Microplastics Sampling Guide

Microplastics are defined as any plastic particle less than 5mm in size in any one direction. There is no defined lower size limit however, convention and instrument capability generally dictate 1 micron diameter.

Primary microplastics consist of manufactured raw plastic material, such as plastic pellets used to manufacture parts and micro-beads which have application in a wide range of products such as cleaning agents. Secondary Microplastics originate from larger plastic products or macro plastic fragments that have broken down due to mechanical, UV radiation or chemical means producing particles less than five millimeters.

Microplastics Sampling

Water samples may be collected in rinsed plastic or glass containers. Environmental samples such as lake and stream water, rain runoff, ponds and other silty bodies of water require a minimum of one liter. Cleaner waters such as seawater away from the wave break region, pools and potable water are better analyzed with a one gallon minimum volume.

Soil and similar solids may be collected by shovel or applicable device and placed into a rinsed one gallon Zip-lock™ style bags, buckets or jars. Whenever possible submit a minimum sample of approximately one liter in volume; however smaller amounts can also be analyzed when sample volume is limited. Beach sand is typically collected along the wrack line which is the point of high tide where sticks and other debris accumulate. This is also the point where the highest concentration of Micro-plastics is usually found.

Air samples may be collected using 0.1µm or 0.4µm polycarbonate filter cassettes. Flow rates may vary but a total volume exceeding 1000 liters is recommended for area samples. Personnel monitoring samples are typically run at 1.5 to 2.5 liters per minute for the intended test duration and are not subject to the volumes suggested for area sampling.

Food and beverages may be submitted in Zip-lock™ style bags, jars or, in the case of unopened food or beverages, in their original containers. Food and beverage samples should be shipped on ice (ice packs) in appropriate coolers for maintaining a cool environment during shipping.

Microplastics Analysis

Multiple reporting styles are available starting with the Basic Microplastics Analysis which includes total microplastics count and sizing information obtained by sieve and fluorescent microscopy to Full Microplastics Analysis which includes the polymer identification with size separation based upon the types of plastics observed. This process is performed by sieve and analysis by Raman Spectrometry. Macroplastics (size >5mm), if found, are also reported for informational purposes but not included in the sizing data.

Example of a Basic Microplastics Report

Upon request the reporting format can be tailored to meet your needs as well as the size ranges and additional data.

Microplastics Sampling Guide

Table X: Microplastic particle results for sample #1.

EMSL ID:	3621xxxxx-0001		
Sample ID:	#1		
Description:	Sand Sample 1		
Amount Analyzed:	1000kg	LOQ (Particles/kg):	0.01
Preparation Parameters	**Value**	**Units**	**Comments**
Sub-sample (prepared):	1000	kg	A
Effective Filter Area:	1070	(mm2)	
Field Area:	1.651	(mm2)	
No. Fields Analyzed:	100	(No.)	
Area Analyzed:	165.1	(mm2)	
Limit of Quantitation:	0.01	P/kg	
Particle Size Range (µm)	**Concentration (Particles/kg)**	**Percent in Range**	**Comments**
<1	0.0648	27.0	B
1 - 5	0.0648	27.0	B
5 - 10	0.0194	8.1	B
10 - 50	0.0259	10.8	B
50 - 100	0.0065	2.7	B
100 - 500	0.0389	16.2	B
500 - 1000	0.0194	8.1	B,C
1000 - 5000	<LOQ	0.0	C
>5000.0	<LOQ	0.0	C, D
Total Microplastics	0.2398	Min. Diam. = 0.5um	Max. Diam. = 750um

Comments: LOQ = Limit of Quantitation

A) Parameters used in the preparation of the sample.

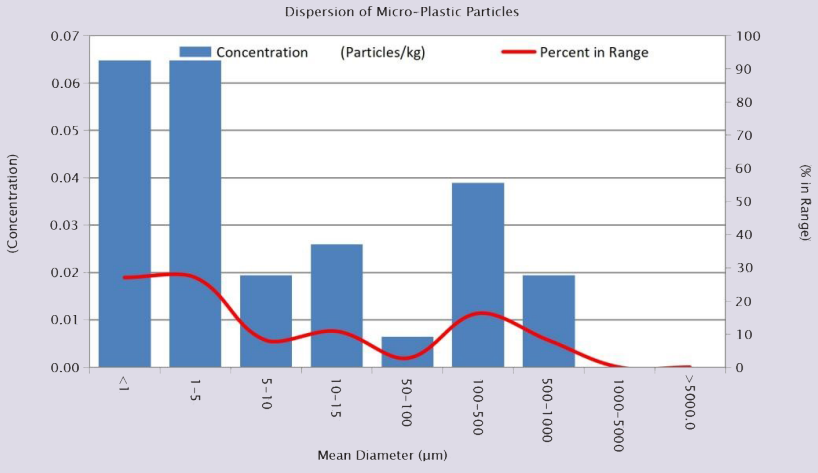
B) Particles observed by microscopic analysis.

C) Particles observed by sieve separation and stereo microscopic analysis.

D) Particles larger than the generally accepted definition of microplastics.

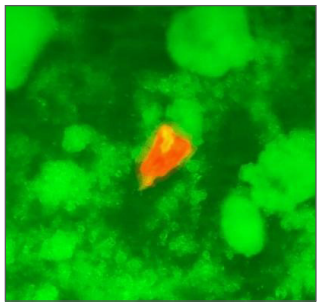
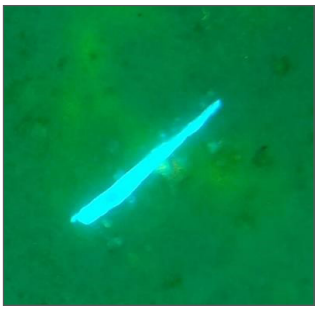
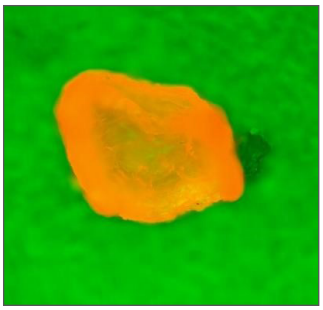
Sample volume based upon filtration rate and suspended particle concentration.

Typical histogram showing the micro-plastic concentration by size range.



Microplastics Sampling Guide

Basic Microplastics Reports also include images of key microplastics particles observed in each sample.

Full Microplastics Analysis also includes the following.

Additional histograms showing the size ranges and sample composition by common plastic types is available as part of the Full Micro-plastic Analysis.

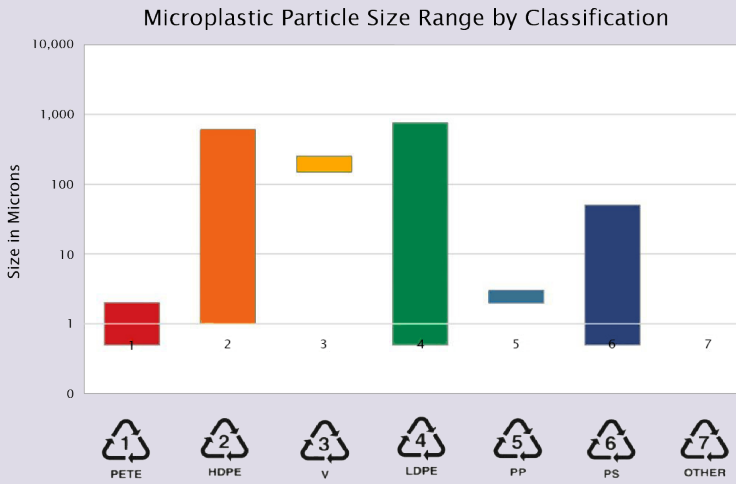


Figure 1: Histogram of #1 showing the particle size by plastic classification.

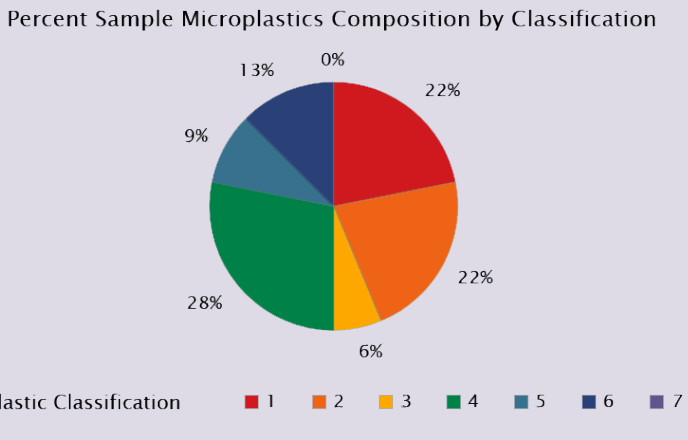


Figure 2: Microplastics composition of sample #1 by plastic classification.

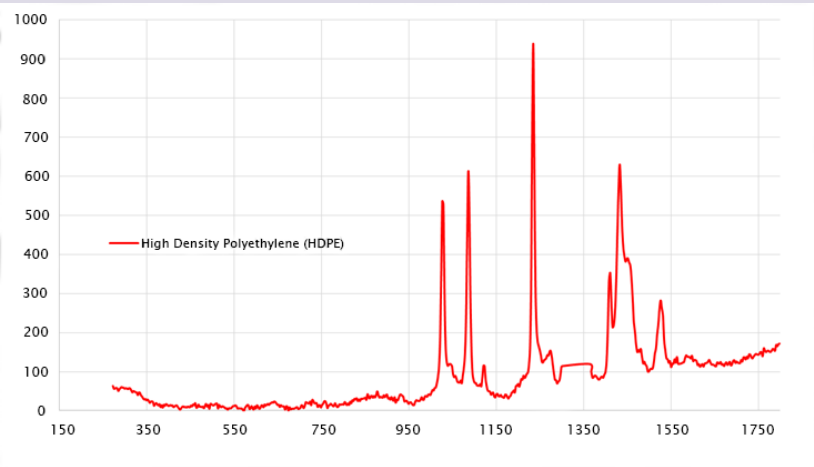


Figure 3: Raman spectrum of high density polyethylene observed in sample #1.