

6-Jul-13
Final Tails Settling Tests

Equipment	Total Time	Final Tls %solid	Coagulant Strength (g/L)	Flocculant Strength (g/L)	Test No.	Coagulant (g/t)	Flocculant (g/t)
2L Beaker	15 minutes	36.5	1	1	1	4	15
					2	4	30
					3	6	15
					4	4	15
					5	6	30
					6	3	30
					7	0	0
					8	4	30

Note: Coagulant was added prior to flocculant in all the tests except for test No. 4 which flocculant was added first.

duplicate test of test No.2

Test Time (minutes)	Solid Level in beaker (ml)								%solid							
	Test 1	Test 2	Test 3	Test 4	Test 5	Test 6	Test 7	Test 8	Test 1	Test 2	Test 3	Test 4	Test 5	Test 6	Test 7	Test 8
0	1020	1060	1010	1080	1050	1060	1000	1020	36.5	36.5	36.5	36.5	36.5	36.5	36.5	36.5
1	1000	1020	970	1050	1000	1000	990	1000	37.2	37.9	36.5	37.5	38.3	38.7	36.9	37.2
2	990	980	960	1040	990	990	980	990	37.6	39.5	36.9	37.9	38.7	39.1	37.2	37.6
3	980	920	950	1025	980	980	940	970	38.0	42.1	37.3	38.5	39.1	39.5	38.8	38.4
4	970	890	940	1010	960	960	820	950	38.4	43.5	37.7	39.0	39.9	40.3	44.5	39.2
5	950	860	925	1000	940	940	900	930	39.2	45.0	38.3	39.4	40.8	41.2	40.6	40.0
6	930	840	910	990	930	920	895	910	40.0	46.1	38.9	39.8	41.2	42.1	40.8	40.9
10	890	790	880	960	880	880	860	860	41.8	49.0	40.2	41.1	43.6	44.0	42.4	43.3
15	820	760	840	900	810	810	830	805	45.4	50.9	42.1	43.8	47.3	47.8	44.0	46.2

7-Jul-13
Final Tails Settling Tests

Equipment	Total Time	Final Tls %solid	Coagulant Strength (g/L)	Flocculant Strength (g/L)	Test No.	Coagulant (g/t)	Flocculant (g/t)
1L Graduated Cylinder	20 minutes	36.5	1	1	1	4	15
					2	0	0
					3	4	30
					4	0	30
					5	6	30
					6	4	22.5
					7	3	30
					8	4	37.5
					9	4	30

Note: Coagulant was added prior to flocculant in all the tests.

duplicate test of test No.3

$$\text{Unit area (UA)} = \frac{t_u}{C_o H_o}$$

where

UA= unit area capacity, cm²/g/day

t_u= time to reach the required pulp density, day;

H_o= initial height, cm

C_o= initial density, g/ml

$$\text{UA} = \frac{0.00031 \text{ cm}^2/\text{g}/\text{day}}{0.333331 \text{ ft}^2/\text{t}/\text{day}} \quad (\text{use 20 minutes for calculation})$$

The diameter of the mag thickener is 13ft.

$$A = 132.7323 \text{ ft}^2$$

$$\text{Process tonnes} = 398.2 \text{ t}$$

Test Time (minutes)	Solid Level in Graduated Cylinder (ml)									%solid								
	Test 1	Test 2	Test 3	Test 4	Test 5	Test 6	Test 7	Test 8	Test 9	Test 1	Test 2	Test 3	Test 4	Test 5	Test 6	Test 7	Test 8	Test 9
0	1020	1020	1020	1020	1020	1020	1020	1020	1020	36.5	36.5	36.5	36.5	36.5	36.5	36.5	36.5	36.5
1	1010	1010	985	1008	1005	1000	998	1005	1000	36.9	36.9	37.8	36.9	37.0	37.2	37.3	37.0	37.2
2	1000	1005	965	1000	992	996	990	998	992	37.2	37.0	38.6	37.2	37.5	37.4	37.6	37.3	37.5
3	990	1000	945	990	980	988	978	980	980	37.6	37.2	39.4	37.6	38.0	37.7	38.1	38.0	38.0
4	986	1000	925	978	970	975	966	962	970	37.8	37.2	40.2	38.1	38.4	38.2	38.5	38.7	38.4
5	980	998	905	965	955	968	950	948	954	38.0	37.3	41.1	38.6	39.0	38.5	39.2	39.3	39.0
6	975	996	885	960	945	958	938	932	946	38.2	37.4	42.1	38.8	39.4	38.9	39.7	39.9	39.4
10	948	978	815	910	898	930	888	878	900	39.3	38.1	45.7	40.9	41.5	40.0	41.9	42.4	41.4
15	915	960	718	855	848	880	830	800	848	40.7	38.8	51.9	43.5	43.9	42.3	44.9	46.5	43.9
20	880	948	680	800	770	838	760	730	790	42.3	39.3	54.8	46.5	48.4	44.4	49.0	51.0	47.1

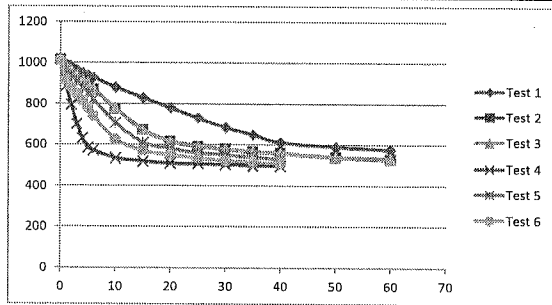
9-Jul-13
Final Tails Settling Tests

Equipment	Total Time	Final Tls %solid	Coagulant Strength (g/L)	Flocculant Strength (g/L)	Test No.	Coagulant (g/t)	Flocculant (g/t)
1L Graduated Cylinder	40-60 minutes	34.7	1	1	1	4	15
					2	4	30
					3	6	30
					4	4	37.5
					5	4	34
					6	4	37.5

Note: Coagulant was added prior to flocculant in all the tests.

duplicate test of test No.4

Test Time (minutes)	Solid Level in Graduated Cylinder (ml)						%solid					
	Test 1	Test 2	Test 3	Test 4	Test 5	Test 6	Test 1	Test 2	Test 3	Test 4	Test 5	Test 6
0	1010	1015	1020	1015	1015	1010	34.7	34.7	34.7	34.7	34.7	34.7
1	990	982	988	890	965	915	35.8	36.0	35.8	39.8	36.7	38.7
2	978	960	962	795	938	880	36.2	36.9	36.8	44.5	37.7	40.2
3	962	938	940	700	910	850	36.8	37.7	37.7	50.6	38.9	41.6
4	950	915	918	630	880	814	37.3	38.7	38.6	56.2	40.2	43.5
5	938	890	898	585	852	778	37.7	39.8	39.4	60.5	41.5	45.5
6	928	870	876	570	822	740	38.1	40.7	40.4	62.1	43.1	47.8
10	882	776	780	535	705	625	40.1	45.6	45.4	66.2	50.2	56.6
15	830	670	672	520	610	570	42.6	52.8	52.7	68.1	58.0	62.1
20	780	615	618	510	580	550	45.4	57.6	57.3	69.4	61.0	64.4
25	730	590	594	508	560	535	48.5	60.0	59.6	69.7	63.2	66.2
30	684	578	580	505	550	524	51.7	61.2	61.0	70.1	64.4	67.5
35	648	564	568	500	540	516	54.6	62.8	62.3	70.8	65.5	68.6
40	610	558	560	498	530	510	58.0	63.4	63.2	71.1	66.8	69.4
50	590	540	542				60.0	65.5	65.3			
60	575	530	535				61.6	66.8	66.2			



Final Tailings Settling Tests (Area Calculations)

(1 of 2)

6-Jul-13

Final Tails Settling Tests

Equipment	Total Time	Final Tls %solid	Coagulant Strength (g/L)	Flocculant Strength (g/L)	Test No.	Coagulant (g/t)	Flocculant (g/t)
2L Beaker	15 minutes	36.5	1	1	1	4	15
					2	4	30
					3	6	15
					4	4	15
					5	6	30
					6	3	30
					7	0	0
					8	4	30

Note: Coagulant was added prior to flocculant in all the tests except for test No. 4 which flocculant was added first.

duplicate test of test No.2

Test Time (minutes)	Solid Level in beaker (ml)								%solid							
	Test 1	Test 2	Test 3	Test 4	Test 5	Test 6	Test 7	Test 8	Test 1	Test 2	Test 3	Test 4	Test 5	Test 6	Test 7	Test 8
0	1020	1060	1010	1080	1050	1060	1000	1020	36.5	36.5	36.5	36.5	36.5	36.5	36.5	36.5
1	1000	1020	970	1050	1000	1000	990	1000	37.2	37.9	36.5	37.5	38.3	38.7	36.9	37.2
2	990	980	960	1040	990	990	980	990	37.6	39.5	36.9	37.9	38.7	39.1	37.2	37.6
3	980	920	950	1025	980	980	940	970	38.0	42.1	37.3	38.5	39.1	39.5	38.8	38.4
4	970	890	940	1010	960	960	820	950	38.4	43.5	37.7	39.0	39.9	40.3	44.5	39.2
5	950	860	925	1000	940	940	900	930	39.2	45.0	38.3	39.4	40.8	41.2	40.6	40.0
6	930	840	910	990	930	920	895	910	40.0	46.1	38.9	39.8	41.2	42.1	40.8	40.9
10	890	790	880	960	880	880	860	860	41.8	49.0	40.2	41.1	43.6	44.0	42.4	43.3
15	820	760	840	900	810	810	830	805	45.4	50.9	42.1	43.8	47.3	47.8	44.0	46.2

Test Time (minutes)	Unit Area Capacity		Process Tonnes
	cm ² /g/day	ft ² /t/day	
0			
5	7.7E-05	0.083	1593
6	9.3E-05	0.100	1327
10	1.5E-04	0.167	796
15	2.3E-04	0.250	531
20	3.1E-04	0.333	398
30	4.6E-04	0.500	265
40	6.2E-04	0.667	199
60	9.3E-04	1.000	133

7-Jul-13

Final Tails Settling Tests

Equipment	Total Time	Final Tls %solid	Coagulant Strength (g/L)	Flocculant Strength (g/L)	Test No.	Coagulant (g/t)	Flocculant (g/t)
1L Graduated Cylinder	20 minutes	36.5	1	1	1	4	15
					2	0	0
					3	4	30
					4	0	30
					5	6	30
					6	4	22.5
					7	3	30
					8	4	37.5
					9	4	30

Note: Coagulant was added prior to flocculant in all the tests.

$$\text{Unit area (UA)} = \frac{t_u}{C_o H_o}$$

where

- UA= unit area capacity, cm²/g/day
- t_u= time to reach the required pulp density, day;
- H_o= initial height, cm
- C_o= initial density, g/ml

$$\text{UA} = 0.00031 \text{ cm}^2/\text{g/day} \quad (\text{use 20 minutes for calculation})$$

$$0.333331 \text{ ft}^2/\text{t/day}$$

The diameter of the mag thickener is 13ft.

$$A = 132.7323 \text{ ft}^2$$

$$\text{Process tonnes} = 398.2 \text{ t}$$

Test Time (minutes)	Solid Level in Graduated Cylinder (ml)									%solid								
	Test 1	Test 2	Test 3	Test 4	Test 5	Test 6	Test 7	Test 8	Test 9	Test 1	Test 2	Test 3	Test 4	Test 5	Test 6	Test 7	Test 8	Test 9
0	1020	1020	1020	1020	1020	1020	1020	1020	1020	36.5	36.5	36.5	36.5	36.5	36.5	36.5	36.5	36.5
1	1010	1010	985	1008	1005	1000	998	1005	1000	36.9	36.9	37.8	36.9	37.0	37.2	37.3	37.0	37.2
2	1000	1005	965	1000	992	996	990	998	992	37.2	37.0	38.6	37.2	37.5	37.4	37.6	37.3	37.5
3	990	1000	945	990	980	988	978	980	980	37.6	37.2	39.4	37.6	38.0	37.7	38.1	38.0	38.0
4	986	1000	925	978	970	975	966	962	970	37.8	37.2	40.2	38.1	38.4	38.2	38.5	38.7	38.4
5	980	998	905	965	955	968	950	948	954	38.0	37.3	41.1	38.6	39.0	38.5	39.2	39.3	39.0
6	975	996	885	960	945	958	938	932	946	38.2	37.4	42.1	38.8	39.4	38.9	39.7	39.9	39.4
10	948	978	815	910	898	930	888	878	900	39.3	38.1	45.7	40.9	41.5	40.0	41.9	42.4	41.4
15	915	960	718	855	848	880	830	800	848	40.7	38.8	51.9	43.5	43.9	42.3	44.9	46.5	43.9
20	880	948	680	800	770	838	760	730	790	42.3	39.3	54.8	46.5	48.4	44.4	49.0	51.0	47.1

9-Jul-13

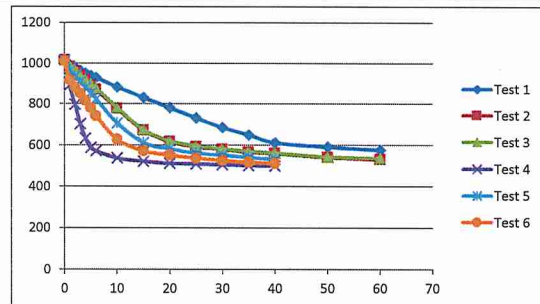
Final Tails Settling Tests

Equipment	Total Time	Final Tls %solid	Coagulant Strength (g/L)	Flocculant Strength (g/L)	Test No.	Coagulant (g/t)	Flocculant (g/t)
1L Graduated Cylinder	10-60 minute	34.7	1	1	1	4	15
					2	4	30
					3	6	30
					4	4	37.5
					5	4	34
					6	4	37.5

Note: Coagulant was added prior to flocculant in all the tests.

duplicate test of test No.4

Test Time (minutes)	Solid Level in Graduated Cylinder (ml)						%solid					
	Test 1	Test 2	Test 3	Test 4	Test 5	Test 6	Test 1	Test 2	Test 3	Test 4	Test 5	Test 6
0	1010	1015	1020	1015	1015	1010	34.7	34.7	34.7	34.7	34.7	34.7
1	990	982	988	890	965	915	35.8	36.0	35.8	39.8	36.7	38.7
2	978	960	962	795	938	880	36.2	36.9	36.8	44.5	37.7	40.2
3	962	938	940	700	910	850	36.8	37.7	37.7	50.6	38.9	41.6
4	950	915	918	630	880	814	37.3	38.7	38.6	56.2	40.2	43.5
5	938	890	898	585	852	778	37.7	39.8	39.4	60.5	41.5	45.5
6	928	870	876	570	822	740	38.1	40.7	40.4	62.1	43.1	47.8
10	882	776	780	535	705	625	40.1	45.6	45.4	66.2	50.2	56.6
15	830	670	672	520	610	570	42.6	52.8	52.7	68.1	58.0	62.1
20	780	615	618	510	580	550	45.4	57.6	57.3	69.4	61.0	64.4
25	730	590	594	508	560	535	48.5	60.0	59.6	69.7	63.2	66.2
30	684	578	580	505	550	524	51.7	61.2	61.0	70.1	64.4	67.5
35	648	564	568	500	540	516	54.6	62.8	62.3	70.8	65.5	68.6
40	610	558	560	498	530	510	58.0	63.4	63.2	71.1	66.8	69.4
50	590	540	542				60.0	65.5	65.3			
60	575	530	535				61.6	66.8	66.2			



10-Jul-13

Final Tails Settling Tests

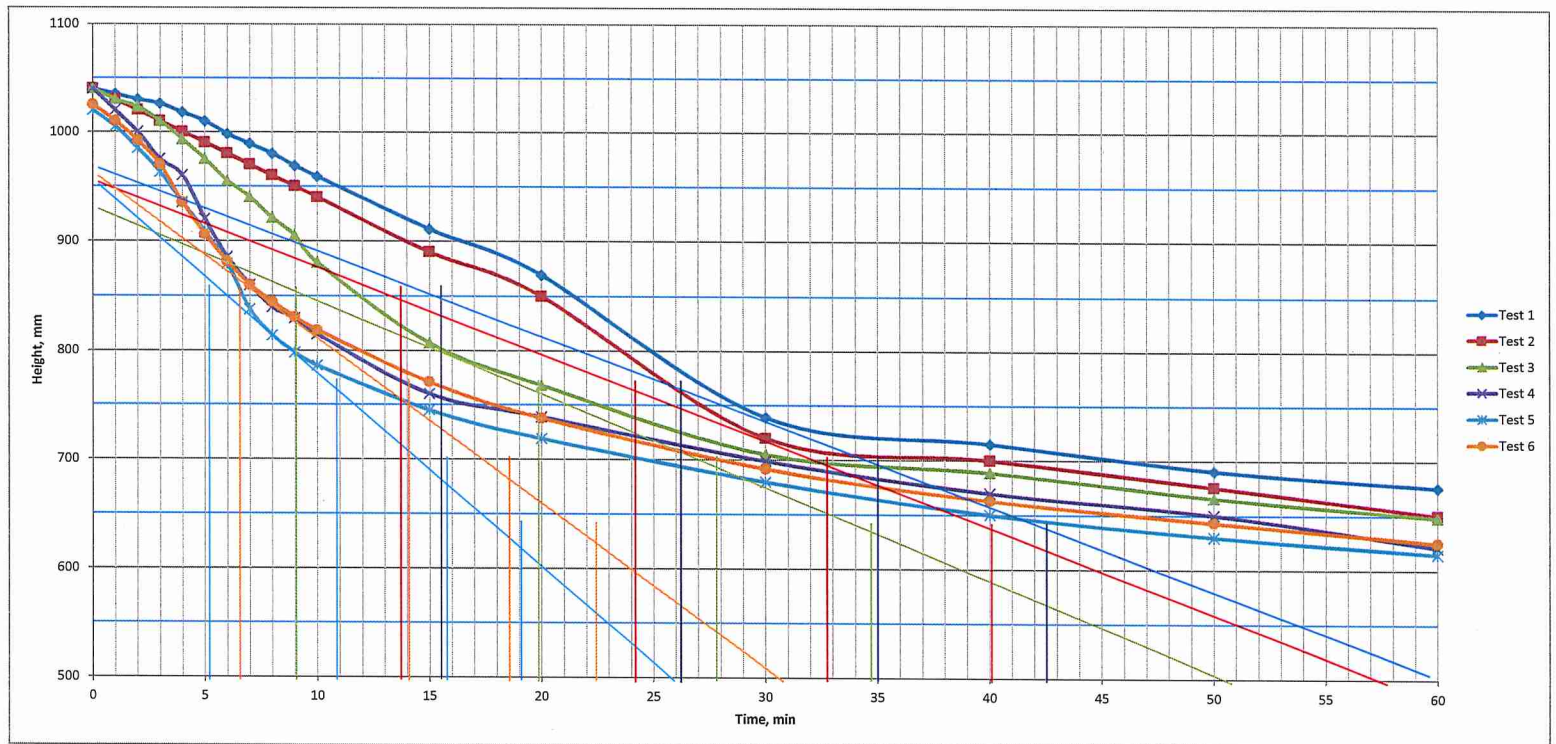
Equipment	Total Time	Final Tls %solid	Coagulant Strength (g/L)	Flocculant Strength (g/L)	Test No.	Coagulant (g/t)	Flocculant (g/t)
1L Graduated Cylinder	10-60 minute	37.5	1	1	1	4	15
		1.3			2	4	30
					3	6	30
					4	4	37.5
					5	4	34
					6	4	37.5

Note: Coagulant was added prior to flocculant in all the tests.

duplicate test of test No.4

Test Time (minutes)	Solid Level in Graduated Cylinder (ml)						%solid					
	Test 1	Test 2	Test 3	Test 4	Test 5	Test 6	Test 1	Test 2	Test 3	Test 4	Test 5	Test 6
0	1040	1040	1040	1040	1020	1025	37.5	37.5	37.5	37.5	37.5	37.5
1	1035	1030	1030	1020	1005	1010	37.7	37.9	37.9	38.2	38.1	38.1
2	1030	1020	1023	1000	985	992	37.9	38.2	38.1	39.0	38.8	38.7
3	1026	1010	1010	975	963	970	38.0	38.6	38.6	40.0	39.7	39.6
4	1018	1000	993	960	935	935	38.3	39.0	39.3	40.6	40.9	41.1
5	1010	990	975	920	908	906	38.6	39.4	40.0	42.4	42.1	42.4
6	998	980	955	885	879	881	39.1	39.8	40.8	44.1	43.5	43.6

7	989	970	940	860	838	860	39.4	40.2	41.5	45.3	45.6	44.7
8	980	960	921	840	814	845	39.8	40.6	42.3	46.4	47.0	45.5
9	969	950	905	830	798	831	40.2	41.1	43.1	47.0	47.9	46.3
10	959	940	880	815	786	819	40.7	41.5	44.3	47.9	48.7	46.9
15	911	890	807	760	745	771	42.8	43.8	48.3	51.3	51.3	49.9
20	869	850	768	739	719	738	44.9	45.9	50.8	52.8	53.2	52.1
30	739	720	705	699	680	692	52.8	54.2	55.3	55.8	56.3	55.5
40	715	700	689	670	650	663	54.5	55.7	56.6	58.2	58.8	58.0
50	691	676	666	650	630	643	56.4	57.7	58.6	60.0	60.7	59.8
60	676	650	648	621	615	625	57.7	60.0	60.2	62.8	62.2	61.5



Sol%	Test 1	Test 2	Test 3	Test 4,6	Test 5
45	13.9	12.1	8.2	6.8	5.2
50	25.2	23	18.5	12.4	10.1
55	34.3	32	26.9	17.1	14.2
60	42.1	39.6	33.8	21.2	17.6

Sol%	Test 1	Test 2	Test 3	Test 4,6	Test 5
45	0.0097	0.0084	0.0057	0.0047	0.0036
50	0.0175	0.0160	0.0128	0.0086	0.0070
55	0.0238	0.0222	0.0187	0.0119	0.0099
60	0.0292	0.0275	0.0235	0.0147	0.0122

Sol%	Test 1	Test 2	Test 3	Test 4,6	Test 5
45	0.2317	0.2017	0.1367	0.1133	0.0867
50	0.4200	0.3833	0.3083	0.2067	0.1683
55	0.5717	0.5333	0.4483	0.2850	0.2367
60	0.7017	0.6600	0.5633	0.3533	0.2933

Sol%	Test 1	Test 2	Test 3	Test 4,6	Test 5
45	572.9	658.2	971.2	1171.2	1531.5
50	316.0	346.3	430.5	642.3	788.5
55	232.2	248.9	296.1	465.7	560.8
60	189.2	201.1	235.6	375.7	452.5