

TBI-FORENSIC SERVICES DIVISION PERFORMANCE VERIFICATION FORM

Instrument/Method to Verify:

Nicolet iS10 FTIR (Serial # AKX1100576) with Golden Gate attachment TBI FCU ID – IR # 6

Check the appropriate box: New Validation ☐ Modification ☐ Performance Check ☒

Laboratory: NCL ☒ KCL ☐ MCL ☐ Unit: Forensic Chemistry

Based on training and competency, the following analyst(s) are authorized by the Technical Leader to participate in this study:

Name Ben Hubert Title SA/FS Initials BH
Completed: Signature Ben Hubert Digitally signed by Ben Hubert Date: 2022.12.16 11:05:11 -06'00' Date 12-16-22

Name _____ Title _____ Initials _____
Completed: Signature _____ Date _____

Name _____ Title _____ Initials _____
Completed: Signature _____ Date _____

Verification of final review:

Unit Supervisor Brett Trotter
Brett Trotter (Dec 16, 2022 11:51 CST) Date _____

Unit Supervisor Rebecca Hernandez Date _____

Unit Supervisor Melann Everett Date _____

Crime Laboratory Regional Supervisor Jenifer Hall
Jenifer Hall (Dec 16, 2022 13:08 CST) Date _____

Crime Laboratory Regional Supervisor _____ Date _____

Crime Laboratory Regional Supervisor _____ Date _____

Quality Assurance Manager Chad Johnson
Chad Johnson (Dec 19, 2022 10:57 CST) Date _____

By signing below, I have verified this study meets all requirements and I deem this procedure/instrument fit for the intended use:

Technical Leader Brett Trotter
Brett Trotter (Dec 16, 2022 11:51 CST) Date _____

All information must be submitted to the Quality Assurance Manager prior to the implementation of the procedure/instrument. If applicable, include training plan and competency testing schedule.

Standard Verification Performance check

**Thermo Scientific Nicolet iS10 FTIR (Serial # AKX1100576) with Golden Gate
attachment**

TBI FCU ID – IR # 6

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Standard Verification Performance check

Thermo Scientific Nicolet iS10 FTIR (Serial # AKX1100576) with Golden Gate attachment TBI FCU ID – IR # 6

1. Purpose:

Each Fourier-transform infrared (FTIR) spectrometer acquired by the TBI FCU must demonstrate that it will accurately reproduce spectra previously obtained within the laboratory. The TBI FCU currently uses Attenuated Total Reflectance (ATR) attachments since this technique is efficient and does not destroy the sample during analysis.

Although properly maintained instruments all adhere to the theories of FTIR, unique factors may exist within each system that can generate slightly different spectra between different instruments.

This instrument was previously in service and was taken out of service for the computer to be replaced. At the same time, the OMNIC software was updated from OMNIC series 8.2.388 to OMNIC series 9.12.1019. As a result, a performance verification was performed.

This performance verification will assess the spectrometer's ability to generate accurate spectra of certified reference standards compared to previously run laboratory standard spectra.

Standard Verification Performance check

Thermo Scientific Nicolet iS10 FTIR (Serial # AKX1100576) with Golden Gate attachment TBI FCU ID – IR # 6

2. Components and Experiment Setup:

Instrument Components

iS10 FTIR	
Source	Single point
Beam splitter	KBr
Laser Type	Helium/Neon laser
Detector	DTGS KBr
Internal Verification Standard	Polystyrene/NG Glass wheel

Experiment parameters

Scans	16
Resolution	4
Spectral Range	4000 – 600
Gain	Auto
Optical Velocity	0.4747
Aperture	Medium resolution

3. Procedure:

Five certified reference standards were tested on this instrument using the Golden Gate attachment. Several of these standards were selected because they are frequently encountered in case work. Both salt forms of cocaine were tested to determine if salt forms could be determined. Non-controlled substances were also tested to determine if the spectrometer could detect possible adulterants.

Prior to running these standards, the routine monthly maintenance as outlined in TBI SOP was performed to ensure the instrument was operating according to acceptable standards. Additionally, laser alignment is recommended every two months by the manufacturer since a slight drift in output is possible. In this performance check, the laser verification was as part of the routine maintenance.

All standards were run in their pure form – no extractions, washes, or other alterations were performed. If available, the same chemical lots utilized to create the FCU ATR spectral library were used. Prior to each standard run, the instrument's sampling area was cleaned, and a background spectrum was collected to ensure no cross-contamination occurred.

Standard Verification Performance check

Thermo Scientific Nicolet iS10 FTIR (Serial # AKX1100576) with Golden Gate attachment TBI FCU ID – IR # 6

4. Standards Used:

Standard	Source	Lot Number
Alprazolam	Upjohn	487RA
Caffeine	Eastman Kodak	355
Cocaine base	Merck	U7472
Cocaine HCl	Sigma	SLCF4870
Methamphetamine	Sigma	34H0144

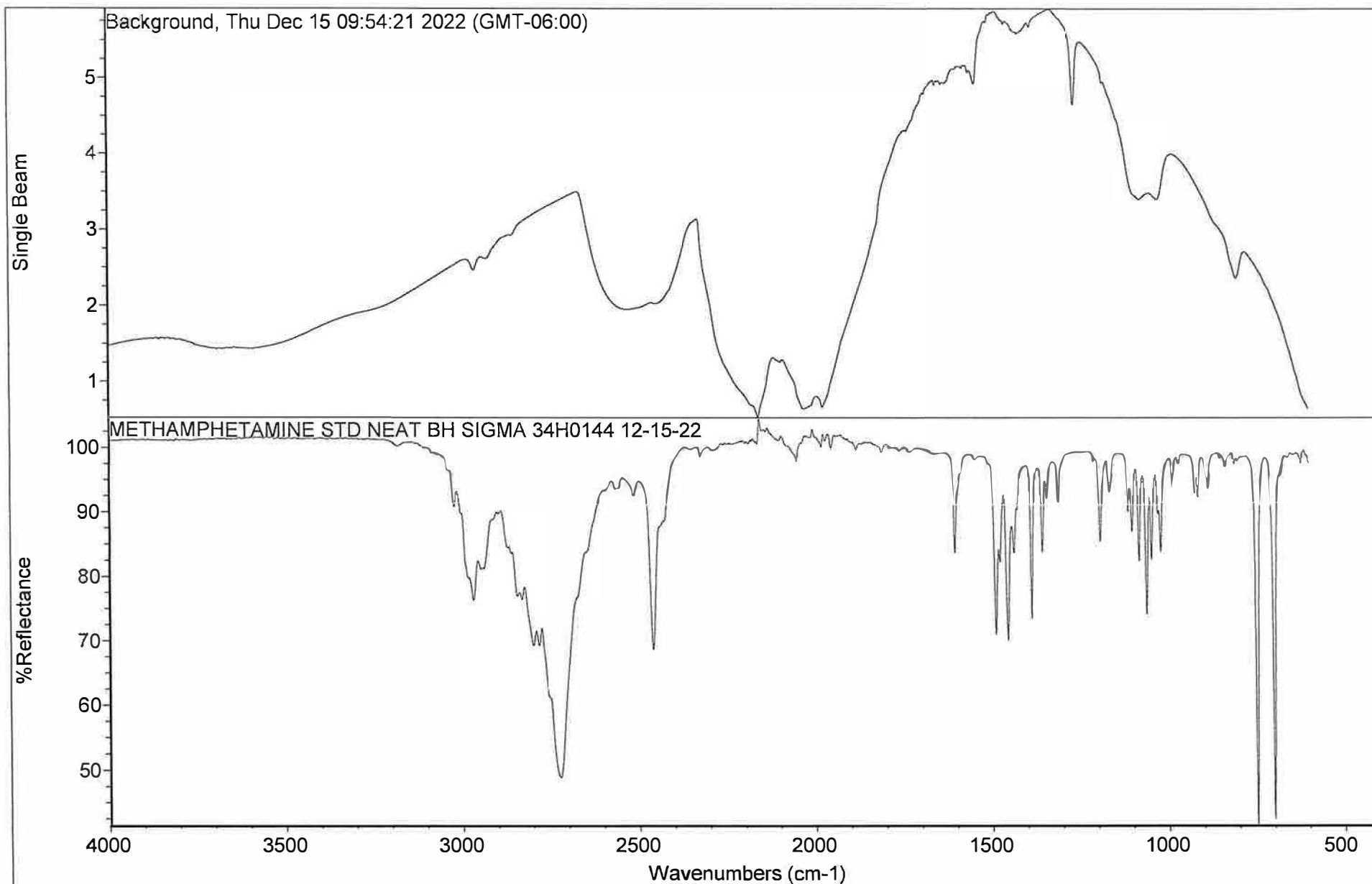
5. Results and Conclusions

Spectra for the five standards generated by IR# 6 were compared to current library standard spectra and a high match percentage (>95%) was obtained for each standard. Results from IR #6 using the Golden Gate attachment were consistent with the library standard spectra and matched satisfactorily for identification.

All data generated for the iS10 using the Golden Gate attachment can be found in Appendix A.

The ValPro Qualification reports outlined in the Procedure section as well as the current maintenance log are also in Appendix A.

In summary, this instrument has demonstrated satisfactory results for use within the TBI FCU. The operation is the same as the unit's other ATRs with a few minor software differences for labeling spectra as documented in the validation for the HAL9000 is20 in service. Therefore, no additional training requirements will be needed for currently trained scientists.



METHAMPHETAMINE STD NEAT BH SIGMA 34H0144 12-15-22

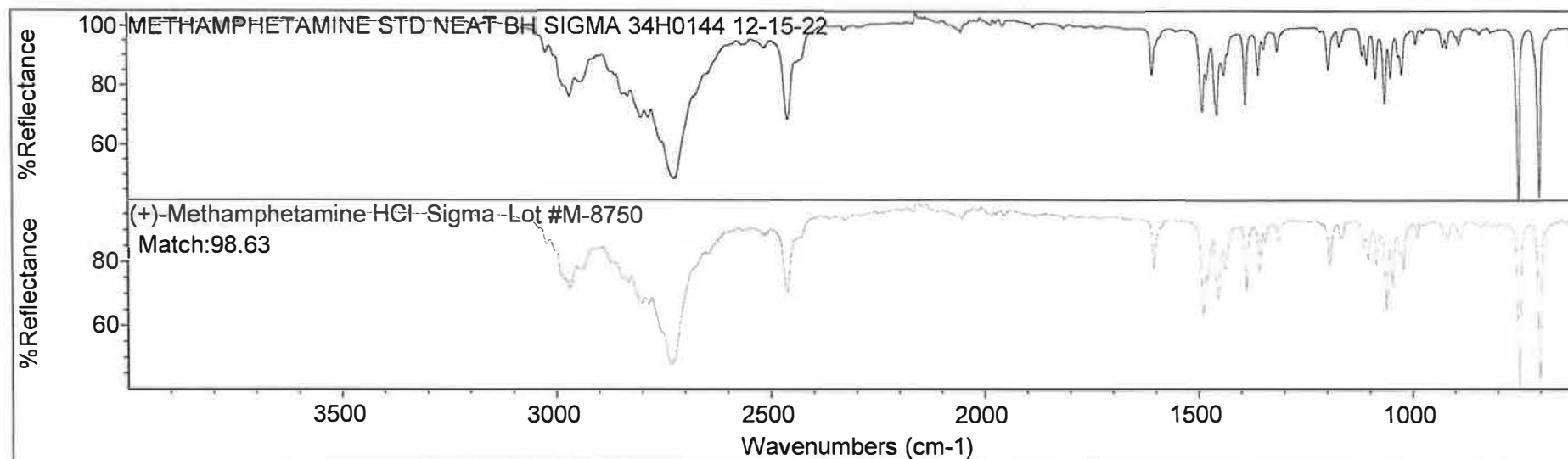
Collection time: Thu Dec 15 09:56:04 2022 (GMT-06:00)

IR# 6

Detector: DTGS KBr
Beamsplitter: KBr
Source: IRNumber of sample scans: 16
Number of background scans: 16
Resolution: 4.000
Sample gain: 8.0
Optical velocity: 0.4747
Aperture: 80.00

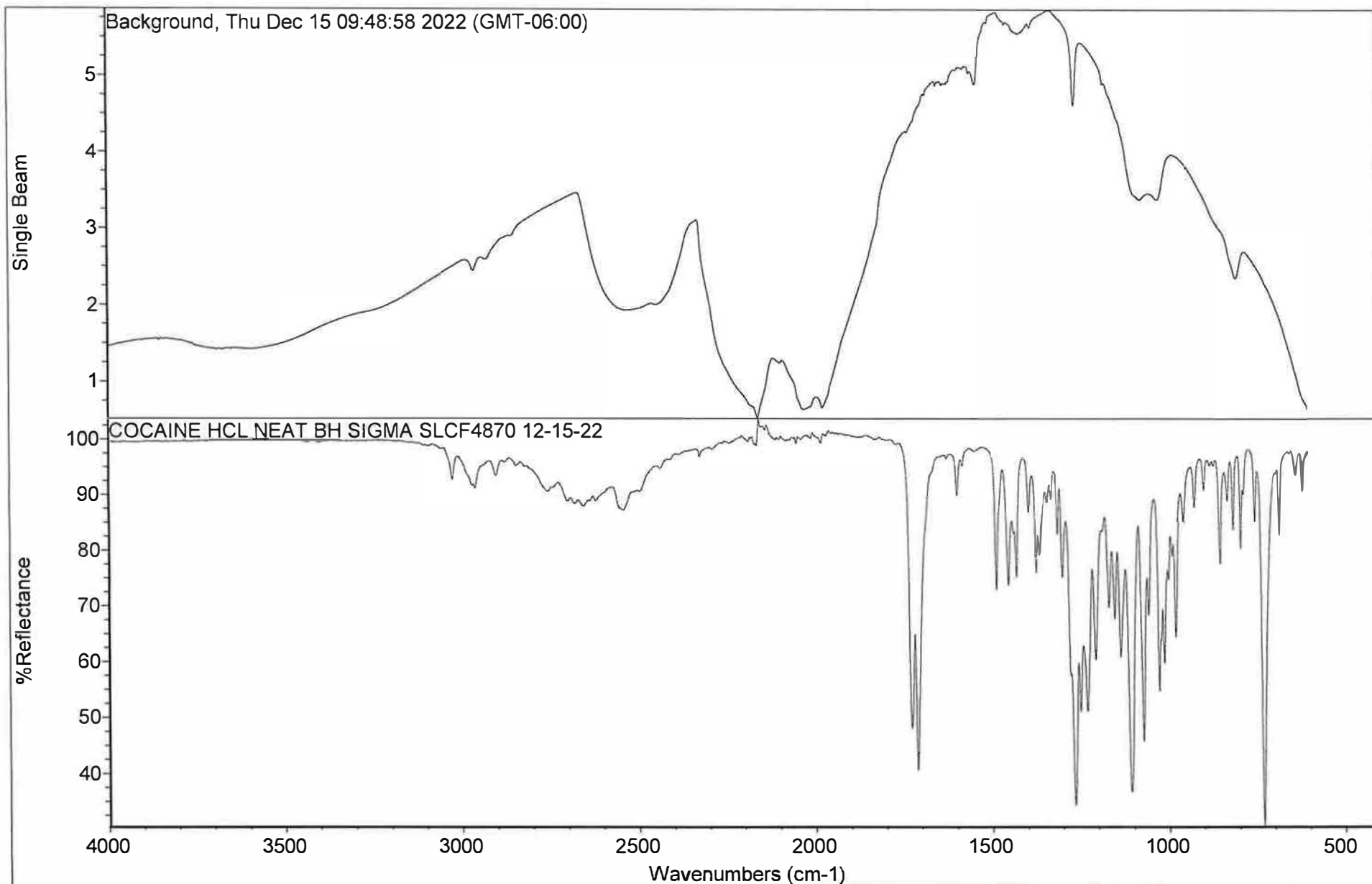
Appendix A

Search results for: METHAMPHETAMINE STD NEAT BH SIGMA 34H0144 12-15-22
Date: Thu Dec 15 09:57:43 2022 (GMT-06:00)
Search algorithm: Correlation
Regions searched: 3998.72-599.78



Search results list of matches

	Index	Match	Compound Name	Library Name
1	356	98.63	(+)-Methamphetamine HCl Sigma Lot #M-8750	TBI ATR LIBRARY
2	79	98.63	(+)-Methamphetamine HCl Sigma Lot #M-8750	TBI ATR LIBRARY
3	79	98.63	(+)-Methamphetamine HCl Sigma Lot #M-8750	TBI ATR Drug Library
4	128	98.63	(+)-Methamphetamine HCl Sigma Lot #M-8750	TBI ATR #2



COCAINE HCL NEAT BH SIGMA SLCF4870 12-15-22

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Collection time: Thu Dec 15 09:51:53 2022 (GMT-06:00)

IR# 6

Detector: DTGS KBr
Beamsplitter: KBr
Source: IRNumber of sample scans: 16
Number of background scans: 16
Resolution: 4.000
Sample gain: 8.0
Optical velocity: 0.4747
Aperture: 80.00

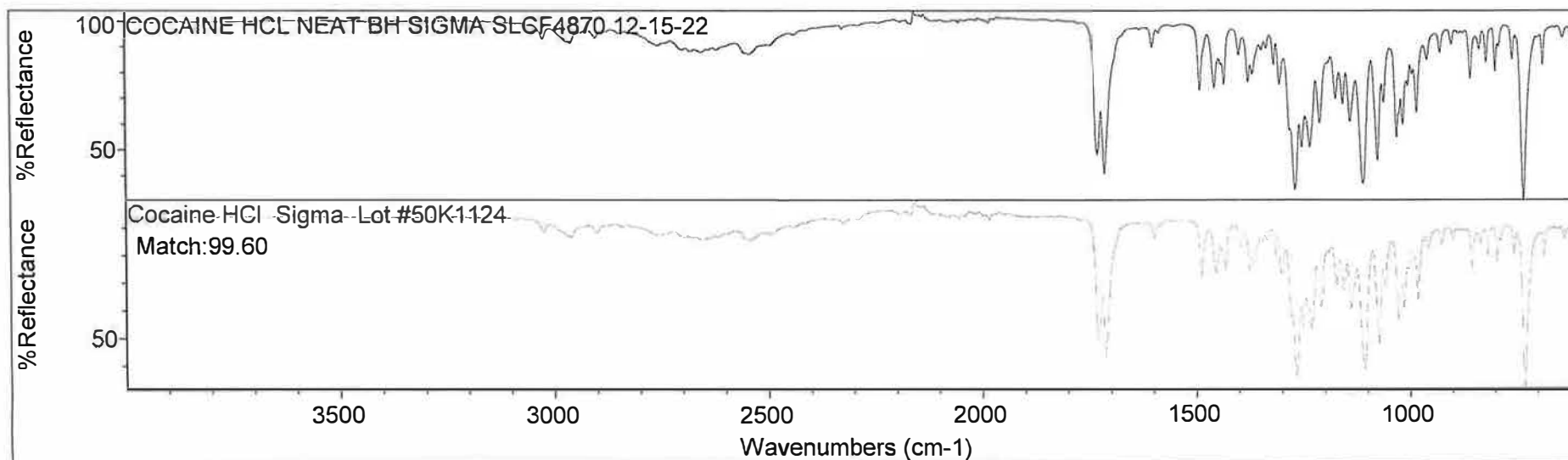
Appendix A

Search results for: COCAINE HCL NEAT BH SIGMA SLCF4870 12-15-22

Date: Thu Dec 15 09:53:07 2022 (GMT-06:00)

Search algorithm: Correlation

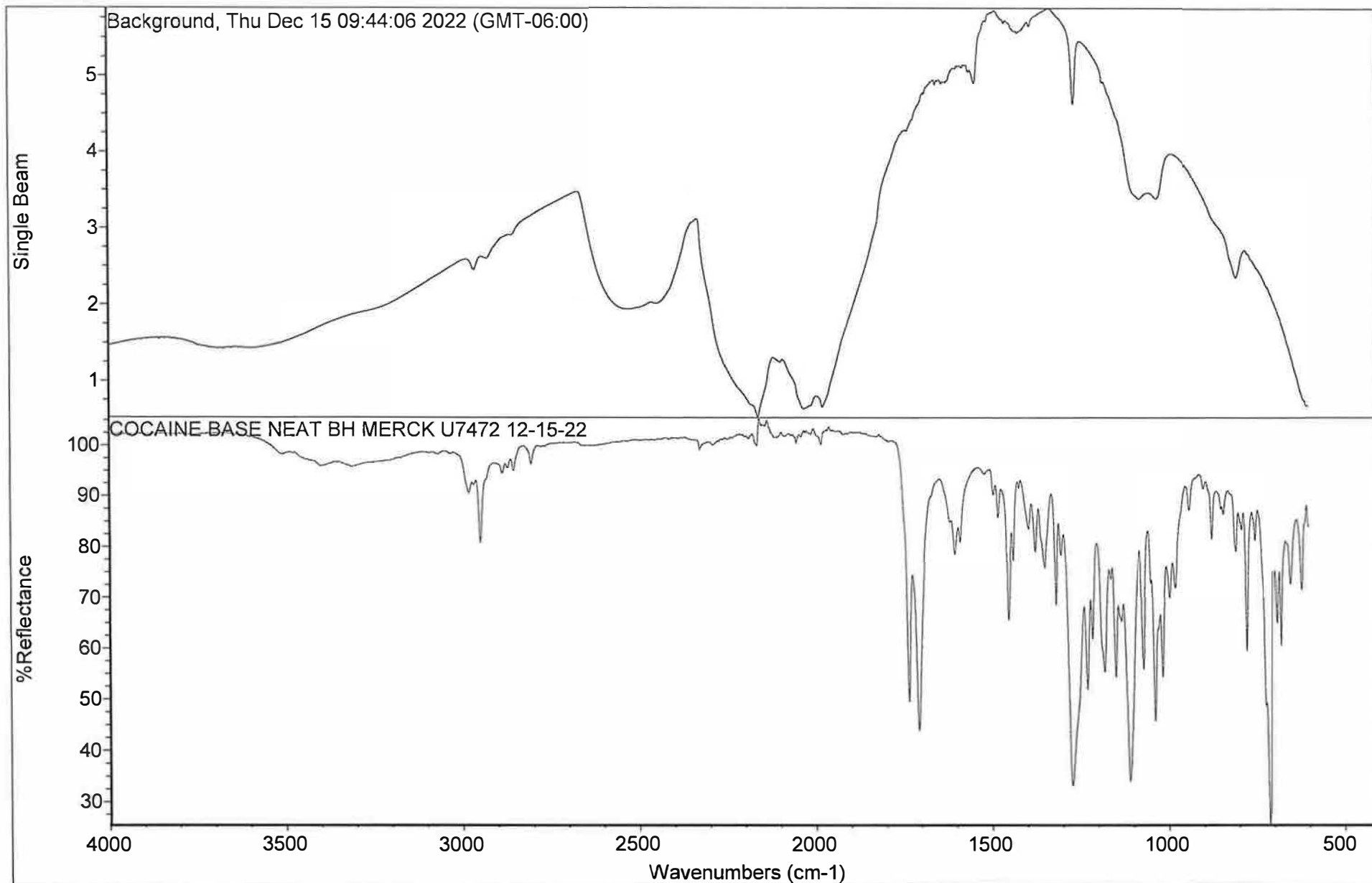
Regions searched: 3998.72-599.78



Search results list of matches

	Index	Match	Compound Name	Library Name
1	308	99.60	Cocaine HCl Sigma Lot #50K1124	TBI ATR LIBRARY
2	31	99.60	Cocaine HCl Sigma Lot #50K1124	TBI ATR LIBRARY
3	31	99.60	Cocaine HCl Sigma Lot #50K1124	TBI ATR Drug Library
4	80	99.60	Cocaine HCl Sigma Lot #50K1124	TBI ATR #2

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COCAINE BASE NEAT BH MERCK U7472 12-15-22

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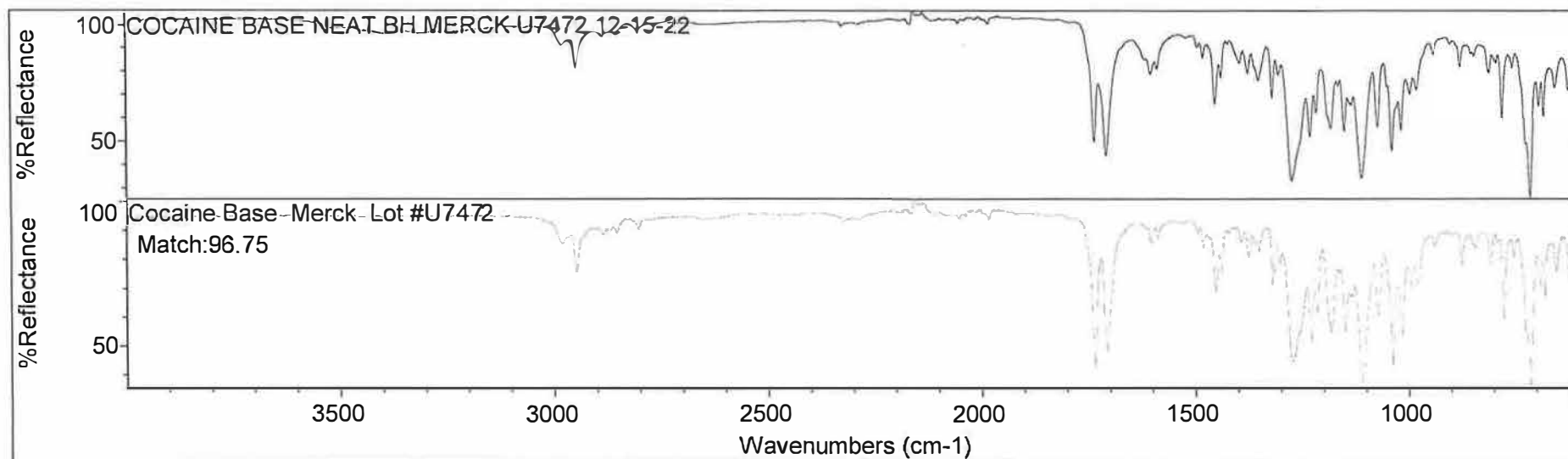
Collection time: Thu Dec 15 09:45:51 2022 (GMT-06:00)

IR# 6

Detector: DTGS KBr
Beamsplitter: KBr
Source: IRNumber of sample scans: 16
Number of background scans: 16
Resolution: 4.000
Sample gain: 8.0
Optical velocity: 0.4747
Aperture: 80.00

Appendix A

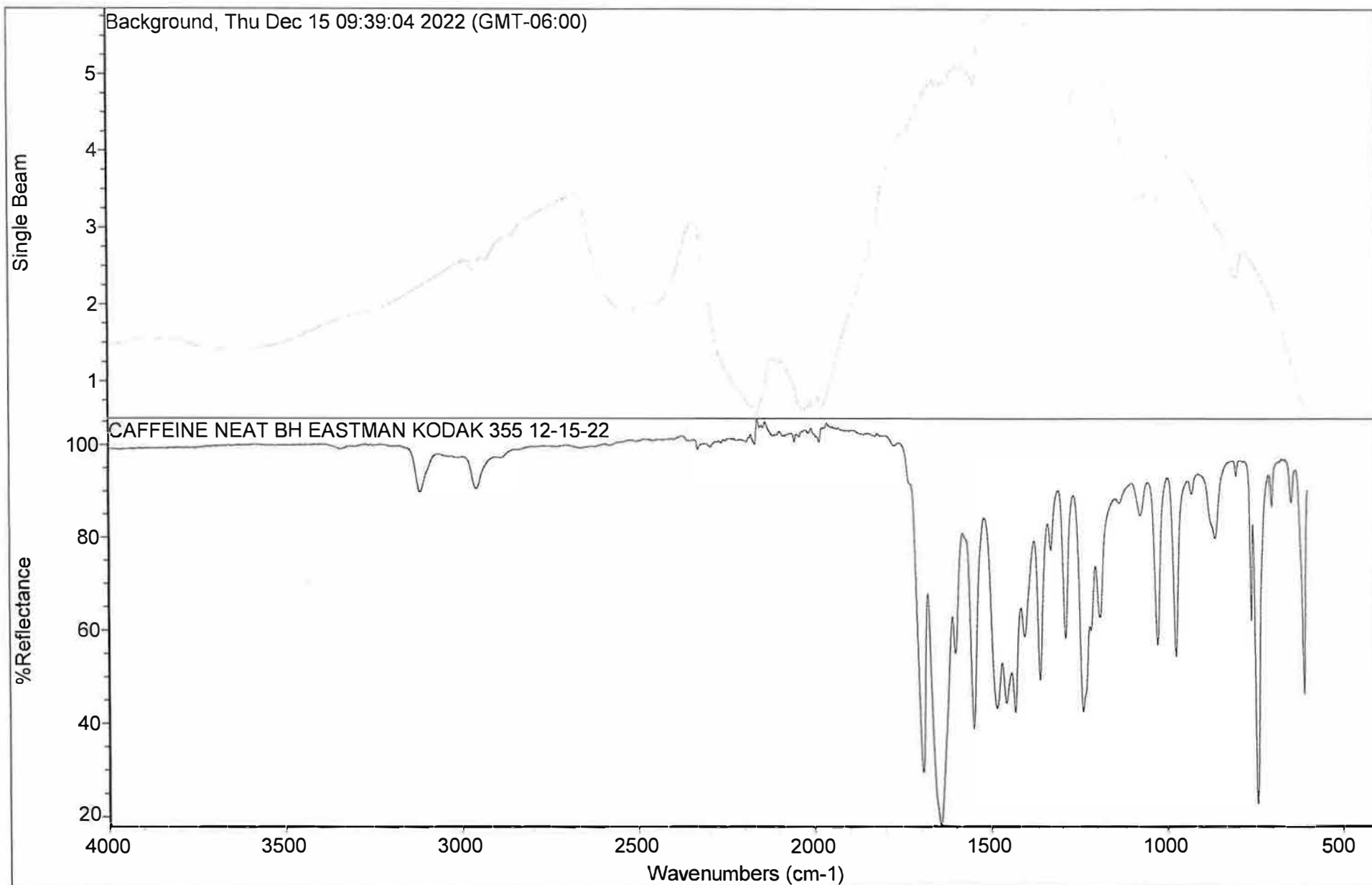
Search results for: COCAINE BASE NEAT BH MERCK U7472 12-15-22
Date: Thu Dec 15 09:47:01 2022 (GMT-06:00)
Search algorithm: Correlation
Regions searched: 3998.72-599.78



Search results list of matches

	Index	Match	Compound Name	Library Name
1	309	96.75	Cocaine Base Merck Lot #U7472	TBI ATR LIBRARY
2	32	96.75	Cocaine Base Merck Lot #U7472	TBI ATR LIBRARY
3	32	96.75	Cocaine Base Merck Lot #U7472	TBI ATR Drug Library
4	81	96.75	Cocaine Base Merck Lot #U7472	TBI ATR #2

mk



CAFFEINE NEAT BH EASTMAN KODAK 355 12-15-22

Collection time: Thu Dec 15 09:40:41 2022 (GMT-06:00)

IR# 6

Detector: DTGS KBr
Beamsplitter: KBr
Source: IRNumber of sample scans: 16
Number of background scans: 16
Resolution: 4.000
Sample gain: 8.0
Optical velocity: 0.4747
Aperture: 80.00

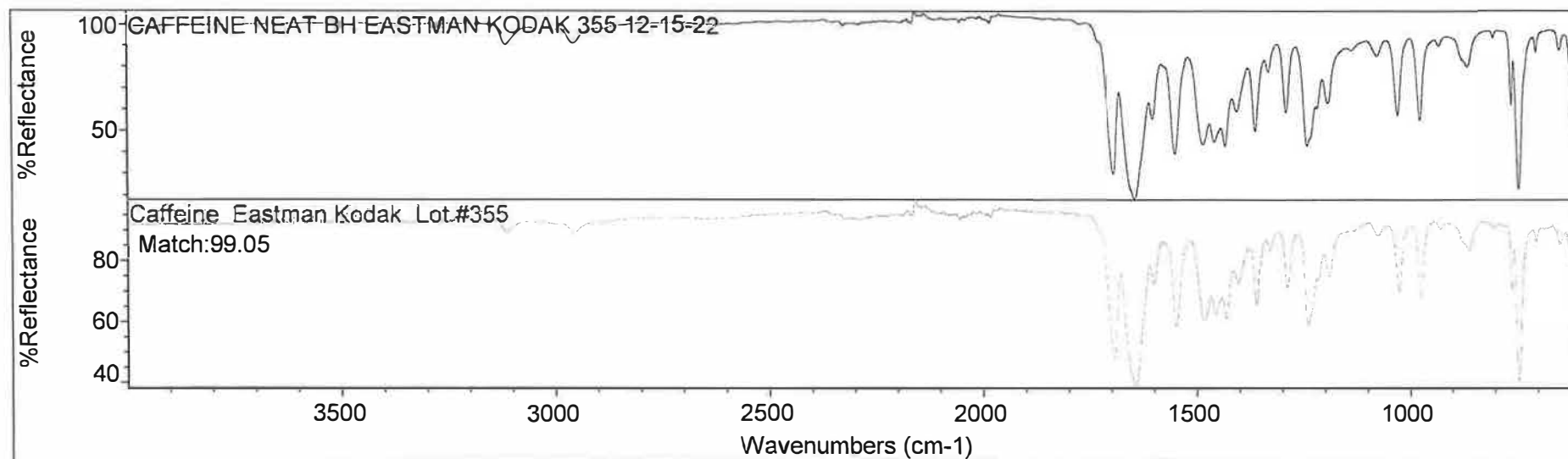
Appendix A

Search results for: CAFFEINE NEAT BH EASTMAN KODAK 355 12-15-22

Date: Thu Dec 15 09:42:12 2022 (GMT-06:00)

Search algorithm: Correlation

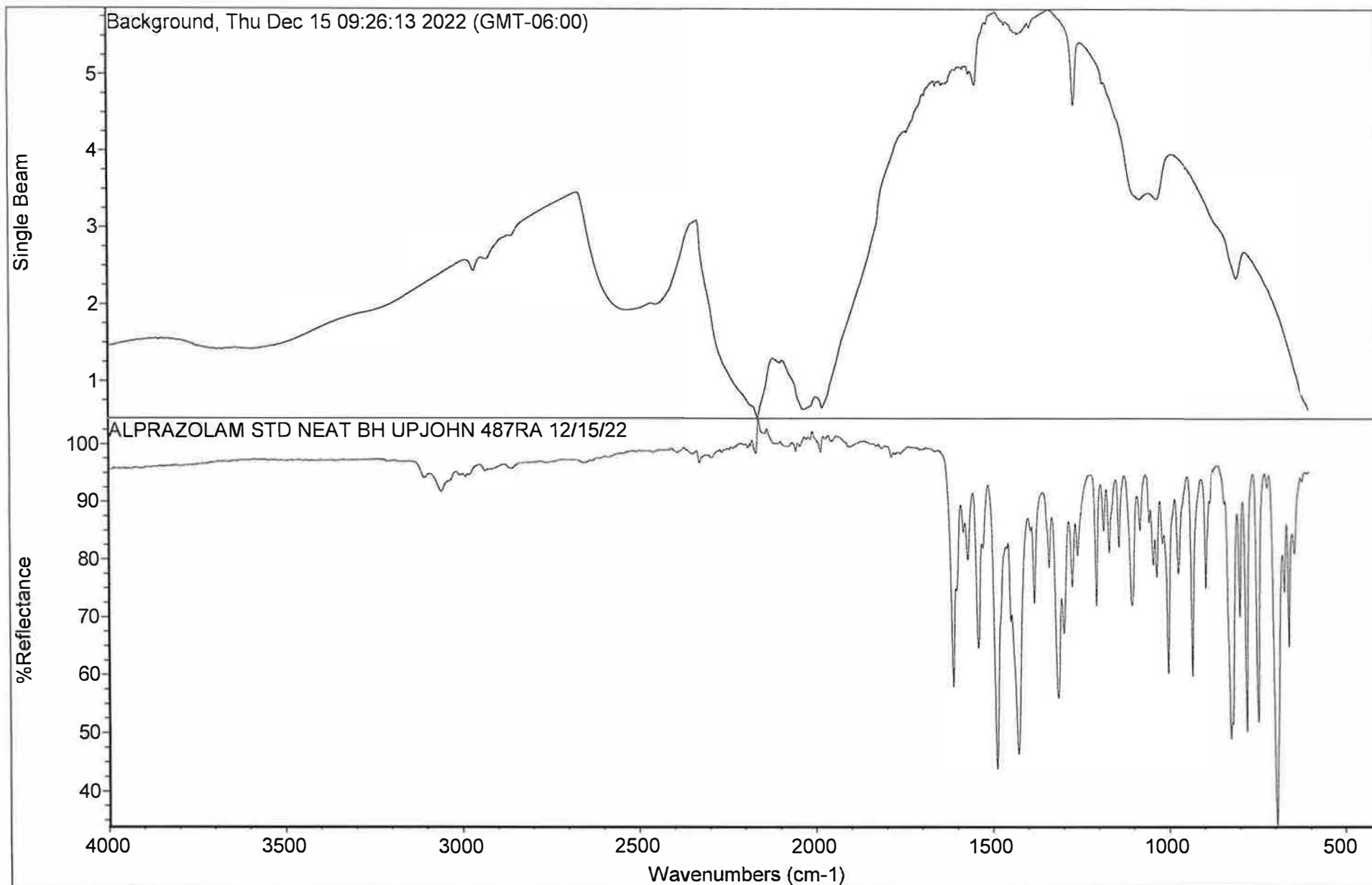
Regions searched: 3998.72-599.78



Search results list of matches

	Index	Match	Compound Name	Library Name
1	298	99.05	Caffeine Eastman Kodak Lot #355	TBI ATR LIBRARY
2	21	99.05	Caffeine Eastman Kodak Lot #355	TBI ATR LIBRARY
3	21	99.05	Caffeine Eastman Kodak Lot #355	TBI ATR Drug Library
4	70	99.05	Caffeine Eastman Kodak Lot #355	TBI ATR #2

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ALPRAZOLAM STD NEAT BH UPJOHN 487RA 12/15/22

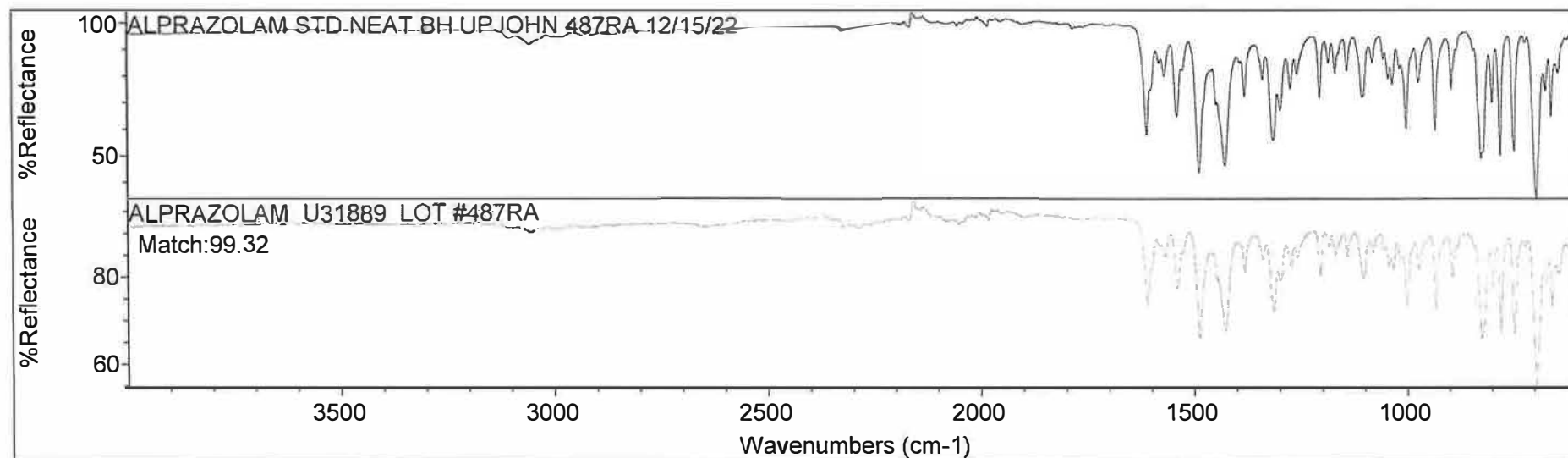
Collection time: Thu Dec 15 09:28:03 2022 (GMT-06:00)

IR# 6

Detector: DTGS KBr
Beamsplitter: KBr
Source: IRNumber of sample scans: 16
Number of background scans: 16
Resolution: 4.000
Sample gain: 8.0
Optical velocity: 0.4747
Aperture: 80.00

Appendix A

Search results for: ALPRAZOLAM STD NEAT BH UPJOHN 487RA 12/15/22
Date: Thu Dec 15 09:32:33 2022 (GMT-06:00)
Search algorithm: Correlation
Regions searched: 3998.72-599.78



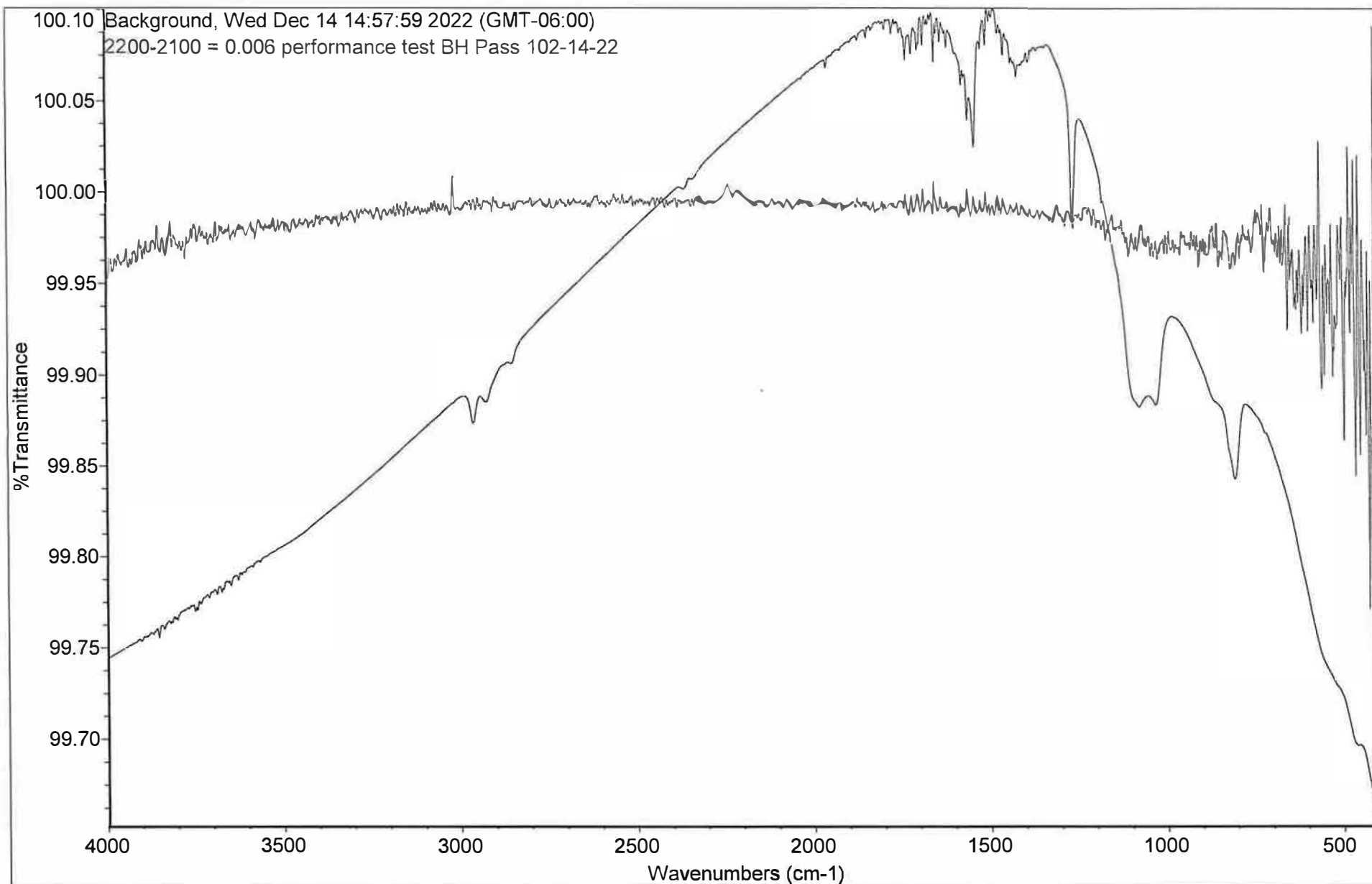
Search results list of matches

	Index	Match	Compound Name	Library Name
1	278	99.32	ALPRAZOLAM U31889 LOT #487RA	TBI ATR LIBRARY
2	1	99.32	ALPRAZOLAM U31889 LOT #487RA	TBI ATR LIBRARY
3	1	99.32	ALPRAZOLAM U31889 LOT#487RA	TBI ATR Drug Library
4	50	99.32	ALPRAZOLAM U31889 LOT #487RA	TBI ATR #2

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<u>ATR Maintenance Log</u>						
			Instrument <u>ATR 6</u>			
Date	Initials	Bench Alignment	Polystyrene Spectra	Instrument Verification	Bench Diagnostics	Other Maintenance
12-14-22	BH	5.96	0.006	Y	Y	





2200-2100 = 0.006 performance test BH Pass 102-14-22

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Collection time: Wed Dec 14 14:59:28 2022 (GMT-06:00)

IR# 6

Detector: DTGS KBr
Beamsplitter: KBr
Source: IRNumber of sample scans: 36
Number of background scans: 36
Resolution: 4.000
Sample gain: 1.0
Optical velocity: 0.6329
Aperture: 80.00

Appendix A

ValPro Qualification Report

Qualification test: Nicolet iS10 system KBr-EP

Operator: DrugLab

Date: Wednesday, December 14, 2022 1:17:18 PM (GMT-06:00)

Instrument: Nicolet iS10 Serial number: AKX1100576

Filename: Nicolet iS10 system KBr-EP_20221214_131718.spg

Test description	High limit	Low limit	Measured	Result
Energy ratio				
Energy ratio 4000 / 2000	1.00	0.20	0.26	Pass
Energy ratio 2000 / 1000	4.00	0.80	1.48	Pass
Noise level				
P-P noise 4050 - 3950 (%T)	0.25	0.00	0.01	Pass
P-P noise 2050 - 1950 (%T)	0.221	0.00	0.007	Pass
P-P noise 1050 - 950 (%T)	0.10	0.00	0.02	Pass
P-P noise 550 - 450 (%T)	1.50	0.00	0.11	Pass
RMS noise 4050 - 3950	0.05	0.00	0.00	Pass
RMS noise 2050 - 1950	0.039	0.00	0.001	Pass
RMS noise 1050 - 950	0.014	0.00	0.005	Pass
RMS noise 550 - 450	0.30	0.00	0.02	Pass
Wavenumber accuracy				
Peak at 3060.0 (cm-1)	3061.0	3059.0	3059.8	Pass
Peak at 2849.5 (cm-1)	2850.5	2848.5	2849.4	Pass
Peak at 1942.9 (cm-1)	1943.9	1941.9	1942.7	Pass
Peak at 1601.2 (cm-1)	1602.2	1600.2	1601.2	Pass
Peak at 1583.0 (cm-1)	1584.0	1582.0	1583.0	Pass
Peak at 1154.5 (cm-1)	1155.5	1153.5	1154.5	Pass
Peak at 1028.3 (cm-1)	1029.3	1027.3	1028.4	Pass
Optical resolution				
Resolution 2870 - 2849.5 (Abs)	10.00	0.33	0.42	Pass
Resolution 1589 - 1583 (Abs)	10.00	0.08	0.12	Pass
Repeatability				
Peak at 3027.1 (cm-1)	5.00	-5.00	-0.01	Pass
Peak at 1028.3 (cm-1)	1.00	-1.00	0.00	Pass
Intensity at 2849.5 (%T)	0.50	-0.50	0.03	Pass
Intensity at 1028.3 (%T)	0.50	-0.50	0.01	Pass
Detector linearity				
Slope	1.10	0.90	0.97	Pass
Intercept (%T)	1.00	-1.00	0.13	Pass

Performed by: Ben Hubert Title: SA/FS Date: 12/14/22

Approved by: _____ Title: _____ Date: _____

Comments: _____

Digital comment(s):

No digital comments found.

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Power Supply	Status	Current	Acceptable Range
+ 5 Volt	Pass	5.00V	4.50V to 5.50V
+ 12 Volt	Pass	12.19V	10.80V to 13.20V
- 12 Volt	Pass	-12.10V	-13.20V to -10.80V
+1.2 Volt	Pass	1.28V	1.13V to 1.39V
+3.3 Volt	Pass	3.38V	3.00V to 3.60V

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Item	Status	Current	Acceptable Range
Laser Current	Pass	0.77A	0.20A to 1.30A
Source Voltage	Pass	10.93V	4.00V to 13.00V
Source Current	Pass	1.31A	0.10A to 10.00A
Source Power		14.37W	
Temperature	Pass	50.72C	0.50C to 70.00C

Print

Return

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