

PARTICLE SIZING OF METHOCEL POWDER



Figure 1: Original image at 100X.



Figure 2: Artifacts and particles sectioned by the field of view are eliminated.

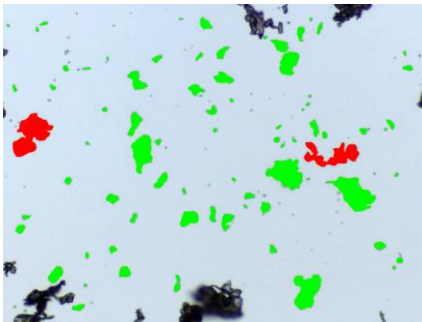


Figure 3: Rough particles (possibly connected particles) are isolated.

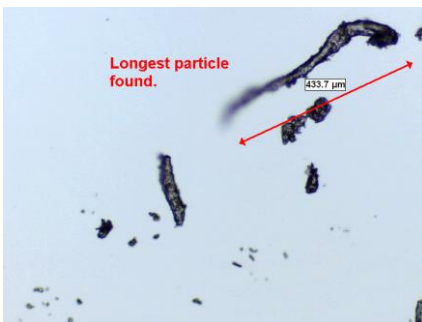


Figure 4: Longest particle found in the sample.

Sample Description

Methocel powder samples were submitted for analysis.

Purpose of Analysis

Demonstrate the ability of the Clemex Vision image analysis system can distinguish the particles, count them and measure their size and shape.

Procedure

The analysis is performed at 100X with transmitted light. The particles are binarized in red by gray thresholding. Small holes are filled using binary operations. Features which are too small to be representative and those sectioned by the field of view are eliminated.

Connected particles are isolated in the green bitplane using a sorting tool (Object Transfer by Limits) based on their irregular shape. The Separate binary tool is then applied to disconnect some touching particles.

Equipment

Image Analysis System:	Clemex Vision PE
Microscope:	Leica DM LM with transmitted light
Magnification:	100X
Stage:	Marzhauser Scan 75x50 WBK
Calibration:	1.2766 microns/pixel

Results

Area, Length, Circular Diameter, Sphericity, Aspect Ratio and Roughness measurements are performed on each particle. Automated statistics (including count) and graph are generated and cumulated for the whole analysis. Final results can be printed directly from Clemex Vision. Raw data are linked to their respective objects for validation. Raw data can also be exported in Excel format. Complete results are available in appendix.

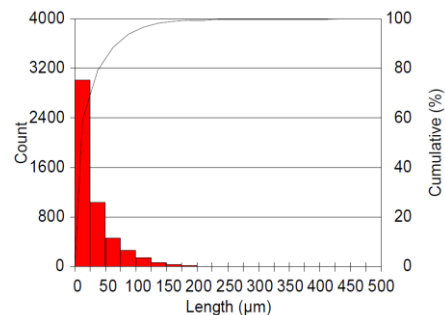


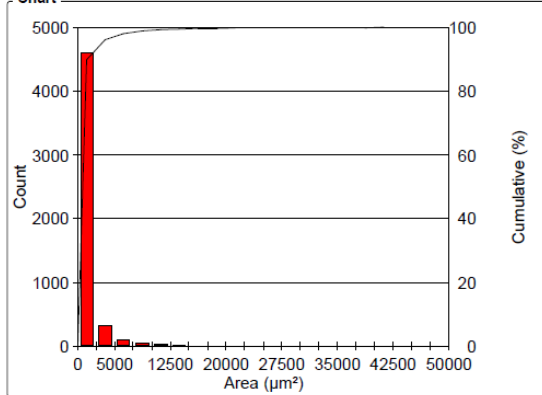
Figure 5: Length distribution of particles.

Appendix

OBJM1 Count - Area

Magn.: 100t Calib.: 1.2766 µm/pixel Bitplane: Particles

Chart



Values

Area Intervals (µm ²)	Count	%	Cumul%
0 - 2500	4602	89.88	89.88
2500 - 5000	319	6.23	96.11
5000 - 7500	97	1.89	98.01
7500 - 10000	45	0.88	98.89
10000 - 12500	19	0.37	99.26
12500 - 15000	13	0.25	99.51
15000 - 17500	6	0.12	99.63
17500 - 20000	8	0.16	99.79
20000 - 22500	2	0.04	99.82
22500 - 25000	5	0.10	99.92
25000 - 27500	0	0	99.92
27500 - 30000	2	0.04	99.96
30000 - 32500	1	0.02	99.98
32500 - 35000	0	0	99.98
35000 - 37500	0	0	99.98
37500 - 40000	0	0	99.98
40000 - 42500	1	0.02	100
42500 - 45000	0	0	100
45000 - 47500	0	0	100
47500 - 50000	0	0	100

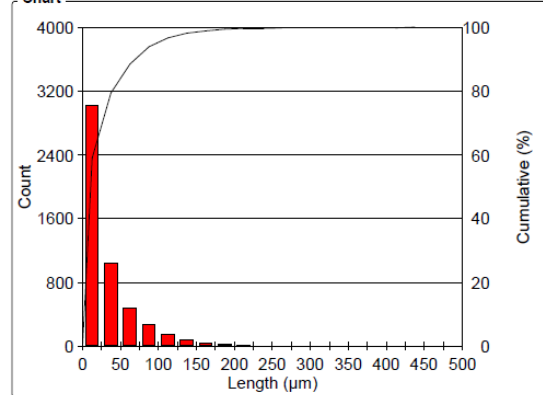
Statistics

Minimum:	6.5	µm ²
Maximum:	40845.1	µm ²
Mean:	913.8	µm ²
Std Dev.:	2238.1	µm ²
Sum:	4678825.8	µm ²
Count:	5120	
Under:	0	
Over:	0	
Accepted:	100	%
Field Count:	208	
Field Area:	709878.7	µm ²
Total Area:	147.7e+06	µm ²

OBJM1 Count - Length

Magn.: 100t Calib.: 1.2766 µm/pixel Bitplane: Particles

Chart



Values

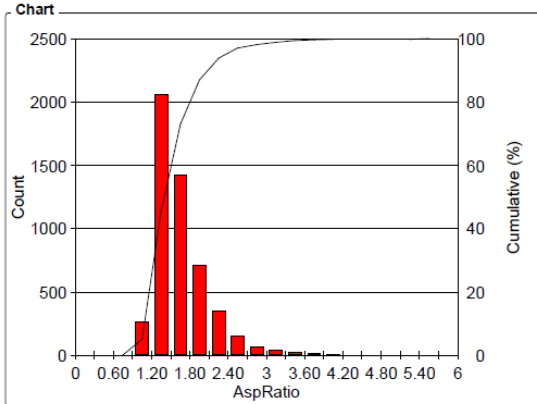
Length Intervals (µm)	Count	%	Cumul%
0 - 25	3025	59.08	59.08
25 - 50	1039	20.29	79.37
50 - 75	469	9.16	88.54
75 - 100	274	5.35	93.89
100 - 125	146	2.85	96.74
125 - 150	76	1.48	98.22
150 - 175	41	0.80	99.02
175 - 200	26	0.51	99.53
200 - 225	8	0.16	99.69
225 - 250	6	0.12	99.80
250 - 275	4	0.08	99.88
275 - 300	3	0.06	99.94
300 - 325	1	0.02	99.96
325 - 350	0	0	99.96
350 - 375	1	0.02	99.98
375 - 400	0	0	99.98
400 - 425	0	0	99.98
425 - 450	1	0.02	100
450 - 475	0	0	100
475 - 500	0	0	100

Statistics

Minimum:	5.1	µm
Maximum:	433.9	µm
Mean:	33.6	µm
Std Dev.:	36.5	µm
Sum:	171921.1	µm
Count:	5120	
Under:	0	
Over:	0	
Accepted:	100	%
Field Count:	208	
Field Area:	709878.7	µm ²
Total Area:	147.7e+06	µm ²

OBJM1 Count - AspRatio

Magn.: 100t Calib.: 1.2766 µm/pixel Bitplane: Particles


Values

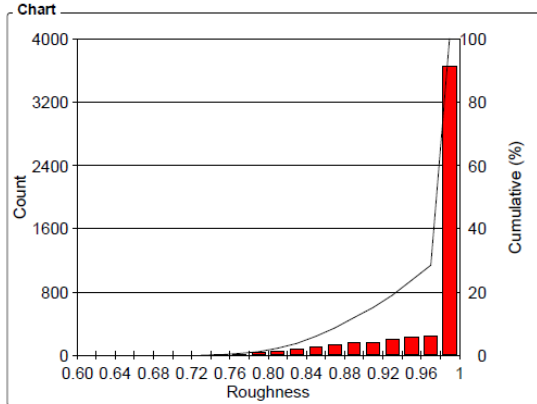
AspRatio Intervals	Count	%	Cumul%
0 - 0.30	0	0	0
0.30 - 0.60	0	0	0
0.60 - 0.90	0	0	0
0.90 - 1.20	264	5.16	5.16
1.20 - 1.50	2062	40.27	45.43
1.50 - 1.80	1423	27.79	73.22
1.80 - 2.10	714	13.95	87.17
2.10 - 2.40	348	6.80	93.96
2.40 - 2.70	157	3.07	97.03
2.70 - 3	63	1.23	98.26
3 - 3.30	40	0.78	99.04
3.30 - 3.60	21	0.41	99.45
3.60 - 3.90	10	0.20	99.65
3.90 - 4.20	9	0.18	99.82
4.20 - 4.50	4	0.08	99.90
4.50 - 4.80	3	0.06	99.96
4.80 - 5.10	0	0	99.96
5.10 - 5.40	0	0	99.96
5.40 - 5.70	2	0.04	100
5.70 - 6	0	0	100

Statistics

Minimum: 1.05
 Maximum: 5.62
 Mean: 1.66
 Std Dev.: 0.441
 Count: 5120
 Under: 0
 Over: 0
 Accepted: 100 %
 Field Count: 208
 Field Area: 709878.7 µm²
 Total Area: 147.7e+06 µm²

OBJM1 Count - Roughness

Magn.: 100t Calib.: 1.2766 µm/pixel Bitplane: Particles


Values

Roughness Intervals	Count	%	Cumul%
0.60 - 0.62	0	0	0
0.62 - 0.64	0	0	0
0.64 - 0.66	0	0	0
0.66 - 0.68	0	0	0
0.68 - 0.70	1	0.02	0.02
0.70 - 0.72	0	0	0.02
0.72 - 0.74	5	0.10	0.12
0.74 - 0.76	11	0.21	0.33
0.76 - 0.78	12	0.23	0.57
0.78 - 0.80	34	0.66	1.23
0.80 - 0.82	53	1.04	2.27
0.82 - 0.84	80	1.56	3.83
0.84 - 0.86	110	2.15	5.98
0.86 - 0.88	139	2.71	8.69
0.88 - 0.90	169	3.30	11.99
0.90 - 0.92	160	3.13	15.12
0.92 - 0.94	205	4.00	19.12
0.94 - 0.96	236	4.61	23.73
0.96 - 0.98	246	4.80	28.54
0.98 - 1	3659	71.46	100

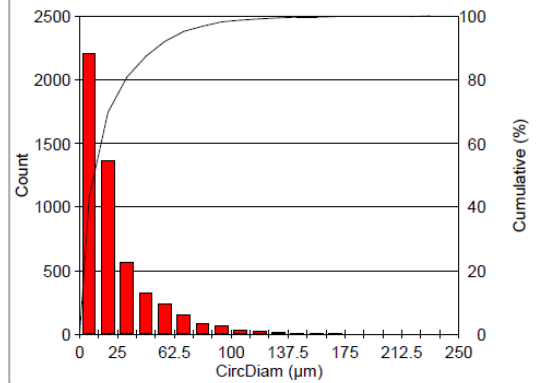
Statistics

Minimum: 0.70
 Maximum: 1
 Mean: 0.972
 Std Dev.: 0.051
 Count: 5120
 Under: 0
 Over: 0
 Accepted: 100 %
 Field Count: 208
 Field Area: 709878.7 µm²
 Total Area: 147.7e+06 µm²

OBJM1 Count - CircDiam

Magn.: 100t Calib.: 1.2766 µm/pixel Bitplane: Particles

Chart



Values

CircDiam Intervals (µm)	Count	%	Cumul%
0 - 12.5	2210	43.16	43.16
12.5 - 25	1368	26.72	69.88
25 - 37.5	571	11.15	81.04
37.5 - 50	327	6.39	87.42
50 - 62.5	240	4.69	92.11
62.5 - 75	157	3.07	95.18
75 - 87.5	87	1.70	96.88
87.5 - 100	70	1.37	98.24
100 - 112.5	32	0.63	98.87
112.5 - 125	19	0.37	99.24
125 - 137.5	13	0.25	99.49
137.5 - 150	8	0.16	99.65
150 - 162.5	8	0.16	99.80
162.5 - 175	5	0.10	99.90
175 - 187.5	1	0.02	99.92
187.5 - 200	3	0.06	99.98
200 - 212.5	0	0	99.98
212.5 - 225	0	0	99.98
225 - 237.5	1	0.02	100
237.5 - 250	0	0	100

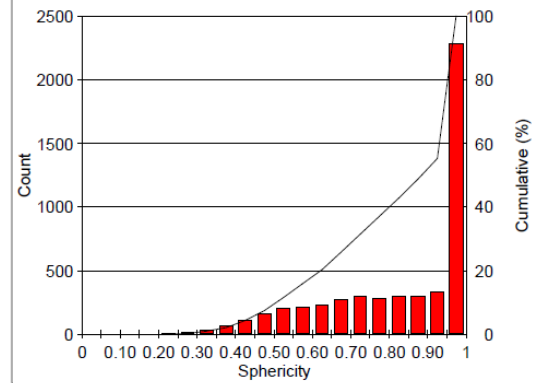
Statistics

Minimum:	2.9	µm
Maximum:	228.0	µm
Mean:	23.9	µm
Std Dev.:	24.3	µm
Sum:	122388.4	µm
Count:	5120	
Under:	0	
Over:	0	
Accepted:	100	%
Field Count:	208	
Field Area:	709878.7	µm ²
Total Area:	147.7e+06	µm ²

OBJM1 Count - Sphericity

Magn.: 100t Calib.: 1.2766 µm/pixel Bitplane: Particles

Chart



Values

Sphericity Intervals	Count	%	Cumul%
0 - 0.05	0	0	0
0.05 - 0.10	0	0	0
0.10 - 0.15	0	0	0
0.15 - 0.20	1	0.02	0.02
0.20 - 0.25	6	0.12	0.14
0.25 - 0.30	11	0.21	0.35
0.30 - 0.35	33	0.64	1.00
0.35 - 0.40	62	1.21	2.21
0.40 - 0.45	115	2.25	4.45
0.45 - 0.50	161	3.14	7.60
0.50 - 0.55	206	4.02	11.62
0.55 - 0.60	215	4.20	15.82
0.60 - 0.65	232	4.53	20.35
0.65 - 0.70	275	5.37	25.72
0.70 - 0.75	295	5.76	31.48
0.75 - 0.80	286	5.59	37.07
0.80 - 0.85	300	5.86	42.93
0.85 - 0.90	304	5.94	48.87
0.90 - 0.95	330	6.45	55.31
0.95 - 1	2288	44.69	100

Statistics

Minimum:	0.18	
Maximum:	1	
Mean:	0.833	
Std Dev.:	0.191	
Count:	5120	
Under:	0	
Over:	0	
Accepted:	100	%
Field Count:	208	
Field Area:	709878.7	µm ²
Total Area:	147.7e+06	µm ²