



## Applications Data Sheet

### MEASUREMENT OF INK DISPERSIONS WITH THE *PARTICA* LA-960

#### Summary

Inks are a liquid dispersion of pigments for writing or printing. The product is a mixture of a number of components, the majority being the pigment particles in some liquid carrier. A number of additives are usually included to modify viscosity, drying, stability, or color characteristics. Particle size of the pigment particles can significantly affect the color strength, surface finish, and durability of the final product.

#### Analytical test method

RI (particle): Varies, depending on the composition of the pigment. Example data shows 1.50-0.10i

Dispersant fluid: Varies, commonly dispersed in water, but many applications require an organic solvent, surfactant may be required.

Sonication: Not generally necessary as the ink is a well-dispersed and stable dispersion

Circulation speed: 2

Agitation speed: 2, continuous

Notes: Generally easy to run. Add sample directly to flow system at sufficient concentration to obtain proper light transmission values. Wait for mixing and start measurements.

#### Example data

See following pages for data printouts.

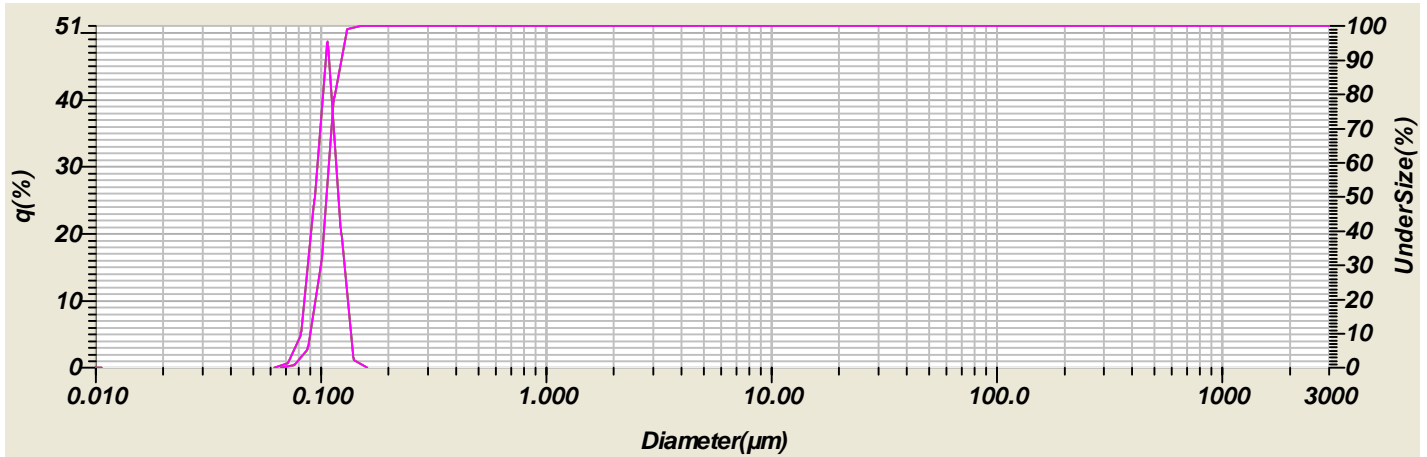
#### Median Diameter ( $\mu\text{m}$ )

Sample ID	Run #1	Run #2	Run #3	Average
Spray Ink	0.106	0.106	0.106	0.106

Discussion: With the stable dispersion, the repeatability was perfect, showing the stability of the LA-960's optical system. The small size measurement capability also can be demonstrated with these fine dispersions.

# Horiba LA960 for Windows [Wet] Ver2.00

Sample Name : COLOR WONDER SPRAY INK  
 Ultra Sonic : 00:03 (7)  
 Circulation Speed : 3  
 Agitation Speed : OFF  
 Distribution Base : Volume  
 Refractive Index (R) : INK[INK( 1.500 - 0.100i),Water( 1.333)]  
 Refractive Index (B) : INK[INK( 1.500 - 0.100i),Water( 1.333)]  
 Iteration Number : 150



Data Name	Graph Type	Sample Name	Median Size	Std.Dev.
200511011226001	<span style="color: red;">█</span>	COLOR WONDER SPRAY INK	0.10583(μm)	0.0120(μm)
200511011227002	<span style="color: green;">█</span>	COLOR WONDER SPRAY INK	0.10583(μm)	0.0120(μm)
200511011227003	<span style="color: magenta;">█</span>	COLOR WONDER SPRAY INK	0.10574(μm)	0.0120(μm)

# HORIBA LA-960 Laser Scattering Particle Size Distribution Analyzer

HORIBA LA960 for Windows [Wet] Ver2.00

ID# : 200511011226001  
 Sample Name : COLOR WONDER SPRAY I  
 Material : INK  
 Lot Number :  
 Project Name : 200510111114087.ngb

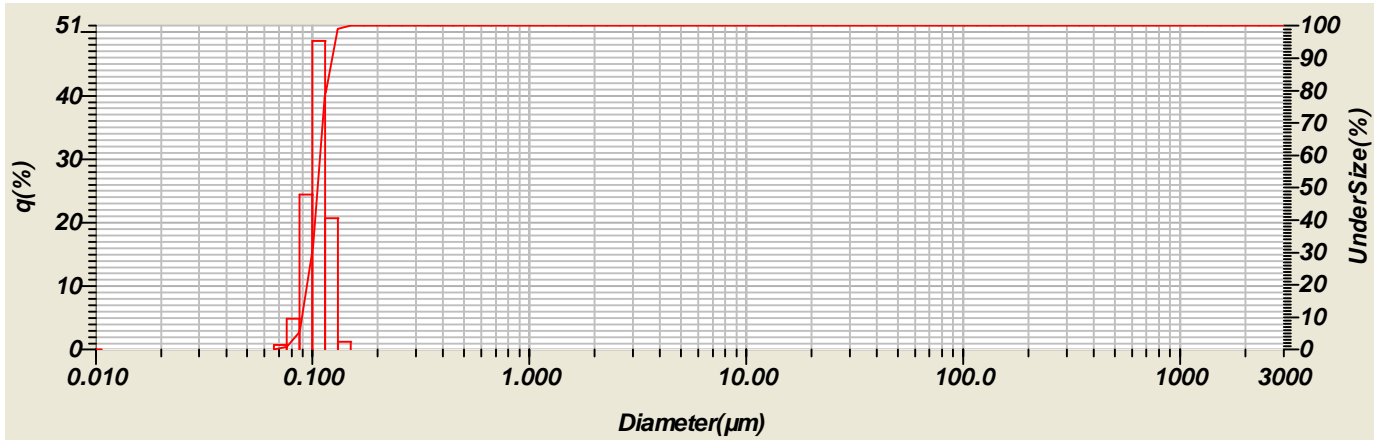
Transmittance(R) : 97.0(%)  
 Transmittance(B) : 85.3(%)  
 Circulation Speed : 3  
 Ultrasonic Time : 1 min.  
 Ultrasonic Power : 7  
 Agitation Speed : 2

**Median Size : 0.10583(μm)**  
**Mean Size : 0.10585(μm)**  
**Mode Size : 0.1065(μm)**  
**Std.Dev. : 0.0120(μm)**  
 Form of Distribution : Auto  
 Iteration Number : ---  
 Distribution Base : Volume

Refractive Index (R) : INK[INK( 1.500 - 0.100i),Water( 1.333)]  
 Refractive Index (B) : INK[INK( 1.500 - 0.100i),Water( 1.333)]

Diameter on Cumulative % : (2)10.00 (%) - 0.0896(μm)  
 : (9)90.00 (%) - 0.1237(μm)

Cumulative % on Diameter : (1)850.0 (μm)- 100.000(%) : (4)300.0 (μm)- 100.000(%) : (7)106.0 (μm)- 100.000(%) : (10)38.00 (μm)- 100.000(%)  
 : (2)600.0 (μm)- 100.000(%) : (5)212.0 (μm)- 100.000(%) : (8)75.00 (μm)- 100.000(%)  
 : (3)425.0 (μm)- 100.000(%) : (6)150.0 (μm)- 100.000(%) : (9)53.00 (μm)- 100.000(%)



No.	Diameter(μm)	q(%)	UnderSize(%)	No.	Diameter(μm)	q(%)	UnderSize(%)	No.	Diameter(μm)	q(%)	UnderSize(%)	No.	Diameter(μm)	q(%)	UnderSize(%)
1	0.011	0.000	0.000	24	0.259	0.000	100.000	47	5.867	0.000	100.000	70	133.103	0.000	100.000
2	0.013	0.000	0.000	25	0.296	0.000	100.000	48	6.720	0.000	100.000	71	152.453	0.000	100.000
3	0.015	0.000	0.000	26	0.339	0.000	100.000	49	7.697	0.000	100.000	72	174.616	0.000	100.000
4	0.017	0.000	0.000	27	0.389	0.000	100.000	50	8.816	0.000	100.000	73	200.000	0.000	100.000
5	0.020	0.000	0.000	28	0.445	0.000	100.000	51	10.097	0.000	100.000	74	229.075	0.000	100.000
6	0.022	0.000	0.000	29	0.510	0.000	100.000	52	11.565	0.000	100.000	75	262.376	0.000	100.000
7	0.026	0.000	0.000	30	0.584	0.000	100.000	53	13.246	0.000	100.000	76	300.518	0.000	100.000
8	0.029	0.000	0.000	31	0.669	0.000	100.000	54	15.172	0.000	100.000	77	344.206	0.000	100.000
9	0.034	0.000	0.000	32	0.766	0.000	100.000	55	17.377	0.000	100.000	78	394.244	0.000	100.000
10	0.039	0.000	0.000	33	0.877	0.000	100.000	56	19.904	0.000	100.000	79	451.556	0.000	100.000
11	0.044	0.000	0.000	34	1.005	0.000	100.000	57	22.797	0.000	100.000	80	517.200	0.000	100.000
12	0.051	0.000	0.000	35	1.151	0.000	100.000	58	26.111	0.000	100.000	81	592.387	0.000	100.000
13	0.058	0.000	0.000	36	1.318	0.000	100.000	59	29.907	0.000	100.000	82	678.504	0.000	100.000
14	0.067	0.000	0.000	37	1.510	0.000	100.000	60	34.255	0.000	100.000	83	777.141	0.000	100.000
15	0.076	0.663	0.663	38	1.729	0.000	100.000	61	39.234	0.000	100.000	84	890.116	0.000	100.000
16	0.087	4.737	5.401	39	1.981	0.000	100.000	62	44.938	0.000	100.000	85	1019.515	0.000	100.000
17	0.100	24.336	29.737	40	2.269	0.000	100.000	63	51.471	0.000	100.000	86	1167.725	0.000	100.000
18	0.115	48.529	78.266	41	2.599	0.000	100.000	64	58.953	0.000	100.000	87	1337.481	0.000	100.000
19	0.131	20.612	98.878	42	2.976	0.000	100.000	65	67.523	0.000	100.000	88	1531.914	0.000	100.000
20	0.150	1.122	100.000	43	3.409	0.000	100.000	66	77.339	0.000	100.000	89	1754.613	0.000	100.000
21	0.172	0.000	100.000	44	3.905	0.000	100.000	67	88.583	0.000	100.000	90	2009.687	0.000	100.000
22	0.197	0.000	100.000	45	4.472	0.000	100.000	68	101.460	0.000	100.000	91	2301.841	0.000	100.000
23	0.226	0.000	100.000	46	5.122	0.000	100.000	69	116.210	0.000	100.000	92	2636.467	0.000	100.000