

Prep Standard - Chemical Standard Summary

Order ID : P5362

Test : TPH GC

Prepbatch ID : PB165807,

Sequence ID/Qc Batch ID: FG122324,

Standard ID :

EP2560,EP2573,PP23913,PP23935,PP23961,PP23962,PP23963,PP23964,PP23965,PP23966,PP23967,

Chemical ID :

E2865,E3551,E3822,E3827,E3828,E3848,P11958,P11959,P13104,P13109,P13213,P13218,P13219,P13492,P13493,P13494,P13495,

Extractions STANDARD PREPARATION LOG

| <u>Recipe ID</u> | <u>NAME</u> | <u>NO.</u> | <u>Prep Date</u> | <u>Expiration Date</u> | <u>Prepared By</u> | <u>ScaleID</u> | <u>PipetteID</u> | <u>Supervised By</u> |
|------------------|--------------------------------|------------------------|------------------|------------------------|--------------------|----------------|------------------|--------------------------------|
| 2017 | 1:1 ACETONE/METHYLENE CHLORIDE | EP2560 | 11/14/2024 | 05/08/2025 | Rajesh Parikh | None | None | RUPESHKUMAR SHAH 11/14/2024 |

FROM 8000.00000ml of E3827 + 8000.00000ml of E3828 = Final Quantity: 16000.000 ml

| <u>Recipe ID</u> | <u>NAME</u> | <u>NO.</u> | <u>Prep Date</u> | <u>Expiration Date</u> | <u>Prepared By</u> | <u>ScaleID</u> | <u>PipetteID</u> | <u>Supervised By</u> |
|------------------|----------------------|------------------------|------------------|------------------------|--------------------|----------------------------------|------------------|--------------------------------|
| 3923 | Baked Sodium Sulfate | EP2573 | 12/16/2024 | 06/16/2025 | Rajesh Parikh | Extraction_SC ALE_2 (EX-SC-2) | None | RUPESHKUMAR SHAH 12/16/2024 |

FROM 4000.00000gram of E3551 = Final Quantity: 4000.000 gram

Pest/Pcb STANDARD PREPARATION LOG

| <u>Recipe ID</u> | <u>NAME</u> | <u>NO.</u> | <u>Prep Date</u> | <u>Expiration Date</u> | <u>Prepared By</u> | <u>ScaleID</u> | <u>PipetteID</u> | <u>Supervised By</u> |
|------------------|------------------------------------|-------------------------|------------------|------------------------|--------------------|----------------|------------------|----------------------|
| 3609 | 20 PPM DRO SPIKE SOLUTION (RESTEK) | PP23913 | 10/25/2024 | 04/23/2025 | Yogesh Patel | None | None | Ankita Jodhani |
| | | | | | | | | 10/25/2024 |

FROM 1.00000ml of P13104 + 1.00000ml of P13109 + 48.00000ml of E3822 = Final Quantity: 50.000 ml

| <u>Recipe ID</u> | <u>NAME</u> | <u>NO.</u> | <u>Prep Date</u> | <u>Expiration Date</u> | <u>Prepared By</u> | <u>ScaleID</u> | <u>PipetteID</u> | <u>Supervised By</u> |
|------------------|-------------------------------------|-------------------------|------------------|------------------------|--------------------|----------------|------------------|----------------------|
| 147 | 20 PPM DRO Surrogate Spike Solution | PP23935 | 11/01/2024 | 04/23/2025 | Yogesh Patel | None | None | Ankita Jodhani |
| | | | | | | | | 11/04/2024 |

FROM 1.00000ml of P13492 + 1.00000ml of P13493 + 1.00000ml of P13494 + 1.00000ml of P13495 + 196.00000ml of E3822 = Final Quantity: 200.000 ml

Pest/Pcb STANDARD PREPARATION LOG

| <u>Recipe ID</u> | <u>NAME</u> | <u>NO.</u> | <u>Prep Date</u> | <u>Expiration Date</u> | <u>Prepared By</u> | <u>ScaleID</u> | <u>PipetteID</u> | <u>Supervised By</u> |
|------------------|--------------------------|-------------------------|------------------|------------------------|--------------------|----------------|------------------|----------------------|
| 433 | 100/100 PPM DRO (Restek) | PP23961 | 11/13/2024 | 05/09/2025 | Yogesh Patel | None | None | Ankita Jodhani |
| | | | | | | | | 11/13/2024 |

FROM 1.00000ml of P11958 + 1.00000ml of P11959 + 1.00000ml of P13213 + 7.00000ml of E3828 = Final Quantity: 10.000 ml

| <u>Recipe ID</u> | <u>NAME</u> | <u>NO.</u> | <u>Prep Date</u> | <u>Expiration Date</u> | <u>Prepared By</u> | <u>ScaleID</u> | <u>PipetteID</u> | <u>Supervised By</u> |
|------------------|---------------------------|-------------------------|------------------|------------------------|--------------------|----------------|------------------|----------------------|
| 3796 | 100/100 PPM DRO STD (CPI) | PP23962 | 11/13/2024 | 02/14/2025 | Yogesh Patel | None | None | Ankita Jodhani |
| | | | | | | | | 11/13/2024 |

FROM 1.00000ml of P13213 + 1.00000ml of P13218 + 1.00000ml of P13219 + 7.00000ml of E3828 = Final Quantity: 10.000 ml

Pest/Pcb STANDARD PREPARATION LOG

| <u>Recipe ID</u> | <u>NAME</u> | <u>NO.</u> | <u>Prep Date</u> | <u>Expiration Date</u> | <u>Prepared By</u> | <u>ScaleID</u> | <u>PipetteID</u> | <u>Supervised By</u> |
|------------------|-----------------------------|-------------------------|------------------|------------------------|--------------------|----------------|------------------|----------------------|
| 435 | 50 PPM ICC DRO STD (Restek) | PP23963 | 11/13/2024 | 05/09/2025 | Yogesh Patel | None | None | Ankita Jodhani |
| | | | | | | | | 11/13/2024 |

FROM 0.50000ml of E3828 + 0.50000ml of PP23961 = Final Quantity: 1.000 ml

| <u>Recipe ID</u> | <u>NAME</u> | <u>NO.</u> | <u>Prep Date</u> | <u>Expiration Date</u> | <u>Prepared By</u> | <u>ScaleID</u> | <u>PipetteID</u> | <u>Supervised By</u> |
|------------------|-----------------------------|-------------------------|------------------|------------------------|--------------------|----------------|------------------|----------------------|
| 437 | 20 PPM ICC DRO STD (Restek) | PP23964 | 11/13/2024 | 05/09/2025 | Yogesh Patel | None | None | Ankita Jodhani |
| | | | | | | | | 11/13/2024 |

FROM 0.80000ml of E3828 + 0.20000ml of PP23961 = Final Quantity: 1.000 ml

Pest/Pcb STANDARD PREPARATION LOG

| <u>Recipe ID</u> | <u>NAME</u> | <u>NO.</u> | <u>Prep Date</u> | <u>Expiration Date</u> | <u>Prepared By</u> | <u>ScaleID</u> | <u>PipetteID</u> | <u>Supervised By</u> |
|------------------|-----------------------------|-------------------------|------------------|------------------------|--------------------|----------------|------------------|----------------------|
| 438 | 10 PPM ICC DRO STD (Restek) | PP23965 | 11/13/2024 | 05/09/2025 | Yogesh Patel | None | None | Ankita Jodhani |
| | | | | | | | | 11/13/2024 |

FROM 0.90000ml of E3828 + 0.10000ml of PP23961 = Final Quantity: 1.000 ml

| <u>Recipe ID</u> | <u>NAME</u> | <u>NO.</u> | <u>Prep Date</u> | <u>Expiration Date</u> | <u>Prepared By</u> | <u>ScaleID</u> | <u>PipetteID</u> | <u>Supervised By</u> |
|------------------|----------------------------|-------------------------|------------------|------------------------|--------------------|----------------|------------------|----------------------|
| 439 | 5 PPM ICC DRO STD (Restek) | PP23966 | 11/13/2024 | 05/09/2025 | Yogesh Patel | None | None | Ankita Jodhani |
| | | | | | | | | 11/13/2024 |

FROM 0.90000ml of E3828 + 0.10000ml of PP23963 = Final Quantity: 1.000 ml



| <u>Recipe ID</u> | <u>NAME</u> | <u>NO.</u> | <u>Prep Date</u> | <u>Expiration Date</u> | <u>Prepared By</u> | <u>ScaleID</u> | <u>PipetteID</u> | <u>Supervised By</u> |
|------------------|--|-------------------------|------------------|------------------------|--------------------|----------------|------------------|----------------------|
| 3797 | 50 PPM DRO ICV STD (CPI) | PP23967 | 11/13/2024 | 02/14/2025 | Yogesh Patel | None | None | Ankita Jodhani |
| <u>FROM</u> | 0.80000ml of E3828 + 0.50000ml of PP23962 = Final Quantity: 1.000 ml | | | | | | | |

CHEMICAL RECEIPT LOG BOOK

| Supplier | ItemCode / ItemName | Lot # | Expiration Date | Date Opened / Opened By | Received Date / Received By | Chemtech Lot # |
|------------------|--|------------|-----------------|-------------------------|-----------------------------|----------------|
| Seidler Chemical | BA-3382-05 / Sand, Purified (cs/4x2.5kg) | 0000243821 | 06/30/2025 | 04/30/2020 / RAJESH | 04/28/2020 / RAJESH | E2865 |

| Supplier | ItemCode / ItemName | Lot # | Expiration Date | Date Opened / Opened By | Received Date / Received By | Chemtech Lot # |
|-----------------------------|--|--------|-----------------|-------------------------|-----------------------------|----------------|
| PCI Scientific Supply, Inc. | PC19631-100 / SODIUM SULFATE, ANHYDROUS, PEST GRADE, 1 | 313201 | 07/01/2025 | 01/03/2024 / Rajesh | 07/20/2023 / Rajesh | E3551 |

| Supplier | ItemCode / ItemName | Lot # | Expiration Date | Date Opened / Opened By | Received Date / Received By | Chemtech Lot # |
|------------------|---|------------|-----------------|-------------------------|-----------------------------|----------------|
| Seidler Chemical | BA-9644-A4 / Methylene Chloride,U-Resi, Cycle-Tainer (215L) | 24I2662006 | 04/23/2025 | 10/24/2024 / Rajesh | 10/24/2024 / Rajesh | E3822 |

| Supplier | ItemCode / ItemName | Lot # | Expiration Date | Date Opened / Opened By | Received Date / Received By | Chemtech Lot # |
|------------------|--|------------|-----------------|-------------------------|-----------------------------|----------------|
| Seidler Chemical | BA-9254-03 / Acetone, Ultra Resi (cs/4x4L) | 24H1462005 | 05/08/2025 | 11/08/2024 / Rajesh | 11/07/2024 / Rajesh | E3827 |

| Supplier | ItemCode / ItemName | Lot # | Expiration Date | Date Opened / Opened By | Received Date / Received By | Chemtech Lot # |
|------------------|---|------------|-----------------|-------------------------|-----------------------------|----------------|
| Seidler Chemical | BA-9644-A4 / Methylene Chloride,U-Resi, Cycle-Tainer (215L) | 24G0862003 | 05/09/2025 | 11/09/2024 / Rajesh | 11/04/2024 / Rajesh | E3828 |

| Supplier | ItemCode / ItemName | Lot # | Expiration Date | Date Opened / Opened By | Received Date / Received By | Chemtech Lot # |
|------------------|---|------------|-----------------|-------------------------|-----------------------------|----------------|
| Seidler Chemical | BA-9644-A4 / Methylene Chloride,U-Resi, Cycle-Tainer (215L) | 24K1762005 | 06/18/2025 | 12/18/2024 / Rajesh | 12/09/2024 / Rajesh | E3848 |

CHEMICAL RECEIPT LOG BOOK

| Supplier | ItemCode / ItemName | Lot # | Expiration Date | Date Opened / Opened By | Received Date / Received By | Chemtech Lot # |
|----------|-------------------------------|----------|-----------------|-------------------------|-----------------------------|----------------|
| Restek | 31266 / Florida TRPH Standard | A0186840 | 05/13/2025 | 11/13/2024 / yogesh | 07/11/2022 / Yogesh | P11958 |

| Supplier | ItemCode / ItemName | Lot # | Expiration Date | Date Opened / Opened By | Received Date / Received By | Chemtech Lot # |
|----------|-------------------------------|----------|-----------------|-------------------------|-----------------------------|----------------|
| Restek | 31266 / Florida TRPH Standard | A0186840 | 05/13/2025 | 11/13/2024 / yogesh | 07/11/2022 / Yogesh | P11959 |

| Supplier | ItemCode / ItemName | Lot # | Expiration Date | Date Opened / Opened By | Received Date / Received By | Chemtech Lot # |
|----------|-------------------------------|----------|-----------------|-------------------------|-----------------------------|----------------|
| Restek | 31266 / Florida TRPH Standard | A0204859 | 04/25/2025 | 10/25/2024 / yogesh | 01/12/2024 / Yogesh | P13104 |

| Supplier | ItemCode / ItemName | Lot # | Expiration Date | Date Opened / Opened By | Received Date / Received By | Chemtech Lot # |
|----------|-------------------------------|----------|-----------------|-------------------------|-----------------------------|----------------|
| Restek | 31266 / Florida TRPH Standard | A0204859 | 04/25/2025 | 10/25/2024 / yogesh | 01/12/2024 / Yogesh | P13109 |

| Supplier | ItemCode / ItemName | Lot # | Expiration Date | Date Opened / Opened By | Received Date / Received By | Chemtech Lot # |
|--------------------------|---------------------------------------|--------|-----------------|-------------------------|-----------------------------|----------------|
| Absolute Standards, Inc. | 72072 / n-Tetracosane-d50, 1000 ug/ml | 101122 | 05/13/2025 | 11/13/2024 / yogesh | 01/17/2024 / Ankita | P13213 |

| Supplier | ItemCode / ItemName | Lot # | Expiration Date | Date Opened / Opened By | Received Date / Received By | Chemtech Lot # |
|-------------------|---|--------|-----------------|-------------------------|-----------------------------|----------------|
| CPI International | Z-110400-05-01 / TRPH Standard (C8-C40), 500 mg/L, 1 ml | 514983 | 02/14/2025 | 08/14/2024 / yogesh | 01/31/2024 / Ankita | P13218 |

CHEMICAL RECEIPT LOG BOOK

| Supplier | ItemCode / ItemName | Lot # | Expiration Date | Date Opened / Opened By | Received Date / Received By | Chemtech Lot # |
|-------------------|---|--------|-----------------|-------------------------|-----------------------------|----------------|
| CPI International | Z-110400-05-01 / TRPH Standard (C8-C40), 500 mg/L, 1 ml | 514983 | 05/13/2025 | 11/13/2024 / yogesh | 01/31/2024 / Ankita | P13219 |

| Supplier | ItemCode / ItemName | Lot # | Expiration Date | Date Opened / Opened By | Received Date / Received By | Chemtech Lot # |
|--------------------------|---------------------------------------|--------|-----------------|-------------------------|-----------------------------|----------------|
| Absolute Standards, Inc. | 72072 / n-Tetracosane-d50, 1000 ug/ml | 101122 | 05/01/2025 | 11/01/2024 / yogesh | 07/24/2024 / yogesh | P13492 |

| Supplier | ItemCode / ItemName | Lot # | Expiration Date | Date Opened / Opened By | Received Date / Received By | Chemtech Lot # |
|--------------------------|---------------------------------------|--------|-----------------|-------------------------|-----------------------------|----------------|
| Absolute Standards, Inc. | 72072 / n-Tetracosane-d50, 1000 ug/ml | 101122 | 05/01/2025 | 11/01/2024 / yogesh | 07/24/2024 / yogesh | P13493 |

| Supplier | ItemCode / ItemName | Lot # | Expiration Date | Date Opened / Opened By | Received Date / Received By | Chemtech Lot # |
|--------------------------|---------------------------------------|--------|-----------------|-------------------------|-----------------------------|----------------|
| Absolute Standards, Inc. | 72072 / n-Tetracosane-d50, 1000 ug/ml | 101122 | 05/01/2025 | 11/01/2024 / yogesh | 07/24/2024 / yogesh | P13494 |

| Supplier | ItemCode / ItemName | Lot # | Expiration Date | Date Opened / Opened By | Received Date / Received By | Chemtech Lot # |
|--------------------------|---------------------------------------|--------|-----------------|-------------------------|-----------------------------|----------------|
| Absolute Standards, Inc. | 72072 / n-Tetracosane-d50, 1000 ug/ml | 101122 | 05/01/2025 | 11/01/2024 / yogesh | 07/24/2024 / yogesh | P13495 |

Sand
Purified
Washed and Ignited



Material No.: 3382-05
Batch No.: 0000243821
Manufactured Date: 2018/04/09
Retest Date: 2025/04/07
Revision No: 1

Certificate of Analysis

| Test | Specification | Result |
|---------------------------|---------------|--------|
| Substances Soluble in HCl | $\leq 0.16\%$ | 0.01 |

For Laboratory, Research or Manufacturing Use
Meets Reagent Specifications for testing USP/NF monographs

Country of Origin: US
Packaging Site: Paris Mfg Ctr & DC

E 2865


Jamie Ethier
Vice President Global Quality

For questions on this Certificate of Analysis please contact Technical Services at 855.282.6867 or +1.610.386.1700

Avantor Performance Materials, LLC
100 Matsonford Rd, Suite 200, Radnor, PA 19087. U.S.A. Phone: 610.386.1700



**PRODUCTOS
QUÍMICOS
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CP 64070
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www.pqm.com.mx

CERTIFICATE OF ANALYSIS

| | | | |
|------------------------|-----------------------------------|---------------|---------------------------------|
| PRODUCT : | SODIUM SULFATE CRYSTALS ANHYDROUS | | |
| QUALITY : | ACS (CODE RMB3375) | FORMULA : | Na ₂ SO ₄ |
| SPECIFICATION NUMBER : | 6399 | RELEASE DATE: | ABR/21/2023 |
| LOT NUMBER : | 313201 | | |

| TEST | SPECIFICATIONS | LOT VALUES |
|--|----------------|-------------|
| Assay (Na ₂ SO ₄) | Min. 99.0% | 99.7 % |
| pH of a 5% solution at 25°C | 5.2 - 9.2 | 6.1 |
| Insoluble matter | Max. 0.01% | 0.005 % |
| Loss on ignition | Max. 0.5% | 0.1 % |
| Chloride (Cl) | Max. 0.001% | <0.001 % |
| Nitrogen compounds (as N) | Max. 5 ppm | <5 ppm |
| Phosphate (PO ₄) | Max. 0.001% | <0.001 % |
| Heavy metals (as Pb) | Max. 5 ppm | <5 ppm |
| Iron (Fe) | Max. 0.001% | <0.001 % |
| Calcium (Ca) | Max. 0.01% | 0.002 % |
| Magnesium (Mg) | Max. 0.005% | 0.001 % |
| Potassium (K) | Max. 0.008% | 0.003 % |
| Extraction-concentration suitability | Passes test | Passes test |
| Appearance | Passes test | Passes test |
| Identification | Passes test | Passes test |
| Solubility and foreign matter | Passes test | Passes test |
| Retained on US Standard No. 10 sieve | Max. 1% | 0.1 % |
| Retained on US Standard No. 60 sieve | Min. 94% | 97.3 % |
| Through US Standard No. 60 sieve | Max. 5% | 2.5 % |
| Through US Standard No. 100 sieve | Max. 10% | 0.1 % |

COMMENTS

QC: PhC Irma Belmares

If you need further details, please call our factory or contact our local distributor.

Recd. by R3 on 7/24/23 E 3551

RC-02-01, Ed. 3

Methylene Chloride
ULTRA RESI-ANALYZED
For Organic Residue Analysis
(dichloromethane)

 **avantors**



Material No.: 9266-A4

Batch No.: 24I2662006

Manufactured Date: 2024-08-29

Expiration Date: 2025-11-28

Revision No.: 0

Certificate of Analysis

| Test | Specification | Result |
|--|----------------|------------|
| FID-Sensitive Impurities (as 2-Octanol) Single Impurity Peak (ng/mL) | ≤ 5 | 2 |
| ECD Sensitive Impurities (as Heptachlor Epoxide) Single Peak (pg/mL) | ≤ 10 | 3 |
| Assay (CH_2Cl_2) (by GC, exclusive of preservative, corrected for water) | $\geq 99.8\%$ | 99.9% |
| Color (APHA) | ≤ 10 | 5 |
| Residue after Evaporation | ≤ 1.0 ppm | 0.2 ppm |
| Titration Acid ($\mu\text{eq/g}$) | ≤ 0.3 | < 0.1 |
| Chloride (Cl) | ≤ 10 ppm | < 5 ppm |
| Water (by KF, coulometric) | $\leq 0.02\%$ | $< 0.01\%$ |

For Laboratory, Research, or Manufacturing Use
MEETS SPECIFICATIONS WITHIN THE EXPIRATION PERIOD

Country of Origin: United States
Packaging Site: Phillipsburg Mfg Ctr & DC

E 3822



Jamie Croak
Director Quality Operations, Bioscience Production

For questions on this Certificate of Analysis please contact Technical Services at 855.282.6867 or +1.610.386.1700

Avantor Performance Materials LLC

Acetone

BAKER RESI-ANALYZED® Reagent

For Organic Residue Analysis

avantor™



Material No.: 9254-03

Batch No.: 24H1462005

Manufactured Date: 2024-05-24

Expiration Date: 2027-05-24

Revision No.: 0

Certificate of Analysis

| Test | Specification | Result |
|---|---------------|-------------|
| Assay ((CH ₃) ₂ CO) (by GC, corrected for water) | >= 99.4 % | 99.8 % |
| Color (APHA) | <= 10 | 5 |
| Residue after Evaporation | <= 1.0 ppm | 0.2 ppm |
| Substances Reducing Permanganate | Passes Test | Passes Test |
| Titration Acid (µeq/g) | <= 0.3 | 0.2 |
| Titration Base (µeq/g) | <= 0.6 | <0.1 |
| Water (H ₂ O) | <= 0.5 % | 0.2 % |
| FID-Sensitive Impurities (as 2-Octanol) Single Impurity Peak (ng/mL) | <= 5 | <1 |
| ECD Sensitive Impurities (as Heptachlor Epoxide) Single Peak (pg/mL) | <= 10 | 1 |

For Laboratory, Research, or Manufacturing Use

MEETS SPECIFICATIONS WITHIN THE EXPIRATION PERIOD

Country of Origin: United States

Packaging Site: Phillipsburg Mfg Ctr & DC

E 3827

Rec'd by RS on ~~11/8/24~~ 11/7/24

$\frac{RS}{11/7}$

Jamie Croak

Director Quality Operations, Bioscience Production

For questions on this Certificate of Analysis please contact Technical Services at 855.282.6867 or +1.610.386.1700

Avantor Performance Materials LLC

Methylene Chloride
ULTRA RESI-ANALYZED
For Organic Residue Analysis
(dichloromethane)

avantor™



Material No.: 9266-A4

Batch No.: 24J0862003

Manufactured Date: 2024-09-12

Expiration Date: 2025-12-12

Revision No.: 0

Certificate of Analysis

| Test | Specification | Result |
|--|----------------|------------|
| FID-Sensitive Impurities (as 2-Octanol) Single Impurity Peak (ng/mL) | ≤ 5 | 2 |
| ECD Sensitive Impurities (as HeptachlorEpoxide) Single Peak (pg/mL) | ≤ 10 | 1 |
| Assay (CH_2Cl_2) (by GC, exclusive of preservative, corrected for water) | $\geq 99.8\%$ | 100.0 % |
| Color (APHA) | ≤ 10 | 5 |
| Residue after Evaporation | ≤ 1.0 ppm | 0.2 ppm |
| Titration Acid ($\mu\text{eq/g}$) | ≤ 0.3 | < 0.1 |
| Chloride (Cl) | ≤ 10 ppm | < 5 ppm |
| Water (by KF, coulometric) | $\leq 0.02\%$ | $< 0.01\%$ |

For Laboratory, Research, or Manufacturing Use

MEETS SPECIFICATIONS WITHIN THE EXPIRATION PERIOD

Country of Origin: United States

Packaging Site: Phillipsburg Mfg Ctr & DC

E 3828

Jamie Croak
Director Quality Operations, Bioscience Production

For questions on this Certificate of Analysis please contact Technical Services at 855.282.6867 or +1.610.386.1700

Avantor Performance Materials LLC

Methylene Chloride
ULTRA RESI-ANALYZED
For Organic Residue Analysis
(dichloromethane)



Material No.: 9266-A4
Batch No.: 24K1762005
Manufactured Date: 2024-10-08
Expiration Date: 2026-01-07
Revision No.: 0

Certificate of Analysis

| Test | Specification | Result |
|--|----------------|-----------|
| FID-Sensitive Impurities (as 2-Octanol) Single Impurity Peak (ng/mL) | ≤ 5 | 1 |
| ECD Sensitive Impurities (as HeptachlorEpoxide) Single Peak (pg/mL) | ≤ 10 | 2 |
| Assay (CH_2Cl_2) (by GC, exclusive of preservative, corrected for water) | $\geq 99.8\%$ | 100.0 % |
| Color (APHA) | ≤ 10 | 5 |
| Residue after Evaporation | ≤ 1.0 ppm | 0.5 ppm |
| Titration Acid ($\mu\text{eq/g}$) | ≤ 0.3 | 0.0 |
| Chloride (Cl) | ≤ 10 ppm | < 5 ppm |
| Water (by KF, coulometric) | $\leq 0.02\%$ | 0.01 % |

For Laboratory, Research, or Manufacturing Use
MEETS SPECIFICATIONS WITHIN THE EXPIRATION PERIOD

Country of Origin: United States
Packaging Site: Phillipsburg Mfg Ctr & DC

E 3848

Jamie Croak
Director Quality Operations, Bioscience Production

For questions on this Certificate of Analysis please contact Technical Services at 855.282.6867 or +1.610.386.1700

Avantor Performance Materials, LLC

100 Matsonford Rd, Suite 200, Radnor, PA, 19087, U.S.A. Phone 610.386.1700



CERTIFIED REFERENCE MATERIAL

110 Benner Circle

Bellefonte, PA 16823-8812

Tel: (800)356-1688

Fax: (814)353-1309

www.restek.com

Certificate of Analysis



FOR LABORATORY USE ONLY-READ SDS PRIOR TO USE.

This Reference Material is intended for Laboratory Use Only as a standard for the qualitative and/or quantitative determination of the analyte(s) listed.

Catalog No. : 31266

Lot No.: A0186840

Description : Florida TRPH Standard

Florida TRPH Standard 500µg/mL, Hexane, 1mL/ampul

Container Size : 2 mL

Pkg Amt: > 1 mL

Expiration Date : July 31, 2029

Storage: 25°C nominal

Handling: Sonicate prior to use.

Ship: Ambient

CERTIFIED VALUES

| Elution Order | Compound | Grav. Conc. (weight/volume) | Expanded Uncertainty (95% C.L.; K=2) | |
|---------------|---|--------------------------------|--|---------------------------------|
| 1 | n-Octane (C8) CAS # 111-65-9 Purity 99% | 505.0 µg/mL | +/- 2.9995 µg/mL +/- 12.5465 µg/mL +/- 15.0390 µg/mL | Gravimetric Unstressed Stressed |
| 2 | n-Decane (C10) CAS # 124-18-5 Purity 99% | 503.0 µg/mL | +/- 2.9877 µg/mL +/- 12.4968 µg/mL +/- 14.9795 µg/mL | Gravimetric Unstressed Stressed |
| 3 | n-Dodecane (C12) CAS # 112-40-3 Purity 99% | 503.5 µg/mL | +/- 2.9906 µg/mL +/- 12.5092 µg/mL +/- 14.9944 µg/mL | Gravimetric Unstressed Stressed |
| 4 | n-Tetradecane (C14) CAS # 629-59-4 Purity 99% | 505.0 µg/mL | +/- 2.9995 µg/mL +/- 12.5465 µg/mL +/- 15.0390 µg/mL | Gravimetric Unstressed Stressed |
| 5 | n-Hexadecane (C16) CAS # 544-76-3 Purity 98% | 504.7 µg/mL | +/- 2.9978 µg/mL +/- 12.5390 µg/mL +/- 15.0301 µg/mL | Gravimetric Unstressed Stressed |
| 6 | n-Octadecane (C18) CAS # 593-45-3 Purity 97% | 504.4 µg/mL | +/- 2.9960 µg/mL +/- 12.5316 µg/mL +/- 15.0212 µg/mL | Gravimetric Unstressed Stressed |
| 7 | n-Eicosane (C20) CAS # 112-95-8 Purity 99% | 503.5 µg/mL | +/- 2.9906 µg/mL +/- 12.5092 µg/mL +/- 14.9944 µg/mL | Gravimetric Unstressed Stressed |

P11948 } 7.8
P11962 } 07/11/16

| | | | | | | |
|----|--|------------------|-------------|--|-------------------------|---------------------------------------|
| 8 | n-Docosane (C22) CAS # 629-97-0 Purity 99% | (Lot MKCL8918) | 504.5 µg/mL | +/- 2.9966 +/- 12.5340 +/- 15.0241 | µg/mL µg/mL µg/mL | Gravimetric Unstressed Stressed |
| 9 | n-Tetracosane (C24) CAS # 646-31-1 Purity 99% | (Lot MKCN2863) | 503.5 µg/mL | +/- 2.9906 +/- 12.5092 +/- 14.9944 | µg/mL µg/mL µg/mL | Gravimetric Unstressed Stressed |
| 10 | n-Hexacosane (C26) CAS # 630-01-3 Purity 99% | (Lot MKCD4540) | 504.0 µg/mL | +/- 2.9936 +/- 12.5216 +/- 15.0093 | µg/mL µg/mL µg/mL | Gravimetric Unstressed Stressed |
| 11 | n-Octacosane (C28) CAS # 630-02-4 Purity 99% | (Lot BCCG0084) | 504.5 µg/mL | +/- 2.9966 +/- 12.5340 +/- 15.0241 | µg/mL µg/mL µg/mL | Gravimetric Unstressed Stressed |
| 12 | n-Triacontane (C30) CAS # 638-68-6 Purity 99% | (Lot MKCN9321) | 505.0 µg/mL | +/- 2.9995 +/- 12.5465 +/- 15.0390 | µg/mL µg/mL µg/mL | Gravimetric Unstressed Stressed |
| 13 | n-Dotriacontane (C32) CAS # 544-85-4 Purity 99% | (Lot BCBW0661) | 505.0 µg/mL | +/- 2.9995 +/- 12.5465 +/- 15.0390 | µg/mL µg/mL µg/mL | Gravimetric Unstressed Stressed |
| 14 | n-Tetratriacontane (C34) CAS # 14167-59-0 Purity 99% | (Lot OML4N) | 504.5 µg/mL | +/- 2.9966 +/- 12.5340 +/- 15.0241 | µg/mL µg/mL µg/mL | Gravimetric Unstressed Stressed |
| 15 | n-Hexatriacontane (C36) CAS # 630-06-8 Purity 99% | (Lot U25B014) | 504.0 µg/mL | +/- 2.9936 +/- 12.5216 +/- 15.0093 | µg/mL µg/mL µg/mL | Gravimetric Unstressed Stressed |
| 16 | n-Octatriacontane (C38) CAS # 7194-85-6 Purity 97% | (Lot 0000127235) | 504.4 µg/mL | +/- 2.9960 +/- 12.5316 +/- 15.0212 | µg/mL µg/mL µg/mL | Gravimetric Unstressed Stressed |
| 17 | n-Tetracontane (C40) CAS # 4181-95-7 Purity 98% | (Lot PADGI) | 504.7 µg/mL | +/- 2.9978 +/- 12.5390 +/- 15.0301 | µg/mL µg/mL µg/mL | Gravimetric Unstressed Stressed |

Solvent: Hexane
CAS # 110-54-3
Purity 99%

Column:

30m x 0.25mm x 0.25µm
Rtx-5 (cat.#10223)

Carrier Gas:

hydrogen-constant pressure 10 psi.

Temp. Program:

40°C (hold 2 min.) to 330°C
@ 10°C/min. (hold 10 min.)

Inj. Temp:

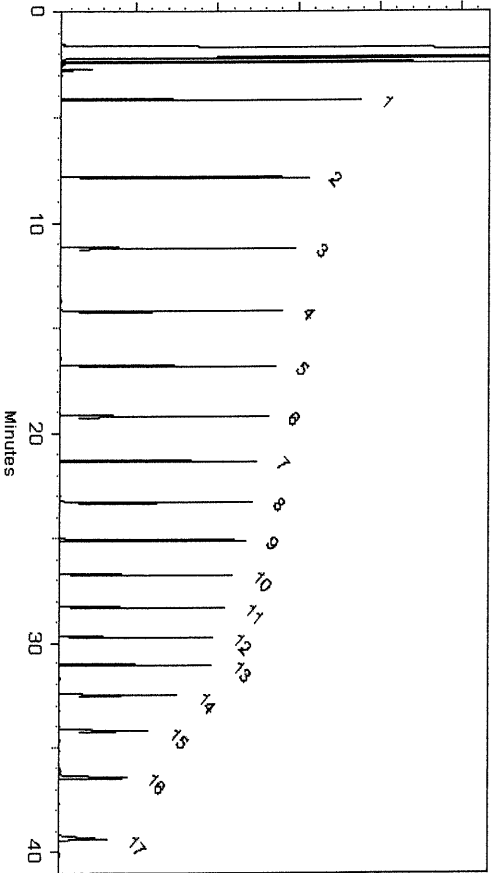
250°C

Det. Temp:

330°C

Det. Type:

FID



This chromatogram represents a general set of testing conditions chosen for product acceptance. For optimal results in your lab, conditions should be adjusted for your specific instrument, method, and application.

Brittany Federinko
Brittany Federinko - Operations Tech I

Date Mixed: 29-Jun-2022

Balance: 1128360905

Christie Mills
Christie Mills - Operations Tech II - ARM QC

Date Passed: 01-Jul-2022

Manufactured under Restek's ISO 9001:2015
Registered Quality System
Certificate #FM 80397

General Certified Reference Material Notes

Expiration Notes:

- Expiration date valid for unopened ampul stored in compliance with the recommended conditions.
- Uncertainty, concentration, and expiration of the CRM are based on the unopened product being stored according to the recommended condition found in the storage field.

Purity Notes:

- Purity and/or chemical identity are determined by one or more of the following techniques: GC/FID, HPLC, GC/μECD, GC/MS, LC/MS, RI, and/or melting point.
- Compounds with a listed purity of less than 99% have been weight corrected to compensate for impurities and/or salts. A correction factor is used to calculate the amount of compound necessary to achieve the desired concentration of the parent compound in solution.
- Purity of isomeric compounds is reported as the sum of the isomers.
- Purity values are rounded to the nearest whole number.

Certified Uncertainty Value Notes:

- The uncertainties are determined in accordance with ISO 17034 and Guide 35. The certified combined stressed uncertainty value (includes gravimetric uncertainty, homogeneity between-ampul uncertainty, storage stability uncertainty and shipping stability uncertainty and were combined using the following formula:

$$U_{combined\ stressed} = k \sqrt{U_{gravimetric}^2 + U_{homogeneity}^2 + U_{storage\ stability}^2 + U_{shipping\ stability}^2}$$

k is a coverage factor of 2, which gives a level of confidence of approximately 95%.

- It is important to note that the shipping stability uncertainty was obtained under temperature extremes for specific time intervals; therefore, the certified combined stressed uncertainty value should only be applied to the product if it was stored at non-standard temperature conditions up to and including 7 days. Contact Restek Technical Service at www.restek.com/Contact-US for use recommendations if your shipment was in-transit for more than 7 days at non-standard temperature conditions.
- Apply the certified combined unstressed uncertainty value if the product was received under standard shipping conditions. Apply the certified combined stressed uncertainty value if the product was received under non-standard conditions as specified below.

| Label Conditions | Standard Conditions | Non-Standard Conditions |
|---|---------------------|-------------------------|
| 25°C Nominal (Room Temperature) | < 60°C | ≥ 60°C up to 7 days |
| 10°C or colder (Refrigerate) | < 40°C | ≥ 40°C up to 7 days |
| 0°C or colder (Freezer) -20°C or colder (Deep Freezer) | < 25°C | ≥ 25°C up to 7 days |

- Separate (not combined) uncertainty values for gravimetric uncertainty are also displayed on the certificate, if needed, separate homogeneity between-ampul uncertainty, storage stability uncertainty and shipping stability uncertainty values are available by contacting Restek Technical Service at www.restek.com/Contact-US.
- The packaged amount is the minimum sample size for which uncertainty is valid. The ampules are over-filled to ensure that the minimum packaged amount can be sufficiently transferred.

Manufacturing Notes:

- Concentration is based upon gravimetric preparation using either a balance whose calibration has been verified daily using NIST traceable weights, and/or dilutions with Class A glassware.

Handling Notes:

- Stability of the unopened product, when stored in compliance with the recommended conditions, is guaranteed through the expiration displayed on the product label and certificate. Contact Restek for additional opened product stability information, with the knowledge/understanding that open product stability is subject to the specific handling and environmental conditions to which the product is exposed. For your convenience Restek supplies deactivated vials with most standards packed in 2mL ampules. Larger volume deactivated vials are available through Restek as a custom ordered item. Additionally, Restek sells DMDCS for the purpose of glassware deactivation as catalog number 31861, which includes complete instructions.



CERTIFIED REFERENCE MATERIAL

110 Benner Circle

Bellefonte, PA 16823-8812

Tel: (800)356-1688

Fax: (814)353-1309

www.restek.com

Certificate of Analysis



FOR LABORATORY USE ONLY-READ SDS PRIOR TO USE.

This Reference Material is intended for Laboratory Use Only as a standard for the qualitative and/or quantitative determination of the analyte(s) listed.

Catalog No. : 31266

Lot No.: A0186840

Description : Florida TRPH Standard

Florida TRPH Standard 500µg/mL, Hexane, 1mL/ampul

Container Size : 2 mL

Pkg Amt: > 1 mL

Expiration Date : July 31, 2029

Storage: 25°C nominal

Handling: Sonicate prior to use.

Ship: Ambient

CERTIFIED VALUES

| Elution Order | Compound | Grav. Conc. (weight/volume) | Expanded Uncertainty (95% C.L.; K=2) | |
|---------------|---|--------------------------------|--|---------------------------------|
| 1 | n-Octane (C8) CAS # 111-65-9 Purity 99% | 505.0 µg/mL | +/- 2.9995 µg/mL +/- 12.5465 µg/mL +/- 15.0390 µg/mL | Gravimetric Unstressed Stressed |
| 2 | n-Decane (C10) CAS # 124-18-5 Purity 99% | 503.0 µg/mL | +/- 2.9877 µg/mL +/- 12.4968 µg/mL +/- 14.9795 µg/mL | Gravimetric Unstressed Stressed |
| 3 | n-Dodecane (C12) CAS # 112-40-3 Purity 99% | 503.5 µg/mL | +/- 2.9906 µg/mL +/- 12.5092 µg/mL +/- 14.9944 µg/mL | Gravimetric Unstressed Stressed |
| 4 | n-Tetradecane (C14) CAS # 629-59-4 Purity 99% | 505.0 µg/mL | +/- 2.9995 µg/mL +/- 12.5465 µg/mL +/- 15.0390 µg/mL | Gravimetric Unstressed Stressed |
| 5 | n-Hexadecane (C16) CAS # 544-76-3 Purity 98% | 504.7 µg/mL | +/- 2.9978 µg/mL +/- 12.5390 µg/mL +/- 15.0301 µg/mL | Gravimetric Unstressed Stressed |
| 6 | n-Octadecane (C18) CAS # 593-45-3 Purity 97% | 504.4 µg/mL | +/- 2.9960 µg/mL +/- 12.5316 µg/mL +/- 15.0212 µg/mL | Gravimetric Unstressed Stressed |
| 7 | n-Eicosane (C20) CAS # 112-95-8 Purity 99% | 503.5 µg/mL | +/- 2.9906 µg/mL +/- 12.5092 µg/mL +/- 14.9944 µg/mL | Gravimetric Unstressed Stressed |

P11948 } 7.8
P11962 } 07/11/16

| | | | | | | |
|----|--|------------------|-------------|--|-------------------------|---------------------------------------|
| 8 | n-Docosane (C22) CAS # 629-97-0 Purity 99% | (Lot MKCL8918) | 504.5 µg/mL | +/- 2.9966 +/- 12.5340 +/- 15.0241 | µg/mL µg/mL µg/mL | Gravimetric Unstressed Stressed |
| 9 | n-Tetracosane (C24) CAS # 646-31-1 Purity 99% | (Lot MKCN2863) | 503.5 µg/mL | +/- 2.9906 +/- 12.5092 +/- 14.9944 | µg/mL µg/mL µg/mL | Gravimetric Unstressed Stressed |
| 10 | n-Hexacosane (C26) CAS # 630-01-3 Purity 99% | (Lot MKCD4540) | 504.0 µg/mL | +/- 2.9936 +/- 12.5216 +/- 15.0093 | µg/mL µg/mL µg/mL | Gravimetric Unstressed Stressed |
| 11 | n-Octacosane (C28) CAS # 630-02-4 Purity 99% | (Lot BCCG0084) | 504.5 µg/mL | +/- 2.9966 +/- 12.5340 +/- 15.0241 | µg/mL µg/mL µg/mL | Gravimetric Unstressed Stressed |
| 12 | n-Triacontane (C30) CAS # 638-68-6 Purity 99% | (Lot MKCN9321) | 505.0 µg/mL | +/- 2.9995 +/- 12.5465 +/- 15.0390 | µg/mL µg/mL µg/mL | Gravimetric Unstressed Stressed |
| 13 | n-Dotriacontane (C32) CAS # 544-85-4 Purity 99% | (Lot BCBW0661) | 505.0 µg/mL | +/- 2.9995 +/- 12.5465 +/- 15.0390 | µg/mL µg/mL µg/mL | Gravimetric Unstressed Stressed |
| 14 | n-Tetratriacontane (C34) CAS # 14167-59-0 Purity 99% | (Lot OML4N) | 504.5 µg/mL | +/- 2.9966 +/- 12.5340 +/- 15.0241 | µg/mL µg/mL µg/mL | Gravimetric Unstressed Stressed |
| 15 | n-Hexatriacontane (C36) CAS # 630-06-8 Purity 99% | (Lot U25B014) | 504.0 µg/mL | +/- 2.9936 +/- 12.5216 +/- 15.0093 | µg/mL µg/mL µg/mL | Gravimetric Unstressed Stressed |
| 16 | n-Octatriacontane (C38) CAS # 7194-85-6 Purity 97% | (Lot 0000127235) | 504.4 µg/mL | +/- 2.9960 +/- 12.5316 +/- 15.0212 | µg/mL µg/mL µg/mL | Gravimetric Unstressed Stressed |
| 17 | n-Tetracontane (C40) CAS # 4181-95-7 Purity 98% | (Lot PADGI) | 504.7 µg/mL | +/- 2.9978 +/- 12.5390 +/- 15.0301 | µg/mL µg/mL µg/mL | Gravimetric Unstressed Stressed |

Solvent: Hexane
CAS # 110-54-3
Purity 99%

Column:

30m x 0.25mm x 0.25µm
Rtx-5 (cat.#10223)

Carrier Gas:

hydrogen-constant pressure 10 psi.

Temp. Program:

40°C (hold 2 min.) to 330°C
@ 10°C/min. (hold 10 min.)

Inj. Temp:

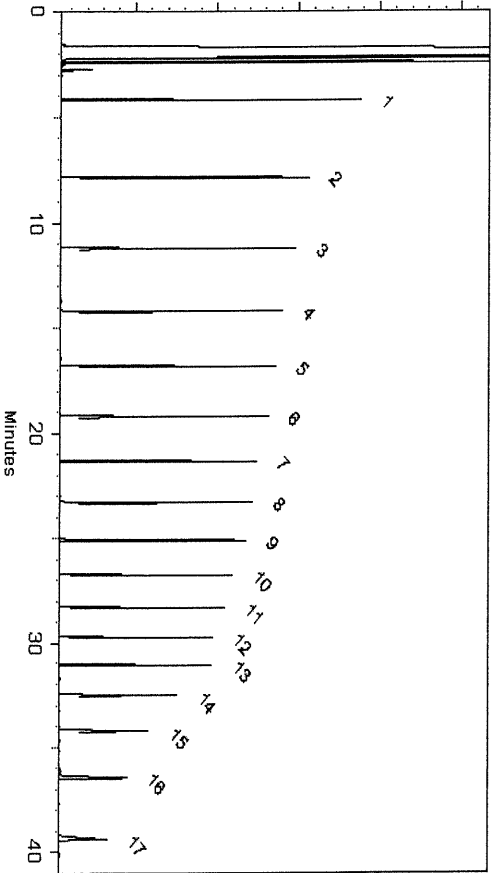
250°C

Det. Temp:

330°C

Det. Type:

FID



This chromatogram represents a general set of testing conditions chosen for product acceptance. For optimal results in your lab, conditions should be adjusted for your specific instrument, method, and application.

Brittany Federinko

Brittany Federinko - Operations Tech I

Date Mixed: 29-Jun-2022

Balance: 1128360905

Christie Mills

Christie Mills - Operations Tech II - ARM QC

Date Passed: 01-Jul-2022

Manufactured under Restek's ISO 9001:2015
Registered Quality System
Certificate #FM 80397

General Certified Reference Material Notes

Expiration Notes:

- Expiration date valid for unopened ampul stored in compliance with the recommended conditions.
- Uncertainty, concentration, and expiration of the CRM are based on the unopened product being stored according to the recommended condition found in the storage field.

Purity Notes:

- Purity and/or chemical identity are determined by one or more of the following techniques: GC/FID, HPLC, GC/μECD, GC/MS, LC/MS, RI, and/or melting point.
- Compounds with a listed purity of less than 99% have been weight corrected to compensate for impurities and/or salts. A correction factor is used to calculate the amount of compound necessary to achieve the desired concentration of the parent compound in solution.
- Purity of isomeric compounds is reported as the sum of the isomers.
- Purity values are rounded to the nearest whole number.

Certified Uncertainty Value Notes:

- The uncertainties are determined in accordance with ISO 17034 and Guide 35. The certified combined stressed uncertainty value (includes gravimetric uncertainty, homogeneity between-ampul uncertainty, storage stability uncertainty and shipping stability uncertainty and were combined using the following formula:

$$U_{combined\ stressed} = k \sqrt{U_{gravimetric}^2 + U_{homogeneity}^2 + U_{storage\ stability}^2 + U_{shipping\ stability}^2}$$

k is a coverage factor of 2, which gives a level of confidence of approximately 95%.

- It is important to note that the shipping stability uncertainty was obtained under temperature extremes for specific time intervals; therefore, the certified combined stressed uncertainty value should only be applied to the product if it was stored at non-standard temperature conditions up to and including 7 days. Contact Restek Technical Service at www.restek.com/Contact-US for use recommendations if your shipment was in-transit for more than 7 days at non-standard temperature conditions.
- Apply the certified combined unstressed uncertainty value if the product was received under standard shipping conditions. Apply the certified combined stressed uncertainty value if the product was received under non-standard conditions as specified below.

| Label Conditions | Standard Conditions | Non-Standard Conditions |
|---|---------------------|-------------------------|
| 25°C Nominal (Room Temperature) | < 60°C | ≥ 60°C up to 7 days |
| 10°C or colder (Refrigerate) | < 40°C | ≥ 40°C up to 7 days |
| 0°C or colder (Freezer) -20°C or colder (Deep Freezer) | < 25°C | ≥ 25°C up to 7 days |

- Separate (not combined) uncertainty values for gravimetric uncertainty are also displayed on the certificate, if needed, separate homogeneity between-ampul uncertainty, storage stability uncertainty and shipping stability uncertainty values are available by contacting Restek Technical Service at www.restek.com/Contact-US.
- The packaged amount is the minimum sample size for which uncertainty is valid. The ampules are over-filled to ensure that the minimum packaged amount can be sufficiently transferred.

Manufacturing Notes:

- Concentration is based upon gravimetric preparation using either a balance whose calibration has been verified daily using NIST traceable weights, and/or dilutions with Class A glassware.

Handling Notes:

- Stability of the unopened product, when stored in compliance with the recommended conditions, is guaranteed through the expiration displayed on the product label and certificate. Contact Restek for additional opened product stability information, with the knowledge/understanding that open product stability is subject to the specific handling and environmental conditions to which the product is exposed. For your convenience Restek supplies deactivated vials with most standards packed in 2mL ampules. Larger volume deactivated vials are available through Restek as a custom ordered item. Additionally, Restek sells DMDCS for the purpose of glassware deactivation as catalog number 31861, which includes complete instructions.



110 Benner Circle
Bellefonte, PA 16823-8812
Tel: 1-814-353-1300
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CERTIFIED REFERENCE MATERIAL

Certificate of Analysis

chromatographic plus



FOR LABORATORY USE ONLY-READ SDS PRIOR TO USE.

This Reference Material is intended for Laboratory Use Only as a standard for the qualitative and/or quantitative determination of the analyte(s) listed.

Catalog No. : 31266 **Lot No.:** A0204859

Description : Florida TRPH Standard

Florida TRPH Standard 500µg/mL, Hexane, 1mL/ampul

Container Size : 2 mL **Pkg Amt:** > 1 mL

Expiration Date : December 31, 2030 **Storage:** 25°C nominal

Handling: Sonicate prior to use. **Ship:** Ambient

P13103 } Y.P.
↓
P13112 } 01/12/2024

CERTIFIED VALUES

| Elution Order | Compound | CAS # | Lot # | Purity | Grav. Conc. (weight/volume) | Expanded Uncertainty * (95% C.L.; K=2) |
|---------------|--------------------------|------------|------------|--------|-----------------------------|--|
| 1 | n-Octane (C8) | 111-65-9 | SHBP9758 | 99% | 504.4 µg/mL | +/- 13.0305 |
| 2 | n-Decane (C10) | 124-18-5 | SHBQ1342 | 99% | 503.6 µg/mL | +/- 13.0098 |
| 3 | n-Dodecane (C12) | 112-40-3 | SHBP7054 | 99% | 503.6 µg/mL | +/- 13.0098 |
| 4 | n-Tetradecane (C14) | 629-59-4 | STBK5437 | 99% | 504.0 µg/mL | +/- 13.0201 |
| 5 | n-Hexadecane (C16) | 544-76-3 | SHBP8192 | 99% | 504.0 µg/mL | +/- 13.0201 |
| 6 | n-Octadecane (C18) | 593-45-3 | UE5NG | 98% | 504.1 µg/mL | +/- 13.0230 |
| 7 | n-Eicosane (C20) | 112-95-8 | MKCN8767 | 97% | 504.0 µg/mL | +/- 13.0204 |
| 8 | n-Docosane (C22) | 629-97-0 | MKQC3882 | 99% | 503.6 µg/mL | +/- 13.0098 |
| 9 | n-Tetracosane (C24) | 646-31-1 | MKQC8345 | 99% | 504.0 µg/mL | +/- 13.0201 |
| 10 | n-Hexacosane (C26) | 630-01-3 | MKQC4814 | 99% | 504.0 µg/mL | +/- 13.0201 |
| 11 | n-Octacosane (C28) | 630-02-4 | BCCG0084 | 99% | 504.0 µg/mL | +/- 13.0201 |
| 12 | n-Triacontane (C30) | 638-68-6 | MKQC9436 | 97% | 504.0 µg/mL | +/- 13.0204 |
| 13 | n-Dotriacontane (C32) | 544-85-4 | BCBW0661 | 99% | 504.0 µg/mL | +/- 13.0201 |
| 14 | n-Tetratriacontane (C34) | 14167-59-0 | OML4N | 99% | 504.4 µg/mL | +/- 13.0305 |
| 15 | n-Hexatriacontane (C36) | 630-06-8 | Z27H018 | 99% | 504.0 µg/mL | +/- 13.0201 |
| 16 | n-Octatriacontane (C38) | 7194-85-6 | 0000145137 | 96% | 503.8 µg/mL | +/- 13.0152 |
| 17 | n-Tetracontane (C40) | 4181-95-7 | OKEGA | 99% | 503.6 µg/mL | +/- 13.0098 |

Solvent: Hexane
CAS # 110-54-3
Purity 99%

Quality Confirmation Test

Column:
30m x 0.25mm x 0.25µm
Rtx-5 (cat.#10223)

Carrier Gas:
hydrogen-constant pressure 10 psi.

Temp. Program:
40°C (hold 2 min.) to 330°C
@ 10°C/min. (hold 10 min.)

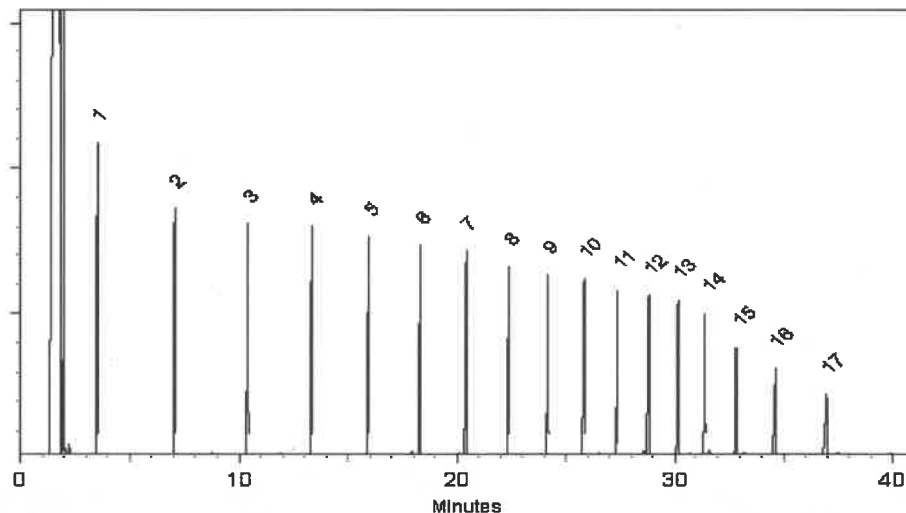
Inj. Temp:
250°C

Det. Temp:
330°C

Det. Type:
FID

Split Vent:
2 ml/min.

Inj. Vol
1µl



This chromatogram represents a general set of testing conditions chosen for product acceptance. For optimal results in your lab, conditions should be adjusted for your specific instrument, method, and application.


Dakota Parson - Operations Technician I

Date Mixed: 29-Nov-2023

Balance Serial # B442140311


Jennifer Pollino - Operations Tech III - ARM QC

Date Passed: 01-Dec-2023

Manufactured under Restek's ISO 9001:2015
Registered Quality System
Certificate #FM 80397

General Certified Reference Material Notes

Expiration Notes:

- Expiration date valid for unopened ampul stored in compliance with the recommended conditions.
- Uncertainty, concentration, and expiration of the CRM are based on the unopened product being stored according to the recommended condition found in the storage field.

Purity Notes:

- Purity and/or chemical identity are determined by one or more of the following techniques: GC/FID, HPLC, GC/ μ ECD, GC/MS, LC/MS, RI, and/or melting point.
- Compounds with a listed purity of less than 99% have been weight corrected to compensate for impurities and/or salts. A correction factor is used to calculate the amount of compound necessary to achieve the desired concentration of the parent compound in solution.
- Purity of isomeric compounds is reported as the sum of the isomers.
- Purity values are rounded to the nearest whole number.

Certified Uncertainty Value Notes:

- The uncertainties are determined in accordance with ISO 17034 and Guide 35. The certified expanded uncertainty value includes gravimetric uncertainty, homogeneity between-ampul uncertainty, storage stability uncertainty and shipping stability uncertainty and were combined using the following formula:

$$U_{combined\ uncertainty} = k \sqrt{u_{gravimetric}^2 + u_{homogeneity}^2 + u_{storage\ stability}^2 + u_{shipping\ stability}^2}$$

k is a coverage factor of 2, which gives a level of confidence of approximately 95%.

- The packaged amount is the minimum sample size for which uncertainty is valid. The ampuls are over-filled to ensure that the minimum packaged amount can be sufficiently transferred.

Manufacturing Notes:

- Concentration is based upon gravimetric preparation using either a balance whose calibration has been verified daily using NIST traceable weights, and/or dilutions with Class A glassware.

Handling Notes:

- Stability of the unopened product, when stored in compliance with the recommended conditions, is guaranteed through the expiration displayed on the product label and certificate. Contact Restek for additional opened product stability information, with the knowledge/understanding that open product stability is subject to the specific handling and environmental conditions to which the product is exposed. For your convenience Restek supplies deactivated vials with most standards packed in 2mL ampuls. Larger volume deactivated vials are available through Restek as a custom ordered item. Additionally, Restek sells DMDCS for the purpose of glassware deactivation as catalog number 31861, which includes complete instructions.
- If any undissolved material is visible inside the ampul, sonicate the unopened ampul until the material is completely dissolved.



110 Benner Circle
Bellefonte, PA 16823-8812
Tel: 1-814-353-1300
Fax: 1-814-353-1309

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CERTIFIED REFERENCE MATERIAL

Certificate of Analysis

chromatographic plus



FOR LABORATORY USE ONLY-READ SDS PRIOR TO USE.

This Reference Material is intended for Laboratory Use Only as a standard for the qualitative and/or quantitative determination of the analyte(s) listed.

Catalog No. : 31266 **Lot No.:** A0204859

Description : Florida TRPH Standard

Florida TRPH Standard 500µg/mL, Hexane, 1mL/ampul

Container Size : 2 mL **Pkg Amt:** > 1 mL

Expiration Date : December 31, 2030 **Storage:** 25°C nominal

Handling: Sonicate prior to use. **Ship:** Ambient

P13103 } Y.P.
↓
P13112 } 01/12/2024

CERTIFIED VALUES

| Elution Order | Compound | CAS # | Lot # | Purity | Grav. Conc. (weight/volume) | Expanded Uncertainty * (95% C.L.; K=2) |
|---------------|--------------------------|------------|------------|--------|-----------------------------|--|
| 1 | n-Octane (C8) | 111-65-9 | SHBP9758 | 99% | 504.4 µg/mL | +/- 13.0305 |
| 2 | n-Decane (C10) | 124-18-5 | SHBQ1342 | 99% | 503.6 µg/mL | +/- 13.0098 |
| 3 | n-Dodecane (C12) | 112-40-3 | SHBP7054 | 99% | 503.6 µg/mL | +/- 13.0098 |
| 4 | n-Tetradecane (C14) | 629-59-4 | STBK5437 | 99% | 504.0 µg/mL | +/- 13.0201 |
| 5 | n-Hexadecane (C16) | 544-76-3 | SHBP8192 | 99% | 504.0 µg/mL | +/- 13.0201 |
| 6 | n-Octadecane (C18) | 593-45-3 | UE5NG | 98% | 504.1 µg/mL | +/- 13.0230 |
| 7 | n-Eicosane (C20) | 112-95-8 | MKCN8767 | 97% | 504.0 µg/mL | +/- 13.0204 |
| 8 | n-Docosane (C22) | 629-97-0 | MKCQ3882 | 99% | 503.6 µg/mL | +/- 13.0098 |
| 9 | n-Tetracosane (C24) | 646-31-1 | MKCQ8345 | 99% | 504.0 µg/mL | +/- 13.0201 |
| 10 | n-Hexacosane (C26) | 630-01-3 | MKCQ4814 | 99% | 504.0 µg/mL | +/- 13.0201 |
| 11 | n-Octacosane (C28) | 630-02-4 | BCCG0084 | 99% | 504.0 µg/mL | +/- 13.0201 |
| 12 | n-Triacontane (C30) | 638-68-6 | MKCQ9436 | 97% | 504.0 µg/mL | +/- 13.0204 |
| 13 | n-Dotriacontane (C32) | 544-85-4 | BCBW0661 | 99% | 504.0 µg/mL | +/- 13.0201 |
| 14 | n-Tetratriacontane (C34) | 14167-59-0 | OML4N | 99% | 504.4 µg/mL | +/- 13.0305 |
| 15 | n-Hexatriacontane (C36) | 630-06-8 | Z27H018 | 99% | 504.0 µg/mL | +/- 13.0201 |
| 16 | n-Octatriacontane (C38) | 7194-85-6 | 0000145137 | 96% | 503.8 µg/mL | +/- 13.0152 |
| 17 | n-Tetracontane (C40) | 4181-95-7 | OKEGA | 99% | 503.6 µg/mL | +/- 13.0098 |

Solvent: Hexane
CAS # 110-54-3
Purity 99%

Quality Confirmation Test

Column:
30m x 0.25mm x 0.25µm
Rtx-5 (cat.#10223)

Carrier Gas:
hydrogen-constant pressure 10 psi.

Temp. Program:
40°C (hold 2 min.) to 330°C
@ 10°C/min. (hold 10 min.)

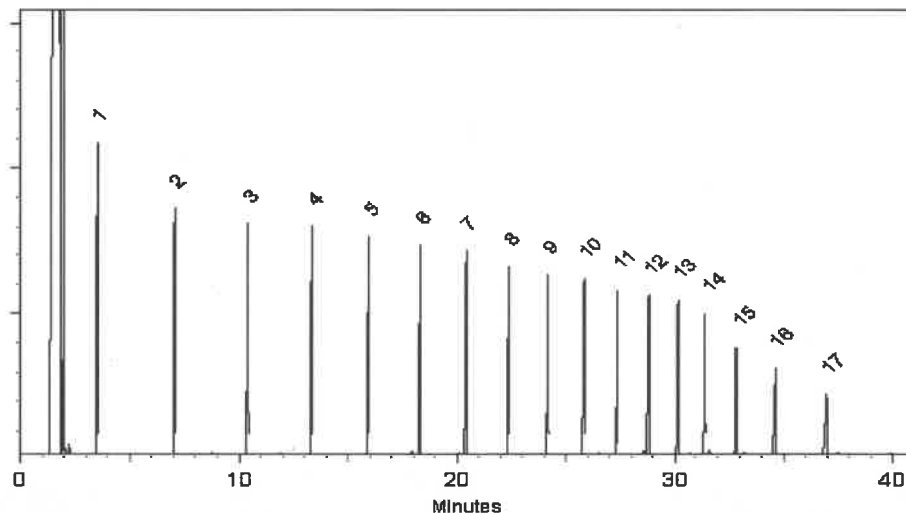
Inj. Temp:
250°C

Det. Temp:
330°C

Det. Type:
FID

Split Vent:
2 ml/min.

Inj. Vol
1µl



This chromatogram represents a general set of testing conditions chosen for product acceptance. For optimal results in your lab, conditions should be adjusted for your specific instrument, method, and application.


Dakota Parson - Operations Technician I

Date Mixed: 29-Nov-2023

Balance Serial # B442140311


Jennifer Pollino - Operations Tech III - ARM QC

Date Passed: 01-Dec-2023

Manufactured under Restek's ISO 9001:2015
Registered Quality System
Certificate #FM 80397

General Certified Reference Material Notes

Expiration Notes:

- Expiration date valid for unopened ampul stored in compliance with the recommended conditions.
- Uncertainty, concentration, and expiration of the CRM are based on the unopened product being stored according to the recommended condition found in the storage field.

Purity Notes:

- Purity and/or chemical identity are determined by one or more of the following techniques: GC/FID, HPLC, GC/ μ ECD, GC/MS, LC/MS, RI, and/or melting point.
- Compounds with a listed purity of less than 99% have been weight corrected to compensate for impurities and/or salts. A correction factor is used to calculate the amount of compound necessary to achieve the desired concentration of the parent compound in solution.
- Purity of isomeric compounds is reported as the sum of the isomers.
- Purity values are rounded to the nearest whole number.

Certified Uncertainty Value Notes:

- The uncertainties are determined in accordance with ISO 17034 and Guide 35. The certified expanded uncertainty value includes gravimetric uncertainty, homogeneity between-ampul uncertainty, storage stability uncertainty and shipping stability uncertainty and were combined using the following formula:

$$U_{combined\ uncertainty} = k \sqrt{u_{gravimetric}^2 + u_{homogeneity}^2 + u_{storage\ stability}^2 + u_{shipping\ stability}^2}$$

k is a coverage factor of 2, which gives a level of confidence of approximately 95%.

- The packaged amount is the minimum sample size for which uncertainty is valid. The ampuls are over-filled to ensure that the minimum packaged amount can be sufficiently transferred.

Manufacturing Notes:

- Concentration is based upon gravimetric preparation using either a balance whose calibration has been verified daily using NIST traceable weights, and/or dilutions with Class A glassware.

Handling Notes:

- Stability of the unopened product, when stored in compliance with the recommended conditions, is guaranteed through the expiration displayed on the product label and certificate. Contact Restek for additional opened product stability information, with the knowledge/understanding that open product stability is subject to the specific handling and environmental conditions to which the product is exposed. For your convenience Restek supplies deactivated vials with most standards packed in 2mL ampuls. Larger volume deactivated vials are available through Restek as a custom ordered item. Additionally, Restek sells DMDCS for the purpose of glassware deactivation as catalog number 31861, which includes complete instructions.
- If any undissolved material is visible inside the ampul, sonicate the unopened ampul until the material is completely dissolved.



CERTIFIED WEIGHT REPORT

Part Number:
Lot Number:
Description:

72072
101122
n-Tetracosane-d50

Solvent(s):
Methylene chloride

Lot#
105345

Expiration Date:
Recommended Storage:
Nominal Concentration (µg/mL):
NIST Test ID#:

101132
Ambient (20 °C)
1000
6UTB

5E-05 Balance Uncertainty
0.058 Flask Uncertainty

Weight(s) shown below were combined and diluted to (mL):

200.0

| Compound | Lot | Nominal | Purity | Uncertainty | Assay | Target | Actual | Expanded | | SDS Information | | |
|----------|--------|--------------|--------|-------------|-------|-----------|-----------|--------------|---------------|--|------|----------------|
| | | | | | | | | Conc (µg/mL) | Purity (%) | (Solvent Safety Info. On Attached pg.) | CAS# | OSHA PEL (TWA) |
| RM# | Number | Conc (µg/mL) | (%) | | (%D) | Weight(g) | Weight(g) | Conc (µg/mL) | (+/-) (µg/mL) | | | |

1. n-Tetracosane-d50

2072 PR-26606

1000

98.7

0.2

99.0

0.20471

0.20482

1000.6

4.1

16416-32-3

N/A

N/A

Method GC8MSD-3.M: Column:SPB-5 (30m X 0.25mm ID X 0.25µm film thickness) Temp 1 = 50°C (1min.), Temp 2 = 300°C (9min.), Rate = 10°C/min., Injector B= 250°C, Detector B = 275°C, Split Ratio = 100:1, Scan Rate = 2. Analysis performed by: Candice Warren.

FIGURE 1: TETRACOSANE-D50

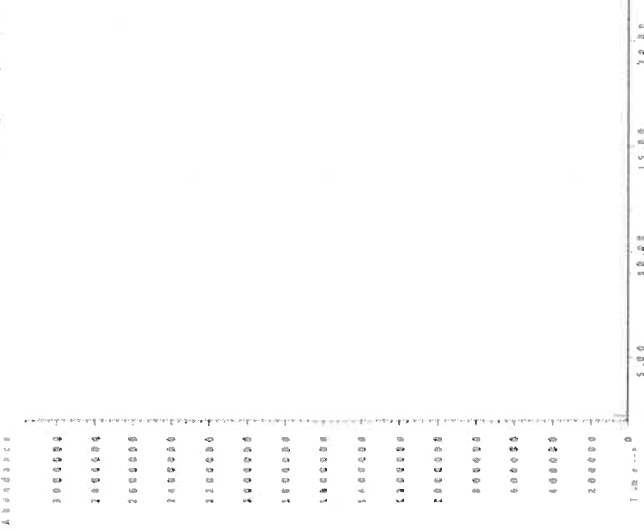
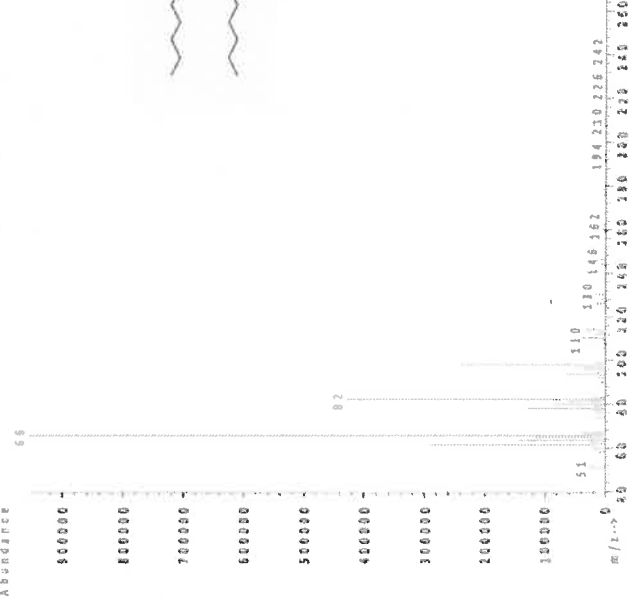


FIGURE 2: TETRACOSANE-D50



P13205
↓
P13214
A3
61/17/24

The certified value is the concentration calculated from gravimetric and volumetric measurements unless otherwise stated.
Standards are prepared gravimetrically using balances that are calibrated with weights traceable to NIST (see above).
Standards are certified (+/-) 0.5% of the stated value, unless otherwise stated.
All Standards, after opening ampule, should be stored with caps tight and under appropriate laboratory conditions.
Uncertainty Reference: Taylor, B.N. and Kuyat, C.E., "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Result," NIST Technical Note 1297, U.S. Government Printing Office, Washington, DC, (1994).



5580 Skylane Blvd
Santa Rosa, CA 95403
(707)525-5788
(800)878-7654 Toll Free
(707)545-7901 Fax

Manufacturer's Quality System
Audited & Registered
by TUV USA to ISO 9001:2015

Date Received: _____

Certificate of Analysis

Page 1 of 1

Catalog No.: Lot No.: Storage:

Z-110400-05 514983 ≤-10 Degrees C

Solvent:

Hexane

Exp. Date:

11/20/2028

Description:

TRPH Standard (C8-C40), 500 mg/L, 1 ml

-01

Compound

CAS No.

Purity (%)

Compound Lot No.

Concentration, mg/L

decane (C10)

124-18-5

99.7

415.7.2P

498.5 ± 6.92

docosane (C22)

629-97-0

98.8

420.9.1P

499.4 ± 6.93

dodecane (C12)

112-40-3

99.7

416.9.3P

502 ± 6.97

dotriacontane (C32)

544-85-4

97

425.9.2.2P

499.6 ± 8.53

eicosane (C20)

112-95-8

99.8

419.7.1P

501 ± 6.95

hexacosane (C26)

630-01-3

99.3

422.7.2.1P

501 ± 6.95

hexatriacontane (C36)

630-06-8

98

427.29.1.1P

499.3 ± 8.53

n-hexadecane (C16)

544-76-3

99.45

368.27.1.1P

498.7 ± 6.91

octacosane (C28)

630-02-4

99.1

423.24.1P

500.5 ± 6.95

n-octadecane (C18)

593-45-3

99.5

418.29.1P

499.5 ± 6.92

octane (C8)

111-65-9

99.4

385.7.2.1P

498.5 ± 6.92

octatriacontane (C38)

7194-85-6

95

428.1.2P

500.2 ± 6.94

tetracontane (C40)

4181-95-7

97

429.7.2P

499.6 ± 6.93

n-tetracosane (C24)

646-31-1

99.5

421.7.1P

499.5 ± 6.93

n-tetradecane (C14)

629-59-4

99.3

417.9.1P

500 ± 6.94

tetatriacontane (C34)

14167-59-0

96.1

426.7.2.2P

499.7 ± 8.53

triacontane (C30)

638-68-6

99.5

424.7.1.1P

500 ± 6.94

Let the standard warm to room temperature and sonicate before opening.

P13215

↓

P13224

AJ
01131124

*Not a certified value

Andrea Schaible

Certified By: _____
Andrea Schaible
Chemist

All weights are traceable through N. I. S. T. Test No. 822/264157-00.
Concentration (correct for purity) and uncertainty (95% confidence) values
listed are determined gravimetrically.



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Manufacturer's Quality System
Audited & Registered
by TUV USA to ISO 9001:2015

Date Received: _____

Certificate of Analysis

Page 1 of 1

Catalog No.: Lot No.: Storage:

Z-110400-05 514983 ≤-10 Degrees C

Solvent:

Hexane

Exp. Date:

11/20/2028

Description:

TRPH Standard (C8-C40), 500 mg/L, 1 ml

-01

Compound

CAS No.

Purity (%)

Compound Lot No.

Concentration, mg/L

decane (C10)

124-18-5

99.7

415.7.2P

498.5 ± 6.92

docosane (C22)

629-97-0

98.8

420.9.1P

499.4 ± 6.93

dodecane (C12)

112-40-3

99.7

416.9.3P

502 ± 6.97

dotriacontane (C32)

544-85-4

97

425.9.2.2P

499.6 ± 8.53

eicosane (C20)

112-95-8

99.8

419.7.1P

501 ± 6.95

hexacosane (C26)

630-01-3

99.3

422.7.2.1P

501 ± 6.95

hexatriacontane (C36)

630-06-8

98

427.29.1.1P

499.3 ± 8.53

n-hexadecane (C16)

544-76-3

99.45

368.27.1.1P

498.7 ± 6.91

octacosane (C28)

630-02-4

99.1

423.24.1P

500.5 ± 6.95

n-octadecane (C18)

593-45-3

99.5

418.29.1P

499.5 ± 6.92

octane (C8)

111-65-9

99.4

385.7.2.1P

498.5 ± 6.92

octatriacontane (C38)

7194-85-6

95

428.1.2P

500.2 ± 6.94

tetracontane (C40)

4181-95-7

97

429.7.2P

499.6 ± 6.93

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500 ± 6.94

tetratriacontane (C34)

14167-59-0

96.1

426.7.2.2P

499.7 ± 8.53

triacontane (C30)

638-68-6

99.5

424.7.1.1P

500 ± 6.94

Let the standard warm to room temperature and sonicate before opening.

P13215

↓

P13224

AJ
01131124

*Not a certified value

Andrea Schaible

Certified By: _____
Andrea Schaible
Chemist

All weights are traceable through N. I. S. T. Test No. 822/264157-00.
Concentration (correct for purity) and uncertainty (95% confidence) values
listed are determined gravimetrically.

ABSOLUTE STANDARDS, INC.

ISO - 17034



Certificate of Analysis



Certified Reference Material (CRM)

Conformance: The "Certificate of Analysis" is applicable for CRM's, fulfilling the requirements in the current version of: ISO 17034.

Health & Safety: See the attached SDS & Certified Weight Report before use.

Intended Use: This Certified Reference Material (CRM) is intended primarily for use in the characterization of unknowns and the establishment of analyzer or instrument response factors by qualified personnel. Typical instrumental organic assays include: GC & LC, and inorganic assays include: ICP & AA. This product is for laboratory use only.

Characterization Values: In production, gravimetric/volumetric readings are certified to be within $\pm 0.5\%$ of the stated value & are valid between 18 °C & 30 °C. The measured characterization of uncertainty can be found on the Certified Weight Report. All product weighings are performed on an analytical balance that is calibrated to NIST Traceable standard weights & certified by the manufacturer. The volumetric glassware used is Class "A" type & conforms to ASTM E-288 unless otherwise stated. The solvents & compounds used are of the highest practical purity & typically meet or exceed ACS Reagent Grade & ACS Standards Grade specifications. The expanded uncertainty field on Certified Wt. Report represents CRM uncertainty as described in ISO 17034.

Homogeneity: Uncertainties that are due to the analytical procedure(s) are within $\pm 5\%$ unless specifically stated on the Certified Wt. Report.

Verification: Uncertainties that are due to the analytical procedure(s) are within $\pm 5\%$ unless specifically stated on the Certified Wt. Report.

Stability: Uncertainties for short-term stability are determined in accordance with ISO 17034. Long-term stability is determined in accordance with ISO 17034. The shelf life is limited by the stated expiration for each product. Expiration dates and additional technical information can be found on the Certified Weight Report and on the product label.

Uncertainty: UCRM is the expanded uncertainty which utilizes a $K = 2$ (coverage factor of 2), in accordance with ISO 17034 as listed above (Characterization, Homogeneity, Verification, and Stability).

Purity & Identity: Organic solutions are typically formulated from neat materials whose purity & identity have been characterized by GC-MSD & LC-PDA techniques with comparison to a NIST Traceable library of mass spectra when available. Additional characterization techniques may include but are not limited to: refractive index measurements of liquids, melting point measurements of solids, & GC-FID, ECD, PID, ELCD, LC-PDA measurements for purity. Inorganic solutions & neats are typically formulated from materials whose purity & identity have been characterized by ICPMS with comparison to a NIST SRM® when available. Additional characterization techniques may include but are not limited to: titrimetry, and densitometry.

Storage: Sealed ampules and other containers should be stored in the dark and at temperatures indicated on the Certified Weight Report or product label. Certification by Absolute Standards, Inc. is typically valid for 3 years from the date of manufacture. Each product will show its own expiration date as the limit of certification. Certified values are not applicable to opened ampules or for any materials stored in re-sealable containers. Please see the "Certified Weight Report" for specific values and any exceptions.

Usage: Ampules & bottles should be brought to room temperature (18 to 30 °C) before opening. Sonication may be required for high concentration solutions or solutions that may precipitate during storage. After opening, care should be exercised to avoid concentration changes owing to evaporation of the solvent or essential components. We recommend that a suitable re-sealable container be available before opening an ampule to decant the standard for short-term storage and use.

Minimum Sample Size: 0.5 uL for analytical applications.

Legal Notice: Warranty of products are as described when shipped. No warranty as to fitness for any particular application is expressed or implied. Errant shipments and/or quality claims must be made within 10 days of receipt. Liability is limited solely to the replacement of the product or refund of purchase price.

Certifying Officer: Stephen J. Arpie, M.S., Director General

Page 1 of 2



Absolute Standards, Inc. • 44 Rossotto Drive • Hamden, CT 06514
Voice: 800-368-1131 • Fax: 800-410-2577 • eMail: StephenArpie@AbsoluteStandards.com
Document Identification: Certificate of Analysis Rev 14, Date Issued: 05/30/2019



ABSOLUTE STANDARDS, INC.

ISO - 17034

Understanding the Certified Weight Report

Each Certified Reference Material (CRM) is supported by a Certified Weight Report. Assigned values for concentrations and associated uncertainties are based upon NIST traceable masses & volumes used in production.

Absolute Standards, Inc.
800-368-1131
www.absolutestandards.com

Certified Reference Material CRM

ISO 17034 Accredited
Scope: http://AbsoluteStandards.com

CERTIFIED WEIGHT REPORT

Part # 10009R
Lot # 070716
Shelf Life Description: CLP Priority Pollutant Internal Standards
GC/MS Calibration - 6 components
070721
Expiration Date: Ambient (20 °C)
Recommended Storage: 4000
Nominal Concentration (µg/mL): 822-275872-11
NIST Test ID#: 5E-05 Balance Uncertainty
0.058 Mass Uncertainty

Solvent(s): Methylene chloride
Lot# 78782

Formulated By: Paul Barron
Reviewed By: Pedro L. Rentes

070716
070716

Weight(s) shown below were combined and diluted to (mL): 500.0

| Compound | SMW | Lot Number | Nominal Conc (µg/mL) | Purity (%) | Uncertainty Purity | Target Weight (µg) | Actual Weight (µg) | Actual Conc (µg/mL) | Expanded Uncertainty (µg/mL) | CAS# | MSDS Information (Solvent Safety Info. On Attached pg.) | OSHA PEL (TWA) | LD50 |
|---------------------------|-----|-------------------|----------------------|------------|--------------------|--------------------|--------------------|---------------------|------------------------------|------------|---|----------------|------|
| 1. 1,4-Dichlorobenzene-d4 | 118 | PR-1845M07287CB1 | 4000 | 98 | 0.2 | 2.04093 | 2.04335 | 4004.7 | 15.4 | 2055-02-1 | N/A | en-ra 500mg/kg | |
| 2. Naphthalene-d8 | 223 | PR-2339M031612HP1 | 4000 | 99 | 0.2 | 2.02032 | 2.02084 | 4001.0 | 15.2 | 1146-85-2 | 10 ppm (50mg/m3RH) | en-ra 400mg/kg | |
| 3. Acenaphthene-d10 | 2 | PR-25444 | 4000 | 99 | 0.2 | 2.02032 | 2.02245 | 4004.2 | 15.2 | 15067-28-2 | N/A | en-ra 500mg/kg | |
| 4. Phenanthrene-d10 | 248 | PR-2305M081711PM1 | 4000 | 98 | 0.2 | 2.04093 | 2.04135 | 4000.8 | 15.4 | 1517-25-2 | N/A | N/A | |
| 5. Chrysene-d12 | 92 | I-19290 | 4000 | 98 | 0.2 | 2.04093 | 2.04150 | 4001.3 | 15.4 | 1719-03-5 | N/A | N/A | |
| 6. Perylene-d12 | 247 | PR-24113 | 4000 | 98 | 0.2 | 2.04093 | 2.04155 | 4001.2 | 15.4 | 1503-58-3 | N/A | N/A | |

Run 35, "P10009R L070716 [4000µg/mL in MeCl2]"
Run Length: 40.00 min, 23900 points at 10 points/second.
Created: Sat, Jul 9, 2016 at 1:54:53 PM.
Sampled: Sequence "070716-GC/MS", Method "GC-MS".
Analyzed using Method "GC-MS".

Comments:
GC-MS Analysis by Melissa Siciric
Column ID SPB-5 30 meter x 0.53mm x 1.5um Film Thickness.
Flow rates: Total Flow = 300 mL/min, Helium (carrier) = 0.5 mL, Helium (make-up) = 25 mL.
Hydrogen (detector) = 30 mL, Air (detector) = 300 mL, Oven Temp 1 = 50°C (1 min).
Rise = 10°C/min, Oven Temp 2 = 300°C (14 min). Total Run Time = 40 Minutes. Injector Temp = 250°C.
FID Temp = 300°C, FID Signal = aDaq Channel 1.
Gas Chromatograph = HP 5890, Auto Sampler = HP 7673, Standard Injection = 0.5 µL, Range = 4

Peak No. Name FID RT (min)

| | | |
|---|------------------------|-------|
| 1 | 1,4-Dichlorobenzene-d4 | 8.34 |
| 2 | Naphthalene-d8 | 8.98 |
| 3 | Acenaphthene-d10 | 12.97 |
| 4 | Phenanthrene-d10 | 16.37 |
| 5 | Chrysene-d12 | 22.62 |
| 6 | Perylene-d12 | 25.75 |

Printed: 5/8/2019, 12:55:50 PM

Part # 10009R Lot # 041219 1 of 2

Formulator
Reviewer

Actual
Concentration
Uncertainty
Values

Health &
Safety

3rd Party
Comparison

For More Information, Contact:

StephenArpie@AbsoluteStandards.com

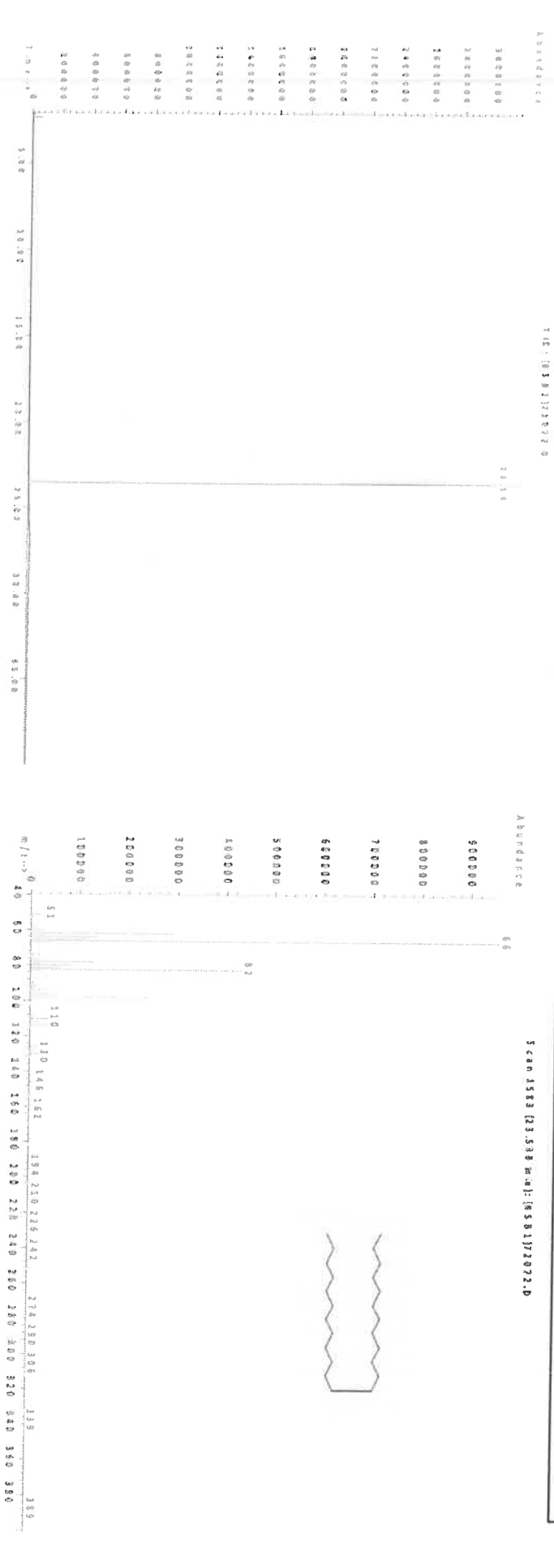
Page 2 of 2



CERTIFIED WEIGHT REPORT

| | | | | |
|---|--|---------------------------------------|--|--------------------|
| Part Number: 72072 | | Solvent(s): Methylene chloride | | Lot# 105345 |
| Lot Number: 101122 | | | | |
| Description: n-Tetracosane-d50 | | | | |
| Expiration Date: 101132 | | | | |
| Recommended Storage: Ambient (20 °C) | | | | |
| Nominal Concentration (µg/mL): 1000 | | | | |
| NIST Test ID#: 6UB3 | | | | |
| Weight(s) shown below were combined and diluted to (mL): 200.0 | | Balance Uncertainty 5E-05 | | |
| | | Flask Uncertainty 0.058 | | |
| <div>Handwritten: 13437, 13496, 07/24/24, Y.F.</div> | | | | |
| Formulated By: Prashant Chauhan | | DATE 101122 | | |
| Reviewed By: Pedro L. Rentas | | DATE 101122 | | |

| Compound | | RM# | Lot Number | Nominal Conc (µg/mL) | Purity (%) | Uncertainty Purity (%) | Assay (%D) | Target Weight(g) | Actual Weight(g) | Actual Conc (µg/mL) | Expanded Uncertainty (+/-) (µg/mL) | SDS Information (Solvent Safety Info. On Attached pg.) | LD50 |
|--|--|------|------------|----------------------|------------|------------------------|------------|------------------|------------------|---------------------|------------------------------------|--|------|
| 1. n-Tetracosane-d50 | | 2072 | PR-26606 | 1000 | 98.7 | 0.2 | 99.0 | 0.20471 | 0.20482 | 1000.6 | 4.1 | 16416-32-3 | N/A |
| Method GC8MSD-3.M: Column:SPB-5 (30m X 0.25mm ID X 0.25µm film thickness) Temp 1 = 50°C (1min.), Temp 2 = 300°C (9min.), Rate = 10°C/min., Injector B= 250°C, Detector B = 275°C, Split Ratio = 100:1, Scan Rate = 2. Analysis performed by: Candice Warren. | | | | | | | | | | | | | |



• The certified value is the concentration calculated from gravimetric and volumetric measurements unless otherwise stated.
• Standards are prepared gravimetrically using balances that are calibrated with weights traceable to NIST (see above).
• Standards are certified (+/-) 0.5% of the stated value, unless otherwise stated.
• All Standards, after opening ampule, should be stored with caps tight and under appropriate laboratory conditions.
• Uncertainty References: Taylor, B.N., and Kuyat, C.E., "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results," NIST Technical Note 1297, U.S. Government Printing Office, Washington, DC, (1994).

ABSOLUTE STANDARDS, INC.

ISO - 17034



Certificate of Analysis



Certified Reference Material (CRM)

Conformance: The "Certificate of Analysis" is applicable for CRM's, fulfilling the requirements in the current version of: ISO 17034.

Health & Safety: See the attached SDS & Certified Weight Report before use.

Intended Use: This Certified Reference Material (CRM) is intended primarily for use in the characterization of unknowns and the establishment of analyzer or instrument response factors by qualified personnel. Typical instrumental organic assays include: GC & LC, and inorganic assays include: ICP & AA. This product is for laboratory use only.

Characterization Values: In production, gravimetric/volumetric readings are certified to be within $\pm 0.5\%$ of the stated value & are valid between 18 °C & 30 °C. The measured characterization of uncertainty can be found on the Certified Weight Report. All product weighings are performed on an analytical balance that is calibrated to NIST Traceable standard weights & certified by the manufacturer. The volumetric glassware used is Class "A" type & conforms to ASTM E-288 unless otherwise stated. The solvents & compounds used are of the highest practical purity & typically meet or exceed ACS Reagent Grade & ACS Standards Grade specifications. The expanded uncertainty field on Certified Wt. Report represents CRM uncertainty as described in ISO 17034.

Homogeneity: Uncertainties that are due to the analytical procedure(s) are within $\pm 5\%$ unless specifically stated on the Certified Wt. Report.

Verification: Uncertainties that are due to the analytical procedure(s) are within $\pm 5\%$ unless specifically stated on the Certified Wt. Report.

Stability: Uncertainties for short-term stability are determined in accordance with ISO 17034. Long-term stability is determined in accordance with ISO 17034. The shelf life is limited by the stated expiration for each product. Expiration dates and additional technical information can be found on the Certified Weight Report and on the product label.

Uncertainty: UCRM is the expanded uncertainty which utilizes a $K = 2$ (coverage factor of 2), in accordance with ISO 17034 as listed above (Characterization, Homogeneity, Verification, and Stability).

Purity & Identity: Organic solutions are typically formulated from neat materials whose purity & identity have been characterized by GC-MSD & LC-PDA techniques with comparison to a NIST Traceable library of mass spectra when available. Additional characterization techniques may include but are not limited to: refractive index measurements of liquids, melting point measurements of solids, & GC-FID, ECD, PID, ELCD, LC-PDA measurements for purity. Inorganic solutions & neats are typically formulated from materials whose purity & identity have been characterized by ICPMS with comparison to a NIST SRM® when available. Additional characterization techniques may include but are not limited to: titrimetry, and densitometry.

Storage: Sealed ampules and other containers should be stored in the dark and at temperatures indicated on the Certified Weight Report or product label. Certification by Absolute Standards, Inc. is typically valid for 3 years from the date of manufacture. Each product will show its own expiration date as the limit of certification. Certified values are not applicable to opened ampules or for any materials stored in re-sealable containers. Please see the "Certified Weight Report" for specific values and any exceptions.

Usage: Ampules & bottles should be brought to room temperature (18 to 30 °C) before opening. Sonication may be required for high concentration solutions or solutions that may precipitate during storage. After opening, care should be exercised to avoid concentration changes owing to evaporation of the solvent or essential components. We recommend that a suitable re-sealable container be available before opening an ampule to decant the standard for short-term storage and use.

Minimum Sample Size: 0.5 uL for analytical applications.

Legal Notice: Warranty of products are as described when shipped. No warranty as to fitness for any particular application is expressed or implied. Errant shipments and/or quality claims must be made within 10 days of receipt. Liability is limited solely to the replacement of the product or refund of purchase price.

Certifying Officer: Stephen J. Arpie, M.S., Director General

Page 1 of 2



Absolute Standards, Inc. • 44 Rossotto Drive • Hamden, CT 06514
Voice: 800-368-1131 • Fax: 800-410-2577 • eMail: StephenArpie@AbsoluteStandards.com
Document Identification: Certificate of Analysis Rev 14, Date Issued: 05/30/2019



ABSOLUTE STANDARDS, INC.

ISO - 17034

Understanding the Certified Weight Report

Each Certified Reference Material (CRM) is supported by a Certified Weight Report. Assigned values for concentrations and associated uncertainties are based upon NIST traceable masses & volumes used in production.

Absolute Standards, Inc.
800-368-1131
www.absolutestandards.com

Certified Reference Material CRM

ISO 17034 Accredited
Scope: http://AbsoluteStandards.com

CERTIFIED WEIGHT REPORT

Part # 10009R
Lot # 070716
Shelf Life Description: CLP Priority Pollutant Internal Standards
GC/MS Calibration - 6 components
070721
Expiration Date: Ambient (20 °C)
Recommended Storage: 4000
Nominal Concentration (µg/mL): 822-275872-11
NIST Test ID#: 5E-05 Balance Uncertainty
0.058 Mass Uncertainty

Solvent(s): Methylene chloride
Lot# 78782

Formulated By: Paul Barron
Reviewed By: Pedro L. Rentes

070716
070716

Weight(s) shown below were combined and diluted to (mL): 500.0

| Compound | SMW | Lot Number | Nominal Conc (µg/mL) | Purity (%) | Uncertainty Purity | Target Weight (µg) | Actual Weight (µg) | Actual Conc (µg/mL) | Expanded Uncertainty (µg/mL) | CAS# | MSDS Information (Solvent Safety Info. On Attached pg.) | OSHA PEL (TWA) | LD50 |
|---------------------------|-----|-------------------|----------------------|------------|--------------------|--------------------|--------------------|---------------------|------------------------------|------------|---|----------------|-----------------|
| 1. 1,4-Dichlorobenzene-d4 | 118 | PR-1845M07287CB1 | 4000 | 98 | 0.2 | 2.04093 | 2.04335 | 4004.7 | 15.4 | 2055-02-1 | N/A | N/A | or-rat 500mg/kg |
| 2. Naphthalene-d8 | 223 | PR-2339M031612HP1 | 4000 | 99 | 0.2 | 2.02032 | 2.02084 | 4001.0 | 15.2 | 1146-85-2 | 10 ppm (50mg/m3/8h) | N/A | or-rat 400mg/kg |
| 3. Acenaphthene-d10 | 2 | PR-25444 | 4000 | 99 | 0.2 | 2.02032 | 2.02245 | 4004.2 | 15.2 | 15067-28-2 | N/A | N/A | or-rat 500mg/kg |
| 4. Phenanthrene-d10 | 248 | PR-2305M081711PM1 | 4000 | 98 | 0.2 | 2.04093 | 2.04135 | 4000.8 | 15.4 | 1517-25-2 | N/A | N/A | N/A |
| 5. Chrysene-d12 | 92 | I-19290 | 4000 | 98 | 0.2 | 2.04093 | 2.04150 | 4001.3 | 15.4 | 1719-03-5 | N/A | N/A | N/A |
| 6. Perylene-d12 | 247 | PR-24113 | 4000 | 98 | 0.2 | 2.04093 | 2.04155 | 4001.2 | 15.4 | 1503-58-3 | N/A | N/A | N/A |

Run 35, "P10009R L070716 [4000µg/mL in MeCl2]"
Run Length: 40.00 min, 23900 points at 10 points/second.
Created: Sat, Jul 9, 2016 at 1:54:53 PM.
Sampled: Sequence "070716-GC/MS", Method "GC-MS".
Analyzed using Method "GC-MS".

Comments:
GC-MS Analysis by Melissa Siciric
Column ID SPB-5 30 meter x 0.53mm x 1.5um Film Thickness.
Flow rates: Total Flow = 300 mL/min, Helium (carrier) = 0.5 mL, Helium (make-up) = 25 mL.
Hydrogen (detector) = 30 mL, Air (detector) = 300 mL, Oven Temp 1 = 50°C (1 min).
Rise = 10°C/min, Oven Temp 2 = 300°C (14 min). Total Run Time = 40 Minutes. Injector Temp = 250°C.
FID Temp = 300°C, FID Signal = sData Channel 1.
Gas Chromatograph = HP 5890, Auto Sampler = HP 7673, Standard Injection = 0.5 µL, Range = 4

Peak No. Name FID RT (min)

| | | |
|---|------------------------|-------|
| 1 | 1,4-Dichlorobenzene-d4 | 8.34 |
| 2 | Naphthalene-d8 | 8.98 |
| 3 | Acenaphthene-d10 | 12.97 |
| 4 | Phenanthrene-d10 | 16.37 |
| 5 | Chrysene-d12 | 22.62 |
| 6 | Perylene-d12 | 25.75 |

Printed: 5/8/2019, 12:55:50 PM

Formulator
Reviewer

Actual
Concentration
Uncertainty
Values

Health &
Safety

3rd Party
Comparison

For More Information, Contact:

StephenArpie@AbsoluteStandards.com

Page 2 of 2



CERTIFIED WEIGHT REPORT

Part Number: 72072
Lot Number: 101122
Description: n-Tetracosane-d50

Solvent(s): Methylene chloride **Lot#** 105345

Expiration Date: 101132
Recommended Storage: Ambient (20 °C)
Nominal Concentration (µg/mL): 1000
NIST Test ID#: 6UB3
Weight(s) shown below were combined and diluted to (mL): 200.0 **Balance Uncertainty** 5E-05 **Flask Uncertainty** 0.058

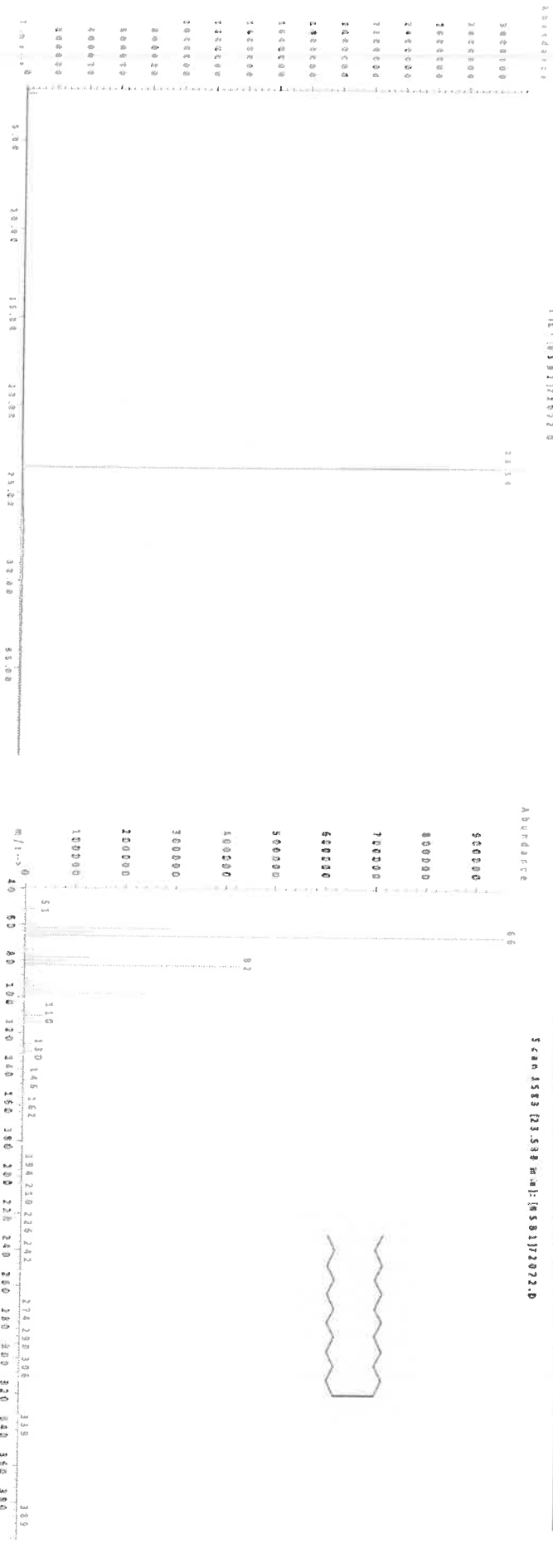
Handwritten: P13437 } x.f.
P13496 } 07/24/24

| | |
|---|---------------|
| Formulated By: <i>Prashant Chauhan</i> | 101122 |
| Reviewed By: <i>Pedro L. Rentas</i> | 101122 |
| DATE | DATE |

| SDS Information | | | | | | | | | | | | | | |
|---------------------------------------|-----|--------|--------------|-----|--------|------|-------------|-----------|--------------|---------------|--------|----------------|--------|--|
| Expanded | | | | | | | | | | | | | | |
| Solvent Safety Info. On Attached pg.) | | | | | | | | | | | | | | |
| Compound | Lot | | Nominal | | Purity | | Uncertainty | | Assay | | Target | | Actual | |
| | RM# | Number | Conc (µg/mL) | (%) | Purity | (%D) | Weight(g) | Weight(g) | Conc (µg/mL) | (+/-) (µg/mL) | CAS# | OSHA PEL (TWA) | LD50 | |

1. n-Tetracosane-d50 2072 PR-26606 1000 98.7 0.2 99.0 0.20471 0.20482 1000.6 4.1 16416-32-3 N/A N/A

Method GC8MSD-3.M: Column:SPB-5 (30m X 0.25mm ID X 0.25µm film thickness) Temp 1 = 50°C (1min.), Temp 2 = 300°C (9min.), Rate = 10°C/min., Injector B = 250°C, Detector B = 275°C, Split Ratio = 100:1, Scan Rate = 2. Analysis performed by: Candice Warren.



• The certified value is the concentration calculated from gravimetric and volumetric measurements unless otherwise stated.
• Standards are prepared gravimetrically using balances that are calibrated with weights traceable to NIST (see above).
• Standards are certified (+/-) 0.5% of the stated value, unless otherwise stated.
• All Standards, after opening ampule, should be stored with caps tight and under appropriate laboratory conditions.
• Uncertainty References: Taylor, B.N., and Kuyat, C.E., "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results," NIST Technical Note 1297, U.S. Government Printing Office, Washington, DC, (1996).

ABSOLUTE STANDARDS, INC.

ISO - 17034



Certificate of Analysis



Certified Reference Material (CRM)

Conformance: The "Certificate of Analysis" is applicable for CRM's, fulfilling the requirements in the current version of: ISO 17034.

Health & Safety: See the attached SDS & Certified Weight Report before use.

Intended Use: This Certified Reference Material (CRM) is intended primarily for use in the characterization of unknowns and the establishment of analyzer or instrument response factors by qualified personnel. Typical instrumental organic assays include: GC & LC, and inorganic assays include: ICP & AA. This product is for laboratory use only.

Characterization Values: In production, gravimetric/volumetric readings are certified to be within $\pm 0.5\%$ of the stated value & are valid between 18 °C & 30 °C. The measured characterization of uncertainty can be found on the Certified Weight Report. All product weighings are performed on an analytical balance that is calibrated to NIST Traceable standard weights & certified by the manufacturer. The volumetric glassware used is Class "A" type & conforms to ASTM E-288 unless otherwise stated. The solvents & compounds used are of the highest practical purity & typically meet or exceed ACS Reagent Grade & ACS Standards Grade specifications. The expanded uncertainty field on Certified Wt. Report represents CRM uncertainty as described in ISO 17034.

Homogeneity: Uncertainties that are due to the analytical procedure(s) are within $\pm 5\%$ unless specifically stated on the Certified Wt. Report.

Verification: Uncertainties that are due to the analytical procedure(s) are within $\pm 5\%$ unless specifically stated on the Certified Wt. Report.

Stability: Uncertainties for short-term stability are determined in accordance with ISO 17034. Long-term stability is determined in accordance with ISO 17034. The shelf life is limited by the stated expiration for each product. Expiration dates and additional technical information can be found on the Certified Weight Report and on the product label.

Uncertainty: UCRM is the expanded uncertainty which utilizes a $K = 2$ (coverage factor of 2), in accordance with ISO 17034 as listed above (Characterization, Homogeneity, Verification, and Stability).

Purity & Identity: Organic solutions are typically formulated from neat materials whose purity & identity have been characterized by GC-MSD & LC-PDA techniques with comparison to a NIST Traceable library of mass spectra when available. Additional characterization techniques may include but are not limited to: refractive index measurements of liquids, melting point measurements of solids, & GC-FID, ECD, PID, ELCD, LC-PDA measurements for purity. Inorganic solutions & neats are typically formulated from materials whose purity & identity have been characterized by ICPMS with comparison to a NIST SRM® when available. Additional characterization techniques may include but are not limited to: titrimetry, and densitometry.

Storage: Sealed ampules and other containers should be stored in the dark and at temperatures indicated on the Certified Weight Report or product label. Certification by Absolute Standards, Inc. is typically valid for 3 years from the date of manufacture. Each product will show its own expiration date as the limit of certification. Certified values are not applicable to opened ampules or for any materials stored in re-sealable containers. Please see the "Certified Weight Report" for specific values and any exceptions.

Usage: Ampules & bottles should be brought to room temperature (18 to 30 °C) before opening. Sonication may be required for high concentration solutions or solutions that may precipitate during storage. After opening, care should be exercised to avoid concentration changes owing to evaporation of the solvent or essential components. We recommend that a suitable re-sealable container be available before opening an ampule to decant the standard for short-term storage and use.

Minimum Sample Size: 0.5 uL for analytical applications.

Legal Notice: Warranty of products are as described when shipped. No warranty as to fitness for any particular application is expressed or implied. Errant shipments and/or quality claims must be made within 10 days of receipt. Liability is limited solely to the replacement of the product or refund of purchase price.

Certifying Officer: Stephen J. Arpie, M.S., Director General

Page 1 of 2



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Voice: 800-368-1131 • Fax: 800-410-2577 • eMail: StephenArpie@AbsoluteStandards.com
Document Identification: Certificate of Analysis Rev 14, Date Issued: 05/30/2019



ABSOLUTE STANDARDS, INC.

ISO - 17034



Understanding the Certified Weight Report



Each Certified Reference Material (CRM) is supported by a Certified Weight Report. Assigned values for concentrations and associated uncertainties are based upon NIST traceable masses & volumes used in production.

Absolute Standards, Inc.
800-368-1131
www.absolutestandards.com

Certified Reference Material CRM

ISO 17034 Accredited
Scope: http://AbsoluteStandards.com

CERTIFIED WEIGHT REPORT

Part # 10009R
Lot # 070716
Description: CLP Priority Pollutant Internal Standards
GC/MS Calibration - 6 components
070721
Expiration Date:
Recommended Storage: Ambient (20 °C)
Nominal Concentration (µg/mL): 4000
NIST Test ID#: 822-275872-11
Weight(s) shown below were combined and diluted to (mL): 500.0

Solvent(s): Methylene chloride
Lot# 78782

Formulated By: Paul Barron
Reviewed By: Pedro L. Rentes

070716
070716

MSDS Information
(Solvent Safety Info. On Attached pg.)

| Compound | SMW | Lot Number | Nominal Conc (µg/mL) | Purity (%) | Uncertainty (%) | Target Weight (µg) | Actual Weight (µg) | Actual Conc (µg/mL) | Expanded Uncertainty (µg/mL) | CAS# | OSHA PEL (TWA) | LD50 |
|---------------------------|-----|-------------------|----------------------|------------|-----------------|--------------------|--------------------|---------------------|------------------------------|------------|---------------------|-----------------|
| 1. 1,4-Dichlorobenzene-d4 | 118 | PR-1845M07287CB1 | 4000 | 98 | 0.2 | 2.04093 | 2.04335 | 4004.7 | 15.4 | 2055-02-1 | N/A | or-rat 500mg/kg |
| 2. Naphthalene-d8 | 223 | PR-2339M031612HP1 | 4000 | 99 | 0.2 | 2.02032 | 2.02084 | 4001.0 | 15.2 | 1146-85-2 | 10 ppm (50mg/m3/8h) | or-rat 400mg/kg |
| 3. Acenaphthene-d10 | 2 | PR-25444 | 4000 | 99 | 0.2 | 2.02032 | 2.02245 | 4004.2 | 15.2 | 15067-28-2 | N/A | or-rat 500mg/kg |
| 4. Phenanthrene-d10 | 248 | PR-2305M081711PM1 | 4000 | 98 | 0.2 | 2.04093 | 2.04135 | 4000.8 | 15.4 | 1517-25-2 | N/A | N/A |
| 5. Chrysene-d12 | 92 | I-19280 | 4000 | 98 | 0.2 | 2.04093 | 2.04150 | 4001.3 | 15.4 | 1719-03-5 | N/A | N/A |
| 6. Perylene-d12 | 247 | PR-24113 | 4000 | 98 | 0.2 | 2.04093 | 2.04155 | 4001.2 | 15.4 | 1503-58-3 | N/A | N/A |

Run 35, "P10009R L070716 [4000µg/mL in MeCl2]"
Run Length: 40.00 min, 23900 points at 10 points/second.
Created: Sat, Jul 9, 2016 at 1:54:53 PM.
Sampled: Sequence "070716-GC/MS", Method "GC-MS".
Analyzed using Method "GC-MS".

Comments:
GC-MS Analysis by Melissa Siciric
Column ID SPB-5 30 meter x 0.53mm x 1.5um Film Thickness.
Flow rates: Total Flow = 300 mL/min, Helium (carrier) = 0.5 mL, Helium (make-up) = 25 mL.
Hydrogen (detector) = 30 mL, Air (detector) = 300 mL, Oven Temp 1 = 50°C (1 min).
Rise = 10°C/min, Oven Temp 2 = 300°C (14 min), Total Run Time = 40 Minutes, Injector Temp = 250°C.
FID Temp = 300°C, FID Signal = sData Channel 1.
Gas Chromatograph = HP 5890, Auto Sampler = HP 7673, Standard Injection = 0.5 µL, Range = 4

| Peak No. | Name | FID RT (min) |
|----------|------------------------|--------------|
| 1 | 1,4-Dichlorobenzene-d4 | 6.34 |
| 2 | Naphthalene-d8 | 8.98 |
| 3 | Acenaphthene-d10 | 12.97 |
| 4 | Phenanthrene-d10 | 16.37 |
| 5 | Chrysene-d12 | 22.62 |
| 6 | Perylene-d12 | 25.75 |

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Formulator
Reviewer

Actual
Concentration
Uncertainty
Values

Health &
Safety

3rd Party
Comparison

For More Information, Contact:

StephenArpie@AbsoluteStandards.com

Page 2 of 2



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Voice: 800-368-1131 • Fax: 800-410-2577 • eMail: StephenArpie@AbsoluteStandards.com
Document Identification: Certificate of Analysis Rev 14, Date Issued: 05/30/2019





CERTIFIED WEIGHT REPORT

Part Number: **72072**
Lot Number: **101122**
Description: **n-Tetracosane-d50**

Solvent(s):
Methylene chloride
Lot#
105345

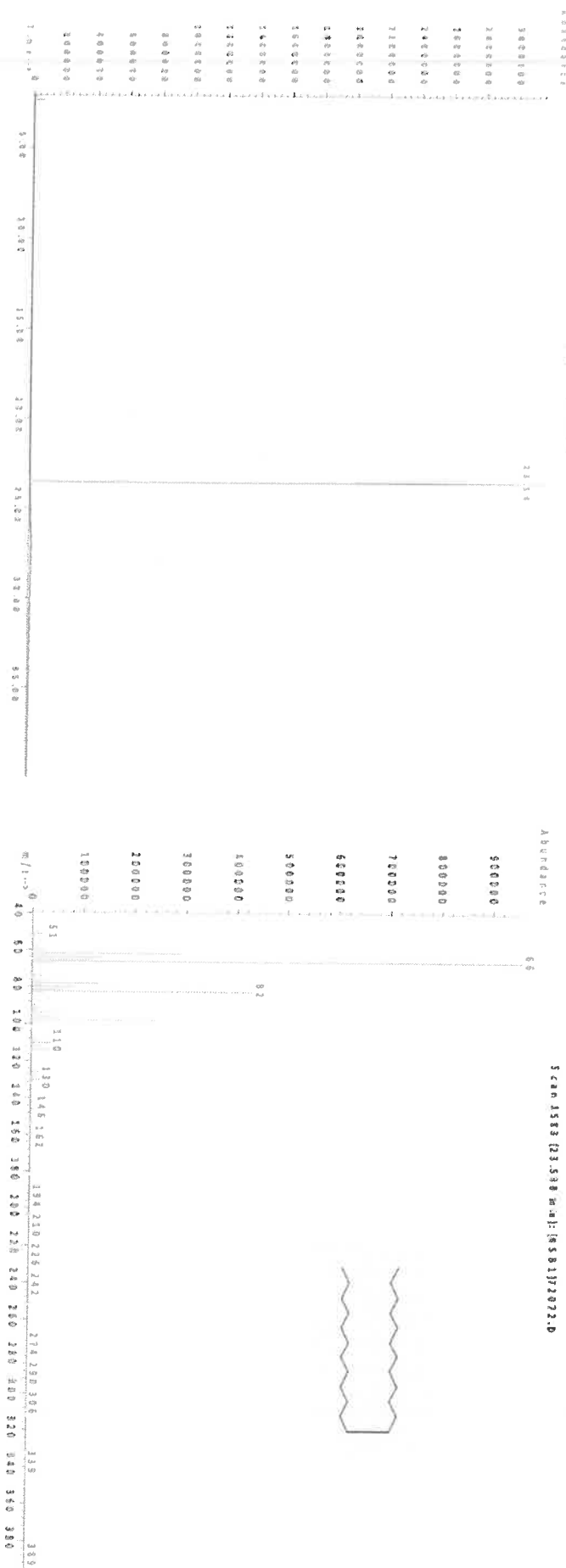
Expiration Date: **101132**
Recommended Storage: **Ambient (20 °C)**
Nominal Concentration (µg/mL): **1000**
NIST Test ID#: **6UB3**
Weight(s) shown below were combined and diluted to (mL): **200.0**
5E-05 Balance Uncertainty
0.058 Flask Uncertainty

P13437
13436
07/24/24
X.F.

| | | |
|----------------|-------------------------|--------|
| Formulated By: | <i>Prashant Chauhan</i> | 101122 |
| Reviewed By: | <i>Pedro L. Rentas</i> | 101122 |
| DATE | | |

| Compound | RM# | Lot Number | Nominal Conc (µg/mL) | Purity (%) | Uncertainty Purity (%) | Assay (%D) | Target Weight(g) | Actual Weight(g) | Actual Conc (µg/mL) | Expanded Uncertainty (+/-) (µg/mL) | SDS Information (Solvent Safety Info. On Attached pg.) | LD50 |
|----------------------|------|------------|----------------------|------------|------------------------|------------|------------------|------------------|---------------------|------------------------------------|--|------|
| 1. n-Tetracosane-d50 | 2072 | PR-26606 | 1000 | 98.7 | 0.2 | 99.0 | 0.20471 | 0.20482 | 1000.6 | 4.1 | 16416-32-3 | N/A |

Method GC8MSD-3.M: Column:SPB-5 (30m X 0.25mm ID X 0.25µm film thickness) Temp 1 = 50°C (1min.), Temp 2 = 300°C (9min.), Rate = 10°C/min., Injector B = 250°C, Detector B = 275°C, Split Ratio = 100:1, Scan Rate = 2. Analysis performed by: Candice Warren.



- The certified value is the concentration calculated from gravimetric and volumetric measurements unless otherwise stated.
- Standards are prepared gravimetrically using balances that are calibrated with weights traceable to NIST (see above).
- Standards are certified (+/-) 0.5% of the stated value, unless otherwise stated.
- All Standards, after opening ampule, should be stored with caps tight and under appropriate laboratory conditions.
- Uncertainty Reference: Taylor, B.N., and Kuyat, C.E., "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results," NIST Technical Note 1297, U.S. Government Printing Office, Washington, DC, (1994).

ABSOLUTE STANDARDS, INC.

ISO - 17034



Certificate of Analysis



Certified Reference Material (CRM)

Conformance: The "Certificate of Analysis" is applicable for CRM's, fulfilling the requirements in the current version of: ISO 17034.

Health & Safety: See the attached SDS & Certified Weight Report before use.

Intended Use: This Certified Reference Material (CRM) is intended primarily for use in the characterization of unknowns and the establishment of analyzer or instrument response factors by qualified personnel. Typical instrumental organic assays include: GC & LC, and inorganic assays include: ICP & AA. This product is for laboratory use only.

Characterization Values: In production, gravimetric/volumetric readings are certified to be within $\pm 0.5\%$ of the stated value & are valid between 18 °C & 30 °C. The measured characterization of uncertainty can be found on the Certified Weight Report. All product weighings are performed on an analytical balance that is calibrated to NIST Traceable standard weights & certified by the manufacturer. The volumetric glassware used is Class "A" type & conforms to ASTM E-288 unless otherwise stated. The solvents & compounds used are of the highest practical purity & typically meet or exceed ACS Reagent Grade & ACS Standards Grade specifications. The expanded uncertainty field on Certified Wt. Report represents CRM uncertainty as described in ISO 17034.

Homogeneity: Uncertainties that are due to the analytical procedure(s) are within $\pm 5\%$ unless specifically stated on the Certified Wt. Report.

Verification: Uncertainties that are due to the analytical procedure(s) are within $\pm 5\%$ unless specifically stated on the Certified Wt. Report.

Stability: Uncertainties for short-term stability are determined in accordance with ISO 17034. Long-term stability is determined in accordance with ISO 17034. The shelf life is limited by the stated expiration for each product. Expiration dates and additional technical information can be found on the Certified Weight Report and on the product label.

Uncertainty: UCRM is the expanded uncertainty which utilizes a $K = 2$ (coverage factor of 2), in accordance with ISO 17034 as listed above (Characterization, Homogeneity, Verification, and Stability).

Purity & Identity: Organic solutions are typically formulated from neat materials whose purity & identity have been characterized by GC-MSD & LC-PDA techniques with comparison to a NIST Traceable library of mass spectra when available. Additional characterization techniques may include but are not limited to: refractive index measurements of liquids, melting point measurements of solids, & GC-FID, ECD, PID, ELCD, LC-PDA measurements for purity. Inorganic solutions & neats are typically formulated from materials whose purity & identity have been characterized by ICPMS with comparison to a NIST SRM® when available. Additional characterization techniques may include but are not limited to: titrimetry, and densitometry.

Storage: Sealed ampules and other containers should be stored in the dark and at temperatures indicated on the Certified Weight Report or product label. Certification by Absolute Standards, Inc. is typically valid for 3 years from the date of manufacture. Each product will show its own expiration date as the limit of certification. Certified values are not applicable to opened ampules or for any materials stored in re-sealable containers. Please see the "Certified Weight Report" for specific values and any exceptions.

Usage: Ampules & bottles should be brought to room temperature (18 to 30 °C) before opening. Sonication may be required for high concentration solutions or solutions that may precipitate during storage. After opening, care should be exercised to avoid concentration changes owing to evaporation of the solvent or essential components. We recommend that a suitable re-sealable container be available before opening an ampule to decant the standard for short-term storage and use.

Minimum Sample Size: 0.5 uL for analytical applications.

Legal Notice: Warranty of products are as described when shipped. No warranty as to fitness for any particular application is expressed or implied. Errant shipments and/or quality claims must be made within 10 days of receipt. Liability is limited solely to the replacement of the product or refund of purchase price.

Certifying Officer: Stephen J. Arpie, M.S., Director General

Page 1 of 2



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Voice: 800-368-1131 • Fax: 800-410-2577 • eMail: StephenArpie@AbsoluteStandards.com
Document Identification: Certificate of Analysis Rev 14, Date Issued: 05/30/2019



ABSOLUTE STANDARDS, INC.

ISO - 17034

Understanding the Certified Weight Report

Each Certified Reference Material (CRM) is supported by a Certified Weight Report. Assigned values for concentrations and associated uncertainties are based upon NIST traceable masses & volumes used in production.

Absolute Standards, Inc.
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www.absolutestandards.com

Certified Reference Material CRM

ISO 17034 Accredited
Scope: http://AbsoluteStandards.com

CERTIFIED WEIGHT REPORT

Part # 10009R
Lot # 070716
Shelf Life Description: CLP Priority Pollutant Internal Standards
GC/MS Calibration - 6 components
070721
Expiration Date: Ambient (20 °C)
Recommended Storage: 4000
Nominal Concentration (µg/mL): 822-275872-11
NIST Test ID#: 5E-05 Balance Uncertainty
0.058 Mass Uncertainty

Solvent(s): Methylene chloride
Lot# 78782

Formulated By: Paul Barron
Reviewed By: Pedro L. Rentes

070716
070716

Weight(s) shown below were combined and diluted to (mL): 500.0

| Compound | SMW | Lot Number | Nominal Conc (µg/mL) | Purity (%) | Uncertainty Purity | Target Weight (µg) | Actual Weight (µg) | Actual Conc (µg/mL) | Expanded Uncertainty (µg/mL) | CAS# | MSDS Information (Solvent Safety Info. On Attached pg.) | OSHA PEL (TWA) | LD50 |
|---------------------------|-----|-------------------|----------------------|------------|--------------------|--------------------|--------------------|---------------------|------------------------------|------------|---|----------------|------|
| 1. 1,4-Dichlorobenzene-d4 | 118 | PR-1845M07287CB1 | 4000 | 98 | 0.2 | 2.04093 | 2.04335 | 4004.7 | 15.4 | 2055-02-1 | N/A | en-ra 500mg/kg | |
| 2. Naphthalene-d8 | 223 | PR-2339M031612HP1 | 4000 | 99 | 0.2 | 2.02032 | 2.02084 | 4001.0 | 15.2 | 1146-85-2 | 10 ppm (50mg/m3/8h) | en-ra 400mg/kg | |
| 3. Acenaphthene-d10 | 2 | PR-25444 | 4000 | 99 | 0.2 | 2.02032 | 2.02245 | 4004.2 | 15.2 | 15067-28-2 | N/A | en-ra 500mg/kg | |
| 4. Phenanthrene-d10 | 248 | PR-2305M081711PM1 | 4000 | 98 | 0.2 | 2.04093 | 2.04135 | 4000.8 | 15.4 | 1517-25-2 | N/A | N/A | |
| 5. Chrysene-d12 | 92 | I-19290 | 4000 | 98 | 0.2 | 2.04093 | 2.04150 | 4001.3 | 15.4 | 1719-03-5 | N/A | N/A | |
| 6. Perylene-d12 | 247 | PR-24113 | 4000 | 98 | 0.2 | 2.04093 | 2.04155 | 4001.2 | 15.4 | 1503-58-3 | N/A | N/A | |

Run 35, "P10009R L070716 [4000µg/mL in MeCl2]"
Run Length: 40.00 min, 23900 points at 10 points/second.
Created: Sat, Jul 9, 2016 at 1:54:53 PM.
Sampled: Sequence "070716-GC/MS", Method "GC-MS".
Analyzed using Method "GC-MS".

Comments:
GC-MS Analysis by Melissa Siciric
Column ID SPB-5 30 meter x 0.53mm x 1.5um Film Thickness.
Flow rates: Total Flow = 300 mL/min, Helium (carrier) = 0.5 mL, Helium (make-up) = 25 mL.
Hydrogen (detector) = 30 mL, Air (detector) = 300 mL, Oven Temp 1 = 50°C (1 min).
Rise = 10°C/min, Oven Temp 2 = 300°C (14 min), Total Run Time = 40 Minutes, Injector Temp = 250°C.
FID Temp = 300°C, FID Signal = aDaq Channel 1.
Gas Chromatograph = HP 5890, Auto Sampler = HP 7673, Standard Injection = 0.5 µL, Range = 4

Peak No. Name FID RT (min)

| | | |
|---|------------------------|-------|
| 1 | 1,4-Dichlorobenzene-d4 | 8.34 |
| 2 | Naphthalene-d8 | 8.98 |
| 3 | Acenaphthene-d10 | 12.97 |
| 4 | Phenanthrene-d10 | 16.37 |
| 5 | Chrysene-d12 | 22.62 |
| 6 | Perylene-d12 | 25.75 |

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Formulator
Reviewer

Actual
Concentration
Uncertainty
Values

Health &
Safety

3rd Party
Comparison

For More Information, Contact:

StephenArpie@AbsoluteStandards.com

Page 2 of 2



CERTIFIED WEIGHT REPORT

Part Number:
Lot Number:
Description:

72072
101122
n-Tetracosane-d50

Solvent(s):
Methylene chloride

Lot#
105345

Expiration Date:
Recommended Storage:
Nominal Concentration (µg/mL):
NIST Test ID#:

101132
Ambient (20 °C)
1000
6U7B

SE-05 Balance Uncertainty
0.058 Flask Uncertainty

101132
1000
101122

| | | |
|----------------|------------------|--------|
| Formulated By: | Prashant Chauhan | 101122 |
| Reviewed By: | Pedro L. Rentas | 101122 |
| DATE | | |

Compound

RM#
Lot
Number

2072
PR-26606

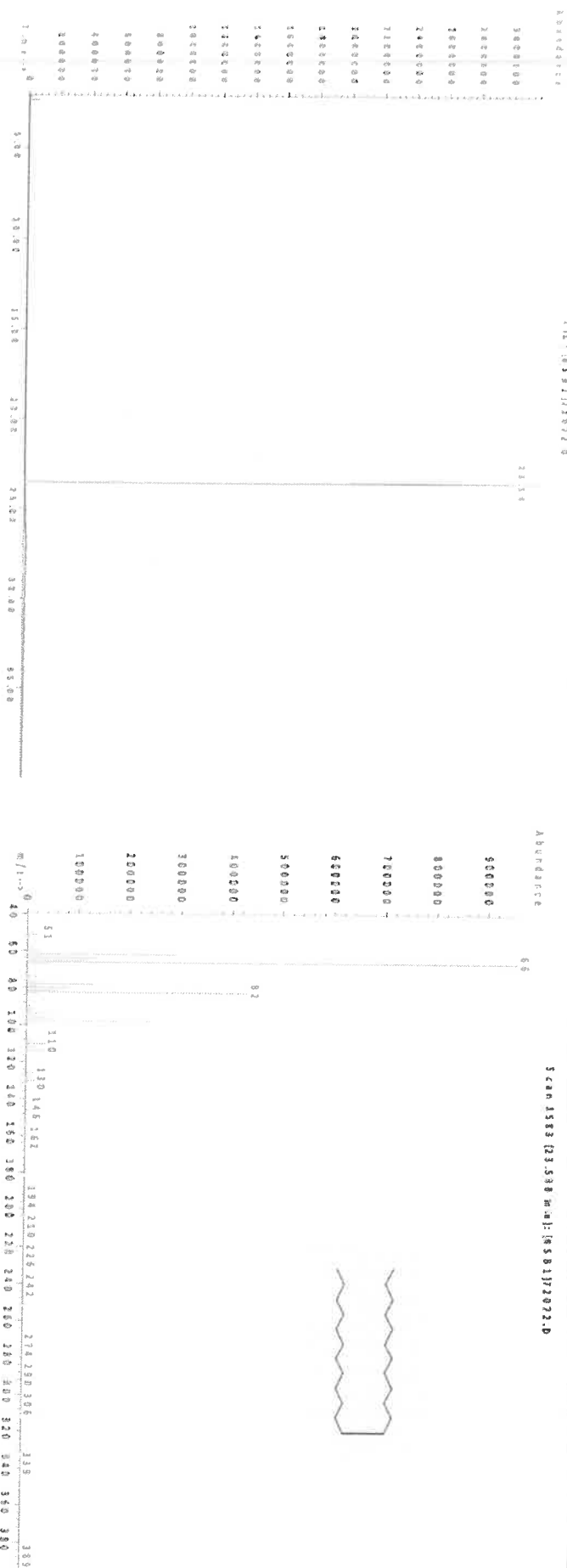
1000
98.7
0.2
99.0

0.20471
0.20482
1000.6
4.1
16416-32-3

N/A

Expanded
Uncertainty
(Solvent Safety Info. On Attached pg.)
CAS#
OSHA PEL (TWA)
LD50

1. n-Tetracosane-d50
Method GC8MSD-3.M: Column:SPB-5 (30m X 0.25mm ID X 0.25µm film thickness) Temp 1 = 50°C (1min.), Temp 2 = 300°C (9min.), Rate = 10°C/min., Injector B = 250°C, Detector B = 275°C, Split Ratio = 100:1, Scan Rate = 2. Analysis performed by: Candice Warren.



- The certified value is the concentration calculated from gravimetric and volumetric measurements unless otherwise stated.
- Standards are prepared gravimetrically using balances that are calibrated with weights traceable to NIST (see above).
- Standards are certified (+/-) 0.5% of the stated value, unless otherwise stated.
- All Standards, after opening ampule, should be stored with caps tight and under appropriate laboratory conditions.
- Uncertainty Reference: Taylor, B.N., and Kuyat, C.E., "Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results," NIST Technical Note 1297, U.S. Government Printing Office, Washington, DC, (1994).

