



## SAMPLE ANALYSIS REQUEST FORM

**Please complete this Sample Analysis Request Form (one request per sample) and send it to CILAS with the Samples and the Safety Datasheet  
Please complete page 2 and 3 for another sample**

Name / Contact	
Company	
Address	
City	
Country	
E-mail	
Tel. Number	
Fax Number	

### Where do you want to receive the results?

E-mail	
Ship to address (reports)	

Date of sending the samples:

### **SEND SAMPLES TO:**

Suzanne VACHIA

Tel: +33-(0)2 38 64 59 24

E-mail: vachia@cilas.com

Application Laboratory

CILAS

8, avenue Buffon – Z.I. La Source – B.P. 6319

45063 ORLEANS Cedex – France



**PARTICLE SIZE CHARACTERIZATION REQUEST**

**Type of industry:**

**Type of product:**

**How was the material made (ex. grinding...)?**

**What is the step of production of powder (raw material, etc)?**

**What do you want to determine?**

- Size                                       Shape                                       Both

**What do you want to measure?**

- Elementary Particles                       Agglomerates                       In-State Powders

**What is the approximate type of particle size distribution?**

- Monodisperse                               Polydisperse

**Which kind of diameter do you expected for your results?**

- D (1,0) : Diameter in Number
- D (2,1) : Diameter in Surface/Length
- D (3,2) : Diameter in Volume/Surface
- D (4,3) : Diameter in Weight/Volume

N.B.: Standard results in particle size analysis by laser diffraction are explained into diameter in Weight/Volume or D (4,3). See at the end of the document the paragraph about the vocabulary.

**What kind of cumulative curves do you want?**

- Oversize                                       Undersize

N.B. : Standard cumulative curves in particle size analysis by laser diffraction are in oversize.

**Which values of diameters do you want for cumulative curves?**

- D10                                       D50                                       D90

Others : .....

N.B. : Please choose 3 diameters maximum and one diameter at least. Standard cumulative results (expressed in ISO 13320 norm) are D10, D50 and D90.

**Expected Size:**                      D50:                       $\mu\text{m}$

**Which analysis method do you want?**

- Fraunhofer                                       Mie                                       Both

If Mie, please note the refractive index of particle material:

**Number of samples for this product:**

**Type of analysis:**

- Dry mode                                       Wet mode  
 Wet and Dry mode                               Shape



**Type of analyzer:**

- 990 (0.2-500 $\mu$ m)                       1090 (0.04-500 $\mu$ m)  
 1190 (0.04-2500 $\mu$ m)                       Shape

**Is the sample corrosive or toxic?**

- Yes                       No

**Usual characterisation Method currently in use in your company:**

- Sieve                       Sedimeter                       Microscopy                       Laser Diffraction (please fill part A page 3)  
 Other: .....

Please join us a typical result.



## CHEMICAL PROPERTIES

**Is your sample soluble?**

Yes       No

If Yes, enumerate the most common solvents:

- Water
- Ethanol
- Other: .....

**Is the sample sensitive to pH?**

Yes       No

**Do you generally disperse your particles?**

Yes       No

If Yes, precise what you generally use:

- Dispersing Agent (indicate it.....)
- Ultra Sounds (time: .....s; Power: .....W, External/ Internal Probe)

## Conditions of Sample Analysis

At reception of the samples, the results will be delivered within two weeks maximum. If it's urgent, please contact CILAS directly.

- **All samples must be sent with a Safety Datasheet, where are mentioned chemical composition and cause uses.**

**Without this document, we won't be able to perform the analysis.**

- **For dry analysis, please supply a minimum quantity of 50 grams of powder.**
- **CILAS will not accept for analysis those materials which are radioactive, Biohazards, for which the applications laboratory is not equipped.**



**STANDARD OPERATURE PROCEDURE**

**What is your carrier liquid? (non solvent liquid of the sample)**

- Water       Ethanol       Other: .....

**Is the sample sensitive to pH?**

- Yes       No

**What kind of Water do you generally use?**

- Demineralised       Deionised       Regular water

**Which dispersing agent do you use?**

- HMP       Decon       Igepal       Other: .....

**Do you use Ultra Sounds?**

- Yes       No

Before analysis: .....s      Time during analysis: .....s

**Do you use an External Probe?**

- Yes       No

Power: ..... W      Time: ..... S

**REQUESTED QUANTITY & SAFETY DATA SHEET**

Dry feeder:	100 grams/ sample minimum
Liquid feeder:	30 grams/ sample minimum

**We remind you that all samples must be sent with a Material Safety Data Sheet, where are mentioned chemical compositions and caution uses. Without this document, we won't be able to perform the analysis.**

## VOCABULARY

These definitions are used for the designation and calculation of all measurement parameters. The definitions are given in alphabetical order. All the equations and the entire vocabulary section refer to standard ISO 9276-1.

✓ **DENSITY:**

The density is the density of your sample in g/cm<sup>3</sup>. You will need to enter the density in the software to calculate parameters such as specific surface. If you do not know the density of your sample, you can measure it with a special instrument.

✓ **DIAMETER AT 10% and 90%:**

This is the diameter value for which the cumulative result is 10% or 90%. These two values give you approximations of the smallest and the largest diameter contained in your sample.

✓ **MEDIAN SIZE (D50) :**

Median size is the diameter value for which the cumulative results are 50%. This means that half of the particles in the sample are above the median size and half of the particles are below the median size.

✓ **DIAMETER IN VOLUME:**

The results provided by laser diffraction are in volume. This is due to Maxwell's equation. By default, "The Particle Expert" software will give you results in volume. The standard results are shown in De Brouckere mean diameter (also called D [4, 3], volume or mass moment mean).

CILAS recommends using this kind of results to improve the reliability of your measurements. The mathematical formula used to calculate the diameter in volume is:

$$D_v = \frac{\sum n_i \times d_i^4}{\sum n_i \times d_i^3}$$

Where:

n<sub>i</sub>: number of particles of class "i",  
d<sub>i</sub>: diameter of class "i".

✓ **DIAMETER IN NUMBER:**

The diameter in number (also called D [1, 0] diameter) is an arithmetic average of the diameters. The mathematical formula is as follows:

$$D_N = \frac{\sum n_i \times d_i}{\sum n_i}$$

Where:

n<sub>i</sub>: number of particles of class "i",  
d<sub>i</sub>: diameter of class "i".

✓ **DIAMETER IN SURFACE:**

The diameter in surface is also called D[2,1] diameter. The mathematical formula is:

$$D_s = \frac{\sum n_i \times d_i^2}{\sum n_i \times d_i}$$

Where:

n<sub>i</sub>: number of particles of class "i",  
d<sub>i</sub>: diameter of class "i".