



April 20, 2012

NEW CALIBRATION SET: PAH-CVS-B

New Polyaromatic Hydrocarbon (PAH) Calibration Set and Support Solutions

Wellington currently offers **PAH-CVS-A** and **L429-CVS** as ready to use calibration sets for the HRGC/HRMS analysis of polyaromatic hydrocarbons (PAHs). **PAH-CVS-B** is being introduced to complement our existing PAH calibration sets and, in order to better suit the needs of our customers, this calibration set contains an increased number and selection of native PAHs (including benzo[c]fluorene).

Summarized in the table below are the individual PAHs to be analyzed according to the European Union (15+1 priority PAHs), the US EPA (various methods; 16 PAHs), and the California EPA Air Resources Board (CARB Method 429).

PAH-CVS-B contains all of these PAHs and thus satisfies the requirements of a number of jurisdictions and their related agencies.

| PAH | 15+1 EU PAHs | US EPA; 16 PAHs | CARB 429 |
|-------------------------|--------------|-----------------|----------|
| Naphthalene | | ‡ | × |
| 2-Methylnaphthalene | | | × |
| Acenaphthylene | | ‡ | × |
| Acenaphthene | | ‡ | × |
| Fluorene | | ‡ | × |
| Phenanthrene | | ‡ | × |
| Anthracene | | ‡ | × |
| Fluoranthene | | ‡ | × |
| Pyrene | | ‡ | × |
| Benzo[c]fluorene | † | | |
| Cyclopenta[c,d]pyrene | † | | |
| Benz[a]anthracene | † | ‡ | × |
| Chrysene | † | ‡ | × |
| 5-Methylchrysene | † | | |
| Benzo[b]fluoranthrene | † | ‡ | × |
| Benzo[j]fluoranthrene | † | | |
| Benzo[k]fluoranthrene | † | ‡ | × |
| Benzo[e]pyrene | | | × |
| Benzo[a]pyrene | † | ‡ | × |
| Perylene | | | × |
| Indeno[1,2,3-c,d]pyrene | † | ‡ | × |
| Benzo[g,h,i]perylene | † | ‡ | × |
| Dibenz[a,h]anthracene | † | ‡ | × |
| Dibenzo[a,i]pyrene | † | | |
| Dibenz[a,e]pyrene | † | | |
| Dibenz[a,j]pyrene | † | | |
| Dibenzo[a,h]pyrene | † | | |

PAH-CVS-B includes five calibration solutions ranging in concentration from 2 ng/ml to 1000 ng/ml (see Table A) and can be used with the following support solutions:

PAH-STK-B: PAH Native Stock Solution (27 components - see Table B)

PAH-LCS-B: PAH Labelled Compound Solution (16 components - see Table C)

PAH-ISS-B: PAH Internal Standard Spiking Solution (3 components - see Table D)

PAH-SS-B: PAH Sampling Standard Solution (2 components - see Table E)



Table A: PAH-CVS-B; Components and Concentrations (ng/ml; isooctane/toluene)

| Native Compounds | CAS # | PAH-B-CS1 | PAH-B-CS2 | PAH-B-CS3 | PAH-B-CS4 | PAH-B-CS5 |
|---|-------------|-----------|-----------|-----------|-----------|-----------|
| Naphthalene | 91-20-3 | 2 | 10 | 50 | 250 | 1000 |
| 2-Methylnaphthalene | 91-57-6 | 2 | 10 | 50 | 250 | 1000 |
| Acenaphthylene | 208-96-8 | 2 | 10 | 50 | 250 | 1000 |
| Acenaphthene | 83-32-9 | 2 | 10 | 50 | 250 | 1000 |
| Fluorene | 86-73-7 | 2 | 10 | 50 | 250 | 1000 |
| Phenanthrene | 85-01-8 | 2 | 10 | 50 | 250 | 1000 |
| Anthracene | 120-12-7 | 2 | 10 | 50 | 250 | 1000 |
| Fluoranthene | 206-44-0 | 2 | 10 | 50 | 250 | 1000 |
| Pyrene | 129-00-0 | 2 | 10 | 50 | 250 | 1000 |
| Benzo[c]fluorene | 205-12-9 | 2 | 10 | 50 | 250 | 1000 |
| Cyclopenta[c,d]pyrene | 27208-37-3 | 2 | 10 | 50 | 250 | 1000 |
| Benz[a]anthracene | 56-55-3 | 2 | 10 | 50 | 250 | 1000 |
| Chrysene | 218-01-9 | 2 | 10 | 50 | 250 | 1000 |
| 5-Methylchrysene | 3697-24-3 | 2 | 10 | 50 | 250 | 1000 |
| Benzo[b]fluoranthene | 205-99-2 | 2 | 10 | 50 | 250 | 1000 |
| Benzo[k]fluoranthene | 207-08-9 | 2 | 10 | 50 | 250 | 1000 |
| Benzo[j]fluoranthene | 205-82-3 | 2 | 10 | 50 | 250 | 1000 |
| Benzo[e]pyrene | 192-97-2 | 2 | 10 | 50 | 250 | 1000 |
| Benzo[a]pyrene | 50-32-8 | 2 | 10 | 50 | 250 | 1000 |
| Perylene | 77392-71-3 | 2 | 10 | 50 | 250 | 1000 |
| Indeno[1,2,3-c,d]pyrene | 193-39-5 | 2 | 10 | 50 | 250 | 1000 |
| Benzo[g,h,i]perylene | 191-24-2 | 2 | 10 | 50 | 250 | 1000 |
| Dibenz[a,h]anthracene | 53-70-3 | 2 | 10 | 50 | 250 | 1000 |
| Dibenzo[a,l]pyrene | 191-30-0 | 2 | 10 | 50 | 250 | 1000 |
| Dibenzo[a,e]pyrene | 192-65-4 | 2 | 10 | 50 | 250 | 1000 |
| Dibenzo[a,i]pyrene | 189-55-9 | 2 | 10 | 50 | 250 | 1000 |
| Dibenzo[a,h]pyrene | 189-64-0 | 2 | 10 | 50 | 250 | 1000 |
| PAH-LCS-B (Extraction Standards) | | | | | | |
| Naphthalene-d ₈ | 1146-65-2 | 100 | 100 | 100 | 100 | 100 |
| 2-Methylnaphthalene-d ₁₀ | 7297-45-2 | 100 | 100 | 100 | 100 | 100 |
| Acenaphthylene-d ₈ | 93951-97-4 | 100 | 100 | 100 | 100 | 100 |
| Phenanthrene-d ₁₀ | 1517-22-2 | 100 | 100 | 100 | 100 | 100 |
| Anthracene-d ₁₀ | 1719-06-8 | 100 | 100 | 100 | 100 | 100 |
| Fluoranthene-d ₁₀ | 93951-69-0 | 100 | 100 | 100 | 100 | 100 |
| Benz[a]anthracene-d ₁₂ | 1718-53-2 | 100 | 100 | 100 | 100 | 100 |
| Chrysene-d ₁₂ | 1719-03-5 | 100 | 100 | 100 | 100 | 100 |
| Benzo[b]fluoranthene-d ₁₂ | 93951-98-5 | 100 | 100 | 100 | 100 | 100 |
| Benzo[k]fluoranthene-d ₁₂ | 93952-01-3 | 100 | 100 | 100 | 100 | 100 |
| Benzo[a]pyrene-d ₁₂ | 63466-71-7 | 100 | 100 | 100 | 100 | 100 |
| Perylene-d ₁₂ | 1520-96-3 | 100 | 100 | 100 | 100 | 100 |
| Indeno[1,2,3-c,d]pyrene-d ₁₂ | 203578-33-0 | 100 | 100 | 100 | 100 | 100 |
| Benzo[g,h,i]perylene-d ₁₂ | 93951-66-7 | 100 | 100 | 100 | 100 | 100 |
| Dibenz[a,h]anthracene-d ₁₄ | 13250-98-1 | 100 | 100 | 100 | 100 | 100 |
| Dibenzo[a,i]pyrene-d ₁₄ | 158776-07-9 | 100 | 100 | 100 | 100 | 100 |
| PAH-ISS-B (Recovery Standards) | | | | | | |
| Acenaphthene-d ₁₀ | 15067-26-2 | 100 | 100 | 100 | 100 | 100 |
| Pyrene-d ₁₀ | 1718-52-1 | 100 | 100 | 100 | 100 | 100 |
| Benzo[e]pyrene-d ₁₂ | 205440-82-0 | 100 | 100 | 100 | 100 | 100 |
| PAH-SS-B (Sampling Standards) | | | | | | |
| Fluorene-d ₁₀ | 81103-79-9 | 100 | 100 | 100 | 100 | 100 |
| p-Terphenyl-d ₁₄ | 1718-51-0 | 100 | 100 | 100 | 100 | 100 |



Table B: PAH-STK-B; Components and Concentrations (ng/ml; isooctane/toluene/nonane)

| Native PAH Compounds | CAS # | Concentration (ng/ml) |
|-------------------------|------------|-----------------------|
| Naphthalene | 91-20-3 | 2500 |
| 2-Methylnaphthalene | 91-57-6 | 2500 |
| Acenaphthylene | 208-96-8 | 2500 |
| Acenaphthene | 83-32-9 | 2500 |
| Fluorene | 86-73-7 | 2500 |
| Phenanthrene | 85-01-8 | 2500 |
| Anthracene | 120-12-7 | 2500 |
| Fluoranthene | 206-44-0 | 2500 |
| Pyrene | 129-00-0 | 2500 |
| Benzo[c]fluorene | 205-12-9 | 2500 |
| Cyclopenta[c,d]pyrene | 27208-37-3 | 2500 |
| Benz[a]anthracene | 56-55-3 | 2500 |
| Chrysene | 218-01-9 | 2500 |
| 5-Methylchrysene | 3697-24-3 | 2500 |
| Benzo[b]fluoranthene | 205-99-2 | 2500 |
| Benzo[k]fluoranthene | 207-08-9 | 2500 |
| Benzo[j]fluoranthene | 205-82-3 | 2500 |
| Benzo[e]pyrene | 192-97-2 | 2500 |
| Benzo[a]pyrene | 50-32-8 | 2500 |
| Perylene | 77392-71-3 | 2500 |
| Indeno[1,2,3-c,d]pyrene | 193-39-5 | 2500 |
| Benzo[g,h,i]perylene | 191-24-2 | 2500 |
| Dibenz[a,h]anthracene | 53-70-3 | 2500 |
| Dibenzo[a,l]pyrene | 191-30-0 | 2500 |
| Dibenzo[a,e]pyrene | 192-65-4 | 2500 |
| Dibenzo[a,i]pyrene | 189-55-9 | 2500 |
| Dibenzo[a,h]pyrene | 189-64-0 | 2500 |

Table C: PAH-LCS-B; Components and Concentrations (ng/ml; isooctane/toluene)

| PAH | CAS # | Concentration (ng/ml) |
|---|-------------|-----------------------|
| Naphthalene-d ₈ | 1146-65-2 | 5000 |
| 2-Methylnaphthalene-d ₁₀ | 7297-45-2 | 5000 |
| Acenaphthylene-d ₈ | 93951-97-4 | 5000 |
| Phenanthrene-d ₁₀ | 1517-22-2 | 5000 |
| Anthracene-d ₁₀ | 1719-06-8 | 5000 |
| Fluoranthene-d ₁₀ | 93951-69-0 | 5000 |
| Benzo[a]anthracene-d ₁₂ | 1718-53-2 | 5000 |
| Chrysene-d ₁₂ | 1719-03-5 | 5000 |
| Benzo[b]fluoranthene-d ₁₂ | 93951-98-5 | 5000 |
| Benzo[k]fluoranthene-d ₁₂ | 93952-01-3 | 5000 |
| Benzo[a]pyrene-d ₁₂ | 63466-71-7 | 5000 |
| Perylene-d ₁₂ | 1520-96-3 | 5000 |
| Indeno[1,2,3-c,d]pyrene-d ₁₂ | 203578-33-0 | 5000 |
| Benzo[g,h,i]perylene-d ₁₂ | 93951-66-7 | 5000 |
| Dibenz[a,h]anthracene-d ₁₄ | 13250-98-1 | 5000 |
| Dibenzo[a,i]pyrene-d ₁₄ | 158776-07-9 | 5000 |



Table D: PAH-ISS-B; Components and Concentrations (ng/ml; isooctane/toluene)

| PAH | CAS # | Concentration (ng/ml) |
|--------------------------------|-------------|-----------------------|
| Acenaphthene-d ₁₀ | 15067-26-2 | 5000 |
| Pyrene-d ₁₀ | 1718-52-1 | 5000 |
| Benzo[e]pyrene-d ₁₂ | 205440-82-0 | 5000 |

Table E: PAH-SS-B; Components and Concentrations (ng/ml; isooctane/toluene)

| PAH | CAS # | Concentration (ng/ml) |
|-----------------------------|------------|-----------------------|
| Fluorene-d ₁₀ | 81103-79-9 | 5000 |
| p-Terphenyl-d ₁₄ | 1718-51-0 | 5000 |

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