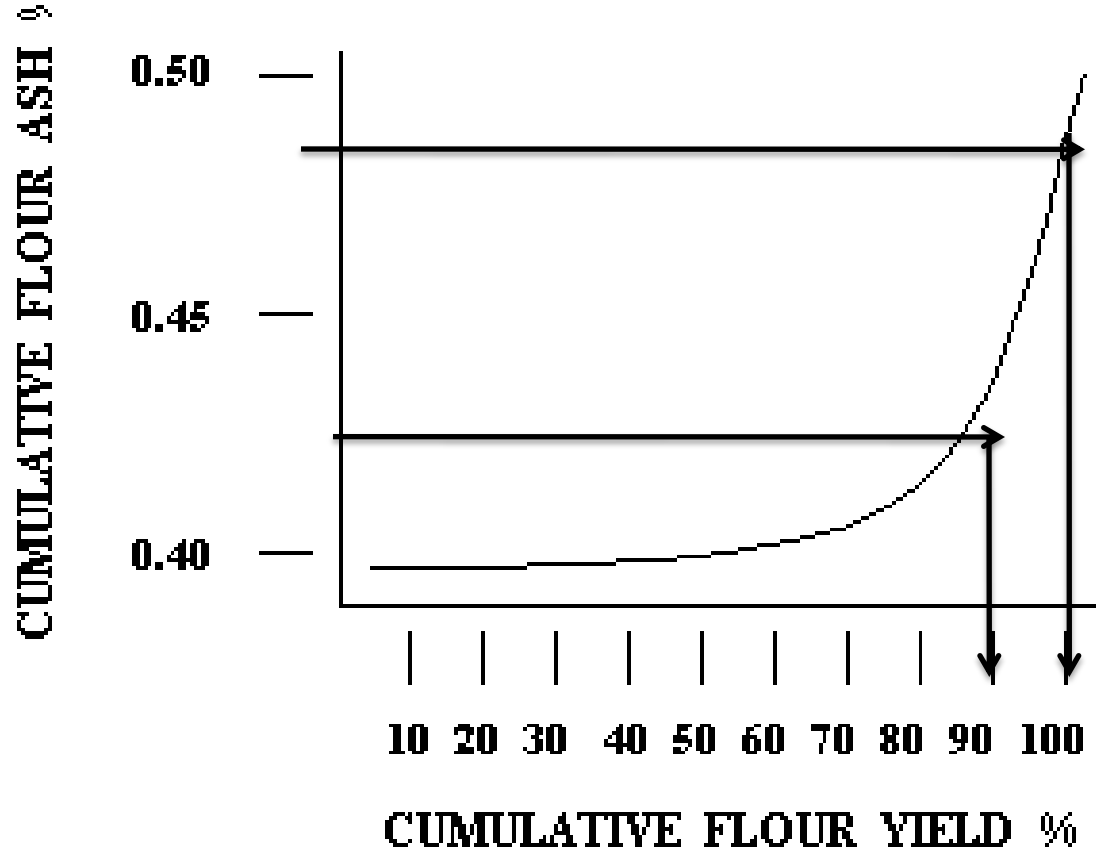
Test Milling Procedures

Typical flour extraction expected from Buhler lab milling a good medium hard to hard wheat is about 68.0% - 71.0%

Making up a 60.0% flour extraction rate may involve blending of 1 Break with 1 Reduction and blending of 2 Break with 2 Reduction and enough if necessary of 3 Break and 3 Reduction to make up 60.0% flour extraction.



Flour Extraction Influences



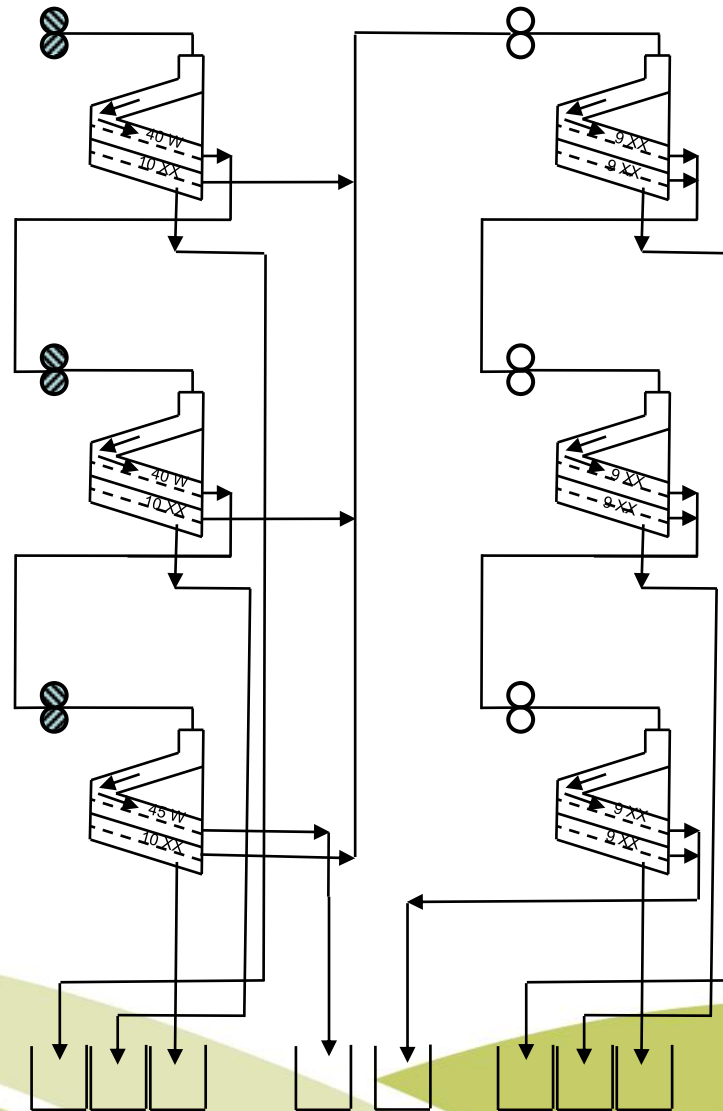


BUHLER LAB MILLING





BUHLER LAB MILLING





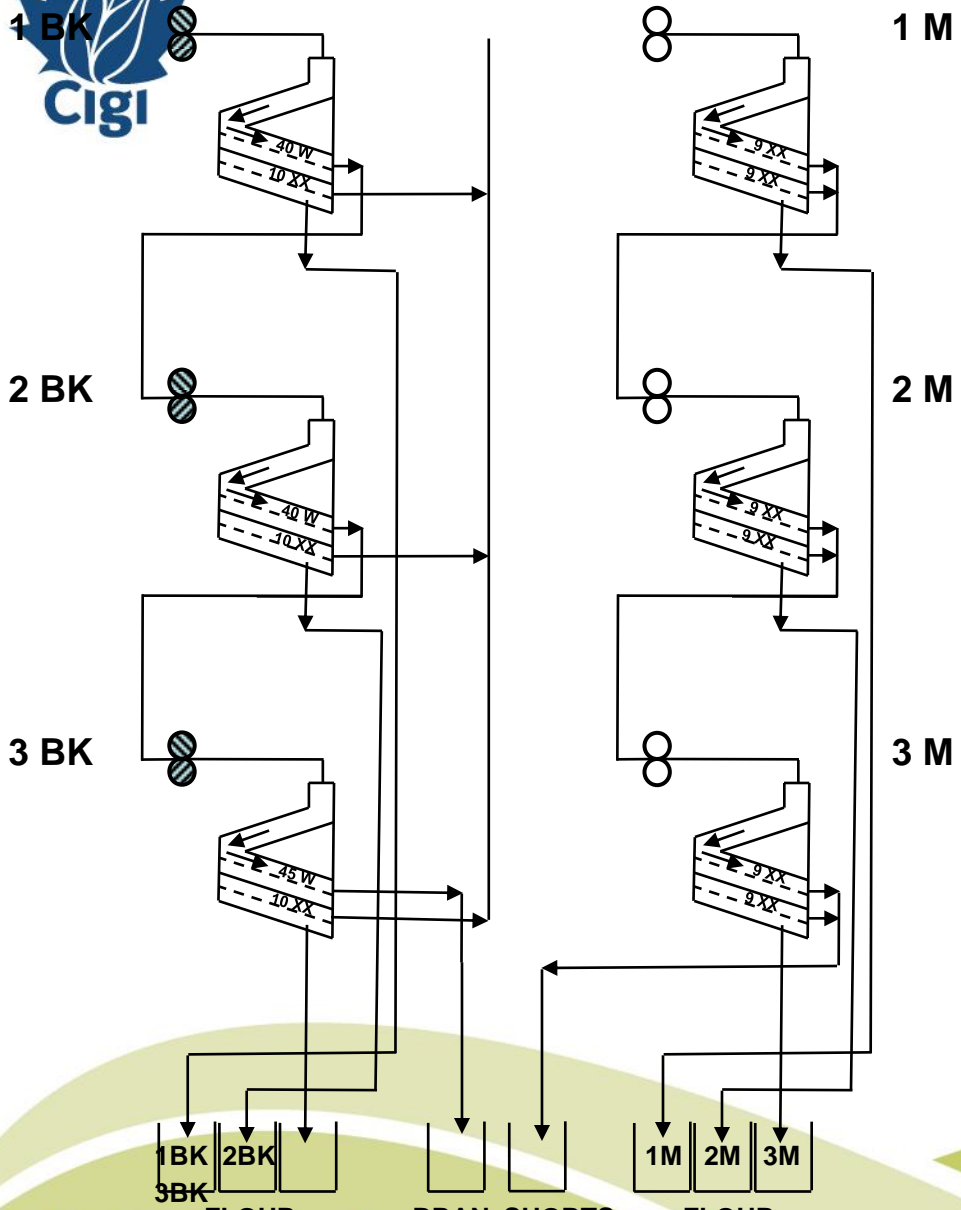
Flour Extraction Influences

Preparing flour sample of 75.0% extraction rate typically requires Buhler lab milling followed by bran dusting.

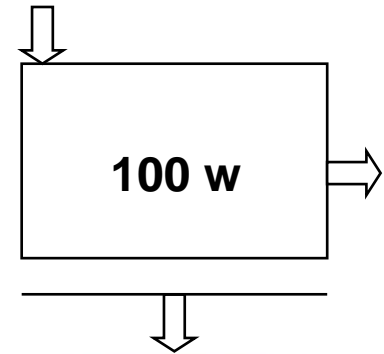
In most cases bran dusting flour is added first to make up the 75.0% and any shortfall is made up by adding the shorts dusting flour



BUHLER LAB MILLING



**BRAN &
SHORTS**

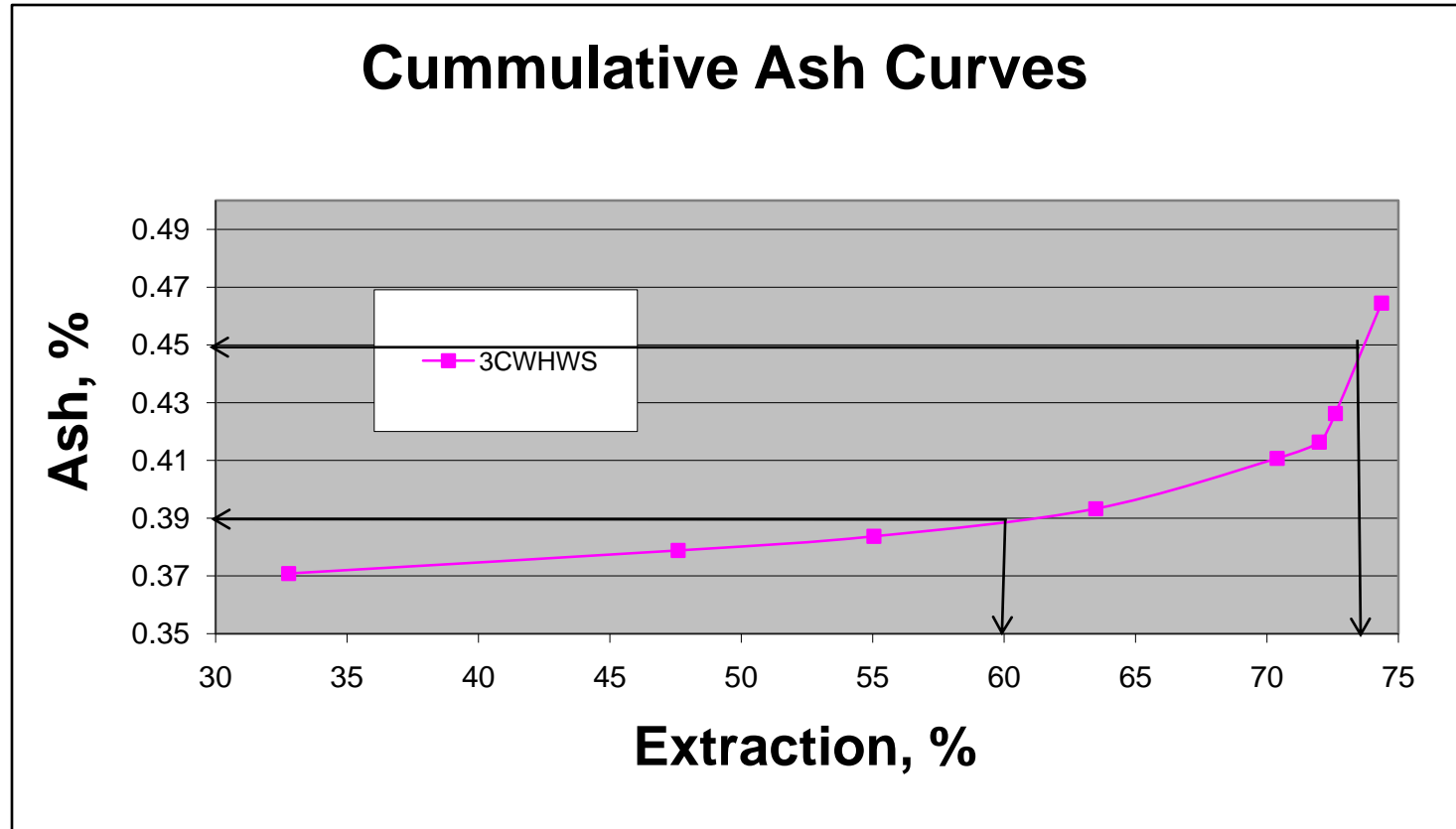


**CLEAN
BRAN &
SHORTS**

**BRAN & SHORTS
FLOUR**

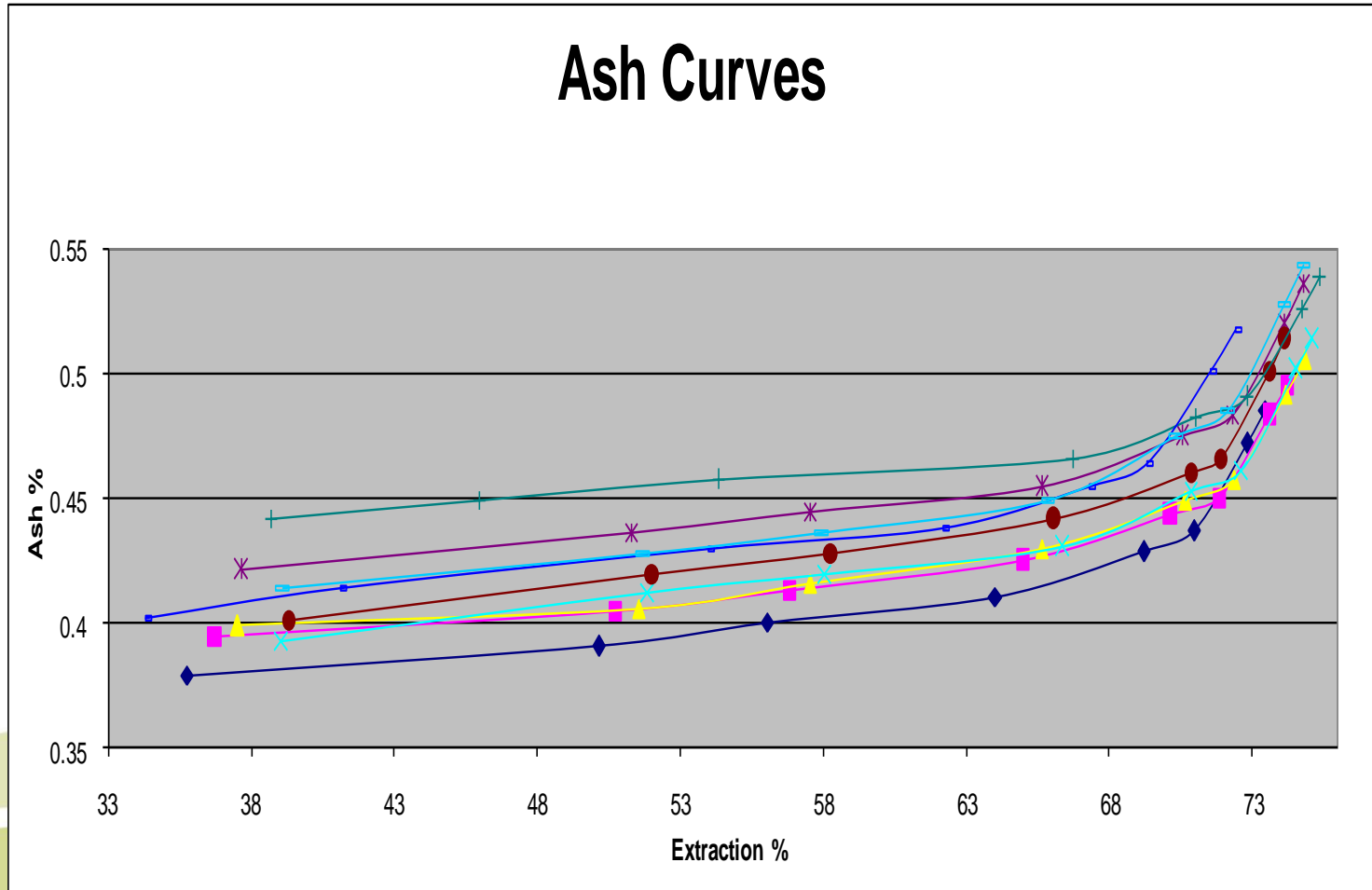


Cummulative Ash Curves





Cumulative Ash Curves of CWRS





Flour Ash Naturally Present could be high or low in pure endosperm

It could also be high due to lower grade

While the former would have little effect the latter would certainly have an impact

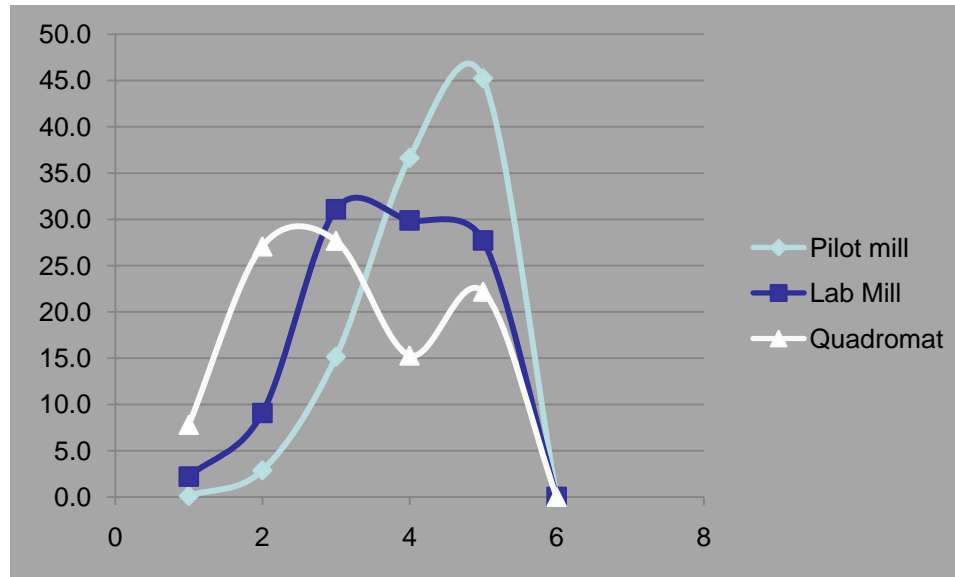
Lower grade extraction will express any issues that could potentially exist on account of functionality

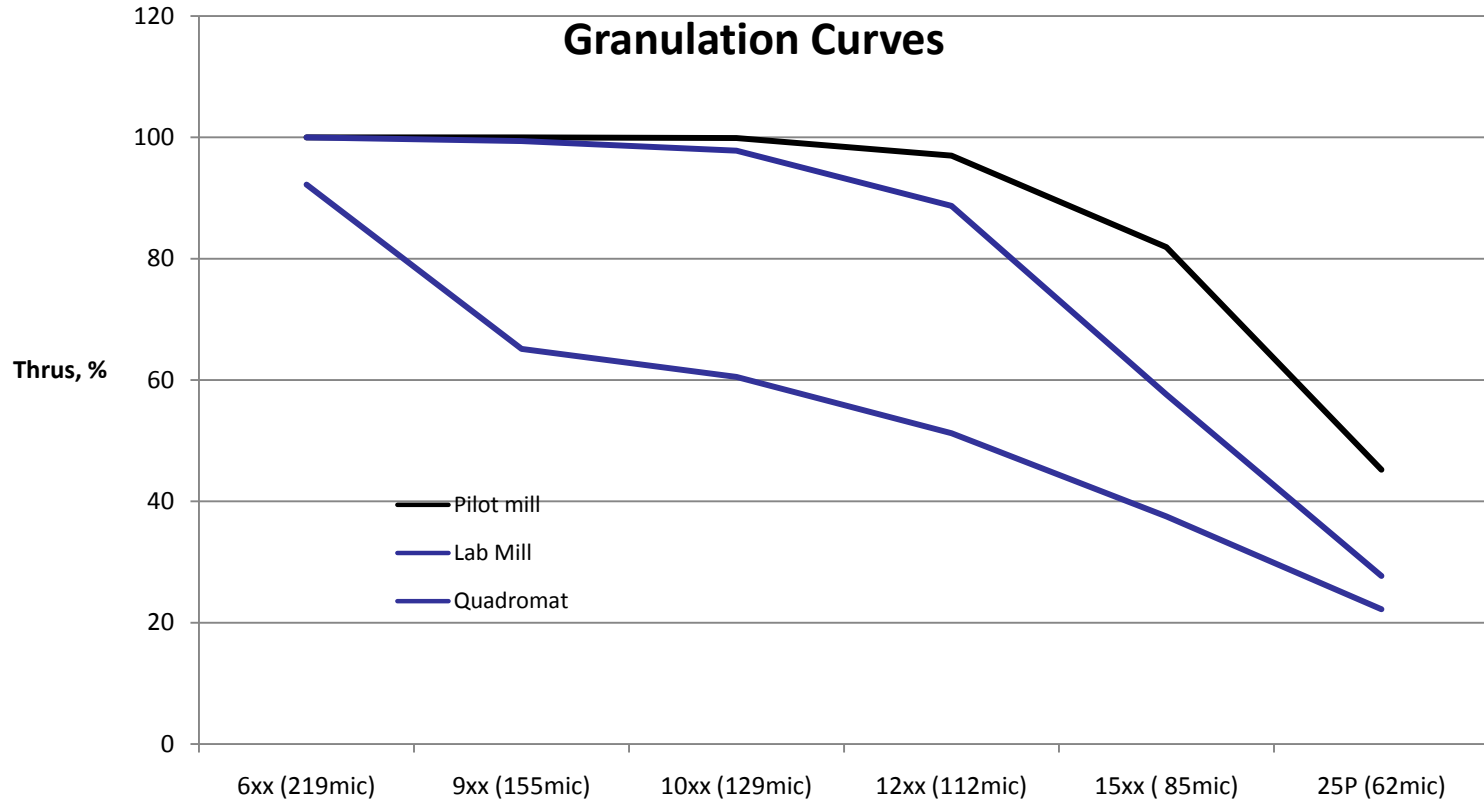


Lab Milled Data on Paten & Low Grade

Sample		
Flour Type	Patent	Low Grade
Mill Date		
FLOUR (14.0% mb)		
Protein content, %		
Ash content, %	0.42	1.19
Starch Damage, UCD	15.0	21.8
FARINOGRAPH		
Absorption, %	60.5	68.6
DDT, min	6.2	7.0
Stability, min	18.5	5.8
MTI, BU	19	28









Flour Granulations

200g 4min

2CWRS

Pilot mill

Lab Mill

Quadromat

6xx 219mic

0.0

0.0

7.8

9xx 155mic

0.0

0.6

27.1

10xx 129mic

0.1

1.6

4.7

12xx 112mic

2.9

9.1

9.3

15xx 85mic

15.1

31.1

13.7

25p 62mic

36.6

29.9

15.3

thru

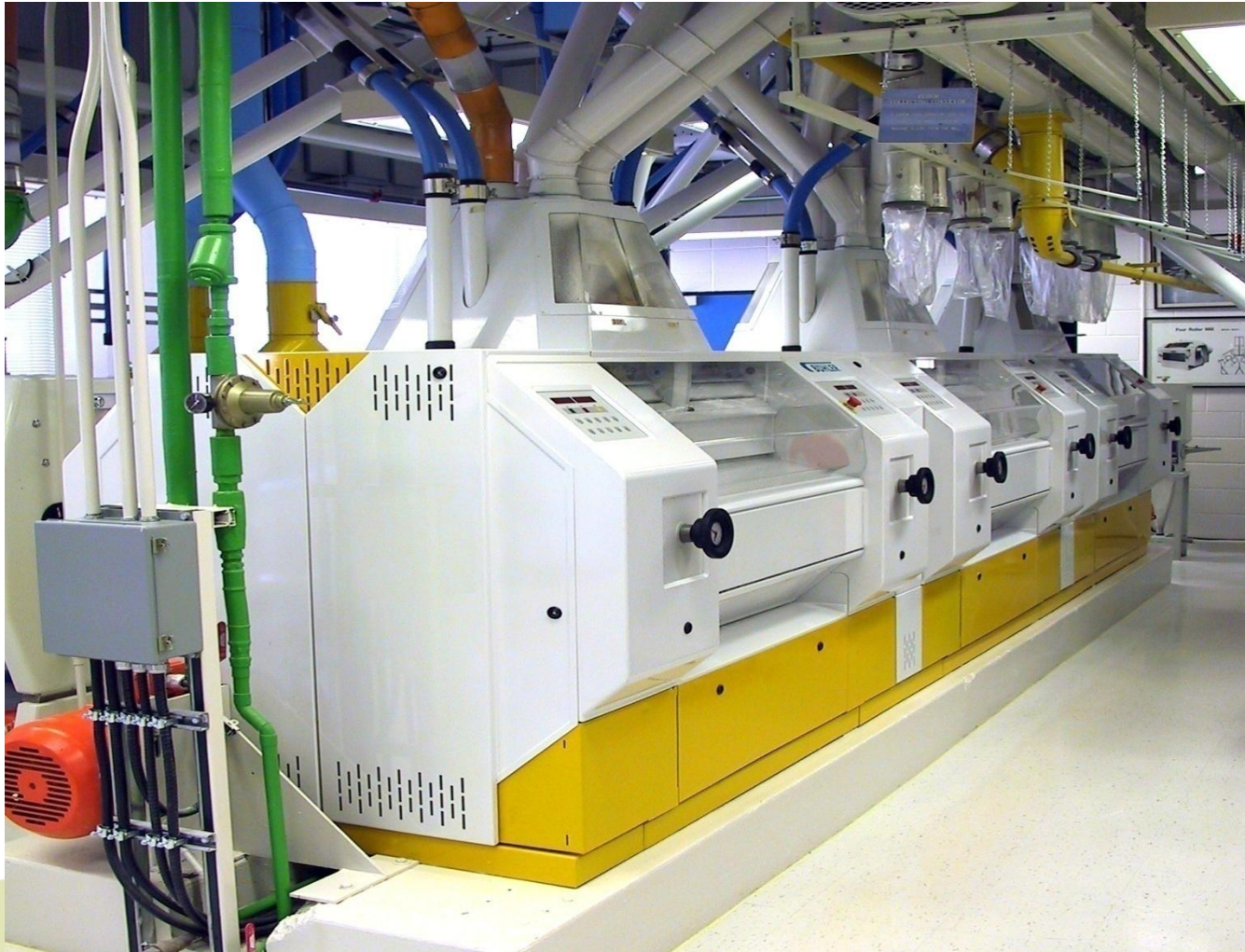
45.2

27.7

22.2

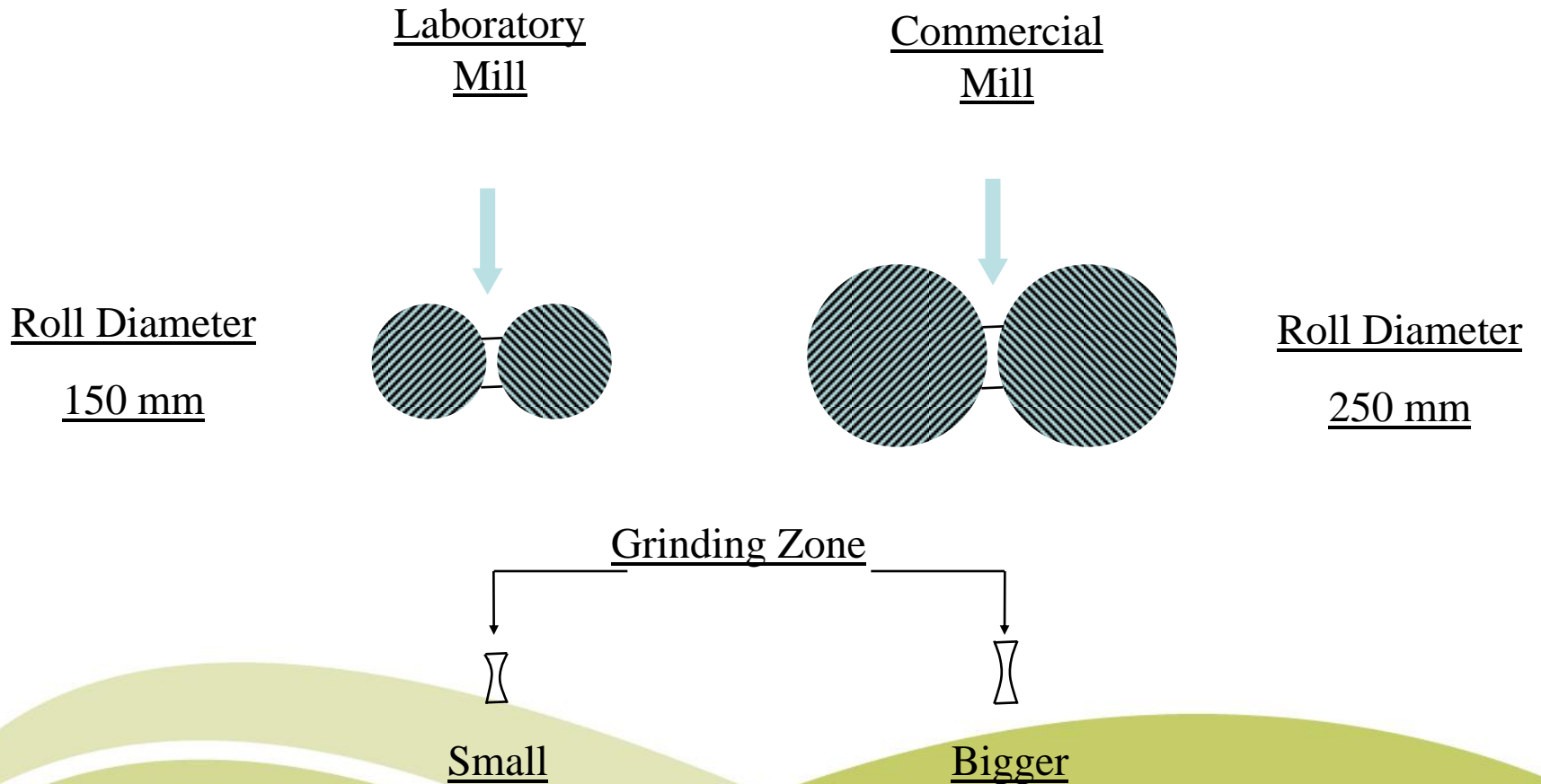


CIGI PILOT MILLING OF NEW CROP



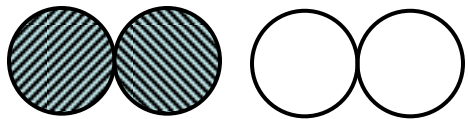
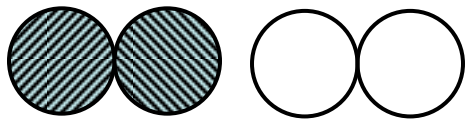
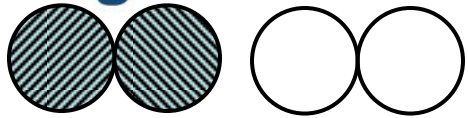


Effect of Grinding on Flour Quality

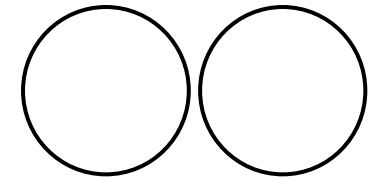
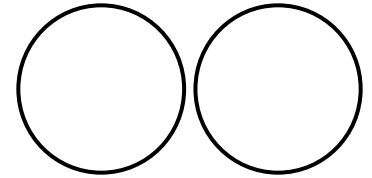
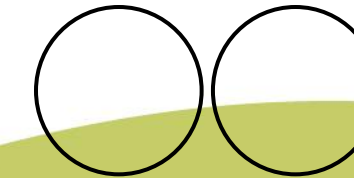
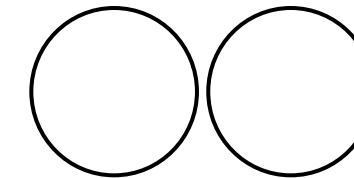
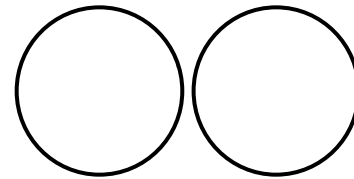
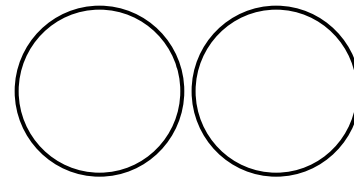
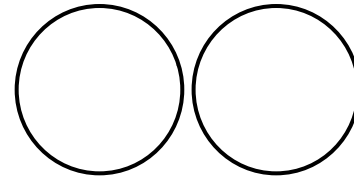
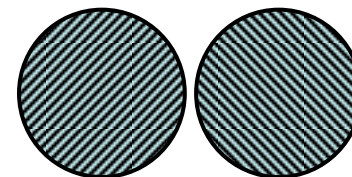
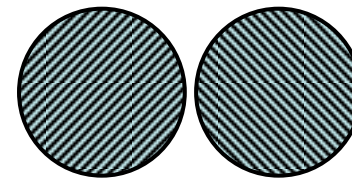
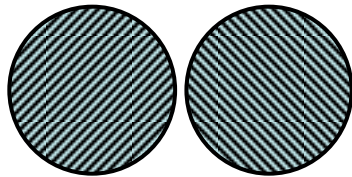
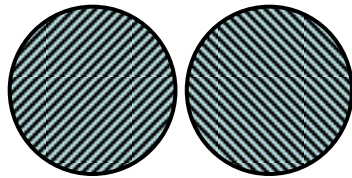




Laboratory Mill

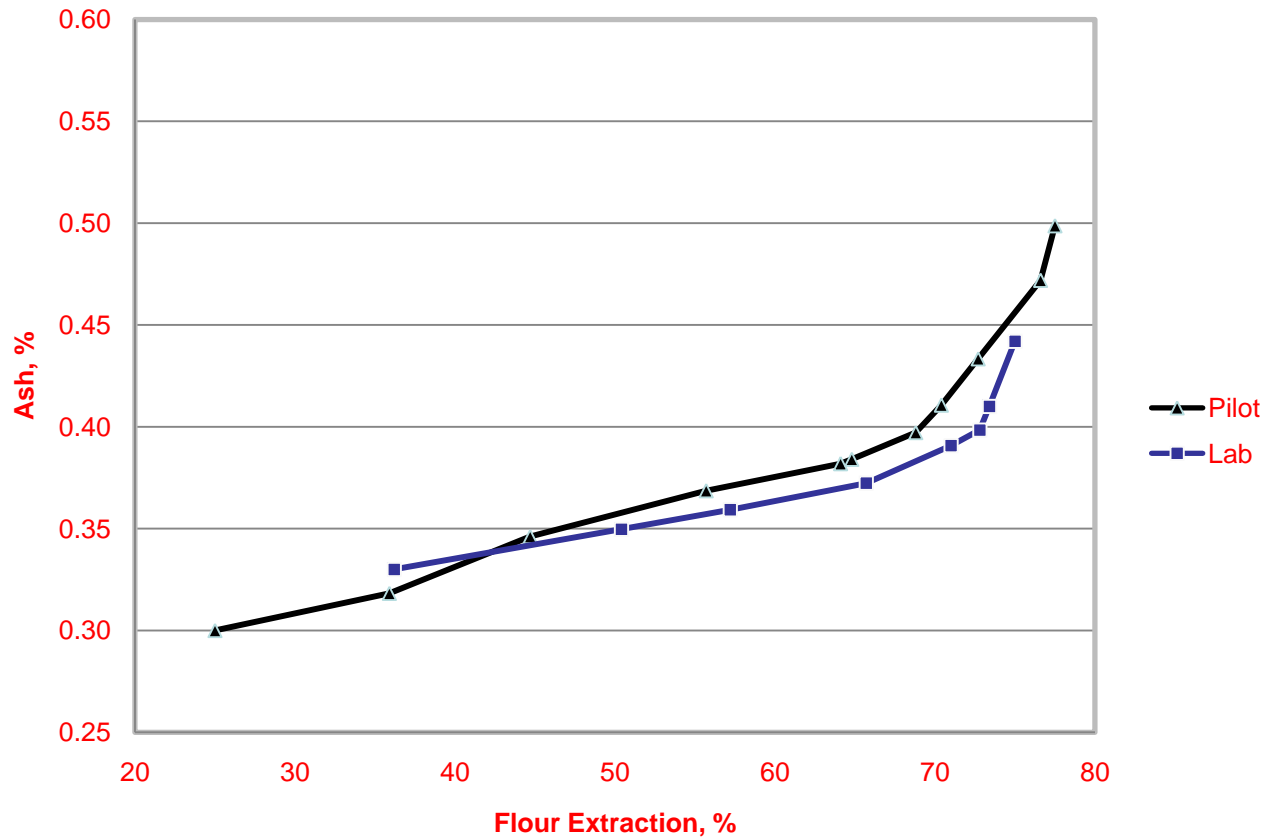


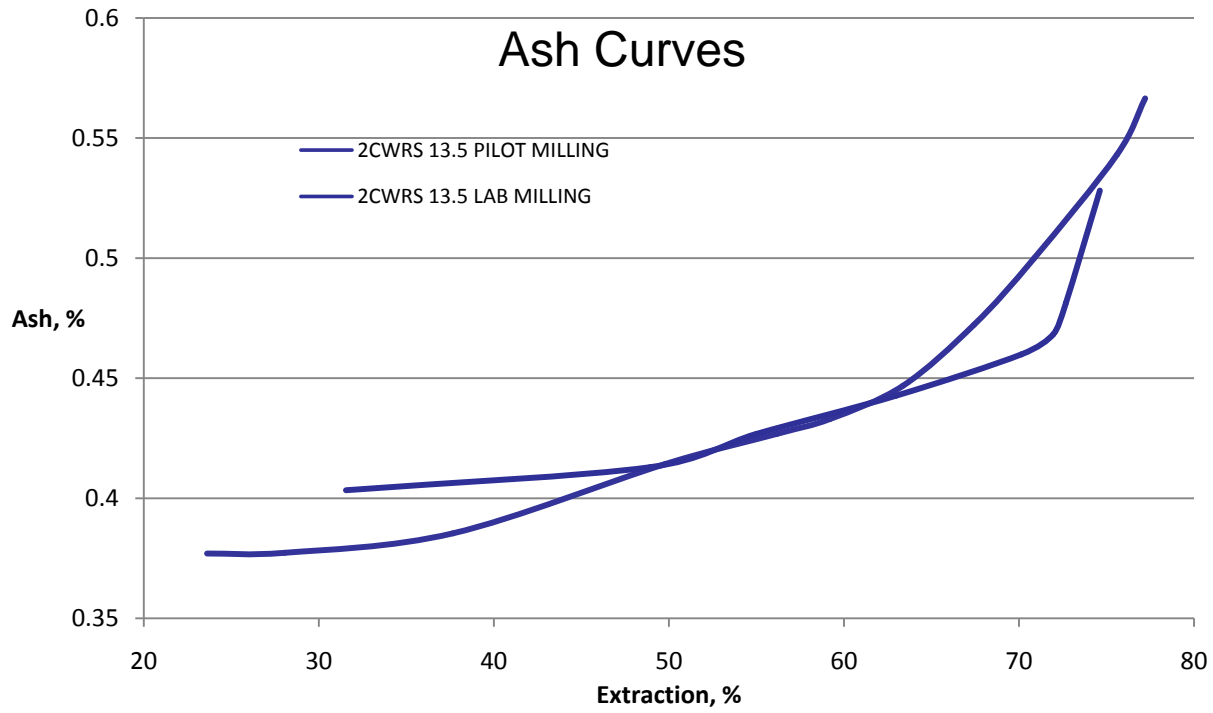
Commercial Mill





Pilot & Lab Cumulative Ash Curve







Lab Mill Vs. Pilot Mil

	1CWRS13.5 Pilot Mill	1CWRS13.5 Lab Mill	2CWRS13.5 Pilot Mill	2CWRS13.5 Lab Mill
Test Weight, kg/hl	83	83	80.3	80.3
Weight per 1000 Kernels, g	32.6	32.6	35.0	35.0
Protein content (CNA), %	13.2	13.2	13.4	13.4
Falling Number, sec	413	413	400	400



Lab Mill Vs. Pilot Mil

	1CWRS13.5 Pilot Mill	1CWRS13.5 Lab Mill	2CWRS13.5 Pilot Mill	2CWRS13.5 Lab Mill
Flour Yield, %	77.6	71.5	77.5	76.1
Ash Content, %	0.53	0.45	0.49	0.47



Lab Mill Vs. Pilot Mil

	1CWRS13.5 Pilot Mill	1CWRS13.5 Lab Mill	2CWRS13.5 Pilot Mill	2CWRS13.5 Lab Mill
Protein , %	12.8	12.4	12.9	12.6
Protein loss , %	0.4	0.8	0.5	0.8
Wet Gluten, %	30.5	31.1	34.6	35.4
Starch Damage (SDmatic), UCD	24.1	16.6	24.7	17.3



Lab Mill Vs. Pilot Mil

	1CWRS13.5 Pilot Mill	1CWRS13.5 Lab Mill	2CWRS13.5 Pilot Mill	2CWRS13.5 Lab Mill
Water absorption, %	<u>63.1</u>	<u>58.0</u>	64.5	59.9
Development time, min	4.7	4.5	5.0	5.2
Stability, min	8.5	10.4	10.5	11.7
MTI, BU	32	23	16	16



Lab Mill Vs. Pilot Mil

	1CWRS13.5 Pilot Mill	1CWRS13.5 Lab Mill	2CWRS13.5 Pilot Mill	2CWRS13.5 Lab Mill
P (height x 1.1), mm	94.0	77..0	111	84
L, mm	89	97	98	137
P/L	1.06	0.80	1.14	0.62
W (x 10E-4), J	299	320	371	355