



Certificate of Preparation – Batch #0001 and Sub-batch #0001(1) (12 polymers–CaCO₃ blend)

This Certificate of Preparation (COP) provides information on the composition and preparation of the polymer reference material intended for use in the pyrolysis–gas chromatography–mass spectrometry (Py–GC–MS) applications.

Table of contents

1.	Composition and preparations.....	2
1.1.	Polymers Used.....	2
1.2.	Diluent.....	4
1.3.	Preparation of polymers–diluent blend.....	4
2.	Sample contents.....	5
2.1.	Stock mixture.....	5
2.2.	Batch #0001(1)	6
3.	Disclaimer	6
3.1.	Support	6
	Abbreviations.....	7
	Units.....	7

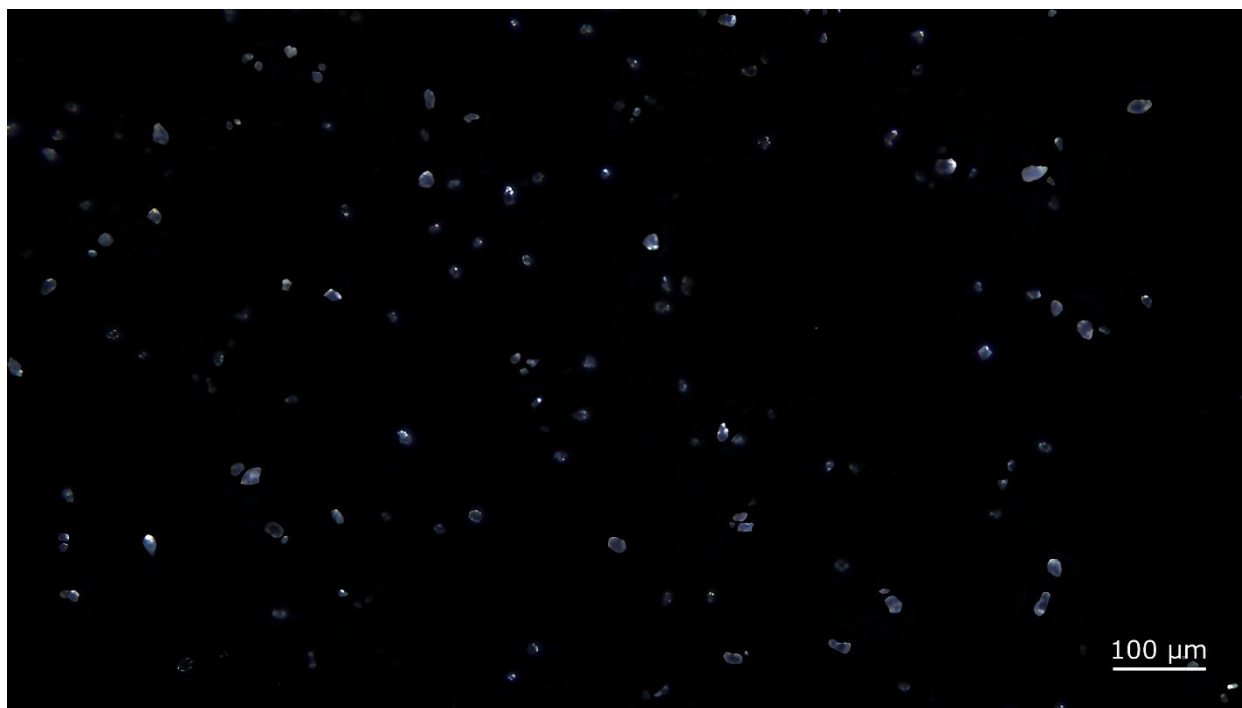


1. Composition and preparations

1.1. Polymers Used

Batch #0001 corresponds to the Advanced kit consisting of 12 common polymers [LDPE, HDPE, PP, PVC, PET, PS, PC, SBR, ABS, PMMA, PA6, PA6.6, PU {thermoset} & TPU {thermoplastic}]. Each polymer type is provided in the form of microplastic (MP) fragments with a maximum diameter of approximately 50 µm, obtained by sieving through a 300-mesh grid (Fig. 1).

Fig. 1: Example: Photomicrograph captured under critical-angle darkfield illumination (CADLFI) of LDPE fragments sieved through a 300-mesh grid.

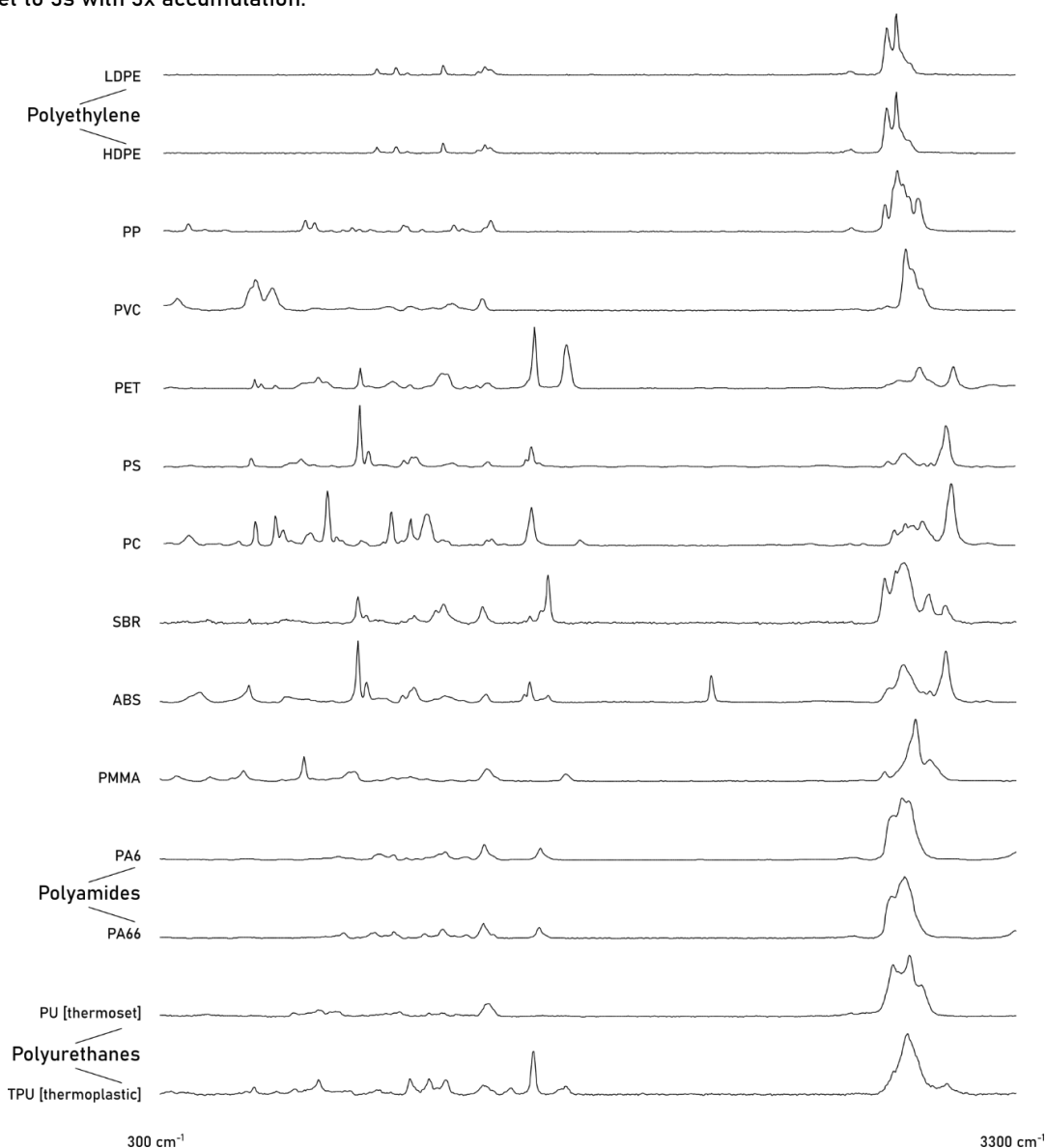


The MP fragments are weighed and dispersed in CaCO₃ diluent, ensuring a traceable distribution of polymer mass within the matrix. Each MP fragment weighs less than 10 ng; therefore, 1 µg of MP powder typically consists of at least 100 particles (at the lowest available concentration of



1.0 µg/mg [0.1 % (w/w)]), ensuring reliable particles dispersion within the CaCO₃ matrix. The nature and purity of each polymer were confirmed by Raman spectroscopy (Fig. 2).

Fig. 2: Raman spectra of the twelve polymers used in Batch 0001. Raman analysis was conducted at a controlled room temperature (22°C) using a Horiba (Jobin Yvon, France) LabRAM Soleil equipped with a high stability air-cooled He-Cd 532 nm laser diode and Nikon LV-NUd5 100x objective. The laser power was set to 6.3% (5.7 mW). Spectra were collected in the 300–3300 cm⁻¹ range using 600 grooves/cm grating with a 100 µm slit. The spectra acquisition time was set to 3s with 3x accumulation.





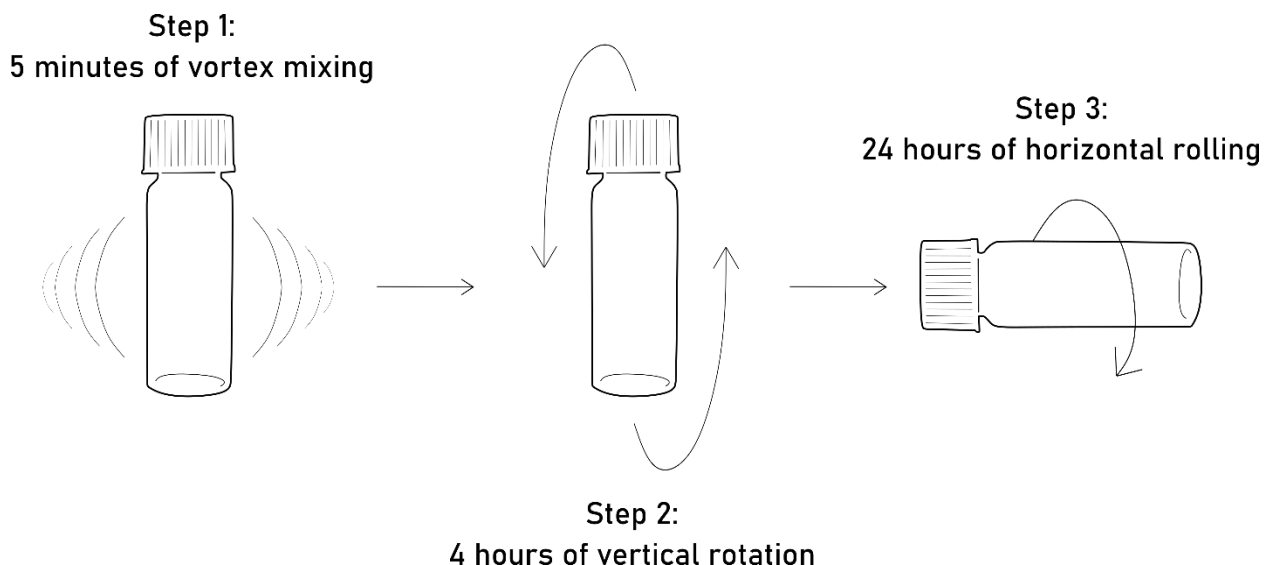
1.2. Diluent

Calcium carbonate (CaCO₃) powder was calcined in a muffle kiln at 530°C prior to use to eliminate possible residual organic matter and ensure material purity.

1.3. Preparation of polymers-diluent blend

Twelve polymers were dispersed in CaCO₃ diluent at the concentration of 5% (w/w). To ensure complete homogeneity, polymer-diluent blends were mixed for 28 hours using continuous agitation, consisting of an initial 5 minutes of vortex mixing, followed by 4 hours of vertical rotation and 24 hours of horizontal rolling (Fig. 3).

Fig. 3: Scheme of polymers–CaCO₃ blend homogenization process.





2. Sample contents

2.1. Stock mixture

Stock mixture (Batch #0001) with a total mass of 2.0 g was prepared, containing approximately 50 µg/mg (5.0% w/w) of each polymer. The specific weighed amounts are provided in Table 1.

Table 1: Polymer concentration of stock mixture used in the current sample.

Polymer type	Mass of polymer, (mg)	Mass of CaCO ₃ diluent, (mg)	Total mass of stock mixture, (mg)	Polymer concentration, (µg/mg)	Polymer concentration, (%)
LDPE	100.5	600.6	2028.6	49.5	5.0
HDPE	100.3			49.4	4.9
PP	100.4			49.5	4.9
PVC	100.2			49.4	4.9
PET	104.4			51.5	5.1
PS	100.6			49.6	5.0
PC	101.8			50.2	5.0
SBR	100.9			49.7	5.0
ABS	100.1			49.3	4.9
PMMA	100.9			49.7	5.0
PA6	100.5			49.5	5.0
PA66	100.5			49.5	5.0
PU	100.3			51.1	5.1
TPU	113.2			55.8	5.6
Mean	102.0			50.3	5.0



2.2. Batch #0001(1)

Batch #0001(1) was subsampled directly from the homogenized stock mixtures without any dilution, preserving the original concentrations.

3. Disclaimer

The information given in this COP is correct to the best of our knowledge at the time of issue. Microplastic Solution (MPS) makes no warranties, express or implied, and assumes no liability in connection with the use of this product.

3.1. Support

We are dedicated to helping researchers succeed. If you experience any issues with this material or require additional information, please reach out to us at contact@microplasticsolution.com. We are committed to supporting researchers in their micro- and nanoplastic analyses.

Approved by:

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Abbreviations

COP	Certificate of Preparation
Py-GC-MS	Pyrolysis-gas chromatography-mass spectrometry
MP	Microplastic
LDPE	Low-density polyethylene
HDPE	High-density polyethylene
PP	Polypropylene
PVC	Polyvinyl chloride
PET	Polyethylene terephthalate
PS	Polystyrene
PC	Polycarbonate
SBR	Styrene butadiene rubber
ABS	Acrylonitrile butadiene styrene
PMMA	Polymethyl methacrylate
PA6	Polyamide 6
PA66	Polyamide 66
PU	Polyurethane [thermoset]
TPU	Polyurethane [thermoplastic]

Units

mg	Milligram
µg	Microgram
ng	Nanogram
cm	Centimeter
µm	Micrometer
w/w	Weight by weight
°C	Degree Celsius (temperature)