FRONTIER LAB

Featured by F-Splitless injection method, Backflush, and Improved separation

NEW

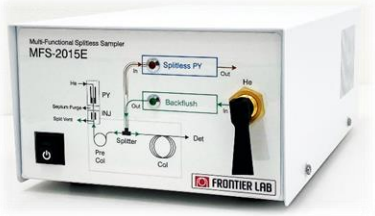
Multi-Functional Splitless Sampler MFS-2015E

Japanese Patent 7142374

This product is a peripheral accessory exclusively used with the Multi-Shot Pyrolyzer (EGA/PY-3030D), which allows for the F-Splitless injection method, backflush, solvent cut, and improves peak separation.

Features of MFS

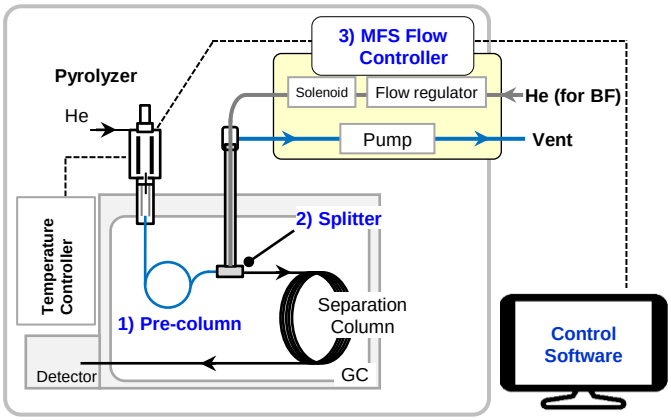
1. F-Splitless injection method: High-sensitivity detection of trace pyrolyzates and solvent venting
2. Backflush: Shortens analysis time by blocking high-boiling compounds from flowing into separation column
3. Peak separation improvement: Improved peak separation by selecting an appropriate pre-column



MFS Flow Controller

System configuration

The MFS consists of three units: (1) a pre-column connected between the GC inlet and a separation column, (2) a splitter between the pre-column and the separation column, and (3) MFS Flow Controller consisting of a suction pump and a flow regulator. The operation of MFS Flow Controller can be programmed through the software that comes standard in the Frontier Lab's pyrolyzer package.



Specifications

Supported columns	Deactivated metal column (Ultra ALLOY®) and FS capillary column, i.d. 0.25 and 0.32 mm	
Required GC or GC/MS (alphabetical order)	Agilent	5977 series, 5975 series, 8890, and 7890 GC
	JEOL	JMS-Q1500GC
	Shimadzu	QP2020 NX, GC-2030 *
	Thermo Fisher	ISQ series, TRACE1600 series, 1300 series
	Each of the above instrument requires the ability to close the split vent and septum purge at the same time for Splitless Pyrolysis. Please contact us for more information.	
Required pyrolyzer*	Multi-Shot Pyrolyzer (EGA/PY-3030D) only	
Analysis method	Flash pyrolysis (Single-shot analysis) only	
Compatible accessory	Auto-Shot Sampler (AS-2020E, AS-1020E) MicroJet Cryo-Trap (MJT-2030E, MJT-1035E, MJT-1030Ex)	
Power requirement	100 ~ 240 VAC, 40 VA	

* A sample injection unit for Shimadzu GC is required to perform splitless pyrolysis using this product in combination with our Auto-Shot Sampler. Please contact us for further information and details.

Three Features of MFS

In the analysis examples below, the following columns are used.

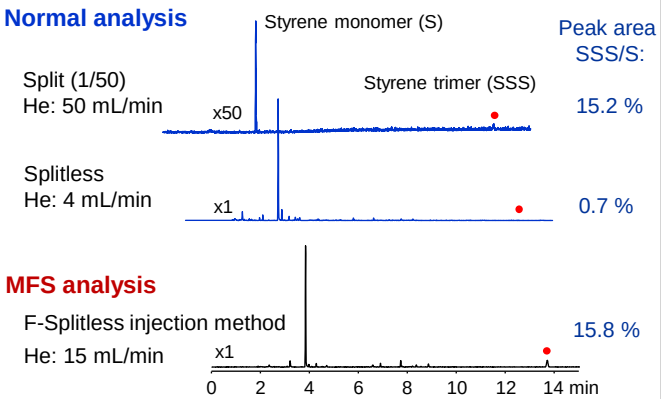
- Pre-column: Ultra ALLOY⁺-50 (50 % diphenyl 50 % dimethylpolysiloxane), *L*=2 m, i.d. 0.25 mm df. 1.0 µm
- Separation column : Ultra ALLOY⁺-5 (5 % diphenyl 95 % dimethylpolysiloxane), *L*=30 m, i.d. 0.25 mm, df. 0.5 µm

1. F-Splitless injection method

1.1 High-sensitivity detection of trace pyrolyzates

In normal splitless pyrolysis, the He flow rate is as low as 4 mL/min, causing secondary reactions that greatly change the pyrogram profile. 15 mL/min of He flow rate with the MFS suppresses secondary reactions and increases sensitivity by about 50 times compared to the split (1/50) pyrolysis method.

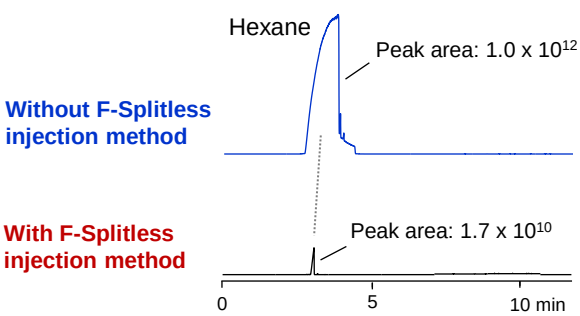
- Sample: Polystyrene 0.25 µg, Furnace Temp.: 550 ºC
- GC Oven: 60 ºC - 280 ºC (40 ºC/min, 10 min hold)



1.2 Solvent venting

By using the F-Splitless injection method of MFS, unwanted components such as solvents are vented from the system by a suction pump before they are introduced into the separation column to protect the separation column and detector.

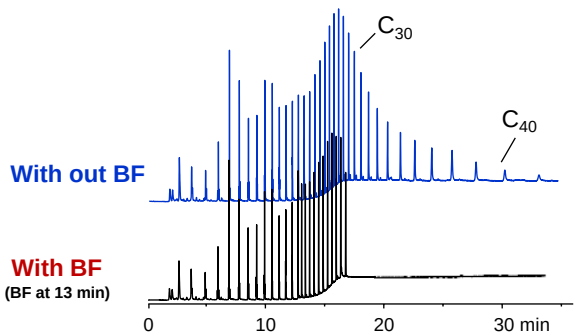
- Sample: Hexane 1 µL, GC detector: FID
- GC oven: 40 ºC (2 min hold) - 200 ºC (20 ºC/min)



2. Shortened analysis time by backflushing (BF)

High-boiling compounds in pyrolyzates tend to remain in the separation column, resulting in ghost peaks during continuous analysis. The MFS prevents contamination of the separation column by backflushing the high-boiling compounds remained in the pre-column, thus significantly shortening the analysis time. The figure below shows an example of BF applied at 13 minutes, shortening the analysis time from 35 to 20 minutes.

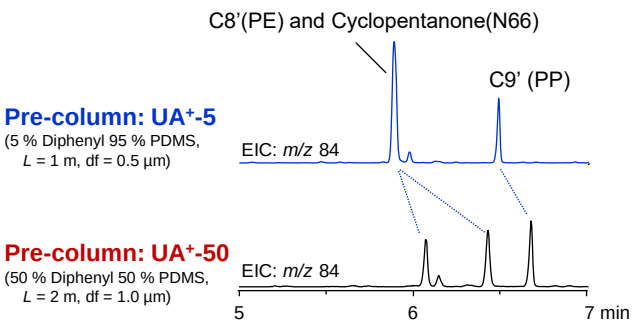
- Sample: polyethylene 0.05 mg, Furnace temp.: 600 ºC
- GC oven: 40 ºC (2 min hold) - 320 ºC (20 ºC/min, 20 min hold)



3. Peak separation improvement by selecting an appropriate pre-column

The figure below shows an example of peak separation by selecting a pre-column having a stationary phase of different polarity and an optimal length.

- Sample: polyethylene (PE) 320 µg, Polypropylene (PP) 80 µg, Nylon-6,6 (N66) 18 µg, Furnace temp.: 600 ºC
- GC oven: 40 ºC (2 min hold) – 280 ºC (20 ºC/min)



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Offering superior products from a company specialized in development and production of high performance pyrolyzers and metal capillary columns.

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