AccuStandard Inc.
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CERTIFICATE OF ANALYSIS

CATALOG NO: S-13907-250ML
DESCRIPTION: Custom PCB Congener Standard
LOT: B5110052
SOLVENT: Isooctane

EXPIRATION: Nov 9,2015

See reverse for additional certification information.

This product is guaranteed accurate to + 0.5% of the Certified Analyte concen
Expiration Date on the Label.

Component	CAS #	Purity % (GC/MS)	Prepared Concentration[1] (µg/mL)		Certified Analyte Concentration[2] (µg/mL)
2,4,4'-Trichlorobiphenyl	7012-37-5	100	817.6	±32.70	817.6
2,3',4,4'-Tetrachlorobiphenyl	32598-10-0	100	733.2	±29.33	733.2
2,4,4',5-Tetrachlorobiphenyl	32690-93-0	100	536.8	±21.47	536.8
2,3',4,4',5-Pentachlorobiphenyl 118	31508-00-6	99.5	513.2	±20.53	510.6
2,2',4,4'-Tetrachlorobiphenyl	2437-79-8	100	288.4	±11.54	288.4
2,2',4,5-Tetrachlorobiphenyl 48	70362-47-9	99.9	188.3	±7.53	188.1
2,4,4',6-Tetrachlorobiphenyl	32598-12-2	99.5	16.12	±0.64	16.04
2,2',3,4,4',5'-Hexachlorobiphenyl 138	35065-28-2	100	*340.0*	± 13.60	*340.0*
2,3,3',4',5,6-Hexachlorobiphenyl 163	74472-44-9	99.0	80.40	±3.22	*79.60*
2,3,3',4',5',6-Hexachlorobiphenyl 164	74472-45-0	*99.7*	32.24	±1.29	32.14
2,2',4,5,5'-Pentachlorobiphenyl 101	37680-73-2	99.4	402.0	±16.08	399.6
2,2',3,4,6'-Pentachlorobiphenyl 89	73555-57-2	*99.9*	12.01	±0.48	12.00
2,2',5,5'-Tetrachlorobiphenyl 52	35693-99-3	100	402.0	±16.08	402.0
2,2',4,5'-Tetrachlorobiphenyl 49	41464-40-8	100	316.4	±12.66	316.4
2,2',3,5-Tetrachlorobiphenyl 43	70362-46-8	*99.9*	36.36	1.45	36.32
2,2',4,4',5,5'-Hexachlorobiphenyl 153	35065-27-1	99.6	325.6	± 13.02	324.3
2,2',4,4',5-Pentachlorobiphenyl 99	38380-01-7	99.6	320.0	±12.80	318.7
2,3',4',5-Tetrachlorobiphenyl 70	32598-11-1	99.0	293.2	±11.73	290.3
2,3,3',4,4'-Pentachlorobiphenyl 105	32598-14-4	100	245.6	±9.82	245.6
2,4',5-Trichlorobiphenyl 31	16606-02-3	100	236.0	±9.44	236.0
2,3,3',4'-Tetrachlorobiphenyl 56	41464-43-1	99.6	116.1	±4.64	115.6
2,3,4,4'-Tetrachlorobiphenyl 60	33025-41-1	99.0	116.4	±4.66	115.2
2,2',3,4-Tetrachlorobiphenyl 41	52663-59-9	W.3	40.24	±1.61	39.96
2,3',4',6-Tetrachlorobiphenyl 71	41464-46-4	100	32.28	±1.29	32.28
2,3,4',6-Tetrachlorobiphenyl 64	52663-58-8	99.0	137.0	a5.43	135.6
2,3,3',4',6-Pentachlorobiphenyl 110	38380-03-9	99.7	144 8	±5.79	144.4
2,2',3,4,4'-Pentachlorobiphenyl 85	65510-45-4	99.0	140.2	±5.61	138.8
2,2',3,4,5'-Pentachlorobiphenyl 87	38380-02-8	W.5	96.84	±3.87	96.36
2,3,4,4',6-Pentachlorobiphenyl	74472-38-1	99.5	8.008	±0.32	7.968
2,2',3,3',4,4'-Hexachlorobiphenyl 128	38380-07-3	*99.7*	80.76	±3.23	80.52
2,2',3,4',5',6-Hexachlorobiphenyl 149	38380-04-0	*99.0*	68.28	±2.73	67.60
2,2',3,4,4',6-Hexachlorobiphenyl 139	56030-56-9	99.4	1.368	±0.05	1.360
2,2',3,5,5'-Pentachlorobiphenyl 92	52663-61-3	99.7	68.48	±2.74	68.27
2,2',3,4,4',5,5'-Heptachlorobiphenyl 180	35065-29-3	100	*56.04*	±2.24	56.04
2,3,3',4,4',6-Hexachlorobiphenyl 158	74472-42-7	100	56.44	±2.26	56.44
2,2',3,4',5,5'-Hexachlorobiphenyl 146	51908-16-8	98.9	52.24	±2.09	51.67
2,2',3',4,5-Pentachlorobiphenyl 97	41464-51-1	99.0	52.20	±2.09	51.68

1. All weights are traceable through NIST, Test No 822/270236-04
2. Certified Analyte Concentration = Purity x Prepared Concentration. The Uncertainty calculated for this product is the Combined Uncertainty $u_c(y)$. It represents an estimated standard deviation equal to the positive square root of the total variance of the uncertainty of components. The Expanded Uncertainty is U which is $U_c(y)$ *K where K is the coverage factor at the 95% confidence level (K=2). Values reported above are Expanded Combined Uncertainty
3. A product with a suffix (-1A, -2B, etc.) on its lot# has had its expiration date extended and is identical to the same lot# without the suffix

Certified by: R. Cooper

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CERTIFICATE OF ANALYSIS

CATALOG NO: S-13907-250ML
DESCRIPTION: Custom PCB Congener Standard
LOT: B5110052
SOLVENT: Isooctane

EXPIRATION: Nov 9, 2015

See reverse for additional certification information.

This product is guaranteed accurate to ± 0.5% of the Certified Analyte concentration through the Expiration Date on the Label.

Component	CAS #	Purity % (GC/MS)	Prepared Concentration[1] (µg/mL)		Certified Analyte Concentration[2] (µg/mL)
2,3,3',4,4',5-Hexachlorobiphenyl 156	38380-08-4	100	48.24	±1.93	48.24
2,2',3,5',6-Pentachlorobiphenyl 95	38379-99-6	99.1	48.40	±1.94	47.96
2,2',3,4',5,5',6-Heptachlorobiphenyl	52663-68-0	99.4	44.20	±1.77	43.93
2,2',3,3',4,4',5-Heptachlorobiphenyl 170	35065-30-6	100	36.28	±1.45	36.28
2,3,3',4,4',5,6-Heptachlorobiphenyl 190	41411-64-7	100	8.016	±0.32	8.016
2,3,4',5,6-Pentachlorobiphenyl 116	68194-11-6	99.0	40.24	±1.61	39.84
2,2',3,4,5,5'-Hexachlorobiphenyl 141	52712-04-6	99.0	36.12	±1.44	35.76
2,2',3,3',4,5'-Hexachlorobiphenyl 130	52663-66-8	99.3	28.00	±1.12	27.80
2,3,3',4,6-Pentachlorobiphenyl	74472-35-8	100	24.12	±0.96	24.12
2,2',3,4,4',5-Hexachlorobiphenyl 137	35694-06-5	99.7	24.04	±0.96	23.97
2,2',3,4'-Tetrachlorobiphenyl 42	36559-22-5	99.4	16.00	±0.64	15.90
2,3,3',6-Tetrachlorobiphenyl 59	74472-33-6	98.5	4.004	±0.16	3.944
2,3,4,4',5-Pentachlorobiphenyl 114	74472-37-0	100	20.16	±0.81	20.16
2,3',4,4',5,5'-Hexachlorobiphenyl 167	52663-72-6	99.0	16.08	±0.64	15.92
2',3,4,4',5-Pentachlorobiphenyl 123	65510-44-3	99.8	12.00	±0.48	11.98
2,3,3',4,4',5'-Hexachlorobiphenyl 157	69782-90-7	99.0	12.09	±0.48	11.88
3,3',4,4'-Tetrachlorobiphenyl 77	32598-13-3	100	8.000	±0.32	8.000
3,4,4',5-Tetrachlorobiphenyl 81	70362-50-4	100	4.008	±0.16	4.008
3,3',4,4',5-Pentachlorobiphenyl 1	57465-28-8	100	1.687	±0.07	1.687
2,3,3',4,4',5,5'-Heptachlorobiphenyl 189	39635-31-9	100	1.404	±0.06	1.404
3,3',4,4',5,5'-Hexachlorobiphenyl 169	32774-16-6	100	0.0144	0.00	.0144

58 Components

1. All weights are traceable through NIST, Test No 822/270236-04
2. Certified Analyte Concentration = Purity x Prepared Concentration. The Uncertainty calculated for this product is the Combined Uncertainty u_c(y). It represents an estimated standard deviation equal to the positive square root of the total variance of the uncertainty of components. The Expanded Uncertainty is U which is U_c(y) *K where K is the coverage factor at the 95% confidence level (K=2). Values reported above are Expanded Combined Uncertainty
3. A product with a suffix (-1A, 2B, etc.) on its lot# has had its expiration date extended and is identical to the same lot# without the suffix.

Certified by: R. Cooper

CERTIFICATION REPORT

1. **Intended Use:** The product covered by this Certificate is designed for Calibration or for use in Quality Control procedures for the specified chemical compounds listed on the reverse side. This product can be used for Identification and/or Quantification. This product can also be used as a Reference Material to validate analytical procedures, subject to the conditions under Section 8.

2. **Raw Materials:** Reference standards are prepared from the highest quality starting materials with defined purities. All analytes and solvents are obtained from pre-qualified vendors and then analyzed or evaluated prior to use according to IS09001 requirements.

3. **Manufacturing:** AccuStandard, Inc. manufactures its products under an ISO 9001 certified quality system. Balances used in the manufacturing process are calibrated regularly. All weights are traceable through the National Institute of Standards and Technology (NIST), Test No. 822/254480.

4. **Homogeneity Assessment:** Homogeneity of the finished product is assessed by analyzing sample batches or by other methods consistent with the intended use of the product and by procedures that comply with the ISO 9001' Quality System.

5. **Stability Assessment:** AccuStandard, Inc. guarantees the stability of this solution through the expiration date stated on the label, when handled and stored according to the conditions stated on the label. To ensure a uniform solution, mix the contents of the sealed container thoroughly prior to use. Care should be Wen not to contaminate the contents of the original container.

6. **Analytical Quality Control:** Products are tested by validated analytical methods covered under the company's ISO 9001 Quality System.

7. **Uncertainty Statistics and Confidence Limits:** The maximum Uncertainty stated on the face of this certificate has been calculated in accordance with the EURACHEM/CITAC Guide – Quantifying Uncertainty in Analytical Measurement - Second Edition. The Uncertainty given is the Expanded Combined Uncertainty and represents an estimated Standard Deviation equal to the positive square root of the total variance of the uncertainty of components. The Expanded Uncertainty is U which is $U_c(y)$ *K, where K is the coverage factor at the 95% confidence level (K=2). The Expanded Uncertainty is based on the combination of uncertainties associated with each individual operation involved in the preparation of the product.

8. **Legal Notice and Limit of Liability:** This product is for research use only. No warranty for any particular application is expressed or implied. Due to their hazardous nature, they should be handled by trained personnel. The company's liability will be limited to replacement of product or refund of purchase price. Notice of claims must be made within thirty (30) days from date of delivery.

WARRANTIES:

Manufacture]: (AccuStandard®, Inc.) warrants that its products shall conform to the description of such products as provided in its catalog or on the specific products' label. This warranty is exclusive, and AccuStandard, Inc. makes no other Warranty, express or implied, including any implied warranty of merchantability or fitness for any particular purpose.

PRODUCT STABILITY:

AccuStandard's products are monitored regularly to ensure they meet Catalog Specifications (on-going stability studies). The integrity of these products is dependent upon proper handling and storage by the end-user.

AccuStandard recommends the following storage conditions:

Volatiles	-10 to -20 °C
Semi-Volatiles	4 °C

Exceptions: Highly concentrated soludons (e.g. Z-014J) should be stored at room temperature.

Note: Allow ampules to equilibrate to 20 °C prior to opening.

LIABILITY:

AccuStandard, Inc. products are for research use only. Due to their hazardous nature, they should be handled by trained personnel. AccuStandard's liability will be limited to replacement of products or refund of purchase price. Failure to give notice of claim within thirty (30) days from *date* of delivery will constitute a waiver by buyer of any and all claims.

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CERTIFICATE OF ANALYSIS

CATALOG NO. S-13907-BLK-250ML

DESCRIPTION: Isooctane Control Blank

EXPIRATION: Nov 9, 2006

LOT: B5110053

SOLVENT: N/A

This product is guaranteed accurate to + 0.5% of the Certified Analyte concentration through the Expiration Date on the Label.

See reverse for additional certification information.

Component	CAS #	Purity % MFG	Prepared Concentration[1]	Certified Analyte Concentration[2]
Isooctane	540-84-1	99.9	N/A ±0	N/A

Please note: AccuStandard follows the U.S. conventions in reporting numerical values, on both certificates and labels.

A comma (,) is used to separate units of one-thousand or greater.
A period (.) is used as a decimal place marker.

1. All weights are traceable through National Institute of Standards & Technology, Test No.
2. Certified Analyte Concentration = Purity x Prepared Concentration
3. A product with a suffix (-1A, -2B, etc.) on its lot# has had its expiration date extended and is identical to the same lot# without the suffix.

Certified by: R. Cooper

This product was manufactured to meet the quality system requirements of ISO 9001

QR-ORG/INO-001
Rev. 11/02

CERTIFICATION REPORT

1. **Intended Use:** The product covered by this Certificate is designed for Calibration or for use in Quality Control procedures for the specified chemical compounds listed on the reverse side. This product can be used for Identification and/or Quantification. This product can also be used as a Reference Material to validate analytical procedures, subject to the conditions under Section 8.

2. **Raw Materials:** Reference Standards are prepared from the highest quality starting materials with defined purities. All analytes and solvents are obtained from pre-qualified vendors and then analyzed or evaluated prior to use according to IS09001 requirements.

3. **Manufacturing:** AccuStandard, Inc. manufactures its products under an ISO 9001 certified quality system. Balances used in the manufacturing process are calibrated regularly. All weights are traceable through the National Institute of Standards and Technology (NIST), Test No, 822/254480.

4. **Homogeneity Assessment:** Homogeneity of the finished product is assessed by analyzing sample batches or by other methods consistent with the intended use of the product and by procedures that comply with the ISO 9001 Quality System.

5. Stability **Assessment:** AccuStandard, Inc. guarantees the stability of this solution through the expiration date stated on the label, when handled and stored according to the conditions stated on the label. To ensure a uniform solution, mix the contents of the sealed container thoroughly prior to use. Care should be taken not to contaminate the contents of the original container.

6. **Analytical Quality Control:** Products are tested by validated analytical methods covered under the company's ISO 9001 Quality System.

7. **Uncertainty Statistics and Confidence Limits:** The maximum Uncertainty stated on the face of this certificate has been calculated in accordance with the EURACHEM/CITAC Guide – Quantifying Uncertainty in Analytical Measurement - Second Edition. The Uncertainty given is the Expanded Combined Uncertainty and represents an estimated Standard Deviation equal to the positive square root of the total variance of the uncertainty of components. The Expanded Uncertainty is U which Is $U_c(y)$ *K, where K Is the coverage factor at the 95% confidence level (K=2). The Expanded Uncertainty is based on the combination of uncertainties associated with each individual operation involved in the preparation of the product.

8. **Legal Notice and Limit of Liability:** This product is for research use only. No warranty for any particular application Is expressed or implied. Due to their hazardous nature, they should be handled by trained personnel. The company's liability will be limited to replacement of product or refund of purchase price. Notice of claims must be made within thirty (30) days from date of delivery.


U.S. DEPARTMENT OF THE INTERIOR
MARCH 3, 1849


NOAA
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
U.S. DEPARTMENT OF COMMERCE