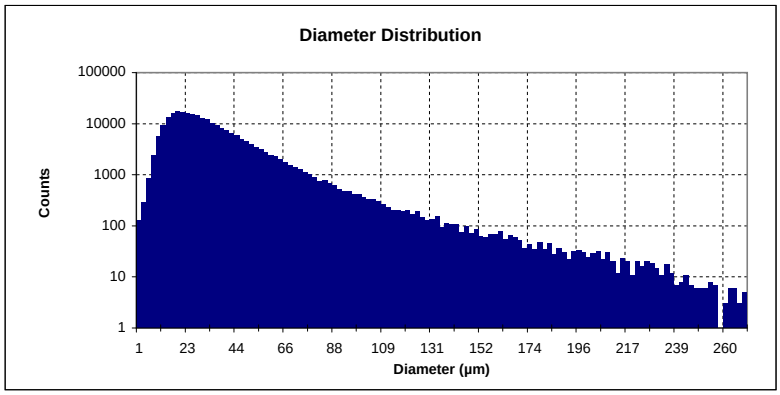

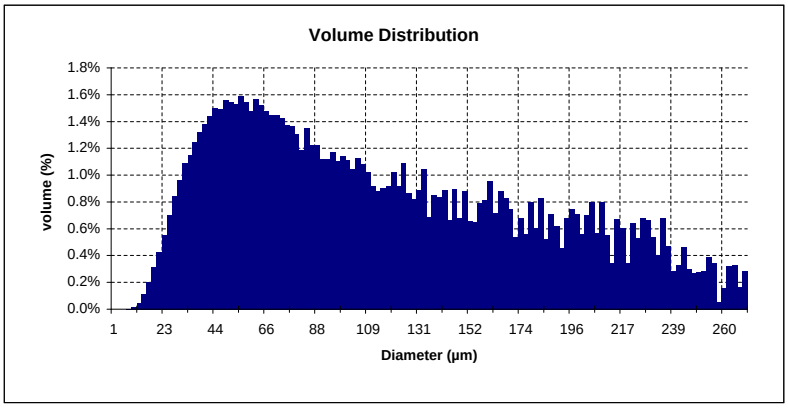

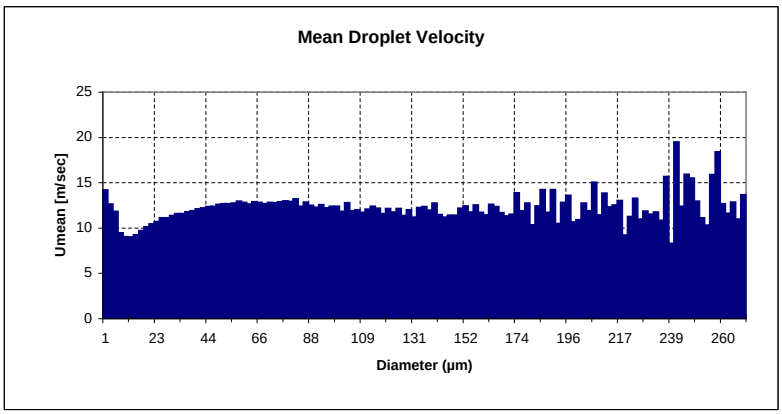

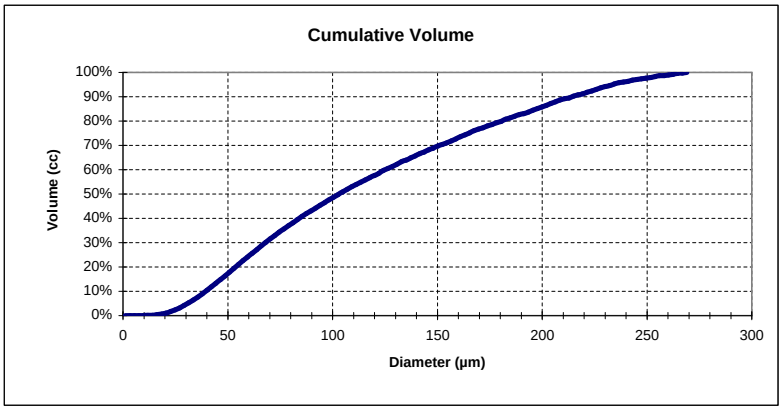

spray research, inc.

PDPA CompositeTest Results

FiberPDA Analysis System, 2.3
Dantec/Invent Measurement Technology

Test Number:	0245_36_01 to 05
Date:	05/02/03
Reference:	srl 0245
Nozzle:	FM-10 [Sample 3]

Liquid

Pressure:	38.10	[psig]
Flow:	4.0	[gpm]

Gas

Pressure:	40.4	[psig]
Flow:	62.8	[scfm]
Air/Liquid mass ratio:	0.14:1	

Traverse:

x-position:	126 to 225	mm
y- position:	0.0	mm
z-position:	300.0	mm

System type:	Laser Phase Doppler
Sample type:	Temporal
Data report per:	ASTM E799-92
Fluid code:	IWS0001
Fluid n(*relative*):	1.3340

Notes:
SSCo FM-10 [Sample 3]
4.03 [gpm] at 40.4 [psig] air pressure
0.0

Sample Analysis Summary

(diameters in µm)

Means

Arithmetic (D10):	34
Surface (D20):	41
Volume (D30):	51
Evaporative (D31):	63
Sauter (D32):	79
Herden (D43):	117

Volume percentiles

DV0.1 (10%):	40
DV0.2 (20%):	53
DV0.3 (30%):	68
DV0.4 (40%):	83
DV0.5 (50%):	103
DV0.6 (60%):	124
DV0.632 (***X***):	133
DV0.7 (70%):	152
DV0.8 (80%):	180
DV0.9 (90%):	215
DV0.99 (99%):	262
Span	1.70

System Performance Summary

Validation

Velocity:	98%	
Diameter:	96%	
Data Rate:	6.51	kHz

Velocity

Mean:	11.8	m/sec
RMS:	6.3	m/sec
Skew:	0.56	m/sec
Flatness:	3.3	m/sec

Sample

Conc.:	7918	[particles/cm^3]
Flux:	0.374	[cm^3/cm^2/sec]

spray research, inc

PDPA Composite Test Results

FiberPDA Analysis System, 2.3
Dantec/Invent Measurement Technology

Test Numbers: 0245_36_01 to 05
Date: 05/02/03
Reference: srl 0245

Class	Bin Ranges Lower		Upper	Count	Area	Cum.Area	Volume	Cum.Vol.	Percent Volume%	Cum.Vol.%	Umean_x
0	0	-	2.2	127	4.7E-06	0.000	8.4E-11	8.4E-11	0.00%	0.0%	14.02
1	2.3	-	4.3	285	9.7E-05	0.000	5.3E-09	5.4E-09	0.00%	0.0%	12.47
2	4.4	-	6.5	864	8.1E-04	0.001	7.3E-08	7.9E-08	0.00%	0.0%	11.66
3	6.6	-	8.6	2408	4.4E-03	0.005	5.6E-07	6.3E-07	0.00%	0.0%	9.29
4	8.7	-	10.8	5647	1.7E-02	0.022	2.8E-06	3.4E-06	0.02%	0.0%	8.85
5	10.9	-	13.0	9449	4.2E-02	0.064	8.4E-06	1.2E-05	0.05%	0.1%	8.81
6	13.1	-	15.1	13231	8.3E-02	0.147	1.9E-05	3.1E-05	0.11%	0.2%	9.09
7	15.2	-	17.3	15776	1.3E-01	0.278	3.5E-05	6.7E-05	0.20%	0.4%	9.54
8	17.4	-	19.4	17087	1.8E-01	0.460	5.6E-05	1.2E-04	0.31%	0.7%	9.96
9	19.5	-	21.6	16570	2.2E-01	0.680	7.6E-05	2.0E-04	0.43%	1.1%	10.26
10	21.7	-	23.8	16004	2.6E-01	0.940	9.8E-05	3.0E-04	0.55%	1.7%	10.54
11	23.9	-	25.9	15404	3.0E-01	1.240	1.2E-04	4.2E-04	0.70%	2.4%	10.94
12	26.0	-	28.1	14474	3.3E-01	1.572	1.5E-04	5.7E-04	0.84%	3.2%	10.93
13	28.2	-	30.2	13123	3.5E-01	1.924	1.7E-04	7.4E-04	0.96%	4.2%	11.18
14	30.3	-	32.4	12013	3.7E-01	2.295	1.9E-04	9.4E-04	1.09%	5.3%	11.41
15	32.5	-	34.6	10375	3.7E-01	2.662	2.0E-04	1.1E-03	1.15%	6.4%	11.39
16	34.7	-	36.7	9284	3.7E-01	3.033	2.2E-04	1.4E-03	1.24%	7.7%	11.62
17	36.8	-	38.9	8286	3.7E-01	3.406	2.4E-04	1.6E-03	1.32%	9.0%	11.74
18	39.0	-	41.0	7320	3.7E-01	3.775	2.5E-04	1.8E-03	1.38%	10.4%	11.94
19	41.1	-	43.2	6520	3.6E-01	4.139	2.6E-04	2.1E-03	1.44%	11.8%	12.04
20	43.3	-	45.4	5838	3.6E-01	4.499	2.7E-04	2.4E-03	1.50%	13.3%	12.18
21	45.5	-	47.5	5055	3.4E-01	4.842	2.7E-04	2.6E-03	1.50%	14.8%	12.20
22	47.6	-	49.7	4605	3.4E-01	5.185	2.8E-04	2.9E-03	1.56%	16.4%	12.44
23	49.8	-	51.8	3992	3.2E-01	5.509	2.7E-04	3.2E-03	1.54%	17.9%	12.50
24	51.9	-	54.0	3490	3.1E-01	5.816	2.7E-04	3.5E-03	1.53%	19.4%	12.49
25	54.1	-	56.2	3218	3.1E-01	6.123	2.8E-04	3.7E-03	1.59%	21.0%	12.58
26	56.3	-	58.3	2792	2.9E-01	6.411	2.7E-04	4.0E-03	1.55%	22.6%	12.77
27	58.4	-	60.5	2385	2.6E-01	6.676	2.6E-04	4.3E-03	1.48%	24.1%	12.63
28	60.6	-	62.6	2272	2.7E-01	6.947	2.8E-04	4.6E-03	1.57%	25.6%	12.48
29	62.7	-	64.8	1994	2.5E-01	7.202	2.7E-04	4.8E-03	1.52%	27.1%	12.70
30	64.9	-	67.0	1746	2.4E-01	7.440	2.6E-04	5.1E-03	1.47%	28.6%	12.63
31	67.1	-	69.1	1557	2.3E-01	7.667	2.6E-04	5.3E-03	1.45%	30.1%	12.51
32	69.2	-	71.3	1416	2.2E-01	7.887	2.6E-04	5.6E-03	1.45%	31.5%	12.63
33	71.4	-	73.4	1274	2.1E-01	8.096	2.5E-04	5.9E-03	1.43%	32.9%	12.59
34	73.5	-	75.6	1128	2.0E-01	8.294	2.4E-04	6.1E-03	1.38%	34.3%	12.72
35	75.7	-	77.8	1023	1.9E-01	8.483	2.4E-04	6.3E-03	1.36%	35.7%	12.80
36	77.9	-	79.9	900	1.8E-01	8.659	2.3E-04	6.6E-03	1.30%	37.0%	12.76
37	80.0	-	82.1	754	1.6E-01	8.814	2.1E-04	6.8E-03	1.18%	38.2%	13.03
38	82.2	-	84.2	797	1.7E-01	8.988	2.4E-04	7.0E-03	1.35%	39.5%	12.22
39	84.3	-	86.4	668	1.5E-01	9.141	2.2E-04	7.2E-03	1.22%	40.7%	12.68
40	86.5	-	88.6	618	1.5E-01	9.289	2.2E-04	7.5E-03	1.22%	42.0%	12.31
41	88.7	-	90.7	527	1.3E-01	9.423	2.0E-04	7.7E-03	1.12%	43.1%	12.12
42	90.8	-	92.9	490	1.3E-01	9.552	2.0E-04	7.9E-03	1.12%	44.2%	12.41
43	93.0	-	95.0	479	1.3E-01	9.685	2.1E-04	8.1E-03	1.17%	45.4%	12.04
44	95.1	-	97.2	421	1.2E-01	9.808	2.0E-04	8.3E-03	1.10%	46.5%	12.20
45	97.3	-	99.4	408	1.2E-01	9.932	2.0E-04	8.5E-03	1.14%	47.6%	12.23
46	99.5	-	101.5	373	1.2E-01	10.050	2.0E-04	8.7E-03	1.12%	48.7%	11.65
47	101.6	-	103.7	329	1.1E-01	10.159	1.9E-04	8.8E-03	1.05%	49.8%	12.62
48	103.8	-	105.8	332	1.1E-01	10.274	2.0E-04	9.0E-03	1.13%	50.9%	11.71
49	105.9	-	108.0	300	1.1E-01	10.381	1.9E-04	9.2E-03	1.08%	52.0%	11.82
50	108.1	-	110.2	268	1.0E-01	10.482	1.8E-04	9.4E-03	1.03%	53.0%	11.54
51	110.3	-	112.3	227	8.8E-02	10.570	1.6E-04	9.6E-03	0.92%	53.9%	11.90
52	112.4	-	114.5	205	8.3E-02	10.653	1.6E-04	9.7E-03	0.88%	54.8%	12.22
53	114.6	-	116.6	199	8.4E-02	10.736	1.6E-04	9.9E-03	0.91%	55.7%	12.00
54	116.7	-	118.8	191	8.3E-02	10.820	1.6E-04	1.0E-02	0.92%	56.7%	11.40
55	118.9	-	121.0	202	9.1E-02	10.911	1.8E-04	1.0E-02	1.03%	57.7%	11.99
56	121.1	-	123.1	172	8.1E-02	10.991	1.6E-04	1.0E-02	0.92%	58.6%	11.60
57	123.2	-	125.3	193	9.4E-02	11.085	1.9E-04	1.1E-02	1.09%	59.7%	11.97
58	125.4	-	127.4	145	7.3E-02	11.158	1.5E-04	1.1E-02	0.86%	60.6%	11.19
59	127.5	-	129.6	131	6.8E-02	11.226	1.5E-04	1.1E-02	0.82%	61.4%	11.84
60	129.7	-	131.8	135	7.2E-02	11.298	1.6E-04	1.1E-02	0.89%	62.3%	11.03
61	131.9	-	133.9	151	8.4E-02	11.382	1.9E-04	1.1E-02	1.04%	63.3%	12.08
62	134.0	-	136.1	95	5.4E-02	11.437	1.2E-04	1.1E-02	0.69%	64.0%	12.20
63	136.2	-	138.2	112	6.6E-02	11.503	1.5E-04	1.2E-02	0.85%	64.9%	11.78
64	138.3	-	140.4	105	6.4E-02	11.567	1.5E-04	1.2E-02	0.84%	65.7%	12.57

65	140.5	-	142.6	106	6.7E-02	0.067	1.6E-04	1.2E-02	0.89%	66.6%	11.30
66	142.7	-	144.7	76	4.9E-02	0.116	1.2E-04	1.2E-02	0.66%	67.2%	11.01
67	144.8	-	146.9	98	6.5E-02	0.181	1.6E-04	1.2E-02	0.90%	68.1%	11.22
68	147.0	-	149.0	71	4.9E-02	0.230	1.2E-04	1.2E-02	0.68%	68.8%	11.22
69	149.1	-	151.2	88	6.2E-02	0.293	1.6E-04	1.2E-02	0.88%	69.7%	12.01
70	151.3	-	153.4	63	4.6E-02	0.339	1.2E-04	1.2E-02	0.66%	70.4%	12.25
71	153.5	-	155.5	60	4.5E-02	0.384	1.2E-04	1.3E-02	0.65%	71.0%	11.57
72	155.6	-	157.7	70	5.4E-02	0.438	1.4E-04	1.3E-02	0.79%	71.8%	12.37
73	157.8	-	159.8	69	5.5E-02	0.492	1.4E-04	1.3E-02	0.81%	72.6%	11.54
74	159.9	-	162.0	78	6.3E-02	0.556	1.7E-04	1.3E-02	0.96%	73.6%	11.26
75	162.1	-	164.2	56	4.7E-02	0.603	1.3E-04	1.3E-02	0.72%	74.3%	12.43
76	164.3	-	166.3	66	5.7E-02	0.659	1.6E-04	1.3E-02	0.88%	75.2%	12.17
77	166.4	-	168.5	60	5.3E-02	0.712	1.5E-04	1.4E-02	0.83%	76.0%	11.50
78	168.6	-	170.6	52	4.7E-02	0.759	1.3E-04	1.4E-02	0.75%	76.7%	11.16
79	170.7	-	172.8	36	3.3E-02	0.792	9.6E-05	1.4E-02	0.54%	77.3%	11.32
80	172.9	-	175.0	44	4.2E-02	0.834	1.2E-04	1.4E-02	0.68%	78.0%	13.70
81	175.1	-	177.1	35	3.4E-02	0.868	1.0E-04	1.4E-02	0.56%	78.5%	11.72
82	177.2	-	179.3	48	4.8E-02	0.916	1.4E-04	1.4E-02	0.80%	79.3%	12.58
83	179.4	-	181.4	35	3.6E-02	0.952	1.1E-04	1.4E-02	0.61%	79.9%	10.17
84	181.5	-	183.6	46	4.8E-02	1.000	1.5E-04	1.4E-02	0.82%	80.8%	12.24
85	183.7	-	185.8	28	3.0E-02	1.030	9.2E-05	1.4E-02	0.52%	81.3%	14.04
86	185.9	-	187.9	37	4.1E-02	1.071	1.3E-04	1.5E-02	0.71%	82.0%	11.53
87	188.0	-	190.1	31	3.5E-02	1.106	1.1E-04	1.5E-02	0.62%	82.6%	14.07
88	190.2	-	192.2	22	2.5E-02	1.131	8.1E-05	1.5E-02	0.45%	83.1%	10.31
89	192.3	-	194.4	32	3.8E-02	1.168	1.2E-04	1.5E-02	0.68%	83.7%	12.65
90	194.5	-	196.6	34	4.1E-02	1.209	1.3E-04	1.5E-02	0.75%	84.5%	13.42
91	196.7	-	198.7	31	3.8E-02	1.247	1.3E-04	1.5E-02	0.71%	85.2%	10.50
92	198.8	-	200.9	24	3.0E-02	1.278	1.0E-04	1.5E-02	0.56%	85.8%	10.74
93	201.0	-	203.0	29	3.7E-02	1.315	1.3E-04	1.5E-02	0.70%	86.5%	12.56
94	203.1	-	205.2	32	4.2E-02	1.357	1.4E-04	1.6E-02	0.80%	87.3%	11.71
95	205.3	-	207.4	22	2.9E-02	1.386	1.0E-04	1.6E-02	0.57%	87.8%	14.87
96	207.5	-	209.5	30	4.1E-02	1.427	1.4E-04	1.6E-02	0.80%	88.6%	11.28
97	209.6	-	211.7	20	2.8E-02	1.455	9.8E-05	1.6E-02	0.55%	89.2%	13.68
98	211.8	-	213.8	12	1.7E-02	1.472	6.1E-05	1.6E-02	0.34%	89.5%	12.15
99	213.9	-	216.0	23	3.3E-02	1.505	1.2E-04	1.6E-02	0.67%	90.2%	12.37
100	216.1	-	218.2	20	3.0E-02	1.535	1.1E-04	1.6E-02	0.60%	90.8%	12.85
101	218.3	-	220.3	11	1.7E-02	1.552	6.1E-05	1.6E-02	0.34%	91.2%	9.05
102	220.4	-	222.5	20	3.1E-02	1.582	1.1E-04	1.6E-02	0.64%	91.8%	11.08
103	222.6	-	224.6	16	2.5E-02	1.608	9.4E-05	1.6E-02	0.53%	92.3%	13.10
104	224.7	-	226.8	20	3.2E-02	1.640	1.2E-04	1.7E-02	0.68%	93.0%	10.82
105	226.9	-	229.0	19	3.1E-02	1.671	1.2E-04	1.7E-02	0.66%	93.7%	11.69
106	229.1	-	231.1	15	2.5E-02	1.696	9.6E-05	1.7E-02	0.54%	94.2%	11.34
107	231.2	-	233.3	11	1.9E-02	1.714	7.2E-05	1.7E-02	0.41%	94.6%	11.57
108	233.4	-	235.4	18	3.1E-02	1.745	1.2E-04	1.7E-02	0.68%	95.3%	10.65
109	235.5	-	237.6	12	2.1E-02	1.766	8.3E-05	1.7E-02	0.47%	95.8%	15.52
110	237.7	-	239.8	7	1.3E-02	1.779	5.0E-05	1.7E-02	0.28%	96.0%	8.11
111	239.9	-	241.9	8	1.5E-02	1.793	5.9E-05	1.7E-02	0.33%	96.4%	19.31
112	242.0	-	244.1	11	2.0E-02	1.814	8.3E-05	1.7E-02	0.47%	96.8%	12.23
113	244.2	-	246.2	7	1.3E-02	1.827	5.4E-05	1.7E-02	0.30%	97.1%	15.74
114	246.3	-	248.4	6	1.2E-02	1.839	4.8E-05	1.7E-02	0.27%	97.4%	15.33
115	248.5	-	250.6	6	1.2E-02	1.850	4.9E-05	1.7E-02	0.27%	97.7%	12.78
116	250.7	-	252.7	6	1.2E-02	1.862	5.0E-05	1.7E-02	0.28%	98.0%	10.94
117	252.8	-	254.9	8	1.6E-02	1.878	6.9E-05	1.7E-02	0.39%	98.3%	10.12
118	255.0	-	257.0	7	1.4E-02	1.893	6.1E-05	1.8E-02	0.35%	98.7%	15.70
119	257.1	-	259.2	1	2.1E-03	1.895	9.0E-06	1.8E-02	0.05%	98.7%	18.21
120	259.3	-	261.4	3	6.4E-03	1.901	2.8E-05	1.8E-02	0.16%	98.9%	12.52
121	261.5	-	263.5	6	1.3E-02	1.914	5.7E-05	1.8E-02	0.32%	99.2%	11.43
122	263.6	-	265.7	6	1.3E-02	1.928	5.8E-05	1.8E-02	0.33%	99.5%	12.67
123	265.8	-	267.8	3	6.7E-03	1.934	3.0E-05	1.8E-02	0.17%	99.7%	10.82
124	267.9	-	270.0	5	1.1E-02	1.946	5.1E-05	1.8E-02	0.29%	100.0%	13.49
				249875							

System Parameters

Transmitter

Fringe spacing(µm):	5.4219
Number of fringes:	59
Wavelength (nm):	514.5
Gauss. beam diam (mm):	0.82
Beam collimator:	1.0
Beam expander:	1.0
Beam separation (mm):	38
Lens focal length (mm):	400

Receiver

Aperture plate:	B
Scattering angle (°):	45
Focal length (mm):	400
Beam expander:	1.0
Polarization angle (°):	0
Fringe direction:	Negative
Polarization orientation:	Parallel
Fringe rotation angle (°):	0

Validation

Signal level validation:	YES
Validation level (db):	-6
Ux velocity validation:	ON
Fringe count low limit:	0
Fringe count high limit:	177
Diameter level validation:	YES
Maximum phase error (°):	15
Spherical validation:	YES
Max spherical deviation:	35

Bandwidth

Range (µm):	0-303	Bandwidth:	12
Mode:	Refraction	Gain:	Low