



Polycyclic Aromatic Compound (PAC) Standards and Standard Mixtures

Solutions for a Greener World

¹³C-Labeled Polycyclic Aromatic Hydrocarbon (PAH) Standards

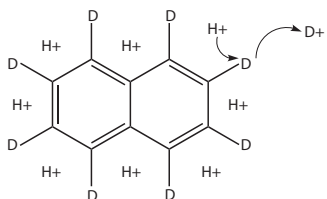
CIL, in cooperation with Cerilliant Corporation, is pleased to offer ¹³C-labeled polycyclic aromatic hydrocarbons (PAHs) as a superior alternative to deuterated standards. Although CIL has traditionally produced high-quality deuterated PAH analogs, some analysts have observed back-exchange of proton for deuterium under harsh extraction conditions and in certain matrices. If precise quantitation is required, or complete recovery information is needed, the non-exchangeable ¹³C isotope label is the right standard to use.

Deuterium Back-Exchange

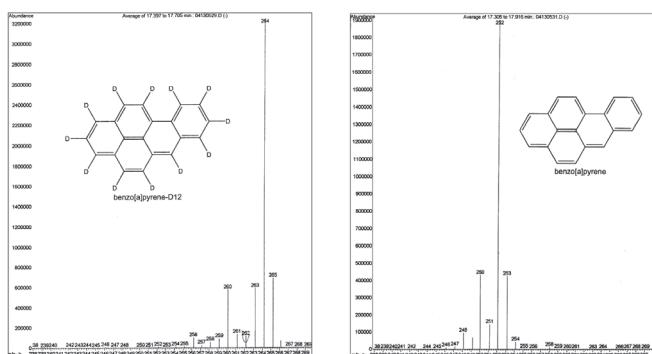
While analysts have been using deuterated PAH standards for years, labile deuterons are susceptible to back-exchange. The phenomenon is particularly likely to occur in acidic or catalytic matrices, when the importance of a reliable internal standard is greatest.

Deuterium-labeled PAH metabolites are even more susceptible to the phenomena of back-exchange and loss of protons/deuterons in the mass spectrometer.

Naphthalene-D₈ deuterium-exchange



Deuterated PAH mass spectra differ from unlabeled mass spectra



Similar Mass Spectra

Even at lower voltages the parent ion loses a considerable number of protons or deuterons. Mass spectra of ¹³C PAHs will show a succession of proton losses (M-1, M-2, M-3, M-4 etc., similar to native PAHs), while mass spectra of deuterated PAHs will show a succession of deuterium losses (M-2, M-4, M-6, M-8, etc.).

In the chromatogram for the deuterated benzo[a]pyrene, the proton losses at M-2, M-4, etc. are supplemented with proton losses of M-1, M-3, etc. This represents a loss of deuterons from incompletely deuterated species. As a result, the profile of the deuterated material does not correspond exactly to that of the unlabeled material. ¹³C-labeled benzo[a]pyrene, however, will match the unlabeled material with the 4 AMU shift being the only difference between the two profiles.

Hydroxy PAHs

PAH exposure occurs through ingestion, inhalation, and dermal contact. In the body, these compounds are predominantly metabolized as epoxides, which are converted to phenol (hydroxy) and dihydrodiol derivatives. The hydroxylated metabolites of the PAHs are excreted in human urine both as free hydroxylated metabolites and as hydroxylated metabolites conjugated to glucuronic acid or sulfate. During 1999-2002, the Centers for Disease Control and Prevention (CDC) began to measure 22 hydroxylated PAH urinary metabolites as part of the Third National Report on Human Exposure to Environmental Chemicals in the National Health and Nutrition Examination Survey (NHANES). Since then, CDC and others have focused human exposure studies on 10 target hydroxylated PAH urinary metabolites. CIL has produced isotopically labeled and unlabeled standard solutions and standard mixtures for each of these target metabolites.

Substituted PAHs

For many years, researchers have studied the effects of diesel combustion engines, and one of the major issues related to this is the production of nitrated PAHs. Nitrated PAHs with >3 rings have been linked to the mutagenic properties associated with diesel-exhaust particulate matter. Alkyl PAHs are found in petroleum products and are typically studied in environmental forensics and fingerprinting. Alkyl PAHs may be found in high levels compared to parent PAHs and are often more persistent and bioaccumulative. Halogenated PAHs are likely the least studied but hold similar interest to parent PAHs and other substituted PAHs. Halogenated PAHs are often associated with incomplete incineration of municipal, industrial, and electronic wastes.

Benzo[a]Pyrene Tetrol Metabolites

Similarly to hydroxy PAHs, researchers have studied benzo[a]pyrene-7,8,9,10-tetrahydrodiol levels in blood samples as markers for human exposure to PAHs, in particular, exposure to cigarette smoke or occupational exposure to benzo[a]pyrene, one of the most commonly studied PAHs.

¹³C-Labeled Polycyclic Aromatic Hydrocarbon (PAH) Standards

Catalog No.	Compound	Structure	Concentration	Amount
CLM-1643-1.2	Acenaphthene (¹³ C ₆ , 99%)		100 ± 10 µg/mL in nonane	1.2 mL
CLM-2477-1.2	Acenaphthylene (¹³ C ₆ , 99%)		100 ± 10 µg/mL in nonane	1.2 mL
CLM-1333-1.2	Anthracene (¹³ C ₆ , 99%)		100 ± 10 µg/mL in nonane	1.2 mL
NEW CDLM-9731-1.2	Benz[e]aceanthrylene/Benz[j]aceanthrylene (¹³ C ₂ , 94%; D ₂ , 94%)		100 ± 10 µg/mL in nonane	1.2 mL
CLM-3602-1.2	Benzo[a]anthracene (¹³ C ₆ , 99%)		100 ± 10 µg/mL in nonane	1.2 mL
CLM-3599-1.2	Benzo[b]fluoranthene (¹³ C ₆ , 99%)		100 ± 10 µg/mL in nonane	1.2 mL
NEW CLM-9590-1.2	Benzo[j]fluoranthene (¹³ C ₁₂ , 99%)		100 ± 10 µg/mL in nonane	1.2 mL
CLM-3756-1.2	Benzo[k]fluoranthene (¹³ C ₆ , 99%)		100 ± 10 µg/mL in nonane	1.2 mL
NEW CLM-9363-1.2	Benzo[c]fluorene (¹³ C ₆ , 99%)		100 ± 10 µg/mL in nonane	1.2 mL
NEW CLM-9610-1.2	Benzo[b]furan (¹³ C ₆ , 99%)		100 ± 10 µg/mL in nonane	1.2 mL
CLM-1364-1.2	Benzo[ghi]perylene (¹³ C ₁₂ , 99%)		100 ± 10 µg/mL in nonane	1.2 mL
NEW CLM-9730-1.2	Benzo[c]phenanthrene (¹³ C ₆ , 99%)		100 ± 10 µg/mL in nonane	1.2 mL
CLM-2722-1.2	Benzo[a]pyrene (¹³ C ₄ , 99%)		100 ± 10 µg/mL in nonane	1.2 mL
CLM-6170-1.2	Benzo[e]pyrene (¹³ C ₄ , 99%)		100 ± 10 µg/mL in nonane	1.2 mL

¹³C-Labeled Polycyclic Aromatic Hydrocarbon (PAH) Standards

Catalog No.	Compound	Structure	Concentration	Amount
CLM-3757-1.2	Chrysene (¹³ C ₆ , 99%)		100 ± 10 µg/mL in nonane	1.2 mL
NEW CLM-9167-1.2	Cyclopenta[cd]pyrene (¹³ C ₆ , 99%)		100 ± 10 µg/mL in nonane	1.2 mL
CLM-3598-1.2	Dibenz[a,h]anthracene (¹³ C ₆ , 99%)		100 ± 10 µg/mL in nonane	1.2 mL
CLM-3835-1.2	Dibenzo[a,e]pyrene (¹³ C ₆ , 99%)		100 ± 10 µg/mL in nonane	1.2 mL
NEW CLM-9165-T-1.2	Dibenzo[a,h]pyrene (¹³ C ₁₂ , 99%)		100 ± 10 µg/mL in toluene	1.2 mL
CLM-3774-A NEW CLM-3774-A-T-1.2	Dibenzo[a,i]pyrene (¹³ C ₁₂ , 99%)		50 ± 5 µg/mL in nonane 100 ± 10 µg/mL in toluene	1.2 mL
NEW CLM-9499-1.2	Dibenzo[a,l]pyrene (¹³ C ₆ , 99%)		100 ± 10 µg/mL in nonane	1.2 mL
CLM-3597-1.2	Fluoranthene (¹³ C ₆ , 99%)		100 ± 10 µg/mL in nonane	1.2 mL
CLM-3596-1.2	Fluorene (¹³ C ₆ , 99%)		100 ± 10 µg/mL in nonane	1.2 mL
CLM-3600-1.2	Indeno[1,2,3-cd]pyrene (¹³ C ₆ , 99%)		100 ± 10 µg/mL in nonane	1.2 mL
NEW CLM-9729-1.2	5-Methylchrysene (¹³ C ₆ , 99%)		100 ± 10 µg/mL in nonane	1.2 mL
CLM-1332-1.2	Naphthalene (¹³ C ₆ , 99%)		100 ± 10 µg/mL in nonane	1.2 mL
CLM-2451-1.2	Phenanthrene (¹³ C ₆ , 99%)		100 ± 10 µg/mL in nonane	1.2 mL
CLM-3601-1.2	Pyrene (¹³ C ₃ , 99%)		100 ± 10 µg/mL in nonane	1.2 mL

Deuterium-Labeled Polycyclic Aromatic Hydrocarbon (PAH) Standards

Catalog No.	Compound	Formula	Concentration	Amount
DLM-108-1.2	Acenaphthene (D ₁₀ , 98%)	C ₁₂ D ₁₀	200 µg/mL in isooctane	1.2 mL
DLM-108-0.1			neat	0.1 g
DLM-108-1			neat	1 g
DLM-108-5			neat	5 g
DLM-2204-1.2	Acenaphthylene (D ₈ , 98%)	C ₁₂ D ₈	200 µg/mL in isooctane	1.2 mL
DLM-2204-0.1			neat	0.1 g
DLM-849-0.1	Acridine (D ₉ , 98%)	C ₁₃ D ₉ N	neat	0.1 g
DLM-849-0.5			neat	0.5 g
DLM-102-1.2	Anthracene (D ₁₀ , 98%)	C ₁₄ D ₁₀	200 µg/mL in isooctane	1.2 mL
DLM-102-1			neat	1 g
DLM-102-5			neat	5 g
DLM-610-1.2	Benz[a]anthracene (D ₁₂ , 98%)	C ₁₈ D ₁₂	200 µg/mL in isooctane	1.2 mL
DLM-610-0.1			neat	0.1 g
DLM-2136-1.2	Benzo[b]fluoranthene (D ₁₂ , 98%)	C ₂₀ D ₁₂	200 µg/mL in isooctane	1.2 mL
DLM-2136-0.01			neat	0.01 g
DLM-1923-1.2	Benzo[k]fluoranthene (D ₁₂ , 98%)	C ₂₀ D ₁₂	200 µg/mL in isooctane	1.2 mL
DLM-1923-0.01			neat	0.01 g
DLM-2135-1.2	Benzo[ghi]perylene (D ₁₂ , 98%)	C ₂₂ D ₁₂	200 µg/mL in toluene-D ₈	1.2 mL
DLM-2135-0.01			neat	0.01 g
DLM-258-1.2	Benzo[a]pyrene (D ₁₂ , 98%)	C ₂₀ D ₁₂	200 µg/mL in isooctane	1.2 mL
DLM-258-0.01			neat	0.01 g
DLM-258-0.05			neat	0.05 g
DLM-258-0.1			neat	0.1 g
DLM-257-1.2	Benzo[e]pyrene (D ₁₂ , 98%)	C ₂₀ D ₁₂	200 µg/mL in isooctane	1.2 mL
DLM-257-0.01			neat	0.01 g
DLM-261-1.2	Chrysene (D ₁₂ , 98%)	C ₁₈ D ₁₂	200 µg/mL in toluene-D ₈	1.2 mL
DLM-261-0.1			neat	0.1 g
DLM-261-1			neat	1 g
DLM-2715-1.2	Coronene (D ₁₂ , 97%)	C ₂₄ D ₁₂	200 µg/mL in benzene	1.2 mL
DLM-2715-0.01			neat	0.01 g
DLM-2715-0.1			neat	0.1 g
DLM-3843-1.2	Dibenz[a,j]acridine (D ₁₃ , 98%)	C ₂₁ D ₁₃ N	50 µg/mL in toluene-D ₈	1.2 mL
NEW DLM-8020-1.2	Dibenz[a,c]anthracene (D ₁₄ , 98%)	C ₂₂ D ₁₄	200 µg/mL in toluene-D ₈	1.2 mL
DLM-677-1.2	Dibenz[a,h]anthracene (D ₁₄ , 98%)	C ₂₂ D ₁₄	200 µg/mL in toluene-D ₈	1.2 mL
DLM-677-0.1			neat	0.1 g
DLM-3740-1.2	Dibenzo[a,i]pyrene (D ₁₄ , 98%)	C ₂₄ D ₁₄	200 µg/mL in toluene-D ₈	1.2 mL
DLM-3841-1.2	7H-Dibenzof[c,g]carbazole (D ₁₂ , 98%)	C ₂₀ D ₁₂ HN	50 µg/mL in toluene-D ₈	1.2 mL
DLM-2140-1.2	Fluoranthene (D ₁₀ , 98%)	C ₁₆ D ₁₀	200 µg/mL in isooctane	1.2 mL
DLM-2140-0.1			neat	0.1 g
DLM-1123-1.2	Fluorene (D ₁₀ , 98%)	C ₁₃ D ₁₀	200 µg/mL in isooctane	1.2 mL
DLM-1123-0.1			neat	0.1 g
DLM-1123-1			neat	1 g
DLM-2148-1.2	Indeno[1,2,3-cd]pyrene (D ₁₂ , 98%)	C ₂₂ D ₁₂	200 µg/mL in isooctane	1.2 mL
DLM-2148-0.01			neat	0.01 g
DLM-365-1.2	Naphthalene (D ₈ , 99%)	C ₁₀ D ₈	200 µg/mL in isooctane	1.2 mL
DLM-365-1			neat	1 g
DLM-365-5			neat	5 g
DLM-365-10			neat	10 g
DLM-3875-10	Naphthalene (D ₈ , 99.5%)	C ₁₀ D ₈	neat	10 g
DLM-366-1.2	Perylene (D ₁₂ , 98%)	C ₂₀ D ₁₂	200 µg/mL in toluene-D ₈	1.2 mL
DLM-366-0.1			neat	0.1 g
DLM-366-1			neat	1 g
DLM-371-1.2	Phenanthrene (D ₁₀ , 98%)	C ₁₄ D ₁₀	200 µg/mL in isooctane	1.2 mL
DLM-371-0.1			neat	0.1 g
DLM-371-1			neat	1 g
DLM-371-5			neat	5 g
DLM-155-1.2	Pyrene (D ₁₀ , 98%)	C ₁₆ D ₁₀	200 µg/mL in isooctane	1.2 mL
DLM-155-0.1			neat	0.1 g
DLM-155-0.5			neat	0.5 g

Deuterium-Labeled PAH Standards

Catalog No.	Compound	Formula	Concentration	Amount
NEW DLM-450-1	<i>o</i> -Terphenyl (D ₁₄ , 98%)	C ₆ D ₄ (C ₆ D ₅) ₂	neat	1 g
DLM-450-5			neat	5 g
NEW DLM-382-1.2	<i>p</i> -Terphenyl (D ₁₄ , 98%)	C ₆ D ₄ (C ₆ D ₅) ₂	200 µg/mL in isooctane	1.2 mL
DLM-382-1			neat	1 g
NEW DLM-382-5			neat	5 g
DLM-601-0.1	Triphenylene (D ₁₂ , 98%)	C ₁₈ D ₁₂	neat	0.1 g
DLM-601-1			neat	1 g

Unlabeled PAH Standards

Catalog No.	Compound	Formula	Concentration	Amount
ULM-7413-1.2	Acenaphthene	C ₁₂ H ₁₀	200 µg/mL in isooctane	1.2 mL
ULM-7422-1.2	Acenaphthylene	C ₁₂ H ₈	200 µg/mL in isooctane	1.2 mL
ULM-7412-1.2	Anthracene	C ₁₄ H ₁₀	200 µg/mL in isooctane	1.2 mL
NEW ULM-9758-1.2	Benz[e]aceanthrylene/Benz[j]aceanthrylene	C ₂₀ H ₁₂	200 µg/mL in nonane	1.2 mL
ULM-2415-I-1.2	Benz[a]anthracene	C ₁₈ H ₁₂	200 µg/mL in isooctane	1.2 mL
ULM-2415-0.1			neat	0.1 g
ULM-2416-I-1.2	Benzo[b]fluoranthene	C ₂₀ H ₁₂	200 µg/mL in isooctane	1.2 mL
ULM-2416-0.1			neat	0.1 g
NEW ULM-2411-1.2	Benzo[j]fluoranthene	C ₂₀ H ₁₂	100 µg/mL in nonane	1.2 mL
ULM-2411-25			neat	25 mg
NEW ULM-2417-I-1.2	Benzo[k]fluoranthene	C ₂₀ H ₁₂	200 µg/mL in isooctane	1.2 mL
ULM-2417-0.1			neat	0.1 g
NEW ULM-9357-1.2	Benzo[c]fluorene	C ₁₇ H ₁₂	100 µg/mL in nonane	1.2 mL
NEW ULM-9618-1.2	Benzo[b]furan	C ₈ H ₆ O	100 µg/mL in nonane	1.2 mL
ULM-2418-1.2	Benzo[ghi]perylene	C ₂₂ H ₁₂	200 µg/mL in toluene	1.2 mL
ULM-2418-0.1			neat	0.1 g
NEW ULM-8155-1.2	Benzo[c]phenanthrene	C ₁₈ H ₁₂	100 µg/mL in nonane	1.2 mL
ULM-8155-25			neat	25 mg
ULM-2412-I-1.2	Benzo[a]pyrene	C ₂₀ H ₁₂	200 µg/mL in isooctane	1.2 mL
ULM-2412-0.1			neat	0.1 g
ULM-7423-1.2	Benzo[e]pyrene	C ₂₀ H ₁₂	200 µg/mL in isooctane	1.2 mL
ULM-7424-1.2	Chrysene	C ₁₈ H ₁₂	200 µg/mL in toluene	1.2 mL
ULM-6576-1.2	Coronene	C ₂₄ H ₁₂	200 µg/mL in benzene	1.2 mL
NEW ULM-6891-1.2	Cyclopenta[cd]pyrene	C ₁₈ H ₁₀	100 µg/mL in nonane	1.2 mL
ULM-3884-1.2	Dibenz[a,j]acridine	C ₂₁ H ₁₃ N	50 µg/mL in toluene	1.2 mL
ULM-3884-25			neat	25 mg
NEW ULM-9759-1.2	Dibenz[a,c]anthracene	C ₂₂ H ₁₄	200 µg/mL in toluene	1.2 mL
ULM-2422-T-1.2	Dibenz[a,h]anthracene	C ₂₂ H ₁₄	200 µg/mL in toluene	1.2 mL
ULM-2422-0.1			neat	0.1 g
ULM-3885-1.2	7H-Dibenzo[c,g]carbazole	C ₂₀ H ₁₃ N	50 µg/mL in toluene	1.2 mL
ULM-6671-1.2	Dibenzo[a,e]fluoranthene	C ₂₄ H ₁₄	200 µg/mL in toluene	1.2 mL
NEW ULM-1226-1.2	Dibenzo[a,e]pyrene	C ₂₄ H ₁₄	100 µg/mL in nonane	1.2 mL
ULM-1226-0.01			neat	0.01 g
ULM-1227-T-1.2	Dibenzo[a,h]pyrene	C ₂₄ H ₁₄	100 µg/mL in toluene	1.2 mL
ULM-1227-0.01			neat	0.01 g
NEW ULM-2423-1.2	Dibenzo[a,i]pyrene	C ₂₄ H ₁₄	200 µg/mL in toluene	1.2 mL
ULM-2423-A-1.2			50 µg/mL in nonane	1.2 mL
ULM-1253-1.2	Dibenzo[a,l]pyrene	C ₂₄ H ₁₄	200 µg/mL in toluene	1.2 mL
ULM-1253-25			neat	25 mg
ULM-7421-1.2	Fluoranthene	C ₁₆ H ₁₀	200 µg/mL in isooctane	1.2 mL
ULM-7414-1.2	Fluorene	C ₁₃ H ₁₀	200 µg/mL in isooctane	1.2 mL
ULM-2426-I-1.2	Indeno[1,2,3-cd]pyrene	C ₂₂ H ₁₂	200 µg/mL in isooctane	1.2 mL
ULM-2426-25			neat	25 mg
ULM-7425-1.2	Naphthalene	C ₁₀ H ₁₀	200 µg/mL in isooctane	1.2 mL
ULM-7426-1.2	Perylene	C ₂₀ H ₁₂	200 µg/mL in isooctane	1.2 mL
ULM-7427-1.2	Phenanthrene	C ₁₄ H ₁₀	200 µg/mL in isooctane	1.2 mL
ULM-7417-1.2	Pyrene	C ₁₆ H ₁₀	200 µg/mL in toluene	1.2 mL
ULM-7428-1.2	<i>p</i> -Terphenyl	C ₁₈ H ₁₄	200 µg/mL in isooctane	1.2 mL

¹³C-Labeled PAH Standard Mixtures

Catalog No.	Compound	Amount
ES-4087	EPA 16 PAH Cocktail	1.2 mL in nonane
	Labeled	($\mu\text{g/mL}$)
	Acenaphthene (¹³ C _{6r} , 99%)	5
	Acenaphthylene (¹³ C _{6r} , 99%)	5
	Anthracene (¹³ C _{6r} , 99%)	5
	Benz[a]anthracene (¹³ C _{6r} , 99%)	5
	Benzo[b]fluoranthene (¹³ C _{6r} , 99%)	5
	Benzo[k]fluoranthene (¹³ C _{6r} , 99%)	5
	Benzo[ghi]perylene (¹³ C _{12r} , 99%)	5
	Benzo[a]pyrene (¹³ C _{4r} , 99%)	5
	Chrysene (¹³ C _{6r} , 99%)	5
	Dibenz[a,h]anthracene (¹³ C _{6r} , 99%)	5
	Fluoranthene (¹³ C _{6r} , 99%)	5
	Fluorene (¹³ C _{6r} , 99%)	5
	Indeno[1,2,3-cd]pyrene (¹³ C _{6r} , 99%)	5
	Naphthalene (¹³ C _{6r} , 99%)	5
	Phenanthrene (¹³ C _{6r} , 99%)	5
	Pyrene (¹³ C _{3r} , 99%)	5
NEW ES-5546	Custom 16 PAH Solution	1.2 mL in nonane
	Labeled	($\mu\text{g/mL}$)
	Naphthalene (¹³ C _{10r} , 99%)	10
	Benzo[c]phenanthrene (¹³ C _{6r} , 99%)	1
	Cyclopenta[cd]pyrene (¹³ C _{6r} , 99%)	1
	Benz[a]anthracene (¹³ C _{6r} , 99%)	1
	Chrysene (¹³ C _{6r} , 99%)	1
	5-Methylchrysene (¹³ C _{6r} , 99%)	1
	Benzo[b]fluoranthene (¹³ C _{6r} , 99%)	1
	Benzo[k]fluoranthene (¹³ C _{6r} , 99%)	1
	Benz[e]aceanthrylene/Benz[j]aceanthrylene (¹³ C _{2r} , 94%; D _{2r} , 94%)	1
	Benzo[a]pyrene (¹³ C _{4r} , 99%)	1
	Indeno[1,2,3-cd]pyrene (¹³ C _{6r} , 99%)	1
	Dibenz[a,h]anthracene (¹³ C _{6r} , 99%)	1
	Dibenzo[a,l]pyrene (¹³ C _{6r} , 99%)	1
	Dibenzo[a,e]pyrene (¹³ C _{6r} , 99%)	1
	Dibenzo[a,i]pyrene (¹³ C _{12r} , 99%)	1
	Dibenzo[a,h]pyrene (¹³ C _{12r} , 99%)	1
NEW ES-5539	EFSA-8 ¹³ C PAH Standard Mixture	1.2 mL in nonane
	Labeled	($\mu\text{g/mL}$)
	Benz[a]anthracene (¹³ C _{6r} , 99%)	5
	Benzo[b]fluoranthene (¹³ C _{6r} , 99%)	5
	Benzo[k]fluoranthene (¹³ C _{6r} , 99%)	5
	Benzo[ghi]perylene (¹³ C _{12r} , 99%)	5
	Benzo[a]pyrene (¹³ C _{4r} , 99%)	5
	Chrysene (¹³ C _{6r} , 99%)	5
	Dibenz[a,h]anthracene (¹³ C _{6r} , 99%)	5
	Indeno[1,2,3-cd]pyrene (¹³ C _{6r} , 99%)	5
NEW ES-5540	EFSA-4 ¹³ C PAH Standard Mixture	1.2 mL in nonane
	Labeled	($\mu\text{g/mL}$)
	Benz[a]anthracene (¹³ C _{6r} , 99%)	5
	Benzo[b]fluoranthene (¹³ C _{6r} , 99%)	5
	Benzo[a]pyrene (¹³ C _{4r} , 99%)	5
	Chrysene (¹³ C _{6r} , 99%)	5

Deuterium-Labeled Polycyclic Aromatic Hydrocarbon (PAH) Standard Mixtures

Catalog No.	Compound	Amount
ES-2528	PAH Cocktail for CARB Method 429	1 mL in benzene-D ₆

Labeled	(µg/mL)
Acenaphthene (D ₁₀ , 98%)	100
Acenaphthylene (D ₈ , 98%)	100
Anthracene (D ₁₀ , 98%)	100
Benzo[a]anthracene (D ₁₂ , 98%)	100
Benzo[b]fluoranthene (D ₁₂ , 98%)	100
Benzo[k]fluoranthene (D ₁₂ , 98%)	100
Benzo[ghi]perylene (D ₁₂ , 98%)	100
Benzo[a]pyrene (D ₁₂ , 98%)	100
Chrysene (D ₁₂ , 98%)	100
Dibenz[a,h]anthracene (D ₁₄ , 98%)	100
Fluoranthene (D ₁₀ , 98%)	100
Fluorene (D ₁₀ , 98%)	100
Indeno[1,2,3-cd]pyrene (D ₁₂ , 98%)	100
Naphthalene (D ₈ , 99%)	100
Phenanthrene (D ₁₀ , 98%)	100
Pyrene (D ₁₀ , 98%)	100

ES-5164	PAH Surrogate Standard Mixture	10 mL in 90% toluene/10% isooctane
NEW ES-5164-1.2		1.2 mL in 90% toluene/10% isooctane

Labeled	(µg/mL)
Naphthalene (D ₈ , 99%)	200
Benzo[a]anthracene (D ₁₂ , 98%)	200
Phenanthrene (D ₁₀ , 98%)	200
Fluoranthene (D ₁₀ , 98%)	200
Benzo[b]fluoranthene (D ₁₂ , 98%)	200
Benzo[a]pyrene (D ₁₂ , 98%)	200
Benzo[ghi]perylene (D ₁₂ , 98%)	200
Indeno[1,2,3-cd]pyrene (D ₁₂ , 98%)	200
Dibenz[a,h]anthracene (D ₁₄ , 98%)	200
Acenaphthylene (D ₈ , 98%)	200
Acenaphthene (D ₁₀ , 98%)	200
Fluorene (D ₁₀ , 98%)	200
Pyrene (D ₁₀ , 98%)	200
Benzo[k]fluoranthene (D ₁₂ , 98%)	200
Perylene (D ₁₂ , 98%)	200
Chrysene (D ₁₂ , 98%)	200

ES-2044	PAH Surrogate Cocktail	1 mL in 50% MeCl-D ₂ /50% methanol-OD
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Labeled	(µg/mL)
Acenaphthylene (D ₈ , 98%)	200
Benzo[a]pyrene (D ₁₂ , 98%)	200
Benzo[ghi]perylene (D ₁₂ , 98%)	200
Fluoranthene (D ₁₀ , 98%)	200
Naphthalene (D ₈ , 99%)	200
Phenanthrene (D ₁₀ , 98%)	200
Pyrene (D ₁₀ , 98%)	200

Deuterium-Labeled Polycyclic Aromatic Hydrocarbon (PAH) Standard Mixtures

Catalog No.	Compound	Amount
NEW ES-5481	PAH Mixture	5 mL in toluene
	Labeled (µg/mL)	
	Chrysene (D ₁₂ , 98%)	2500
	Dibenz[<i>a,h</i>]anthracene (D ₁₄ , 98%)	2500
	Naphthalene (D ₈ , 99%)	2500
	Perylene (D ₁₂ , 98%)	2500
	Phenanthrene (D ₁₀ , 98%)	2500
	Acenaphthene (D ₁₀ , 98%)	2500
ES-2043	"EEC Six" PAH Cocktail	1.2 mL in benzene-D ₆
	Labeled (µg/mL)	
	Benzo[<i>b</i>]fluoranthene (D ₁₂ , 98%)	1000
	Benzo[<i>k</i>]fluoranthene (D ₁₂ , 98%)	1000
	Benzo[<i>ghi</i>]perylene (D ₁₂ , 98%)	1000
	Benzo[<i>a</i>]pyrene (D ₁₂ , 98%)	1000
	Indeno[1,2,3- <i>cd</i>]pyrene (D ₁₂ , 98%)	1000
	Fluoranthene (D ₁₀ , 98%)	1000
ES-5386	PAH-SIM Recovery Standard Mixture	1.2 mL in MeCl ₂
	Labeled (µg/mL)	
	2-Methylnaphthalene (D ₁₀ , 98%)	1000
	Anthracene (D ₁₀ , 98%)	1000
	<i>p</i> -Terphenyl (D ₁₄ , 98%)	1000
	Benzo[<i>e</i>]pyrene (D ₁₂ , 98%)	1000
NEW ES-5498	PAH Two-Component Mixture	1.2 mL in 80% isooctane/ 20% toluene
	Labeled (µg/mL)	
	Benzo[<i>a</i>]pyrene (D ₁₂ , 98%)	2000
	Fluoranthene (D ₁₀ , 98%)	2000
NEW ES-9463	PAH Injection Standard	10 mL in isooctane
	Labeled (ng/mL)	
	Anthracene (D ₁₀ , 98%)	10
	Fluoranthene (D ₁₀ , 98%)	10
	Benz[<i>a</i>]anthracene (D ₁₂ , 98%)	10
NEW ES-9464	PAH Recovery Standard	10 mL in isooctane/toluene-D ₈
	Labeled (ng/mL)	
	Acenaphthene (D ₁₀ , 98%)	10
	<i>p</i> -Terphenyl (D ₁₄ , 98%)	10
	Perylene (D ₁₂ , 98%)	10

Unlabeled Polycyclic Aromatic Hydrocarbon (PAH) Standard Mixtures

Catalog No.	Compound	Amount
NEW ES-5437	PAH Cocktail for CARB Method 429	1.2 mL in benzene

Unlabeled	(µg/mL)
Acenaphthene	100
Acenaphthylene	100
Anthracene	100
Benz[a]anthracene	100
Benzo[b]fluoranthene	100
Benzo[k]fluoranthene	100
Benzo[ghi]perylene	100
Benzo[a]pyrene	100
Chrysene	100
Dibenz[a,h]anthracene	100
Fluoranthene	100
Fluorene	100
Indeno[1,2,3-cd]pyrene	100
Naphthalene	100
Phenanthrene	100
Pyrene	100

NEW ES-5549	Custom 16 PAH Native Standard Mixture	1.2 mL in nonane
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Unlabeled	(µg/mL)
Naphthalene	10
Benzo[c]phenanthrene	1
Cyclopenta[cd]pyrene	1
Benz[a]anthracene	1
Chrysene	1
5-Methylchrysene	1
Benzo[b]fluoranthene	1
Benzo[k]fluoranthene	1
Benzo[e]aceanthrylene/Benz[j]aceanthrylene	1
Benzo[a]pyrene	1
Indeno[1,2,3-cd]pyrene	1
Dibenz[a,h]anthracene	1
Dibenzo[a,l]pyrene	1
Dibenzo[a,e]pyrene	1
Dibenzo[a,i]pyrene	1
Dibenzo[a,h]pyrene	1

NEW ES-5541	EFSA-8 Native PAH Standard Mixture	1.2 mL in isooctane
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Unlabeled	(µg/mL)
Benz[a]anthracene	5
Benzo[b]fluoranthene	5
Benzo[k]fluoranthene	5
Benzo[ghi]perylene	5
Benzo[a]pyrene	5
Chrysene	5
Dibenz[a,h]anthracene	5
Indeno[1,2,3-cd]pyrene	5

Unlabeled Polycyclic Aromatic Hydrocarbon (PAH) Standard Mixtures

Catalog No.	Compound	Amount
NEW ES-5542	EFS-A-4 Native PAH Standard Mixture	1.2 mL in isooctane

Unlabeled	($\mu\text{g/mL}$)
Benz[a]anthracene	5
Benzo[b]fluoranthene	5
Benzo[a]pyrene	5
Chrysene	5

ES-5438	PAH Native Standard Mixture	1.2 mL in 90% toluene/10% isooctane
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Unlabeled	($\mu\text{g/mL}$)
Naphthalene	200
Benz[a]anthracene	200
Phenanthrene	200
Fluoranthene	200
Benzo[b]fluoranthene	200
Benzo[a]pyrene	200
Benzo[ghi]perylene	200
Indeno[1,2,3-cd]pyrene	200
Dibenz[a,h]anthracene	200
Acenaphthylene	200
Acenaphthene	200
Fluorene	200
Pyrene	200
Benzo[k]fluoranthene	200
Perylene	200
Chrysene	200

NEW ES-5503	PAH-SIM Recovery Standard Mixture	1.2 mL in MeCl
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Unlabeled	($\mu\text{g/mL}$)
2-Methylnaphthalene	1000
Anthracene	1000
<i>p</i> -Terphenyl	1000
Benzo[e]pyrene	1000

Alkyl Polycyclic Aromatic Hydrocarbon (PAH) Standards

Catalog No.	Compound	Formula	Concentration	Amount
DLM-2845-1.2	9,10-Dimethylanthracene (D ₁₄ , 98%)	C ₁₆ D ₁₄	50 µg/mL in toluene-D ₈	1.2 mL
NEW ULM-6234-1.2	9,10-Dimethylanthracene (unlabeled)	C ₁₆ H ₁₄	50 µg/mL in toluene	1.2 mL
DLM-2852-1.2	1,6-Dimethylnaphthalene (D ₁₂ , 98%)	C ₁₂ D ₁₂	50 µg/mL in toluene-D ₈	1.2 mL
NEW ULM-6182-1.2	1,6-Dimethylnaphthalene (unlabeled)	C ₁₂ H ₁₂	50 µg/mL in toluene	1.2 mL
DLM-2854-1.2	1,8-Dimethylnaphthalene (D ₁₂ , 98%)	C ₁₂ D ₁₂	50 µg/mL in toluene-D ₈	1.2 mL
ULM-6181-1.2	1,8-Dimethylnaphthalene (unlabeled)	C ₁₂ H ₁₂	50 µg/mL in toluene	1.2 mL
DLM-2853-1.2	2,6-Dimethylnaphthalene (D ₁₂ , 98%)	C ₁₂ D ₁₂	50 µg/mL in toluene-D ₈	1.2 mL
ULM-7271-1.2	2,6-Dimethylnaphthalene (unlabeled)	C ₁₂ H ₁₂	50 µg/mL in toluene	1.2 mL
NEW CLM-9729-1.2	5-Methylchrysene (¹³ C ₆ , 99%)	*C ₆ C ₁₃ H ₁₄	100 µg/mL in nonane	1.2 mL
DLM-3842-1.2	5-Methylchrysene (methyl-D ₃ , 98%)	C ₁₉ D ₃ H ₁₁	50 µg/mL in toluene-D ₈	1.2 mL
ULM-6235-1.2	5-Methylchrysene (unlabeled)	C ₁₉ H ₁₄	50 µg/mL in toluene	1.2 mL
DLM-1607-1	1-Methylnaphthalene (D ₁₀ , 98%)	C ₁₁ D ₁₀	neat	1 g
CLM-3621-1.2	2-Methylnaphthalene (¹³ C ₆ , 99%)	*C ₆ C ₅ H ₁₀	100 µg/mL in nonane	1.2 mL
DLM-1322-1.2	2-Methylnaphthalene (D ₁₀ , 98%)	C ₁₁ D ₁₀	200 µg/mL in isooctane	1.2 mL
ULM-7416-1.2	2-Methylnaphthalene (unlabeled)	C ₁₁ H ₁₀	200 µg/mL in isooctane	1.2 mL
NEW CLM-8174-1.2	2-Methyl-1-naphthol (5,6,7,8,9,10- ¹³ C ₆ , 99%)	*C ₆ C ₅ H ₁₀ O	50 µg/mL in toluene	1.2 mL
NEW ULM-8239-1.2	2-Methyl-1-naphthol (unlabeled)	C ₁₁ H ₁₀ O	50 µg/mL in toluene	1.2 mL

Halogenated Polycyclic Aromatic Hydrocarbon (PAH) Standards

Catalog No.	Compound	Formula	Concentration	Amount
NEW CLM-9028-1.2	7-Bromobenz[a]anthracene (¹³ C ₆ , 99%)	*C ₆ C ₁₂ H ₁₁ Br	50 µg/mL in toluene	1.2 mL
NEW ULM-9025-1.2	7-Bromobenz[a]anthracene (unlabeled)	C ₁₈ H ₁₁ Br	50 µg/mL in toluene	1.2 mL
ULM-8269-1.2	9-Chloroanthracene (unlabeled)	C ₁₄ H ₉ Cl	50 µg/mL in toluene	1.2 mL
NEW CLM-8989-1.2	7-Chlorobenz[a]anthracene (¹³ C ₆ , 99%)	*C ₆ C ₁₂ H ₁₁ Cl	50 µg/mL in toluene	1.2 mL
NEW ULM-9011-1.2	7-Chlorobenz[a]anthracene (unlabeled)	C ₁₈ H ₁₁ Cl	50 µg/mL in toluene	1.2 mL
ULM-8270-1.2	9-Chlorophenanthrene (unlabeled)	C ₁₄ H ₉ Cl	50 µg/mL in toluene	1.2 mL
CLM-8267-1.2	1-Chloropyrene (mix of ring labeling) (¹³ C ₆ , 99%)	C ₁₀ *C ₆ H ₉ Cl	50 µg/mL in toluene	1.2 mL
ULM-8268-1.2	1-Chloropyrene (unlabeled)	C ₁₆ H ₉ Cl	50 µg/mL in toluene	1.2 mL
NEW CLM-9029-1.2	7,12-Dichlorobenz[a]anthracene (¹³ C ₆ , 99%)	C ₁₂ *C ₆ H ₁₀ Cl ₂	50 µg/mL in toluene	1.2 mL
NEW ULM-9024-1.2	7,12-Dichlorobenz[a]anthracene (unlabeled)	C ₁₈ H ₁₀ Cl ₂	50 µg/mL in toluene	1.2 mL

Nitro Polycyclic Aromatic Hydrocarbon (PAH) Standards

Catalog No.	Compound	Formula	Concentration	Amount
DLM-3836-1.2	5-Nitroacenaphthene (D ₉ , 98%)	C ₁₂ D ₉ NO ₂	50 µg/mL in toluene-D ₈	1.2 mL
NEW ULM-8790-1.2	5-Nitroacenaphthene (unlabeled)	C ₁₂ H ₉ NO ₂	50 µg/mL in toluene	1.2 mL
DLM-4712-1.2	9-Nitroanthracene (D ₉ , 98%)	C ₁₄ D ₉ NO ₂	50 µg/mL in toluene-D ₈	1.2 mL
NEW ULM-8365-1.2	9-Nitroanthracene (unlabeled)	C ₁₄ H ₉ NO ₂	50 µg/mL in toluene	1.2 mL
DLM-3839-1.2	6-Nitrochrysene (D ₁₁ , 98%)	C ₁₈ D ₁₁ NO ₂	50 µg/mL in toluene-D ₈	1.2 mL
NEW ULM-3881-1.2	6-Nitrochrysene (unlabeled)	C ₁₈ H ₁₁ NO ₂	50 µg/mL in toluene	1.2 mL
DLM-4711-1.2	3-Nitrofluoranthene (D ₉ , 98%) CP 87%	C ₁₆ D ₉ NO ₂	50 µg/mL in toluene-D ₈	1.2 mL
NEW ULM-6600-1.2	3-Nitrofluoranthene (unlabeled) CP 87%	C ₁₆ H ₉ NO ₂	50 µg/mL in toluene	1.2 mL
DLM-3837-1.2	2-Nitrofluorene (D ₉ , 98%)	C ₁₃ D ₉ NO ₂	50 µg/mL in toluene-D ₈	1.2 mL
ULM-3883-1.2	2-Nitrofluorene (unlabeled)	C ₁₃ H ₉ NO ₂	50 µg/mL in toluene	1.2 mL
DLM-1528-1.2	1-Nitropyrene (D ₉ , 98%)	C ₁₈ D ₉ NO ₂	50 µg/mL in toluene-D ₈	1.2 mL
ULM-3978-1.2	1-Nitropyrene (unlabeled)	C ₁₈ H ₉ NO ₂	50 µg/mL in toluene	1.2 mL

Benzo[a]pyrene Metabolites

Catalog No.	Compound	Concentration	Amount
NEW CLM-7245-1.2	(+/-)-Benzo[a]pyrene R-7,T-8,C-9,C-10-tetrahydrotetrol (ring- ¹³ C ₆ , 99%)	100 µg/mL in methanol	Inquire
NEW CLM-7246-1.2	(+/-)-Benzo[a]pyrene R-7,T-8,T-9,C-10-tetrahydrotetrol (ring- ¹³ C ₆ , 99%)	100 µg/mL in methanol	Inquire
NEW CLM-7308-1.2	(+/-)-Benzo[a]pyrene R-7,T-8,C-9,T-10-tetrahydrotetrol (ring- ¹³ C ₆ , 99%)	100 µg/mL in methanol	Inquire
NEW CLM-7627-1.2	(+/-)-Benzo[a]pyrene R-7,T-8,T-9,T-10-tetrahydrotetrol (ring- ¹³ C ₆ , 99%)	100 µg/mL in methanol	Inquire

Hydroxy Polycyclic Aromatic Hydrocarbon (PAH) Standards

Catalog No.	Compound	Concentration	Amount
CLM-4860-T-1.2	6-Hydroxychrysene (mix of ring labeling) ($^{13}\text{C}_6$, 99%)	50 $\mu\text{g}/\text{mL}$ in toluene	1.2 mL
NEW ULM-7552-1.2	6-Hydroxychrysene (unlabeled)	50 $\mu\text{g}/\text{mL}$ in isooctane	1.2 mL
NEW CLM-6087-1.2	2-Hydroxyfluorene (random- $^{13}\text{C}_6$, 99%)	50 $\mu\text{g}/\text{mL}$ in toluene	1.2 mL
NEW ULM-8973-1.2	2-Hydroxyfluorene (unlabeled)	50 $\mu\text{g}/\text{mL}$ in toluene	1.2 mL
NEW CLM-8977-1.2	3-Hydroxyfluorene ($^{13}\text{C}_6$, 99%)	50 $\mu\text{g}/\text{mL}$ in toluene	1.2 mL
NEW ULM-8974-1.2	3-Hydroxyfluorene (unlabeled)	50 $\mu\text{g}/\text{mL}$ in toluene	1.2 mL
NEW CLM-7700-1.2	9-Hydroxyfluorene ($^{13}\text{C}_6$, 99%)	50 $\mu\text{g}/\text{mL}$ in toluene	1.2 mL
NEW ULM-8975-1.2	9-Hydroxyfluorene (unlabeled)	50 $\mu\text{g}/\text{mL}$ in toluene	1.2 mL
NEW CLM-7701-1.2	1-Hydroxynaphthalene (1-naphthol) ($^{13}\text{C}_6$, 99%)	50 $\mu\text{g}/\text{mL}$ in toluene	1.2 mL
NEW ULM-8971-1.2	1-Hydroxynaphthalene (1-naphthol) (unlabeled)	50 $\mu\text{g}/\text{mL}$ in toluene	1.2 mL
NEW CLM-7713-1.2	2-Hydroxynaphthalene (2-naphthol) ($^{13}\text{C}_6$, 99%)	50 $\mu\text{g}/\text{mL}$ in toluene	1.2 mL
NEW ULM-8972-1.2	2-Hydroxynaphthalene (2-naphthol) (unlabeled)	50 $\mu\text{g}/\text{mL}$ in toluene	1.2 mL
NEW CLM-7669-1.2	1-Hydroxyphenanthrene ($^{13}\text{C}_4$, 99%)	50 $\mu\text{g}/\text{mL}$ in toluene	1.2 mL
NEW ULM-7929-1.2	1-Hydroxyphenanthrene (unlabeled)	50 $\mu\text{g}/\text{mL}$ in toluene	1.2 mL
NEW CLM-8463-T-1.2	2-Hydroxyphenanthrene ($^{13}\text{C}_6$, 99%)	50 $\mu\text{g}/\text{mL}$ in toluene	1.2 mL
NEW ULM-8464-T-1.2	2-Hydroxyphenanthrene (unlabeled)	50 $\mu\text{g}/\text{mL}$ in toluene	1.2 mL
CLM-4859-T-1.2	3-Hydroxyphenanthrene ($^{13}\text{C}_6$, 99%)	50 $\mu\text{g}/\text{mL}$ in toluene	1.2 mL
NEW ULM-7446-1.2	3-Hydroxyphenanthrene (unlabeled)	50 $\mu\text{g}/\text{mL}$ in toluene	1.2 mL
NEW CLM-7670-1.2	4-Hydroxyphenanthrene ($^{13}\text{C}_4$, 99%)	50 $\mu\text{g}/\text{mL}$ in toluene	1.2 mL
NEW ULM-7928-1.2	4-Hydroxyphenanthrene (unlabeled)	50 $\mu\text{g}/\text{mL}$ in toluene	1.2 mL
NEW CLM-9012-1.2	1-Hydroxypyrene ($^{13}\text{C}_6$, 99%)	50 $\mu\text{g}/\text{mL}$ in toluene	1.2 mL
NEW ULM-8976-1.2	1-Hydroxypyrene (unlabeled)	50 $\mu\text{g}/\text{mL}$ in toluene	1.2 mL

Hydroxy Polycyclic Aromatic Hydrocarbon (PAH) Standard Mixtures

Catalog No.	Compound	Amount
NEW ES-5472	CDC OH-PAH Calibration Standards [CS1-CS10]	10 × 0.5 mL in toluene
NEW ES-5472-CS1	CDC OH-PAH Calibration Standard [CS1]	0.5 mL in toluene
NEW ES-5472-CS2	CDC OH-PAH Calibration Standard [CS2]	0.5 mL in toluene
NEW ES-5472-CS3	CDC OH-PAH Calibration Standard [CS3]	0.5 mL in toluene
NEW ES-5472-CS4	CDC OH-PAH Calibration Standard [CS4]	0.5 mL in toluene
NEW ES-5472-CS5	CDC OH-PAH Calibration Standard [CS5]	0.5 mL in toluene
NEW ES-5472-CS6	CDC OH-PAH Calibration Standard [CS6]	0.5 mL in toluene
NEW ES-5472-CS7	CDC OH-PAH Calibration Standard [CS7]	0.5 mL in toluene
NEW ES-5472-CS8	CDC OH-PAH Calibration Standard [CS8]	0.5 mL in toluene
NEW ES-5472-CS9	CDC OH-PAH Calibration Standard [CS9]	0.5 mL in toluene
NEW ES-5472-CS10	CDC OH-PAH Calibration Standard [CS10]	0.5 mL in toluene

All concentrations are in ng/mL

Unlabeled	IUPAC	CS1	CS2	CS3	CS4	CS5	CS6	CS7	CS8	CS9	CS10
1-Hydroxynaphthalene		4	8	20	40	200	400	2000	4000	8000	16,000
2-Hydroxynaphthalene		4	8	20	40	200	400	2000	4000	8000	16,000
2-Hydroxyfluorene		1	2	5	10	50	100	500	1000	–	–
3-Hydroxyfluorene		1	2	5	10	50	100	500	1000	–	–
9-Hydroxyfluorene		1	2	5	10	50	100	500	1000	–	–
1-Hydroxyphenanthrene		1	2	5	10	50	100	500	1000	–	–
2-Hydroxyphenanthrene		1	2	5	10	50	100	500	1000	–	–
3-Hydroxyphenanthrene		1	2	5	10	50	100	500	1000	–	–
4-Hydroxyphenanthrene		1	2	5	10	50	100	500	1000	–	–
1-Hydroxypyrene		1	2	5	10	50	100	500	1000	–	–
Labeled											
1-Hydroxynaphthalene (¹³ C ₆ , 99%)		400	400	400	400	400	400	400	400	400	400
2-Hydroxynaphthalene (¹³ C ₆ , 99%)		400	400	400	400	400	400	400	400	400	400
2-Hydroxyfluorene (random- ¹³ C ₆ , 99%)		100	100	100	100	100	100	100	100	100	100
3-Hydroxyfluorene (¹³ C ₆ , 98%)		100	100	100	100	100	100	100	100	100	100
9-Hydroxyfluorene (¹³ C ₆ , 99%)		100	100	100	100	100	100	100	100	100	100
1-Hydroxyphenanthrene (¹³ C ₄ , 99%)		100	100	100	100	100	100	100	100	100	100
2-Hydroxyphenanthrene (¹³ C ₆ , 99%)		100	100	100	100	100	100	100	100	100	100
3-Hydroxyphenanthrene (¹³ C ₆ , 99%)		100	100	100	100	100	100	100	100	100	100
4-Hydroxyphenanthrene (¹³ C ₄ , 99%)		100	100	100	100	100	100	100	100	100	100
1-Hydroxypyrene (¹³ C ₆ , 99%)		100	100	100	100	100	100	100	100	100	100
2,4,4'-TriCB (¹³ C ₁₂ , 99%)	28	100	100	100	100	100	100	100	100	100	100
2,3,3',4,4'-PentaCB (¹³ C ₁₂ , 99%)	105	100	100	100	100	100	100	100	100	100	100
2,2',4,4',5,5'-HexaCB (¹³ C ₁₂ , 99%)	153	100	100	100	100	100	100	100	100	100	100
2,3',4,4',5,5'-HexaCB (¹³ C ₁₂ , 99%)	167	100	100	100	100	100	100	100	100	100	100

Hydroxy Polycyclic Aromatic Hydrocarbon (PAH) Standard Mixtures

Catalog No.	Compound	Amount
NEW ES-5473-T	CDC OH-PAH Spiking Standard	0.5 mL in toluene

Labeled	(ng/mL)
1-Hydroxynaphthalene ($^{13}\text{C}_6$, 99%)	10,000
2-Hydroxynaphthalene ($^{13}\text{C}_6$, 99%)	10,000
2-Hydroxyfluorene (random- $^{13}\text{C}_6$, 99%)	2500
3-Hydroxyfluorene ($^{13}\text{C}_6$, 98%)	2500
9-Hydroxyfluorene ($^{13}\text{C}_6$, 99%)	2500
1-Hydroxyphenanthrene ($^{13}\text{C}_4$, 99%)	2500
2-Hydroxyphenanthrene ($^{13}\text{C}_6$, 99%)	2500
3-Hydroxyphenanthrene ($^{13}\text{C}_6$, 99%)	2500
4-Hydroxyphenanthrene ($^{13}\text{C}_4$, 99%)	2500
1-Hydroxypyrene ($^{13}\text{C}_6$, 99%)	2500

NEW ES-5474	CDC PCB Recovery Standard for OH-PAHs	1.0 mL in toluene
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Labeled	IUPAC	(ng/mL)
2,4,4'-TriCB ($^{13}\text{C}_{12}$, 99%)	28	200
2,3,3',4,4'-PentaCB ($^{13}\text{C}_{12}$, 99%)	105	200
2,2',4,4',5,5'-HexaCB ($^{13}\text{C}_{12}$, 99%)	153	200
2,3',4,4',5,5'-HexaCB ($^{13}\text{C}_{12}$, 99%)	167	200

NEW ES-5484	CDC OH-PAH Native PAR Standard	1.2 mL in toluene
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Unlabeled	(ng/mL)
1-Hydroxynaphthalene	4000
2-Hydroxynaphthalene	4000
2-Hydroxyfluorene	1000
3-Hydroxyfluorene	1000
9-Hydroxyfluorene	1000
1-Hydroxyphenanthrene	1000
2-Hydroxyphenanthrene	1000
3-Hydroxyphenanthrene	1000
4-Hydroxyphenanthrene	1000
1-Hydroxypyrene	1000

Isotope-Labeled Polychlorinated Naphthalene (PCN) Standards

	Catalog No.	Compound	PCN	Concentration	Amount
NEW	ECN-5217	2-Monochloronaphthalene ($^{13}\text{C}_{10}$, 99%)	2	10 $\mu\text{g}/\text{mL}$ in isooctane	1.2 mL
NEW	ECN-5520	1,5-Dichloronaphthalene ($^{13}\text{C}_{10}$, 99%)	6	10 $\mu\text{g}/\text{mL}$ in isooctane	1.2 mL
NEW	ECN-5575	1,2,3-Trichloronaphthalene ($^{13}\text{C}_{10}$, 99%)	13	10 $\mu\text{g}/\text{mL}$ in isooctane	Inquire
	ECN-5240	1,2,3,4-Tetrachloronaphthalene ($^{13}\text{C}_{10}$, 99%)	27	10 $\mu\text{g}/\text{mL}$ in isooctane	1.2 mL
	ECN-5241	1,3,5,7-Tetrachloronaphthalene ($^{13}\text{C}_{10}$, 99%)	42	10 $\mu\text{g}/\text{mL}$ in isooctane	1.2 mL
	ECN-5250	1,2,3,5,7-Pentachloronaphthalene ($^{13}\text{C}_{10}$, 99%)	52	10 $\mu\text{g}/\text{mL}$ in isooctane	1.2 mL
	ECN-5260	1,2,3,4,5,7-Hexachloronaphthalene ($^{13}\text{C}_{10}$, 99%)	64	10 $\mu\text{g}/\text{mL}$ in isooctane	1.2 mL
NEW	ECN-5267	1,2,3,4,5,8-Hexachloronaphthalene ($^{13}\text{C}_{10}$, 99%)	65	10 $\mu\text{g}/\text{mL}$ in isooctane	1.2 mL
	ECN-5261-A	1,2,3,5,6,7-Hexachloronaphthalene ($^{13}\text{C}_{10}$, 99%)	67	10 $\mu\text{g}/\text{mL}$ in isooctane	1.2 mL
	ECN-5270-A	1,2,3,4,5,6,7-Heptachloronaphthalene ($^{13}\text{C}_{10}$, 99%)	73	10 $\mu\text{g}/\text{mL}$ in isooctane	1.2 mL
	ECN-5280	Octachloronaphthalene ($^{13}\text{C}_{10}$, 99%)	75	10 $\mu\text{g}/\text{mL}$ in isooctane	1.2 mL
NEW	DLM-2005-1.2	2-Chloronaphthalene (D_7 , 98%)		100 $\mu\text{g}/\text{mL}$ in nonane	1.2 mL
NEW	DLM-2005-0.01			neat	0.01 g
NEW	DLM-2005-0.1			neat	0.1 g

Unlabeled Polychlorinated Naphthalene (PCN) Standards

	Catalog No.	Compound	PCN	Concentration	Amount
	ECN-2610	1-Monochloronaphthalene	1	100 $\mu\text{g}/\text{mL}$ in nonane	1 mL
	ECN-2611	2-Monochloronaphthalene	2	100 $\mu\text{g}/\text{mL}$ in nonane	1 mL
	ECN-2620	1,2-Dichloronaphthalene	3	100 $\mu\text{g}/\text{mL}$ in nonane	1 mL
	ECN-2621	1,4-Dichloronaphthalene	5	100 $\mu\text{g}/\text{mL}$ in nonane	1 mL
	ECN-2622	1,5-Dichloronaphthalene	6	100 $\mu\text{g}/\text{mL}$ in nonane	1 mL
	ECN-2623	1,8-Dichloronaphthalene	9	100 $\mu\text{g}/\text{mL}$ in nonane	1 mL
	ECN-2624	2,3-Dichloronaphthalene	10	100 $\mu\text{g}/\text{mL}$ in nonane	1 mL
	ECN-2630	1,2,3-Trichloronaphthalene	13	100 $\mu\text{g}/\text{mL}$ in nonane	1 mL
NEW	ECN-2632	1,2,4-Trichloronaphthalene	14	100 $\mu\text{g}/\text{mL}$ in nonane	1 mL
NEW	ECN-2631	1,4,6-Trichloronaphthalene	24	100 $\mu\text{g}/\text{mL}$ in nonane	1 mL
	ECN-2640	1,2,3,4-Tetrachloronaphthalene	27	100 $\mu\text{g}/\text{mL}$ in nonane	1 mL
NEW	ECN-2645	1,2,3,5-Tetrachloronaphthalene	28	100 $\mu\text{g}/\text{mL}$ in nonane	1 mL
NEW	ECN-2646	1,2,3,8-Tetrachloronaphthalene	31	100 $\mu\text{g}/\text{mL}$ in nonane	1 mL
	ECN-2642	1,2,5,6-Tetrachloronaphthalene	36	100 $\mu\text{g}/\text{mL}$ in nonane	1 mL
	ECN-2641	1,3,5,7-Tetrachloronaphthalene	42	100 $\mu\text{g}/\text{mL}$ in nonane	1 mL
NEW	ECN-2644	1,4,5,8-Tetrachloronaphthalene	46	100 $\mu\text{g}/\text{mL}$ in nonane	1 mL
	ECN-2643	2,3,6,7-Tetrachloronaphthalene	48	100 $\mu\text{g}/\text{mL}$ in nonane	1 mL
NEW	ECN-2654	1,2,3,4,5-Pentachloronaphthalene	49	100 $\mu\text{g}/\text{mL}$ in nonane	1 mL
	ECN-2652	1,2,3,4,6-Pentachloronaphthalene	50	100 $\mu\text{g}/\text{mL}$ in nonane	1 mL
	ECN-2651	1,2,3,5,7-Pentachloronaphthalene	52	100 $\mu\text{g}/\text{mL}$ in nonane	1 mL
	ECN-2650	1,2,3,5,8-Pentachloronaphthalene	53	100 $\mu\text{g}/\text{mL}$ in nonane	1 mL
	ECN-2653	1,2,3,6,7-Pentachloronaphthalene	54	100 $\mu\text{g}/\text{mL}$ in nonane	1 mL
NEW	ECN-2656	1,2,4,5,8-Pentachloronaphthalene	59	100 $\mu\text{g}/\text{mL}$ in nonane	1 mL
NEW	ECN-2655	1,2,4,6,7-Pentachloronaphthalene	60	100 $\mu\text{g}/\text{mL}$ in nonane	1 mL
NEW	ECN-2668	1,2,3,4,5,6-Hexachloronaphthalene	63	100 $\mu\text{g}/\text{mL}$ in nonane	1 mL
NEW	ECN-2669	1,2,3,4,5,7-Hexachloronaphthalene	64	100 $\mu\text{g}/\text{mL}$ in nonane	1 mL
NEW	ECN-2667	1,2,3,4,5,8-Hexachloronaphthalene	65	100 $\mu\text{g}/\text{mL}$ in nonane	1 mL
	ECN-2660	1,2,3,4,6,7-Hexachloronaphthalene	66	100 $\mu\text{g}/\text{mL}$ in nonane	1 mL
	ECN-2663	1,2,3,5,6,7-Hexachloronaphthalene	67	100 $\mu\text{g}/\text{mL}$ in nonane	1 mL
	ECN-2664	1,2,3,5,6,8-Hexachloronaphthalene	68	100 $\mu\text{g}/\text{mL}$ in nonane	1 mL
	ECN-2662	1,2,3,5,7,8-Hexachloronaphthalene	69	100 $\mu\text{g}/\text{mL}$ in nonane	1 mL
	ECN-2665	1,2,3,6,7,8-Hexachloronaphthalene	70	100 $\mu\text{g}/\text{mL}$ in nonane	1 mL
	ECN-2666	1,2,4,5,6,8-Hexachloronaphthalene	71	100 $\mu\text{g}/\text{mL}$ in nonane	1 mL
	ECN-2661	1,2,4,5,7,8-Hexachloronaphthalene	72	100 $\mu\text{g}/\text{mL}$ in nonane	Inquire
	ECN-2670	1,2,3,4,5,6,7-Heptachloronaphthalene	73	100 $\mu\text{g}/\text{mL}$ in nonane	1 mL
	ECN-2671	1,2,3,4,5,6,8-Heptachloronaphthalene	74	100 $\mu\text{g}/\text{mL}$ in nonane	1 mL
	ECN-2680	Octachloronaphthalene	75	100 $\mu\text{g}/\text{mL}$ in nonane	1 mL

Polychlorinated Naphthalene (PCN) Standard Mixtures

Catalog No.	Compound	Amount
NEW ECN-5489	PCN Calibration Solutions [CS1-CS7]	7 × 0.5 mL in nonane
NEW ECN-5489-CS1	PCN Calibration Solution [CS1]	0.5 mL in nonane
NEW ECN-5489-CS2	PCN Calibration Solution [CS2]	0.5 mL in nonane
NEW ECN-5489-CS3	PCN Calibration Solution [CS3]	0.5 mL in nonane
NEW ECN-5489-CS4	PCN Calibration Solution [CS4]	0.5 mL in nonane
NEW ECN-5489-CS5	PCN Calibration Solution [CS5]	0.5 mL in nonane
NEW ECN-5489-CS6	PCN Calibration Solution [CS6]	0.5 mL in nonane
NEW ECN-5489-CS7	PCN Calibration Solution [CS7]	0.5 mL in nonane

All concentrations are in ng/mL

Unlabeled	PCN	CS1	CS2	CS3	CS4	CS5	CS6	CS7
1,2,3,4-TetraCN	27	0.1	0.2	1	2	10	20	100
1,2,3,5,7-PentaCN	52	0.1	0.2	1	2	10	20	100
1,2,3,4,6,7-HexaCN	66	0.1	0.2	1	2	10	20	100
1,2,3,5,6,7-HexaCN	67	0.1	0.2	1	2	10	20	100
1,2,3,5,6,8-HexaCN	68	0.1	0.2	1	2	10	20	100
1,2,3,4,5,6,7-HeptaCN	73	0.1	0.2	1	2	10	20	100
OctaCN	75	0.1	0.2	1	2	10	20	100
Labeled								
1,2,3,4-TetraCN (¹³ C ₁₀ , 99%)	27	10	10	10	10	10	10	10
1,2,3,5,7-PentaCN (¹³ C ₁₀ , 99%)	52	10	10	10	10	10	10	10
1,2,3,4,5,7-HexaCN (¹³ C ₁₀ , 99%)	64	10	10	10	10	10	10	10
1,2,3,5,6,7-HexaCN (¹³ C ₁₀ , 99%)	67	10	10	10	10	10	10	10
1,2,3,4,5,6,7-HeptaCN (¹³ C ₁₀ , 99%)	73	10	10	10	10	10	10	10
OctaCN (¹³ C ₁₀ , 99%)	75	10	10	10	10	10	10	10
1,2,3,4-TetraCDD (¹³ C ₆ , 99%)		25	25	25	25	25	25	25

NEW ECN-5490	PCN Cleanup Solution	5 mL in methanol/isooctane
NEW ECN-5490-200X-1.2	PCN Cleanup Solution (200X stock)	Inquire

Labeled	PCN	ECN-5490 (ng/mL)	ECN-5490-200X-1.2 (ng/mL)
1,2,3,4-TetraCN (¹³ C ₁₀ , 99%)	27	0.5	100
1,2,3,5,7-PentaCN (¹³ C ₁₀ , 99%)	52	0.5	100
1,2,3,4,5,7-HexaCN (¹³ C ₁₀ , 99%)	64	0.5	100
1,2,3,5,6,7-HexaCN (¹³ C ₁₀ , 99%)	67	0.5	100
1,2,3,4,5,6,7-HeptaCN (¹³ C ₁₀ , 99%)	73	0.5	100
OctaCN (¹³ C ₁₀ , 99%)	75	0.5	100

NEW ECN-5497	PCN Native PAR Solution	1.2 mL in nonane
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Unlabeled	PCN	(ng/mL)
1,2,3,4-TetraCN	27	1000
1,2,3,5,7-PentaCN	52	1000
1,2,3,4,6,7-HexaCN	66	1000
1,2,3,5,6,7-HexaCN	67	1000
1,2,3,5,6,8-HexaCN	68	1000
1,2,3,4,5,6,7-HeptaCN	73	1000
OctaCN	75	1000

Polychlorinated Naphthalene (PCN) Standard Mixtures

Catalog No.	Compound	Amount
ECN-5102	Tetra-Octa PCN Mixture	1.2 mL in isooctane

Labeled	PCN	(ng/mL)
1,2,3,4-TetraCN (¹³ C ₁₀ , 99%)	27	1000
1,3,5,7-TetraCN (¹³ C ₁₀ , 99%)	42	1000
1,2,3,5,7-PentaCN (¹³ C ₁₀ , 99%)	52	1000
1,2,3,5,6,7-HexaCN (¹³ C ₁₀ , 99%)	67	1000
1,2,3,4,5,6,7-HeptaCN (¹³ C ₁₀ , 99%)	73	1000
OctaCN (¹³ C ₁₀ , 99%)	75	1000

NEW ECN-5558	Mono-Octa PCN Native Mixture	1.2 mL in nonane
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Unlabeled	PCN	(ng/mL)
2-MonoCN	2	1000
1,2-DiCN	3	1000
1,4-DiCN	5	1000
1,2,3-TriCN	13	1000
1,4,6-TriCN	24	1000
1,4,5,8-TetraCN	46	1000
1,3,5,7-TetraCN	42	1000
1,2,3,5,7-PentaCN	52	1000
1,2,3,5,8-PentaCN	53	1000
1,2,3,4,6,7-HexaCN	66	1000
1,2,3,5,6,8-HexaCN	68	1000
1,2,3,4,5,6,7-HeptaCN	73	1000
OctaCN	75	1000

Halowax Technical Mixtures

Catalog No.	Compound	Concentration	Amount
ECN-1000	HALOWAX 1000	100 µg/mL in hexane	2 mL
ECN-1013	HALOWAX 1013	100 µg/mL in hexane	2 mL
ECN-1051	HALOWAX 1051	100 µg/mL in hexane	2 mL

