

## Visible and Sub-Visible Particle Testing

Particles diminish the quality or even cause batch failures for a wide range of products. We use Hound to automatically determine the count, size, shape and identity of particles with Raman or LIBS spectroscopy. We'll get you the data needed to know the size distribution and composition of the particles giving you problems.

### Applications

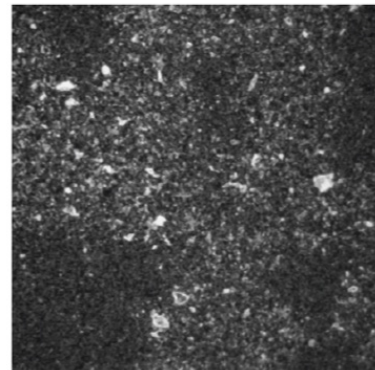
- Particle count and identification in your size range of interest
- Particle size distribution
- Chemically specific size distributions
- Specialized inhaler testing
- Technical cleanliness (VDA 19 & ISO 16232)
- Released particle count (ISO 8871-3)

### Visible and Sub-Visible Particle Testing

- Identification of up to 5,000 particles >2 µm in a sample
- ID particles from liquids, powders, sprays, creams, hardware and medical devices, etc.
- "Chain of custody" – your particles are imaged and documented before sample prep, after sample prep and through spectroscopic identification



Hound counts, sizes and identifies particles by Raman and LIBS spectroscopy.



Particulate collected on a filter round from a dry powder inhaler.

| Reference Match                | Total Count | Size (µm)  |           |           |          |
|--------------------------------|-------------|------------|-----------|-----------|----------|
|                                |             | 2 - <5     | 5 - <10   | 10 - <25  | >25      |
| Cellulose Acetate              | 41          | 32         | 6         | 3         | 0        |
| Polyamide                      | 95          | 78         | 12        | 5         | 0        |
| Carbon                         | 141         | 120        | 11        | 8         | 2        |
| Polyester                      | 160         | 132        | 17        | 7         | 4        |
| Others (9 different materials) | 77          | 60         | 12        | 5         | 0        |
| <b>Total analyzed</b>          | <b>514</b>  | <b>422</b> | <b>58</b> | <b>28</b> | <b>6</b> |

Hound automatically counts sizes and identifies particles down to 2 µm.

# About Unchained Labs Testing

## Testing includes

- Sample preparation and testing performed by trained experts
- Detailed experimental reports that document the test plan, measurement parameters and results
- Results delivered when you need them: 3 business days, 5 business days, 2 weeks or 3-4 weeks turnaround available

## Our analysis tools

| Instrument         | Methods   |
|--------------------|---|
| Hound              | Particle imaging<br>Raman spectroscopy<br>Laser-induced breakdown spectroscopy (LIBS) |
| Bouncer            | White light reflectometry<br>Laser interferometry                                     |
| Bruker LUMOS       | ATR Infrared spectroscopy (ATR FT-IR)   |
| PAMAS SVSS         | Light obstruction   |
| FlowCam VS         | Dynamic imaging particle analysis   |
| Bruker QUANTAX EDS | Scanning electron microscopy (SEM)<br>Energy dispersive X-ray spectroscopy (EDS)      |

## Our Labs



• Pleasanton, California

• Berlin, Germany

- ISO 9001:2015 compliant lab
- USP<788> compliance
- Custom method development
- Custom method validation
- Full visual inspection capabilities



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