284 Sheffield Street, Mountainside, New Jersey 07092, Phone : 908 789 8900, Fax : 908 789 8922

Prep Standard - Chemical Standard Summary

Order ID : Q2552

Test : VOCMS Group5

Prepbatch ID :

Sequence ID/Qc Batch ID: VU072125,

Standard ID :
VP133953,VP134722,VP134723,VP134867,VP134871,VP134872,VP134880,

Chemical ID :
MDL-VP134879,V13391,V13880,V14419,V14626,V14629,V14710,V14747,V14838,V15045,W3112,

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Fax : 908 789 8922

VOC STANDARD PREPARATION LOG

Recipe ID	NAME	NO.	Prep Date	Expiration Date	Prepared By	ScaleID	PipetteID	Supervised By
218	BFB, 25PPM	VP133953	05/19/2025	11/09/2025	Semsettin Yesilyurt	None	None	Mahesh Dadoda 05/21/2025

FROM 0.25000ml of V13391 + 24.75000ml of V14626 = Final Quantity: 25.000 ml

Recipe ID	NAME	NO.	Prep Date	Expiration Date	Prepared By	ScaleID	PipetteID	Supervised By
552	524 Internal STD and Surrogate Mix, 5 PPM	VP134722	07/11/2025	12/31/2025	Semsettin Yesilyurt	None	None	Mahesh Dadoda 07/23/2025

FROM 0.02500ml of V15045 + 9.97500ml of V14629 = Final Quantity: 10.000 ml

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VOC STANDARD PREPARATION LOG

Recipe ID	NAME	NO.	Prep Date	Expiration Date	Prepared By	ScaleID	PipetteID	Supervised By
553	524 Calibration CC Mix Working STD, 25 PPM	VP134723	07/11/2025	09/30/2025	Semsettin Yesilyurt	None	None	Mahesh Dadoda 07/23/2025

FROM 0.12500ml of V13880 + 0.12500ml of V14419 + 0.12500ml of V14747 + 0.12500ml of V14838 + 0.25000ml of V14710 + 9.24500ml of V14629 = Final Quantity: 10.000 ml

Recipe ID	NAME	NO.	Prep Date	Expiration Date	Prepared By	ScaleID	PipetteID	Supervised By
1736	BFB	VP134867	07/21/2025	07/22/2025	Mahesh Dadoda	None	None	Semsettin Yesilyurt 08/01/2025

FROM 39.98400ml of W3112 + 0.01600ml of VP133953 = Final Quantity: 40.000 ml

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VOC STANDARD PREPARATION LOG

Recipe ID	NAME	NO.	Prep Date	Expiration Date	Prepared By	ScaleID	PipetteID	Supervised By
1131	10 PPB CCC, 524.2	VP134871	07/21/2025	07/22/2025	Mahesh Dadoda	None	None	Semsettin Yesilyurt 08/01/2025

FROM 39.97600ml of W3112 + 0.00800ml of VP134722 + 0.01600ml of VP134723 = Final Quantity: 40.000 ml

Recipe ID	NAME	NO.	Prep Date	Expiration Date	Prepared By	ScaleID	PipetteID	Supervised By
1131	10 PPB CCC, 524.2	VP134872	07/21/2025	07/22/2025	Mahesh Dadoda	None	None	Semsettin Yesilyurt 08/01/2025

FROM 39.97600ml of W3112 + 0.00800ml of VP134722 + 0.01600ml of VP134723 = Final Quantity: 40.000 ml

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Fax : 908 789 8922

VOC STANDARD PREPARATION LOG

Recipe ID	NAME	NO.	Prep Date	Expiration Date	Prepared By	ScaleID	PipetteID	Supervised By
1898	524 LOD LOQ, 1PPB	VP134880	07/21/2025	07/22/2025	Mahesh Dadoda	None	None	Semsettin Yesilyurt 08/01/2025

FROM 39.99000ml of W3112 + 0.00160ml of VP134723 + 0.00800ml of VP134722 = Final Quantity: 40.000 ml

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CHEMICAL RECEIPT LOG BOOK

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Restek	30067 / BFB tuneing solution	A0191805	11/22/2025	11/22/2024 / SAM	01/13/2023 / SAM	V13391

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Restek	564323 / Custom Oxygenates Standard	A0199211	06/16/2026	06/16/2025 / SAM	06/30/2023 / SAM	V13880

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Restek	30601 / VOA Mega Mix, Drinking Water VOA Mega Mix, 524.2 Rev 4.1, 1mL, 2000ug/mL P&TM	A0204639	10/17/2025	10/17/2024 / SAM	06/04/2024 / SAM	V14419

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Seidler Chemical	BA9077-02 / Methanol, Purge/Trap (cs=6x1L)	23I0762004	11/09/2025	05/09/2025 / SAM	11/26/2024 / SAM	V14626

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Seidler Chemical	BA9077-02 / Methanol, Purge/Trap (cs=6x1L)	23I0762004	01/09/2026	07/07/2025 / SAM	11/26/2024 / SAM	V14629

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Restek	30006 / VOA Mix, CLP method Calibration Std #1 ketones 5000uq/ml, PTM, 1ml	A02110618	12/16/2025	06/16/2025 / SAM	12/17/2024 / SAM	V14710

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CHEMICAL RECEIPT LOG BOOK

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Restek	30042 / VOA Mix,500 series method 502.2 Calibration Std #1 gases, 2000uq/ml, PTM, 1ml	A0216826	12/16/2025	06/16/2025 / SAM	12/17/2024 / SAM	V14747

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Restek	560065 / Custom Standard, 524 Std w/ COC [CS 8005]	A0220861	01/31/2026	06/16/2025 / SAM	01/16/2025 / SAM	V14838

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Restek	30201 / VOA Mix,500 series method, 524 Internal Std., 2000ug/mL. P&TM, 1mL/ampul	A0223883	07/11/2026	07/11/2025 / SAM	07/01/2025 / SAM	V15045

Supplier	ItemCode / ItemName	Lot #	Expiration Date	Date Opened / Opened By	Received Date / Received By	Chemtech Lot #
Seidler Chemical	DIW / DI Water	Daily Lab-Certified	07/03/2029	07/03/2024 / Iwona	07/03/2024 / Iwona	W3112

Methanol
ULTRA RESI-ANALYZED
For Purge and Trap Analysis

avantor™ | J.T.Baker®

Material No.: 9077-02
Batch No.: 2310762004
Manufactured Date: 2023-08-11
Expiration Date: 2026-08-10
Revision No.: 0

Certificate of Analysis

Test	Specification	Result
Assay (CH_3OH) (by GC, corrected for water)	≥ 99.9 %	100.0 %
Residue after Evaporation	≤ 1.0 ppm	0.5 ppm
Titrable Acid (µeq/g)	≤ 0.3	0.2
Titrable Base (µeq/g)	≤ 0.10	0.01
Water (by KF, coulometric)	≤ 0.08 %	< 0.01 %
Volatile Organic Trace Analysis – Below EPA 8260B CRQL	Conforms	Conforms

For Laboratory,Research,or Manufacturing Use
Performance Tested for Use in EPA Methods
500 Series for Drinking Water
600 Series for Wastewater
846 for Solid Waste

Country of Origin: USA
Packaging Site: Phillipsburg Mfg Ctr & DC

Ken Koehnlein
Sr. Manager, Quality Assurance

Methanol
ULTRA RESI-ANALYZED
For Purge and Trap Analysis

avantor™ | J.T.Baker®

Material No.: 9077-02
Batch No.: 2310762004
Manufactured Date: 2023-08-11
Expiration Date: 2026-08-10
Revision No.: 0

Certificate of Analysis

Test	Specification	Result
Assay (CH_3OH) (by GC, corrected for water)	≥ 99.9 %	100.0 %
Residue after Evaporation	≤ 1.0 ppm	0.5 ppm
Titrable Acid (µeq/g)	≤ 0.3	0.2
Titrable Base (µeq/g)	≤ 0.10	0.01
Water (by KF, coulometric)	≤ 0.08 %	< 0.01 %
Volatile Organic Trace Analysis – Below EPA 8260B CRQL	Conforms	Conforms

For Laboratory,Research,or Manufacturing Use
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500 Series for Drinking Water
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Country of Origin: USA
Packaging Site: Phillipsburg Mfg Ctr & DC

Ken Koehnlein
Sr. Manager, Quality Assurance

RESTEK
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

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Reference Material Producer
Certificate #3222.01

ACCREDITED
ISO/IEC 17025 Accredited
Testing Laboratory
Certificate #3222.02

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. : 30067 **Lot No.:** A0191805

Description : 4-Bromofluorobenzene Standard

4-Bromofluorobenzene Standard 2,500µg/mL, P&T Methanol, 1mL/ampul

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

Expiration Date : November 30, 2027 **Storage:** 0°C or colder

Ship: Ambient

CERTIFIED VALUES

Elution Order	Compound	CAS #	Lot #	Purity	Grav. Conc. (weight/volume)	Expanded Uncertainty * (95% C.L.; K=2)
1	1-Bromo-4-fluorobenzene (BFB)	460-00-4	184975	99%	2,483.9 µg/mL	+/- 139.5488

* Expanded Uncertainty displayed in same units as Grav. Conc.

Solvent: P&T Methanol
CAS # 67-56-1
Purity 99%

Quality Confirmation Test

Column:
105m x 0.53mm x 3.0µm
Rtx-502.2 (cat.#10910)

Carrier Gas:
hydrogen-constant pressure 11.0 psi.

Temp. Program:
40°C (hold 2 min.) to 240°C
@ 8°C/min. (hold 5 min.)

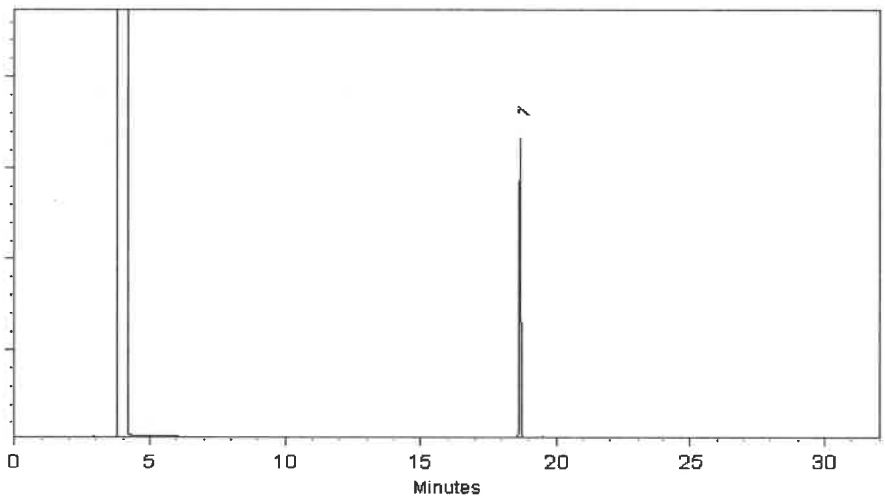
Inj. Temp:
200°C

Det. Temp:
250°C

Det. Type:
FID

Split Vent:
40 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.

Alicia Leathers - Operation Technician I **Date Mixed:** 17-Nov-2022 **Balance Serial #** B251644995

Jennifer Pollino - Operations Tech III - ARM QC **Date Passed:** 21-Nov-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 expanded uncertainty value includes gravimetric uncertainty, homogeneity between-ampul uncertainty, storage stability uncertainty and shipping stability uncertainty and were combined using the following formula:

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

  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.

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Certificate of Analysis

chromatographic

ACCREDITED
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Reference Material Producer
Certificate #3222.01

ACCREDITED
ISO/IEC 17025 Accredited
Testing Laboratory
Certificate #3222.02

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. : 564323 **Lot No.:** A0199211

Description : Custom Oxygenates Standard

Custom Oxygenates Standard 2,000-10,000µg/mL, P&T Methanol, 1mL/ampul

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

Expiration Date : June 30, 2028 **Storage:** 0°C or colder

Ship: Ambient

CERTIFIED VALUES

Elution Order	Compound	CAS #	Lot #	Purity	Grav. Conc. (weight/volume)	Expanded Uncertainty * (95% C.L.; K=2)
1	tert-Butanol (TBA)	75-65-0	101619K21F-1	99%	10,093.2 µg/mL	+/- 125.6116
2	Diisopropyl ether (DIPE)	108-20-3	STBK3450	99%	2,011.0 µg/mL	+/- 25.0950
3	Ethyl-tert-butyl ether (ETBE)	637-92-3	MKCP5997	99%	2,009.8 µg/mL	+/- 25.0800
4	tert-Amyl methyl ether (TAME)	994-05-8	HMBJ0825	99%	2,009.2 µg/mL	+/- 25.0726
5	tert-Amyl ethyl ether (TAEE)	919-94-8	IKVYB	97%	2,010.4 µg/mL	+/- 25.0878

* Expanded Uncertainty displayed in same units as Grav. Conc.

Solvent: P&T Methanol
CAS # 67-56-1
Purity 99%

Quality Confirmation Test

Column:
105m x 0.53mm x 3.0µm
Rtx-502.2 (cat.#10910)

Carrier Gas:
hydrogen-constant pressure 11.0 psi.

Temp. Program:
40°C (hold 2 min.) to 240°C
@ 8°C/min. (hold 5 min.)

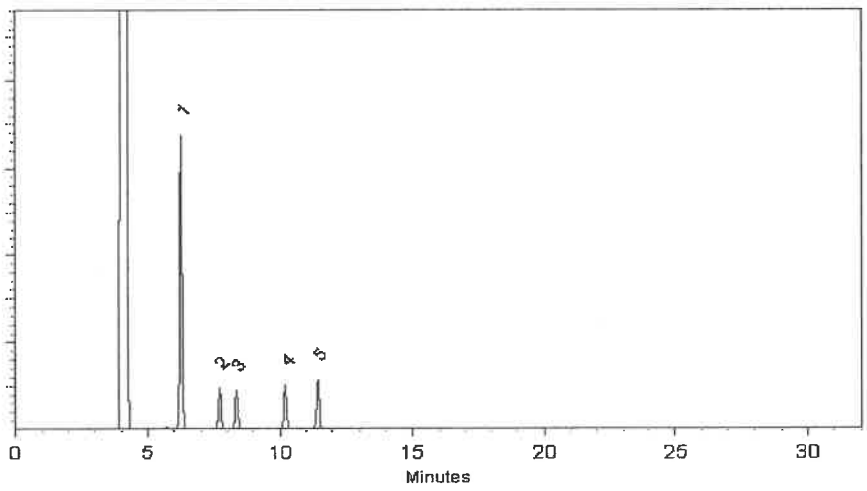
Inj. Temp:
200°C

Det. Temp:
250°C

Det. Type:
FID

Split Vent:
40 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.

Bryan Snyder - Operations Tech I

Date Mixed: 22-Jun-2023 **Balance Serial #** 1128342314

Jennifer Pollino - Operations Tech III - ARM QC

Date Passed: 23-Jun-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/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 expanded uncertainty value includes gravimetric uncertainty, homogeneity between-ampul uncertainty, storage stability uncertainty and shipping stability uncertainty and were combined using the following formula:

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

  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.

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Certificate of Analysis

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ilac-MRA A2LA ACCREDITED ISO/IEC 17025 Accredited Testing Laboratory Certificate #3222.02

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. : 30601 **Lot No.:** A0204639

Description : Drinking Water VOA MegaMix™, 524.2 Rev 4.1

Drinking Water VOA Mega Mix 524.2 Rev 4.1, 2000µg/mL, P&T Methanol, 1mL/ampul

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

Expiration Date : November 30, 2026 **Storage:** 0°C or colder

Ship: Ambient

CERTIFIED VALUES

Elution Order	Compound	CAS #	Lot #	Purity	Grav. Conc. (weight/volume)	Expanded Uncertainty * (95% C.L.; K=2)
1	Diethyl ether (ethyl ether)	60-29-7	SHBQ1495	99%	2,016.9 µg/mL	+/- 70.1908
2	1,1-dichloroethene	75-35-4	SHBG8609V	99%	2,009.6 µg/mL	+/- 69.9229
3	Iodomethane (methyl iodide)	74-88-4	MKCN8012	99%	2,016.5 µg/mL	+/- 70.1787
4	Allyl chloride (3-chloropropene)	107-05-1	RD221118RSR	99%	2,017.0 µg/mL	+/- 69.7168
5	Methylene chloride (dichloromethane)	75-09-2	231383	99%	2,013.2 µg/mL	+/- 70.0499
6	Carbon disulfide	75-15-0	N28F701	99%	2,017.0 µg/mL	+/- 70.1961
7	Acrylonitrile	107-13-1	102466R02E	99%	2,017.1 µg/mL	+/- 70.1995
8	Methyl-tert-butyl ether (MTBE)	1634-04-4	SHBP0179	99%	2,017.0 µg/mL	+/- 69.7168
9	trans-1,2-Dichloroethene	156-60-5	MKCP9516	99%	2,011.9 µg/mL	+/- 70.0038
10	1,1-Dichloroethane	75-34-3	852900	99%	2,010.5 µg/mL	+/- 69.9560
11	Propionitrile	107-12-0	BCCH7430	99%	2,017.0 µg/mL	+/- 70.1943
12	2,2-Dichloropropane	594-20-7	RD230426	99%	2,013.2 µg/mL	+/- 70.0652
13	cis-1,2-Dichloroethene	156-59-2	MKCP7830	99%	2,014.0 µg/mL	+/- 70.0903
14	Methacrylonitrile	126-98-7	1012014	99%	2,015.7 µg/mL	+/- 70.1491
15	Methyl acrylate	96-33-3	SHBG6616V	99%	2,019.0 µg/mL	+/- 70.2639
16	chloroform	67-66-3	SHBN8469	99%	2,009.7 µg/mL	+/- 69.9273

17	Bromochloromethane	74-97-5	230810JLM	99%	2,016.0	µg/mL	+/- 70.1613
18	Tetrahydrofuran	109-99-9	SHBQ0910	99%	2,019.6	µg/mL	+/- 70.2865
19	1,1,1-trichloroethane	71-55-6	RD230728RSR	99%	2,011.1	µg/mL	+/- 69.9769
20	1-Chlorobutane (Butyl chloride)	109-69-3	SHBC2651V	99%	2,015.0	µg/mL	+/- 69.6476
21	1,1-Dichloropropene	563-58-6	230825JLM	99%	2,018.9	µg/mL	+/- 70.2629
22	carbon tetrachloride	56-23-5	SHBP4875	99%	2,011.5	µg/mL	+/- 69.9890
23	1,2-Dichloroethane	107-06-2	SHBQ0693	99%	2,008.7	µg/mL	+/- 69.8916
24	Benzene	71-43-2	MKCS3357	99%	2,017.4	µg/mL	+/- 70.2100
25	Trichloroethene	79-01-6	SHBN3720	99%	2,008.3	µg/mL	+/- 69.8786
26	1,2-Dichloropropane	78-87-5	BCBR0882V	99%	2,012.1	µg/mL	+/- 70.0117
27	Methyl methacrylate	80-62-6	MKCQ2756	99%	2,017.7	µg/mL	+/- 70.2204
28	Chloroacetonitrile	107-14-2	MKBG6249V	99%	2,006.0	µg/mL	+/- 69.3366
29	bromodichloromethane	75-27-4	MKCF8470	99%	2,012.6	µg/mL	+/- 70.0273
30	Dibromomethane	74-95-3	10233302	99%	2,014.7	µg/mL	+/- 70.1153
31	2-Nitropropane	79-46-9	BCCB9352	97%	2,015.9	µg/mL	+/- 70.1562
32	cis-1,3-Dichloropropene	10061-01-5	RD230406RSR	99%	2,005.0	µg/mL	+/- 69.7655
33	Toluene	108-88-3	MKCS9989	99%	2,019.0	µg/mL	+/- 70.2643
34	Ethyl methacrylate	97-63-2	MKCN6206	97%	2,015.4	µg/mL	+/- 70.1393
35	trans-1,3-Dichloropropene	10061-02-6	RD230727RSR	99%	2,011.3	µg/mL	+/- 69.9838
36	1,1,2-Trichloroethane	79-00-5	FGB01	99%	2,013.2	µg/mL	+/- 70.0491
37	1,3-Dichloropropane	142-28-9	BCCH5357	99%	2,017.1	µg/mL	+/- 70.2002
38	Tetrachloroethene	127-18-4	SHBQ0051	99%	2,011.5	µg/mL	+/- 69.9908
39	dibromochloromethane	124-48-1	MKCQ4517	99%	2,006.6	µg/mL	+/- 69.8185
40	1,2-Dibromoethane (EDB)	106-93-4	BCCH7113	99%	2,009.0	µg/mL	+/- 69.9176
41	Chlorobenzene	108-90-7	SHBN6640	99%	2,009.8	µg/mL	+/- 69.9299
42	1,1,1,2-Tetrachloroethane	630-20-6	GC01	99%	2,013.8	µg/mL	+/- 70.0833
43	Ethylbenzene	100-41-4	094632L21G	99%	2,006.8	µg/mL	+/- 69.8411
44	m-Xylene	108-38-3	SHBN6673	99%	2,018.7	µg/mL	+/- 70.2559
45	p-Xylene	106-42-3	SHBP5191	99%	2,008.0	µg/mL	+/- 69.8828
46	o-Xylene	95-47-6	SHBN5105	99%	2,016.3	µg/mL	+/- 70.1724
47	Styrene	100-42-5	MKCQ3390	99%	2,014.8	µg/mL	+/- 70.1209
48	Isopropylbenzene (cumene)	98-82-8	Z20D022	99%	2,011.4	µg/mL	+/- 70.0026
49	bromoform	75-25-2	050494L04R	99%	2,009.6	µg/mL	+/- 69.9255
50	1,1,2,2-Tetrachloroethane	79-34-5	OXACF	99%	2,011.7	µg/mL	+/- 69.9986
51	1,2,3-Trichloropropane	96-18-4	Q91-34	98%	2,013.8	µg/mL	+/- 70.0841
52	trans-1,4-dichloro-2-butene	110-57-6	RP231113CTH	94%	2,017.2	µg/mL	+/- 69.7251

53	n-Propylbenzene	103-65-1	095067T18C	99%	2,018.4	µg/mL	+/- 70.2434
54	Bromobenzene	108-86-1	MKCQ7174	99%	2,016.9	µg/mL	+/- 70.1919
55	1,3,5-Trimethylbenzene	108-67-8	BCCF4166	99%	2,017.0	µg/mL	+/- 70.1961
56	2-Chlorotoluene	95-49-8	235783M23T	99%	2,017.8	µg/mL	+/- 70.2253
57	4-Chlorotoluene	106-43-4	BCCG9286	99%	2,014.1	µg/mL	+/- 70.0958
58	tert-Butylbenzene	98-06-6	STBJ1937	99%	2,005.2	µg/mL	+/- 69.7868
59	1,2,4-Trimethylbenzene	95-63-6	MKCS3775	99%	2,015.9	µg/mL	+/- 70.1571
60	Pentachloroethane	76-01-7	13550700	97%	2,012.8	µg/mL	+/- 69.5699
61	sec-Butylbenzene	135-98-8	MKCP2266	99%	2,011.0	µg/mL	+/- 69.9872
62	p-Isopropyltoluene (p-Cymene)	99-87-6	MKCR6143	99%	2,014.6	µg/mL	+/- 70.1111
63	1,3-Dichlorobenzene	541-73-1	BCCD5315	99%	2,003.2	µg/mL	+/- 69.7020
64	1,4-Dichlorobenzene	106-46-7	MKBS7929V	99%	2,015.0	µg/mL	+/- 70.1108
65	n-Butylbenzene	104-51-8	09418JJ	99%	2,005.3	µg/mL	+/- 69.7882
66	1,2-Dichlorobenzene	95-50-1	SHBN3835	99%	2,009.0	µg/mL	+/- 69.9020
67	Hexachloroethane	67-72-1	QTORH	99%	2,016.0	µg/mL	+/- 69.6822
68	1,2-Dibromo-3-chloropropane	96-12-8	HBMVB	97%	2,005.1	µg/mL	+/- 69.7821
69	Nitrobenzene	98-95-3	10224044	99%	2,017.9	µg/mL	+/- 70.2256
70	1,2,4-Trichlorobenzene	120-82-1	SHBP5900	99%	2,015.0	µg/mL	+/- 70.1251
71	Hexachlorobutadiene	87-68-3	RP230823RSR	98%	2,001.7	µg/mL	+/- 69.6639
72	Naphthalene	91-20-3	STBL1057	99%	2,008.9	µg/mL	+/- 69.9149
73	1,2,3-Trichlorobenzene	87-61-6	MKBX7627V	99%	2,012.3	µg/mL	+/- 70.0318

* Expanded Uncertainty displayed in same units as Grav. Conc.

Solvent: P&T Methanol
CAS # 67-56-1
Purity 99%

Quality Confirmation Test

Column:
60m x 0.25mm x 1.4µm
Rtx-502.2 (cat.#10916)

Carrier Gas:
helium-constant pressure 30 psi

Temp. Program:
40°C (hold 6 min.) to 240°C
@ 6°C/min. (hold 10 min.)

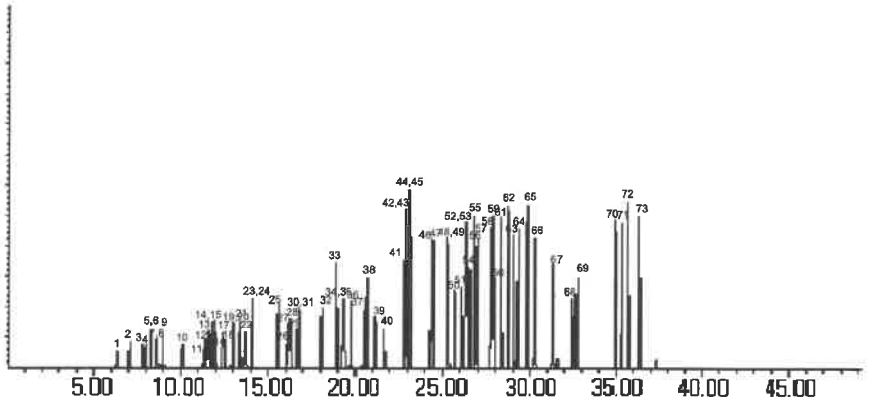
Inj. Temp:
200°C

Det. Temp:
250°C

Det. Type:
MSD

Split Vent:
20.0 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.

John Friedline - Operations Technician I

Date Mixed: 20-Nov-2023 **Balance Serial #** 1128342314

Dillan Murphy - Operations Technician I

Date Passed: 29-Nov-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/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 expanded uncertainty value includes gravimetric uncertainty, homogeneity between-ampul uncertainty, storage stability uncertainty and shipping stability uncertainty and were combined using the following formula:

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

  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.

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CERTIFIED REFERENCE MATERIAL

30 V.4

Certificate of Analysis

chromatographic plus

V14697-to-14726

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ISO 17034 Accredited
Reference Material Producer
Certificate #3222.01

ACCREDITED
ISO/IEC 17025 Accredited
Testing Laboratory
Certificate #3222.02

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. : 30006 **Lot No.:** A0210618

Description : VOA Calibration Mix #1

VOA Calibration Mix #1 5,000µg/mL, P&T Methanol/Water(90:10), 1mL/ampul

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

Expiration Date : July 31, 2027 **Storage:** 0°C or colder

Ship: Ambient

CERTIFIED VALUES

Elution Order	Compound	CAS #	Lot #	Purity	Grav. Conc. (weight/volume)	Expanded Uncertainty * (95% C.L.; K=2)
1	Acetone	67-64-1	SHBQ8504	99%	5,014.8 µg/mL	+/- 173.2883
2	2-Butanone (MEK)	78-93-3	SHBQ4704	99%	5,012.4 µg/mL	+/- 173.2054
3	4-Methyl-2-pentanone (MIBK)	108-10-1	SHBP9200	99%	5,011.6 µg/mL	+/- 173.1777
4	2-Hexanone	591-78-6	MKCQ6663	99%	5,013.0 µg/mL	+/- 173.2261

* Expanded Uncertainty displayed in same units as Grav. Conc.

Solvent: P&T Methanol/Water (90:10)
CAS # 67-56-1/7732-18-5
Purity 99%

Quality Confirmation Test

Column:
105m x 0.53mm x 3.0µm
Rtx-502.2 (cat.#10910)

Carrier Gas:
hydrogen-constant pressure 11.0 psi.

Temp. Program:
40°C (hold 2 min.) to 240°C
@ 8°C/min. (hold 5 min.)

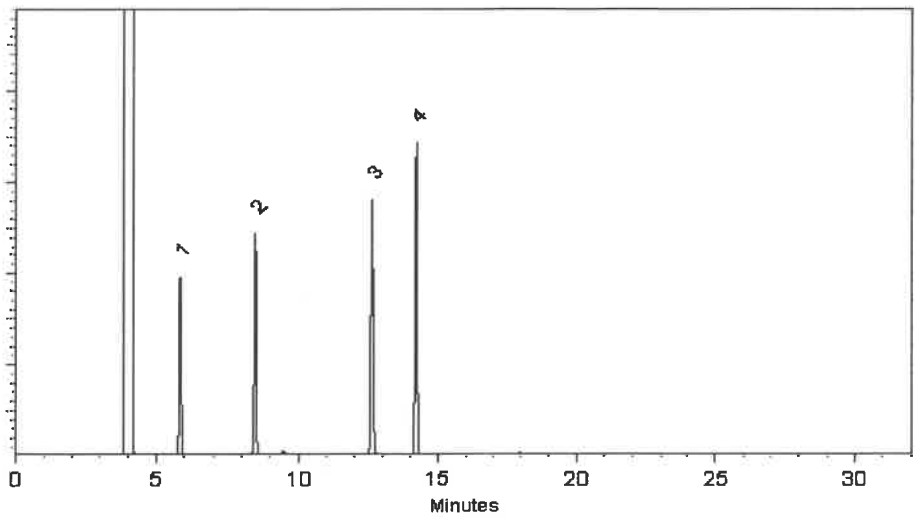
Inj. Temp:
200°C

Det. Temp:
250°C

Det. Type:
FID

Split Vent:
40 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: 22-Apr-2024 **Balance Serial #** B707717271

Jennifer Pollino - Operations Tech III - ARM QC

Date Passed: 24-Apr-2024

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 expanded uncertainty value includes gravimetric uncertainty, homogeneity between-ampul uncertainty, storage stability uncertainty and shipping stability uncertainty and were combined using the following formula:

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

  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.

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CERTIFIED REFERENCE MATERIAL

30 Vial

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V14727 to
V14756

ACCREDITED
ISO 17034 Accredited
Reference Material Producer
Certificate #3222.01

ACCREDITED
ISO/IEC 17025 Accredited
Testing Laboratory
Certificate #3222.02

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. : 30042 **Lot No.:** A0216826

Description : 502.2 Calibration Mix #1

502.2 Calibration Mix #1 2,000µg/mL, P&T Methanol, 1mL/ampul

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

Expiration Date : May 31, 2031 **Storage:** 0°C or colder

Ship: Ambient

CERTIFIED VALUES

Elution Order	Compound	CAS #	Lot #	Purity	Grav. Conc. (weight/volume)	Expanded Uncertainty * (95% C.L.; K=2)
1	Dichlorodifluoromethane (CFC-12)	75-71-8	00022922	99%	2,000.9 µg/mL	+/- 112.4144
2	Chloromethane (methyl chloride)	74-87-3	00022694	99%	2,000.7 µg/mL	+/- 112.3998
3	Vinyl chloride	75-01-4	00015559	99%	2,000.3 µg/mL	+/- 112.3779
4	Bromomethane (methyl bromide)	74-83-9	00017022	99%	2,001.8 µg/mL	+/- 112.4650
5	Chloroethane (ethyl chloride)	75-00-3	107-401039114-1	99%	2,000.1 µg/mL	+/- 112.3700
6	Trichlorofluoromethane (CFC-11)	75-69-4	MKCJ8658	99%	2,000.7 µg/mL	+/- 112.3992

* Expanded Uncertainty displayed in same units as Grav. Conc.

Solvent: P&T Methanol
CAS # 67-56-1
Purity 99%

Quality Confirmation Test

Column:
60m x 0.25mm x 1.4µm
Rtx-502.2 (cat.#10916)

Carrier Gas:
helium-constant flow 2.0 mL/min.

Temp. Program:
40°C (hold 6 min.) to 100°C
@ 6°C/min.

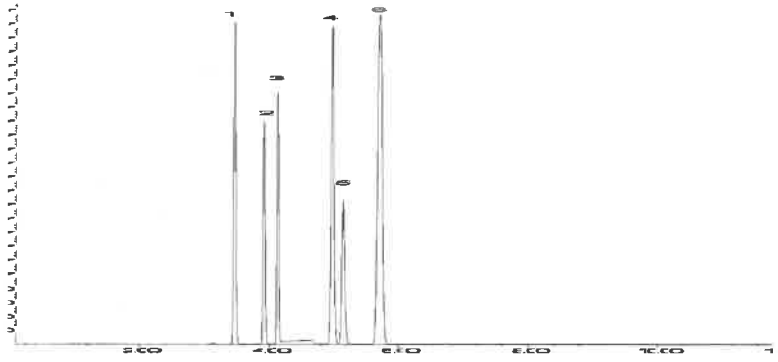
Inj. Temp:
200°C

Det. Temp:
250°C

Det. Type:
MSD

Split Vent:
Split ratio 10:1

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.

Tom Suckar - Mix Technician

Date Mixed: 23-Sep-2024 **Balance Serial #** B707717271

Jennifer Pollino - Operations Tech III - ARM QC

Date Passed: 04-Oct-2024

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 expanded uncertainty value includes gravimetric uncertainty, homogeneity between-ampul uncertainty, storage stability uncertainty and shipping stability uncertainty and were combined using the following formula:

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

  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.

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Rec 01/16/25

CERTIFIED REFERENCE MATERIAL

5 vial

Certificate of Analysis

chromatographic

V14837 to V14841

ACCREDITED ISO 17034 Accredited Reference Material Producer Certificate #3222.01

ACCREDITED ISO/IEC 17025 Accredited Testing Laboratory Certificate #3222.02

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. : 560065 **Lot No.:** A0220861

Description : Custom 524 Standard

Custom 524 Standard 2,000-10,000µg/mL, P&T Methanol, 1mL/ampul

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

Expiration Date : January 31, 2026 **Storage:** 0°C or colder

Ship: Ambient

CERTIFIED VALUES

Elution Order	Compound	CAS #	Lot #	Purity	Grav. Conc. (weight/volume)	Expanded Uncertainty * (95% C.L.; K=2)
1	1,1,2-Trichlorotrifluoroethane (CFC-113)	76-13-1	00022779	99%	2,009.0 µg/mL	+/- 69.4402
2	tert-Butanol (TBA)	75-65-0	SHBR5545	99%	10,036.0 µg/mL	+/- 346.8674
3	Acrylonitrile	107-13-1	102466R02E	99%	2,015.0 µg/mL	+/- 69.6476
4	Propionitrile	107-12-0	BCCL0691	99%	8,074.0 µg/mL	+/- 279.0744
5	Tetrahydrofuran	109-99-9	SHBR7392	99%	2,009.0 µg/mL	+/- 69.4402
6	Cyclohexane	110-82-7	SHBS0091	99%	2,014.0 µg/mL	+/- 69.6131
7	Methylcyclohexane	108-87-2	SHBR3777	99%	2,015.0 µg/mL	+/- 69.6476
8	Methyl methacrylate	80-62-6	MKCQ2756	99%	2,011.0 µg/mL	+/- 69.5094
9	trans-1,4-dichloro-2-butene	110-57-6	RD240719ECSB	97%	2,013.7 µg/mL	+/- 69.6034
10	Nitrobenzene	98-95-3	10224044	99%	8,026.0 µg/mL	+/- 277.4153

* Expanded Uncertainty displayed in same units as Grav. Conc.

Solvent: P&T Methanol

CAS # 67-56-1

Purity 99%

Quality Confirmation Test

Column:
60m x 0.25mm x 1.4µm
Rtx-502.2 (cat.#10916)

Carrier Gas:
helium-constant pressure 30 psi

Temp. Program:
40°C (hold 2 min.) to 240°C
@ 8°C/min. (hold 5 min.)

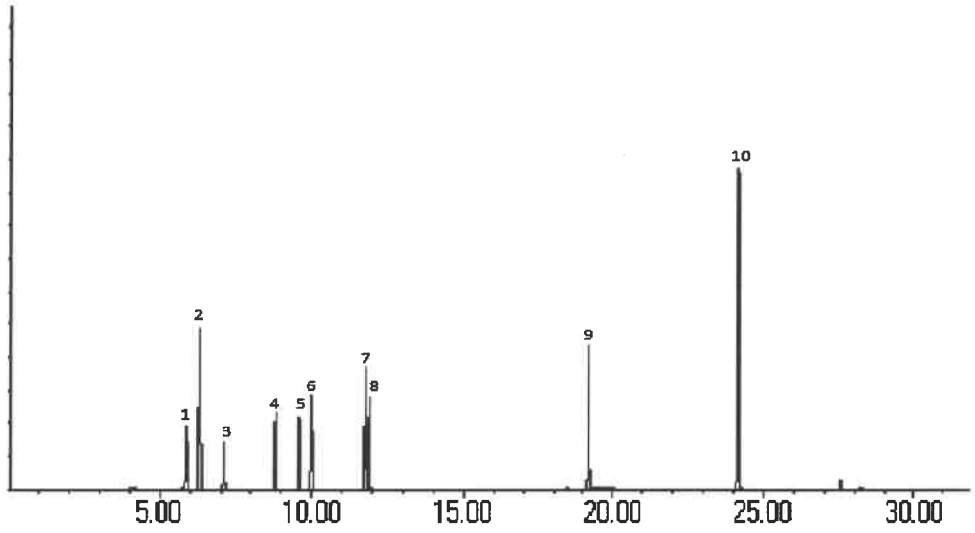
Inj. Temp:
200°C

Det. Temp:
250°C

Det. Type:
MSD

Split Vent:
25.0 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.

Morgan Craighead - Mix Technician

Date Mixed: 07-Jan-2025 **Balance Serial #** 1128342314

Dillan Murphy - Operations Technician I

Date Passed: 10-Jan-2025

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 expanded uncertainty value includes gravimetric uncertainty, homogeneity between-ampul uncertainty, storage stability uncertainty and shipping stability uncertainty and were combined using the following formula:

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

  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.

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CERTIFIED REFERENCE MATERIAL

5 vial.

Certificate of Analysis

chromatographic plus

V15045 to V15049

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ISO/IEC 17025 Accredited
Testing Laboratory
Certificate #3222.02

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. : 30201 **Lot No.:** A0223883

Description : 524 Internal Std / Surrogate Mix

524 Internal Std/Surrogate Mix 2000µg/mL, P&T Methanol, 1mL/ampul

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

Expiration Date : March 31, 2032 **Storage:** 0°C or colder

Ship: Ambient

CERTIFIED VALUES

Elution Order	Compound	CAS #	Lot #	Purity	Grav. Conc. (weight/volume)	Expanded Uncertainty * (95% C.L.; K=2)
1	Fluorobenzene	462-06-6	BCBZ5549	99%	2,002.0 µg/mL	+/- 112.4750
2	1-Bromo-4-fluorobenzene (BFB)	460-00-4	0000268853	99%	2,003.3 µg/mL	+/- 112.5499
3	1,2-Dichlorobenzene-d4	2199-69-1	PR-32597	99%	2,006.0 µg/mL	+/- 112.6997

* Expanded Uncertainty displayed in same units as Grav. Conc.

Solvent: P&T Methanol
CAS # 67-56-1
Purity 99%