

NEW

Ultra ALLOY (UA) MP column kit

This product is a high-resolution column kit consisting of a precolumn (UAMP-2M-1.0F) and a separation column (UA5-30M-0.5F) of different polarities and film thicknesses.

Features of UAMP column kit

1. Improved peak separation with precolumn

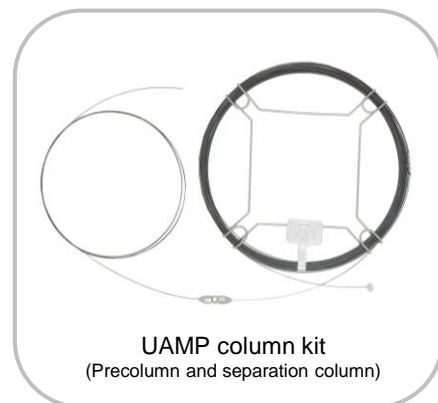
For the 12 commonly used polymers*¹, pyrolyzates of each polymer can be analyzed with good separation and peak shape.

2. Precolumn helps reduce column contamination

Periodic replacement of the precolumn maintains the performance of the separation column since high boiling contaminants are retained in the precolumn.

3. Connectivity to a Multi-Functional Splitless Sampler

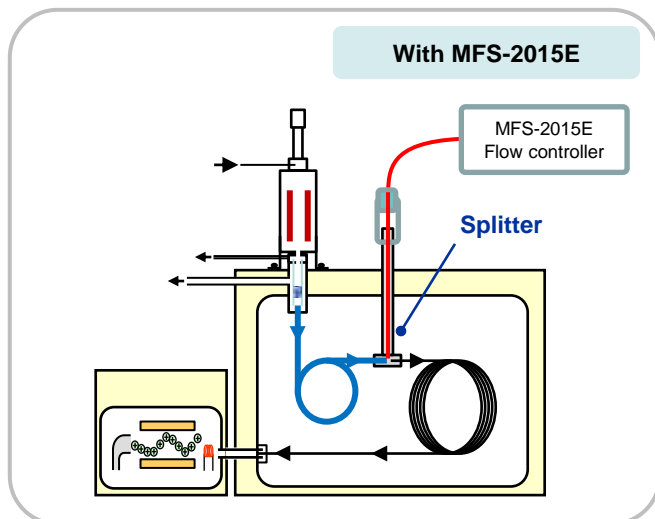
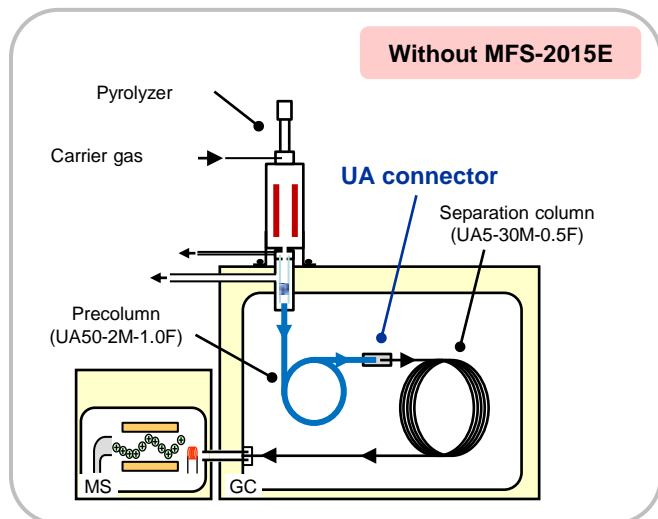
Connecting a Multi-Functional Splitless Sampler (MFS-2015E, Frontier Labs) between the precolumn and separation column allows splitless pyrolysis and backflushing.



*1: Polyethylene (PE) / Polycarbonate (PC) / Acrylonitrile-butadiene-styrene resin (ABS) / Polypropylene (PP) / Poly methyl methacrylate (PMMA) / Styrene diene rubber (SBR) / Polystyrene (PS) / Polyethylene terephthalate (PET) / Polyurethane (PU) / Polyvinyl chloride (PVC) / Nylon 6 (N6) / Nylon 66 (N66)

Connection diagram

The connection of the UAMP column kit differs depending on whether MFS-2015E is used or not (see figure below). When MFS-2015E is not used, connect both columns using the UA connector. When using the MFS-2015E, a specifically designed splitter is used to connect the precolumn and separation column. The splitter and the UA connector can be easily attached or detached due to the mechanical flexibility, abrasion resistance, and impact resistance of metal capillary columns.

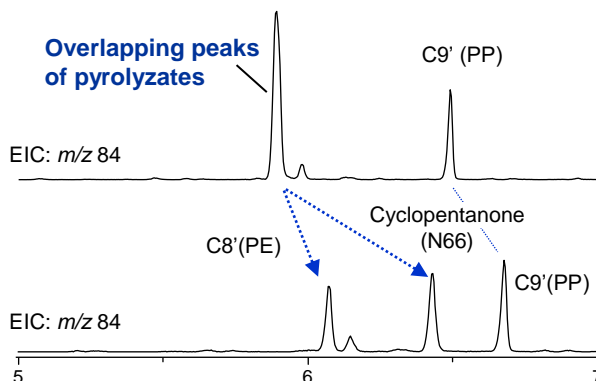


Connection diagram for UAMP column kit

Improved separation and reduced column contamination by precolumn

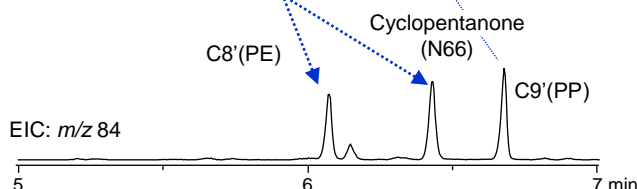
By connecting a precolumn (UAMP-2M-1.0F) to a separation column (UA5-30M-0.5F), peak separation can be achieved (see figure below). High boiling compounds are retained in the precolumn, reducing contamination of the separation column. Also, periodic replacement of the precolumn will extend the life of the separation column.

Without precolumn



- Sample: Polyethylene (PE) 320 µg, Polypropylene (PP) 80 µg, Nylon-6,6 (N66) 18 µg
- Furnace temperature: 600 °C
- GC oven temperature: 40 °C (2 min hold) - 280 °C (20 °C/min)

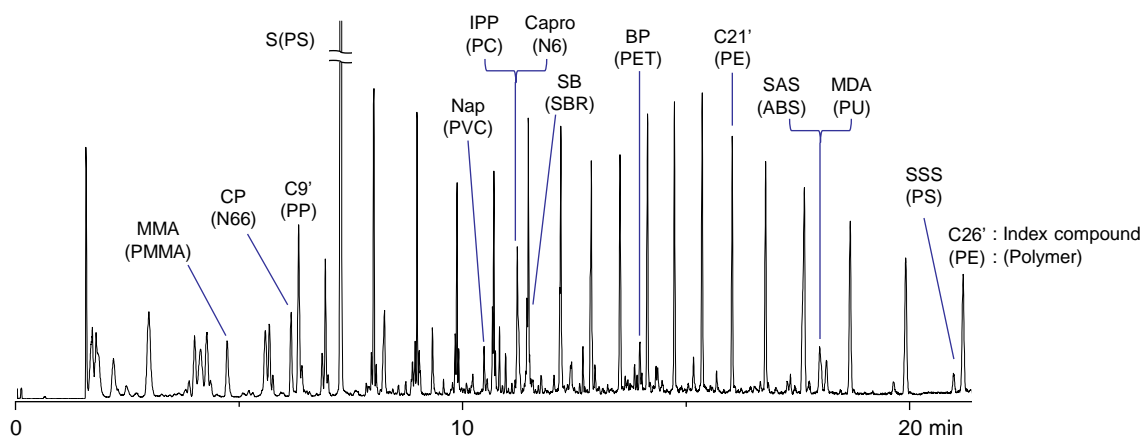
With precolumn
(UA⁺-50, L = 2 m,
df = 1.0 µm)



Pyrolysis GC/MS measurement of microplastic standard using UAMP column kit (an example)

The pyrogram of the MPs Calibration Standard (PY1-4940, Frontier Labs), a mixture consisting of 12 types of polymers, obtained by Py-GC/MS using the UAMP column kit are shown below along with major pyrolyzates.

Sample: MPs Calibration Standard 4 mg (PE: 160 µg, PP: 40 µg, PS: 8 µg, ABS: 16 µg, SBR: 16 µg, PMMA: 8 µg, PC: 4 µg, PVC: 40 µg, PU: 4 µg, PET: 16 µg, N6: 5 µg, N66: 18 µg, diluent CaCO₃: 3.8 mg)
Py temp.: 600 °C, GC oven: 40 °C (2 min hold) - 280 °C (20 °C/min, 10 min hold), He: 150 kPa, Split ratio: 1/50



MMA: Methyl methacrylate, CP: Cyclopentanone, C9': 2,4-Dimethyl-1-heptane, Nap: Naphthalene, IPP: 4-Isopropenylphenol, Capro: ε-Caprolactam, SB: 4-Phenylcyclohexene, BP: Benzophenone, C21': 1,20-Heneicosadiene, SAS: 2-Phenethyl-4-phenylpent-4-enenitrile, MDA: 4,4'-Methylenedianiline, SSS: Styrene trimer

Specifications

	Column	Liquid phase (Chemically bonded)	Polarity	Length (m)	Inner diameter (mm)	Film thickness (µm)	Max (°C)	Product number
Precolumn	Ultra ALLOY-50 (UA-50)	50 % Diphenyl 50 % polydimethylsiloxane (PDMS)	Medium	2	0.25	1.0	350	UAMP-2M-1.0F
Separation column	Ultra ALLOY-5 (UA-5)	5 % Diphenyl 95 % PDMS	Ext. low	30	0.25	0.5	350	UA5-30M-0.5F

Carrier gases such as helium, nitrogen, and hydrogen can be used.