

Attachments



AccuStandard Inc.

125 Market Street
New Haven, CT 06513
USA

CERTIFICATE OF ANALYSIS



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CATALOG NO: S-13907-250ML

EXPIRATION: Nov 9, 2015

DESCRIPTION: Custom PCB Congener Standard

LOT: B5110052

See reverse for additional certification information.

SOLVENT: Isooctane

This product is guaranteed accurate to + 0.5% of the Certified Analyte concentration. 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 113	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 108	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	±5.43 135.6
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 82	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(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(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

Page 1 of 2 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 ISO9001 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. 8221254480.
- 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.



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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 155	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	1 0	8.016	±0.32 8.016
2,3,4',5,6-Pentachlorobiphenyl 188	68194-11-6	99.0	40.24	±1.61 39.84
2,2',3,4,5,5'-Hexachlorobiphenyl 191	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	35694-06-3	99.7	24.04	±0.96 23.97
2,2',3,4'-Tetrachlorobiphenyl 142	36559-22-3	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 144	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	99.3	12.00	±0.48 11.98
2,3,3',4,4',5'-Hexachlorobiphenyl 177	69782-90-7	99.3	12.00	±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 0.0144

58 Components

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

QR-OR014V010002