



# Empore™ Extraction Disks

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## Method Summary

Proposed SPE Disk Method for Aqueous Phase EPA Quick Turnaround Methods (QTM):  
Polynuclear Aromatic Hydrocarbons (PAHs)

### Summary

A water sample (100 ml) is passed through a 47mm C18 Empore™ disk and eluted with methylene chloride. The extract is dried, reduced in volume and analyzed by GC/FID. If interfering compounds are present, clean-up protocols are described in the EPA QTM method.

#### PERFORMANCE DATA

| <u>Analyte</u>             | <u>High Level<sup>a</sup></u> |                        | <u>Low Level<sup>b</sup></u> |                        |
|----------------------------|-------------------------------|------------------------|------------------------------|------------------------|
|                            | <u>Ave</u><br><u>% R</u>      | <u>%</u><br><u>RSD</u> | <u>Ave</u><br><u>% R</u>     | <u>%</u><br><u>RSD</u> |
| Naphthalene                | 47.0                          | 4.2                    | 48.2                         | 0.4                    |
| Acenaphthylene             | 58.8                          | 3.9                    | 59.2                         | 1.8                    |
| Acenaphthene               | 57.7                          | 3.8                    | 60.0                         | 2.3                    |
| Fluorene                   | 62.7                          | 4.1                    | 69.5                         | 6.8                    |
| Phenanthrene               | 67.0                          | 4.6                    | 80.6                         | 7.6                    |
| Anthracene                 | 64.9                          | 4.5                    | 81.4                         | 7.9                    |
| Fluoranthene               | 70.9                          | 4.7                    | 86.5                         | 7.1                    |
| Pyrene                     | 70.6                          | 5.2                    | 86.1                         | 6.8                    |
| Benzo(a)anthracene         | 67.4                          | 6.6                    | 91.6                         | 5.4                    |
| Chrysene                   | 67.5                          | 7.0                    | 90.9                         | 5.0                    |
| Benzo(b&k)fluoranthene     | 69.9                          | 6.4                    | 87.5                         | 6.7                    |
| Benzo(a)pyrene             | 69.5                          | 7.2                    | 91.7                         | 5.8                    |
| Indeno(1,2,3,c,d)pyrene    | 69.0                          | 9.7                    | 94.0                         | 5.9                    |
| Dibenzo(a,h)anthracene     | 72.0                          | 8.6                    | 88.4                         | 7.4                    |
| Benzo(g,h,i)perylene       | 74.4                          | 7.5                    | 91.7                         | 7.3                    |
| Bromofluorene <sup>c</sup> | 73.1                          | 5.9                    | 58.4                         | 14.4                   |

<sup>a</sup> Compounds spiked at 200 ppb into groundwaters from two different hazardous waste sites. n=6.

<sup>b</sup> Compounds spiked at 20 ppb into groundwater from a hazardous waste site. n=3.

<sup>c</sup> Surrogate compound

## Method

1. Assemble an all glass filtration assembly using a 47mm C18 Empore disk. Use of a manifold for multiple extractions is acceptable.
2. Wash the extraction apparatus and disk by adding 5 ml of methylene chloride to the reservoir. Pull a small amount through the disk with a vacuum; turn off the vacuum and allow the disk to soak for about one minute. Pull the remaining solvent through the disk and allow the disk to dry.
3. Condition the disk by adding approximately 5 ml of methanol to the reservoir, pulling a small amount through the disk then letting it soak for about one minute. Pull most of the remaining methanol through the disk, leaving 3-5 mm of methanol on the surface of the disk.
4. Add 10 ml of reagent water to the disk. Using the vacuum pull most through, again leaving 3-5 mm of water on the surface of the disk.
5. Add 0.5 ml of methanol to the water sample and mix well. Add the water sample to the reservoir and, under vacuum, filter as quickly as the vacuum will allow. Drain as much water from the sample bottle as possible.
6. Remove filter assembly and insert suitable sample tube for eluate collection.
7. Add 10 ml of methylene chloride to sample bottle. Rinse bottle thoroughly and set aside momentarily.
8. Wet the disk with a small amount of acetone – just enough to wet the surface (approximately 0.5 ml or less) and immediately transfer the methylene chloride from the sample bottle to the disk with a dispo-pipette, rinsing the sides of the filtration reservoir in the process.
9. Pull half of the solvent through the disk then release the vacuum. Allow the remaining methylene chloride to soak the disk for about one minute then draw remainder through under vacuum.
10. Repeat the solvent rinse of the sample bottle using 5 ml methylene chloride and transfer to the apparatus, rinsing down the sides of the reservoir. Add 5 ml methylene chloride directly on the disk, let soak for about one minute, and draw through under vacuum.
11. Dry the combined eluate with anhydrous sodium sulfate. Rinse the collection tube and sodium sulfate with two 5 ml aliquots of methylene chloride and place combined solvent into a concentrator tube.
12. Concentrate extract to 1.0 ml under a gentle stream of nitrogen (may be warmed gently at approximately 30°C).
13. Analyze by GC/FID.

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