

493 Seaport Court, Suite 105, Redwood City, California 94063 * (650) 365-6597 Fax: (650) 365-5845 * (800) 822-3940 Email: spectrex@spectrex.com

PC-2200 LASER PARTICLE COUNTER



Calibration:

Spectrex provides three sealed calibration standards with each unit. Each standard contains a precise number of NIST traceable polystyrene spheres of known size in suspension and are sealed with inert Argon gas These standards have a proven stability of more than 2 years and provide efficient calibration within 10 minutes.

Applications:

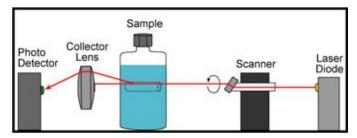
- Water Treatment Plants
- Hydraulic Fluids and Oil QC
- Silts and Sediment Sizing
- University Laboratories
- Pharmaceutical Manufacturers
- Oil Refineries and On-site drilling
- Bottling & Beverage Operations
- Oceanographic Studies
- Liquid Chromatography Solvent QC
- Cooling Power and Waste Water Filter Efficiency
- Particle Agglomeration Studies
- Particle Settling Characteristics
- Corrosive Chemical and Solvent Sizing
- Vial and Ampule Inspection
- De-ionized Water and Acid Testing
- Cell Counting

Features:

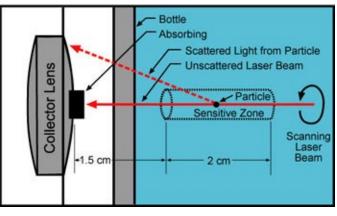
- Easy Do-It-Yourself Calibration
- SuperCount® Software
- Compact & Portable (6 lbs)
- Quickly Counts & Sizes
- No Cross-contamination of Flow Lines
- Eliminates Sample Flushing
- Built in magnetic stirrer

Operational Theory:

Utilizing the principle of "near angle light scatter," a revolving laser beam passes through the walls of a glass container or a flow-thru cell. When it is directed through a central "sensitive zone" the PC-2200 not only counts the particles in suspension, but tabulates their size as well. The analog signals generated by the light pulses are routed to a computer and digitized.



Optical Schematic of the Laser Particle Counter



Detail of Laser Optics

Image: Construction of the second s	3940 ve. 1 1990 Filter 0% A-T 0 s S-T 160 s S-T 160 s Dilutn 1.00.1 1.00.1 0.00V Gain 5.55x Counts 827 Nor Smps
Interim Spectra Claure 0 20 55 87 16 145 174 203 233 281 2	290 Filter 0% A-T 0 5 S-T 160 5 Dilutin 1.00.1 Offsel 0.00V Gain 5.55x Counts 827 Nar
# um % Count 0 20 58 87 116 145 174 203 232 261 2	29) Filter 0% A-T 0 5 S-T 160 5 Dilutin 1.00.1 0.00V Gain 5.55x Counts 827 Nar
Column Column Column Column Mass/bin	0% A-T 0 s S-T 160 s Dilut n 1.00.1 Offset 0.00V Gain 5.55x Counts 827 Nar
Image: Section of the sectio	A-T 0 s S-T 160 s Dilut n 1.00.1 Offsel 0.00V Gain 5.55x Counts 827 Nar
Image: Section of the sectio	0 s S-T 160 s Dilut n 1.00.1 Offsel 0.00V Gain 5.55x Counts 827 Nar
Str Counts Surface 23 23 24 10 11 13 13 13 13 13 13 13 13 14 14 14 <	0 s S-T 160 s Dilut n 1.00.1 Offsel 0.00V Gain 5.55x Counts 827 Nar
10 10 10 10 12 <t< th=""><th>S-T 160 s Dilutin 1.00.1 Offsel 0.00V Gain 5.55x Counts 827 Nar</th></t<>	S-T 160 s Dilutin 1.00.1 Offsel 0.00V Gain 5.55x Counts 827 Nar
10 10 10 10 12 <t< th=""><th>160 s Diluťia 1.00.1 Offsei 0.00V Gain 5.55x Counts 827 Nar</th></t<>	160 s Diluťia 1.00.1 Offsei 0.00V Gain 5.55x Counts 827 Nar
11111405 12	Dilutin 1.00.1 Offsel 0.00V Gain 5.55x Counts 827 Nar
13 13 0.30 3 14 14 0.30 3 15 0.36 3 16 15 0.36 3 16 15 0.36 3 17 16 16 14 18 16 0.36 1 19 27 0.07 1 1 19 27 0.00 0 0 22 37 0.00 0 0 22 27 0.00 0 0 22 27 0.00 0 0 22 27 0.00 0 0 22 27 0.00 0 0 22 2000 0 0 00% 0.00% 0.00% 1 1um 217.32 26.28% 1.30% 0.25% 0.0007 3 3um 147.02 17.78% 7.93% 3.49% 0.0017 3 3um 147.02 17.78% 7.93% 3.49% 0.0023	1.00.1 Offsel 0.00V Gain 5.55x Counts 827 Nar
16 0.15 1 17 17 0.07 1 19 27 0.07 1 19 27 0.07 1 22 23 0.00 0 22 23 0.00 0 22 23 0.00 0 22 24 52 0.00 0 22 25 0.00 0 0 23 22 0.00 0 0 23 22 0.00 0 0 23 22 0.00 0 0 23 22 0.00 0 0 23 22 0.00 0 0 0.00% 0.00% 0.000% 1 1um 217.32 26.28% 1.30% 0.25% 0.0001 2 2um 195.6C 23.55% 4.99% 1.52% 0.0001 3 3um 147.02 17.78% 7.23% 3.69% 0.0023 6 6um 24.01 2.92%	1.00.1 Offsel 0.00V Gain 5.55x Counts 827 Nar
18=22 0.18 2 19=27 0.07 1 19=27 0.07 0 22=23 0.00 0 23=45 0.00 0 24=52 0.00 0 22=57 0.00 0 23=45 0.00 0 23=77 0.00 0 23=77 0.00 0 23=77 0.00 0 23=77 0.00 0 23=77 0.00 0 23=77 0.00 0 31=87 0.00 0 31=87 0.00 0 2 0.00 0 1 1 2.526.8% 1.00% 1 1.1 2.526.8% 4.00% 0.000% 1 1.1 1.1 1.1 1.1 1.1 1.1 1 2 2.0m 95.6C 2.355% 4.60% 0.0023 3 3.0m 147.02 17.76% 7.25% 5.06% 0.00027 5 <t< th=""><th>0.00V Gain 5.55x Counts 827 Nar</th></t<>	0.00V Gain 5.55x Counts 827 Nar
19-72 0.07 1 20-32 0.00 0 23-42 0.00 0 23-45 0.00 0 24-52 0.00 0 24-52 0.00 0 24-52 0.00 0 24-52 0.00 0 25-57 0.00 0 24-57 0.00 0 23-57 0.00 0 24-57 0.00 0 25-57 0.00 0 24-57 0.00 0 25-57 0.00 0 26-77 0.00 0 27-75 0.00 0 31-57 0.00 0 31-57 0.00 0 1 1um 217.32 26.28% 1.30% 0.25% 0.0001 1 1um 217.32 26.26% 1.30% 0.25% 0.00023 3 3um 147.02 17.78% 7.35% 3.49% 0.0023 5 5um 2.47% 7.28%	0.00V Gain 5.55x Counts 827 Nar
22 52 0.00 0 22 62 0.00 0 23 67 0.00 0 23 67 0.00 0 23 77 0.00 0 23 77 0.00 0 23 72 0.00 0 31 27 0.00 0 31 27 0.00 0 31 27 0.00 0 1 100 0.00 0.00% 0.00% 1 1um 217.32 26.26% 1.30% 0.25% 1 1um 217.32 26.26% 1.30% 0.25% 0.0001 2 2um 195.6C 23.65% 4.99% 1.0023 5.5% 0.0001 3 3um 147.05 1.77% 7.2% 4.60% 0.0027 3 9 1.117.1% 2.52% 6.11% 0.0027 0.0027 5	Gain 5.55x Counts 827 Nar
22 52 0.00 0 22 62 0.00 0 23 67 0.00 0 23 67 0.00 0 23 77 0.00 0 23 77 0.00 0 23 72 0.00 0 31 27 0.00 0 31 27 0.00 0 31 27 0.00 0 1 100 0.00 0.00% 0.00% 1 1um 217.32 26.26% 1.30% 0.25% 1 1um 217.32 26.26% 1.30% 0.25% 0.0001 2 2um 195.6C 23.65% 4.99% 1.0023 5.5% 0.0001 3 3um 147.05 1.77% 7.2% 4.60% 0.0027 3 9 1.117.1% 2.52% 6.11% 0.0027 0.0027 5	5.55x Counts 827 Nar
22 52 0.00 0 22 62 0.00 0 23 67 0.00 0 23 67 0.00 0 23 77 0.00 0 23 77 0.00 0 23 72 0.00 0 31 27 0.00 0 31 27 0.00 0 31 27 0.00 0 1 100 0.00 0.00% 0.00% 1 1um 217.32 26.26% 1.30% 0.25% 1 1um 217.32 26.26% 1.30% 0.25% 0.0001 2 2um 195.6C 23.65% 4.99% 1.0023 5.5% 0.0001 3 3um 147.05 1.77% 7.2% 4.60% 0.0027 3 9 1.117.1% 2.52% 6.11% 0.0027 0.0027 5	Counts 827 Nar
20 62 0.00 0 22 77 0.00 0 31 62 0.00 0 31 62 0.00 0 31 62 0.00 0 31 62 0.00 0 31 62 0.00 0 32 22 0.00 0 31 62 0.00 0 31 62 0.00 0 31 62 0.00 0 1 1um 217.32 266.28% 1.30% 0.025% 0.0001 2 2um 195.6C 23.65% 4.69% 1.52% 0.0001 2 2um 195.6C 21.68% 9.25% 5.06% 0.0023 3 3um 147.6C 17.78% 7.35% 3.49% 0.0023 5 5um 2.52% 6.11% 5.06% 0.0023 6 6um 2.401 <t< th=""><th>827 NBF</th></t<>	827 NBF
28-72 0.00 0 31-82 0.00 0 31-82 0.00 0 31-82 0.00 0 31-82 0.00 0 32-7 0.00 0 31-82 0.00 0 32-7 0.00 0 31-82 0.00 0 1 1um 20.732 26.28% 1 1um 217.32 26.28% 1.30% 0.25% 1 1um 217.32 26.28% 1.30% 0.25% 0.0007 3 3um 147.02 17.78% 7.53% 3.49% 0.0017 3 3um 147.02 17.78% 7.55% 0.0023 5.5% 0.0024 0.0027 6 6um 24.01 2.90% 5.18% 0.0027 10.0030 9 9um 12.12 1.47% 5.88% 5.91% 0.0027 10 10um 17.15 2.07% 10.28%	827 NBF
30 22 0.00 0 31 62 0.00 0 22 0.00 0 0 32 22 0.00 0 12 22 0.00 0 12 20 0.00 0 13 100 0.00% 0.00% 0.00% 1 1um 217.32 26.26% 1.30% 0.25% 0.0001 2 2um 195.62 23.65% 4.09% 1.52% 0.0007 0.0023 0.00023 0.0001 1.168% 9.26% 0.0001 0.0023 0.0001 0.0023 0.0001 0.0023 0.0001 0.0023 0.0001 0.0023 0.0001 0.0023 0.0001 0.0023 0.0001 0.0023 0.0001 0.0023 0.0001 0.0023 0.0001 0.0023 0.0001 0.0023 0.0001 0.0023 0.0001 0.0023 0.0001 0.0023 0.0001 0.0025 0.0001 0.0023 0.0001	
Cool Tota Surface NSF counts Counts area Volume Mass/bin Bin Size /cc percent percent <th></th>	
Tota Surface Surface Mass/bin Bin Size /cc percent	
NSF counts Counts area Volume Mass/sin Bin Size /cc percent percent <t< th=""><th></th></t<>	
- -	
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	
4 4um 96.6C 11.68% 9.26% 5.06% 0.0023 5 5um 47.56 5.75% 7.12% 4.60% 0.0021 6 6um 24.01 2.90% 5.18% 3.84% 0.0021 7 7um 20.81 2.52% 6.11% 5.08% 0.0023 8 8um 18.75 2.27% 7.19% 6.61% 0.0023 9 9um 12.12 1.47% 5.88% 5.91% 0.0027 10 10um 17.15 2.07% 10.28% 11.16% 0.0020 11 11um 11.55 1.40% 8.37% 9.77% 0.0044 12 12um 4.12 0.30% 3.24% 4.29% 0.0019 13 13um 3.22 0.30% 3.25% 5.13% 0.0019 14 14um 2.52 0.30% 3.25% 5.07% 0.0026 16 16um 2.56 0.35% 3	
5 5um 47.56 5.75% 7.12% 4.60% 0.0021 6 6um 24.01 2.90% 5.18% 3.84% 0.0017 7 7um 20.81 2.52% 6.11% 5.08% 0.0023 8 8um 18.72 2.27% 7.19% 6.81% 0.0023 9 9um 12.12 1.47% 5.88% 5.91% 0.0027 10 10um 17.15 1.47% 5.88% 5.91% 0.0027 11 1um 1.155 1.40% 8.35% 4.42% 0.0021 13 13um 3.22 0.39% 3.24% 4.29% 0.0019 14 1.4um 2.52 0.30% 3.55% 4.13% 0.0026 14 1.4um 2.52 0.30% 3.25% 5.0% 0.0032 15 16um 2.86 0.35% 3.85% 5.0% 0.0032 16 16um 1.26 0.16% 4.42	
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	
10 10um 17.15 2.07%, 10.28%, 11.16%, 0.0050 11 11um 11.55 1.40%, 8.37%, 9.77%, 0.0044 12 12um 4.12 0.50%, 3.55%, 4.42%, 0.0020 13 13um 3.2C 0.33%, 3.24%, 4.29%, 0.0019 14 14um 2.52 0.30%, 2.95%, 4.13%, 0.0019 15 16um 2.86 0.35%, 3.85%, 5.67%, 0.0032 16 16µm, 1.26 0.15%, 1.93%, 2.98%, 0.0032 17 17µm, 2.45 0.30%, 4.42%, 8.88%, 0.0032 18 22µm, 0.55 0.07%, 4.42%, 8.88%, 0.0025 20 32µm, 0.00 0.00%, 0.00%, 0.00%, 0.0000 21 37µm, 0.00 0.00%, 0.00%, 0.00%, 0.000% 22 42µm, 0.	
12 12um 4.12 0.50% 3.55% 4.42% 0.0020 13 13um 3.22 0.39% 3.24% 4.29% 0.0019 14 14um 2.52 0.30% 2.95% 4.13% 0.0019 15 15um 2.88 0.35% 3.85% 5.67% 0.0026 16 16um 1.26 0.15% 1.93% 2.98% 0.0032 17 17um 2.45 0.30% 4.32% 6.99% 0.0032 19 22um 1.52 0.18% 4.42% 8.88% 0.0039 19 27um 0.55 0.07% 0.40% 0.00%	
13 13um 3.2C 0.39% 3.24% 4.29% 0.0019 14 1.4um 2.52 0.30% 2.95% 4.13% 0.0019 15 15um 2.86 0.35% 3.85% 5.6% 0.0026 16 16um 1.26 0.35% 1.93% 2.98% 0.0013 17 17um 2.46 0.35% 4.42% 6.89% 0.0032 18 22um 1.52 0.18% 4.42% 8.68% 0.0026 20 32um 0.00 0.00% 0.00% 0.00% 0.0026 21 37um 0.00 0.00% 0.00% 0.00% 0.000 22 42um 0.00 0.00% 0.00% 0.00% 0.00% 0.00% 23 47um 0.00 0.00% 0.00% 0.00% 0.00% 0.00% 0.00% 0.00% 0.00% 0.00% 0.00% 0.00% 0.00% 0.00% 0.00% 0.00% 0.00% <th></th>	
15 15um 2.86 0.35% 3.85% 5.67% 0.0026 16 16um 1.26 0.15% 1.93% 2.98% 0.0013 17 17um 2.46 0.30% 4.32% 6.98% 0.0032 18 22um 1.52 0.18% 4.42% 8.88% 0.0025 20 32um 0.55 0.07% 2.42% 5.54% 0.0025 20 32um 0.00 0.00% 0.00% 0.00% 0.0000 21 37um 0.00 0.00% 0.00% 0.00% 0.0000 22 42um 0.00 0.00% 0.00% 0.00% 0.000% 0.000% 23 47um 0.00 0.00% 0.00% 0.00% 0.00% 0.00% 0.00% 24 52um 0.00 0.00% 0.00% 0.00% 0.00% 0.00% 0.00%	
16 16µm 1.2€ 0.15% 1.93% 2.98% 0.0013 17 17µm 2.4≦ 0.30% 4.32% 6.99% 0.0032 18 22µm 1.55 0.18% 4.42% 8.89% 0.0032 19 27µm 0.55 0.07% 2.42% 5.54% 0.0025 20 32µm 0.0C 0.00% 0.00% 0.00% 0.00% 0.00% 21 37µm 0.0C 0.00% <td< th=""><th></th></td<>	
18 22um 1.52 0.18% 4.42% 8.68% 0.0039 19 27um 0.55 0.07% 2.42% 5.54% 0.0025 20 32um 0.0C 0.00% 0.00% 0.00% 0.009% 0.0025 21 37um 0.0C 0.00% 0.00% 0.00% 0.00% 0.0096 0.0006 22 42um 0.0C 0.00%	
19 27um 0.55 0.07% 2.42% 5.54% 0.0025 20 32um 0.0C 0.00% 0.00% 0.00% 0.00% 0.00% 21 37um 0.0C 0.00% 0.00% 0.00% 0.00% 0.00% 0.000% 22 42um 0.0C 0.00% 0.00% 0.00% 0.0000 23 47um 0.0C 0.00% 0.00% 0.00% 0.0000 24 52um 0.0C 0.00% 0.00% 0.00% 0.000%	
21 37um 0.0C 0.00% 0.00% 0.00% 0.00% 0.00% 0.00% 0.00% 0.00% 0.00% 0.00% 0.00% 0.00% 0.00% 0.00% 0.00% 0.00% 0.00% 0.00% 0.00% 0.0000 23 47um 0.0C 0.00% 0.00% 0.00% 0.00% 0.000% <t< th=""><th></th></t<>	
22 42um 0.00 9.00% 0.00% 0.00% 0.000 23 47um 0.00 0.00% 0.00% 0.00% 0.00% 24 52um 0.00 0.00% 0.00% 0.00% 0.000%	
24 52um 0.00 0.00% 0.00% 0.00% 0.0000	
25 57um 0.00 0.00% 0.00% 0.00% 0.0000	
26 62um 0.0C 0.00% 0.00% 0.00% 0.0000	
27 67um 0.00 0.00% 0.00% 0.00% 0.0000 28 72um 0.00 0.00% 0.00% 0.00% 0.0000	
29 77um 0.00 0.00% 0.00% 0.00% 0.0000	
30 82um 0.00 0.00% 0.00% 0.00% 0.0000 31 87um 0.00 0.00% 0.00% 0.00% 0.00%	
32 92um 0.00 0.00% 0.00% 0.00% 0.0000	
> 0.00 0.00% 0.00% 0.00% 0.000	
TOTALS 827.00 100.00% 100.00% 100.00% 0.0452	
Total Surface NSF counts area Volume Mass/bin	
NSF counts Counts area Volume Mass/bin Class Size /cc percent percent ppm	
#1 < 1 0.00 0.00% 0.00% 0.00% 0.00% 0.0000 #2 1-5 656.55 79.39% 23.18% 10.33% 0.0047	
#3 5-15 161.76 19.58% 59.88% 59.81% 0.0270	
#4 15-30 8.69 1.05% 16.94% 29.86% 0.0135 #5 30-50 0.00 0.00% 0.00% 0.00% 0.00%	
#6 50-100 0.00 0.00% 0.00% 0.00% 0.000	
Total counts. 827.00/cc	
Total suspended	
solids: 0.05pp/n (mg/liter) Spec. gravity. 1.00	
Mean size: 3.39um	
Stendard dev: 2.95im	

Sample Print-out

Specifications:

Size: 4.75" x 14" x 4.5" (height with Light Tight Cover is 5.5") Weight: 6 lbs **Typical Bottle Size:** 15-60 mm inside diameter Detectable Particle Size: From 0.5µm - 100µm.

SuperCount[®] Software:

Developed by Spectrex, the custom interfacing electronics and proprietary software provide an easy means of analyzing and saving data generated by the PC-2200. SuperCount® provides instant sizing information and generates a printout with count information and a histogram of size distribution in addition to indicating:

- **Absolute Counts**
- Mean Size •
- Mass Distribution
- Percentage Distribution
- Standard Deviation
- **Total Suspended Solids**

The dilution factor can be automatically computed to give absolute counts for liquids as dense as sludge! SuperCount® also is loaded with a special bonus program for hydraulic fluids * and Phi classifications. Auto-Mode Software for sequential reading at user selected intervals is available upon request. It is ideal for monitoring rates of change such as dissolution or agglomeration. * NAS, SAE, and ISO classifications.

Options:

- **Opacity Meter** provides an instantaneous measurement of the sample's opacity to correlate with computer calculations.
- Small Vial Attachment follows for use of 5ml vials or ampoules.
- Flow-Thru-Cell Spectrex stocks various sizes of flow-thru-cells and can manufacture cells to customer specifications. Cells are also available for testing at high pressure and temperatures.
- Datacom a 21 CFR 11 compliant product for pharmaceutical and other applications that require secure liquid particle data logging. (See our website for more information)

Bottle Material: Transparent, scratch-free glass Power: 115v 60Hz (230v optional)

