Gravimetric Certificate

Dr. Ehrenstorfer

Reference Materials for Residue Analysis

Product Identification

20007300 PCB 73 (2,3′,5′,6-Tetrachlorobiphenyl)

Formula C12H6Cl4

Mol.Weight 291.99

CAS No. 74338-23-1

Expiry Date 16.03.2017

Lot Number 20316IO

Store at 20°C in the dark

Please note: The expiry date is valid under recommended storage conditions only.

Gravimetric Data

Product Name	Conc. (mg/l)	Purity %	Weight (mg)
PCB 73 (2,3′,5′,6-Tetrachlorobiphenyl)	10,000	99,7	1,002

Solvent Information

Solvent	Lot No.	Exact Quantity (ml)
Iso-Octane	72851	100,00

Traceability Data

20007300 02011	neat product
20007300 20316IO	10,000 mg/l

Analytical Data

Detection: GC/ECD

Column: DB-5, 30 m, ID 0.25 mm

Inj.-Vol.: 0,20 µl

Flow: 0,2 ml/min

Ret.-Time: **13,31 min.**

Method Details:

Injector: 320° C

Start Temperature:120° C for 4 min

End Temperature: 320° C for 5 min

Gradient: 15° C/min

Identity check RT

Comment purity was confirmed by external standard method

The uncertainty/tolerance of this standard is +/- 2,0 %, 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 Uc(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 this product.

Certified on 18.05.2012

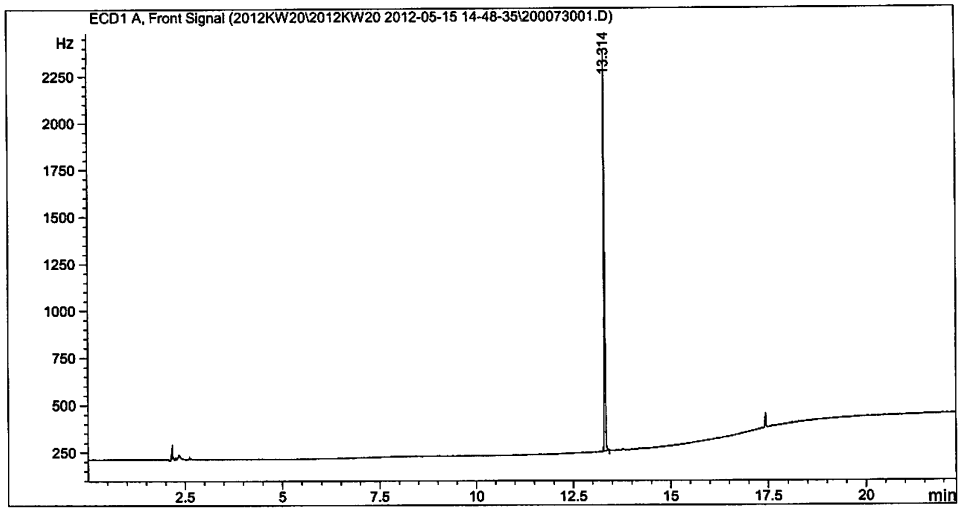
by P. Feuerriegel

Data File C:\CHEM32\1\DATA\2012KW20\2012KW20 2012-05-15 14-48-35\200073001.D
Sample Name: 20316IO

18.5.12

```
==========================================================================
Acq. Operator    : Dr. Heidrich                  Seq. Line :   1
Acq. Instrument  : AgilentECD2                    Location : Vial 51
Injection Date   : 5/15/2012 2:50:38 PM              Inj :   1
                                                Inj Volume : 0.2 µl
Acq. Method      : C:\CHEM32\1\DATA\2012KW20\2012KW20 2012-05-15 14-48-35\PAHK.M
Last changed     : 7/16/2010 11:46:02 AM by Dr. Heidrich
Analysis Method  : C:\CHEM32\1\METHODS\PAHK.M
Last changed     : 7/16/2010 11:46:02 AM by Dr. Heidrich
Method Info      : pahk

Sample Info      : PCB No. 73
```




```
==========================================================================
                        Area Percent Report
==========================================================================

Sorted By             :      Signal
Multiplier:                   :      1.0000
Dilution:                     :      1.0000
Use Multiplier & Dilution Factor with ISTDs


Signal 1: ECD1 A, Front Signal

Peak RetTime Type  Width     Area      Height     Area
  #   [min]       [min]    [Hz*s]      [Hz]       %
----|-------|----|-------|----------|----------|--------|
   1  13.314 BB    0.0277 3489.23682 2063.61230 1.000e2

Totals :                  3489.23682 2063.61230
```


Dr. Ehrenstorfer

Reference Materials for Residue Analysis

1. Application:

This standard solution is desinged for calibration or recalibration of chromatographic systems for the determination of the specified chemical compounds concerning identity and quantification. The product can also be used as reference material for interlabortory studies to validate analytical procedures.

2. Raw material:

All raw materials used to prepare this standard solution are of the highest purity. After our production process each material is checked by several of the following methods, if applicabel: UV-, IR-Spectroscopy, Elemental analysis, chromotographical properties (GC/FID, GC/ECD, HPLC/DAD, TLC) and physical properties (phase, colour, odor, melting point) and Karl-Fischer for detection of traces of water.

3. Manufacturing:

Prior to the production for each standard solution we calculate the necessary weight of the neat material, compensate the difference of the purity of the compound to 100%. We use an electronic scale capable of weighing to 0,000001 g with a built in automatic calibration function, which is executed minimum once a week. Once a month the balance is calibrated with weights complying with the OIML-IR-20 design requirements and traceable to the national prototype of the Physikalisch-Technische Bundesanstalt, Braunschweig, the German office of weights and measurements. Every year the balance is calibrated by the manufacturer service technician. This company is also certified by the DQS following ISO9001. All steps are documented conform to ISO 9001 requirements. The single components are weighed and filled into volumetric flask (class A glassware) with the exact quantiy of solvent as indicated on the certifcate. Solvents are stored and handled in special rooms, which have the constant ambient temperature required from the manufacturer of the volumetric equipment. The tolerance of the weighing procedure and the dilution error adds to a maximum of +/- 1.0 %.

4. Packaging and Storeage:

The final formulation was packaged in amber OPC ampoules to prevent photodegradation and then sealed by hand. Every reference material is stored under controlled condition. One sample of each lot is kept according GLP rules to bring our staff in a position to check the specific lot even years after the last item was sold.

5. Stability:

In regular intervals each lot is checked for stability. We guarantee the stability of the solution until expiry date given in the Gravimetric Certificate. In case, that the tests show a degradation within the period the customer will be notified by Dr. Ehrenstorfer. We recommend to store the ampules in the dark at 20°C +/- 4°C

6. Gravimetric Certificate:

The documentation gives all the data of the production process with all the information necessary for traceability of each lot. Following GLP rules you are obliged to note the used product, lot number of the product, purity, exact weight/quantity of the product, name of the solvent, lot number of the solvent, exact quantitiy of the solvent, date of production, date of expiry and signature of the person in charge. Copies have to be authorized by stamp, signature of the person in charge according to your quality management handbook and date of authorization.

7. Analytical Quality Control:

The summary of the quality control procedure is documented in the separate Certificate of Analysis. Our company holds the Quality System Certificate DQS-Reg.No.:2874-01 for the standard from the ISO 9001 / EN 29000 series and the scope as specified. The audit performed by the DQS has verified, that our quality system fulfills the requirements of DIN ISO 9001. The Laboratory Dr. Ehrenstorfer-Schäfers is accreditated by DGA as indicated by the Accreditation Certificate DGA-PL-4536.00 based on DIN EN ISO/IEC 17025:2005 for the weighing of amounts of substances for the preparation of standard solutions.

REG.NO.: 2874 - 01

The Laboratory Dr. Ehrenstorfer-Schäfers is accreditated by DAR as indicated by the Accreditation Certificate DGA-PL-4536.00 based on DIN EN ISO/IEC 17025:2005 for the weighing of amounts of substances for the preparation of standard solutions.

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Deutscher Akkreditierungs Rat DAR

DGA-PL-4536.00