

# OPERATING **GT6000 MOBILIS** FTIR GAS ANALYZER & OPTIONAL HOT/WET EXTRACTIVE SAMPLING SYSTEM QUICK GUIDE

Check the GT6000 & Calcmet manuals for full user instructions  
or contact local representative or Gaset

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## GT6000 Mobilis FTIR Gas Analyzer & optional Sampling system



## Suggested Start-Up procedure

1. Install Heated Sample Lines before switching on power to GT6000 or PSS  
( **Caution** : The connectors become very hot and gloves should be worn if tightening/adjusting is required when GT6000 or PSS is power on)
2. Power GT6000 & PSS on after Sample Lines installed
3. Turn rotary communication Switch to Bluetooth (if using another communication method be sure to change settings in Calcmeter EASY software to match)
4. Install PSS control cable between GT6000 and PSS



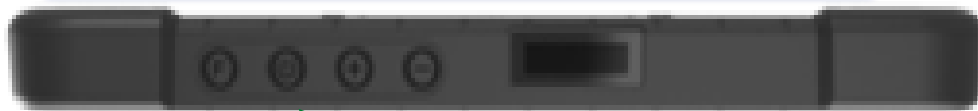
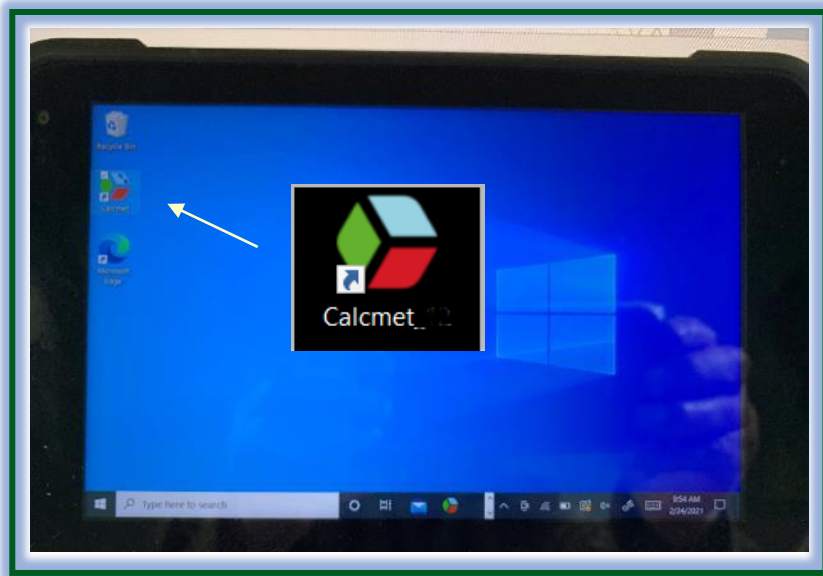
5. Warm up to 180C (354F) operating temperature takes ~ 30 mins.  
Monitoring of the warmup (temperature in GT6000, heated lines & sample pump) can be viewed in Calcmeter EASY software

# Running Calcmet™ EASY on Gasmeter Tablet

Calcmet - [Analysis Results - SN54955\_c14\_135\_Rev1.CLIB: SAMPLE\_57541.SPEX]

Ch	Component	Concentration	Unit	Co..	Range	Residual
0001	Water vapor H2O	13.52	vol-%	wet	25	0.0062
0002	Carbon dioxide CO2	7.48	vol-%	wet	20	0.0007
0003	Carbon monoxide CO	33.53	ppm	wet	2000	0.0039
0004	Nitrous oxide N2O	2.46	ppm	wet	100	0.0038
0005	Nitrogen monoxide NO	21.43	ppm	wet	1500	0.0048
0006	Nitrogen dioxide NO2	2.62	ppm	wet	250	0.0007
0007	Sulfur dioxide SO2	0.00	ppm	wet	50	0.0095
0008	Ammonia NH3	1.49	ppm	wet	50	0.0006
0009	Hydrogen chloride HCl	2.68	ppm	wet	50	0.0005
0010	Hydrogen fluoride HF	1.55	ppm	wet	50	0.0022
0011	Methane CH4	1.44	ppm	wet	100	0.0028
0012	Ethane C2H6	0.00	ppm	wet	200	0.0033
0013	Ethylene C2H4	1.12	ppm	wet	100	0.0006
0014	Propane C3H8	0.00	ppm	wet	50	0.0029
0015	Hexane C6H14	0.06	ppm	wet	50	0.0028
0016	Formaldehyde HCOH	0.70	ppm	wet	50	0.0005

gasmeter OK



1. Turn on Tablet
2. Double Tap Calcmet Icon with Stylus or Finger
3. Wait 10-20 secs for Calcmet EASY screen  
(last application library used will automatically load \_ Default is CalcmetLibraryXXXXX

(xxxxx= serial number of GT6000)

If Calcmet software installed on users own laptop refer to Appendix 1.



# Check Hardware Status

## Click Hardware



Checks that the analyzer is ready to measure  
'Hardware status is **OK**' is displayed  
if analyzer is ready to measure. This occurs  
when all components in touch with the sample  
have reached the 180C operating temperature.

If 'Hardware status is Not OK' is displayed  
Click on Details. Contact Gasmeter or  
representative if Status 'OK'  
cannot be displayed after waiting further  
warm-up time.

Description	Value	Unit
Status	OK	
Software version	14.140	
Time	2021-04-22 16:17:14	
Resolution	7.72	1/cm
Data range	594.4 - 4400.4	1/cm
Path length	500	
Sample line	0	
Sample scans	10	
Serial number	32295	
Analyzer type	GT6000 Mobilis + PSS Plus	
Cell temperature	180.08	°C
Pressure	998.00	mbar
Pressure configuration	AP	
PSS status	READY/OK	
PSS oven temperature	180.00	
PSS line in temperature	179.50	
PSS line out temperature	180.00	
PSS oxygen calibration	CALIBRATED	

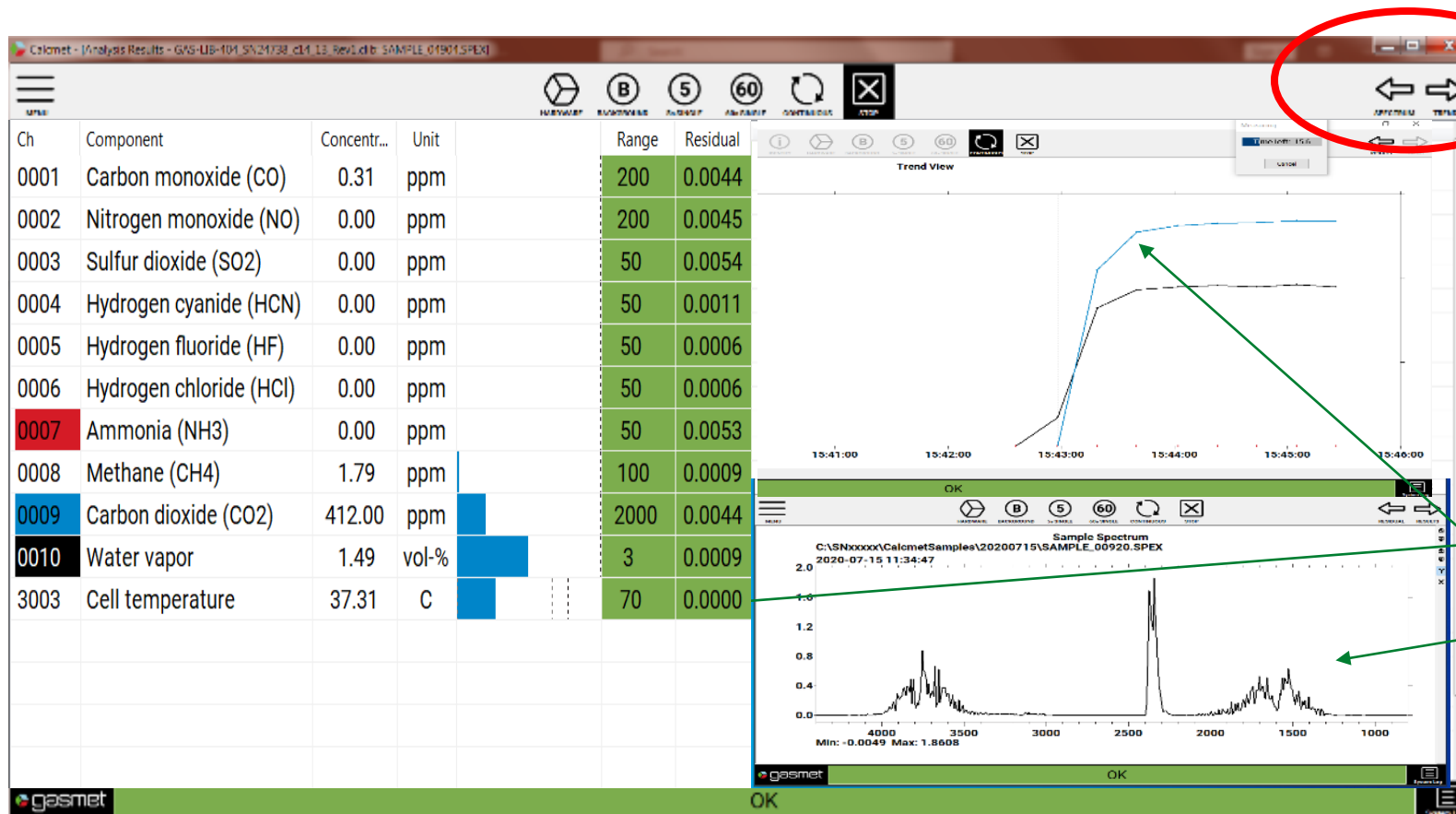
Input 1:	0.00	Input 5:	0.00
Input 2:	0.00	Input 6:	0.00
Input 3:	0.00	Input 7:	0.00
Input 4:	0.00	Input 8:	0.00

Update Copy Cancel

If error occurs after clicking Hardware, check settings according to slide  
"GT6000 & Calcmeter EASY Communication Settings"



# Calcmnet EASY Software



Left & Right arrows  
move between  
screens

## Views

Results

Spectrum

Trend

Residual


Background

**Five different screens available**

(each screen is separate not as shown above)

# Verify GT6000 is functioning correctly



1. Position heated sample probe so it can draw in fresh ambient air (ie not installed in stack)
2. Start a continuous measurement where pump will automatically started by clicking 
3. Countdown clock initiates when Continuous button clicked showing measurement time. Analysis results are updated to the screen at end of each cycle.

4. Check that OK is displayed

5. One single measurement where the **pump is not activated** can be taken by clicking



MENU	IDENTIFY	HARDWARE	BACKGROUND	5s SINGLE	60s SINGLE	CONTINUOUS	STOP	SPECTRUM	TREND
0001	Carbon monoxide (CO)	0.31	ppm					200	0.0044
0002	Nitrogen monoxide (NO)	0.00	ppm					200	0.0045
0003	Sulfur dioxide (SO2)	0.00	ppm					50	0.0054
0004	Hydrogen cyanide (HCN)	0.00	ppm					50	0.0011
0005	Hydrogen fluoride (HF)	0.00	ppm					50	0.0006
0006	Hydrogen chloride (HCl)	0.00	ppm					50	0.0006
0007	Ammonia (NH3)	0.00	ppm					50	0.0053
0008	Methane (CH4)	1.79	ppm					100	0.0009
0009	Carbon dioxide (CO2)	412.00	ppm					2000	0.0044
0010	Water vapor	1.49	vol-%					3	0.0009
3003	Cell temper	37.31	C					70	0.0000

# Background measurement

1. Connect 5.0 purity nitrogen ( $N_2$ ) gas to **Zero gas port** inlet on the PSS. Depending on the regulator for the zero gas bottle following flush times are recommended.



2. Flush Time setting (Menu → Measuring Times)  
When ( $N_2$ ) gas flow is 2 – 4 l/min set Flush time = 120s

3. Observe Zero gas flow on PSS Rotameter

4. Click **Background** .



The GT5000 will automatically proceed to the perform background. Time clock will show Flush Time then count down the preset 3 mins background time. At completion of background a new screen as shown next page will be displayed.

**Turn off Nitrogen zero gas.**

Configuration settings

**Measuring Times**

Flush time:

Pump time:

Sampling time:

Measuring interval:

Limit continuous samples:

**Background Measurement**

Flush time:

Measuring time:



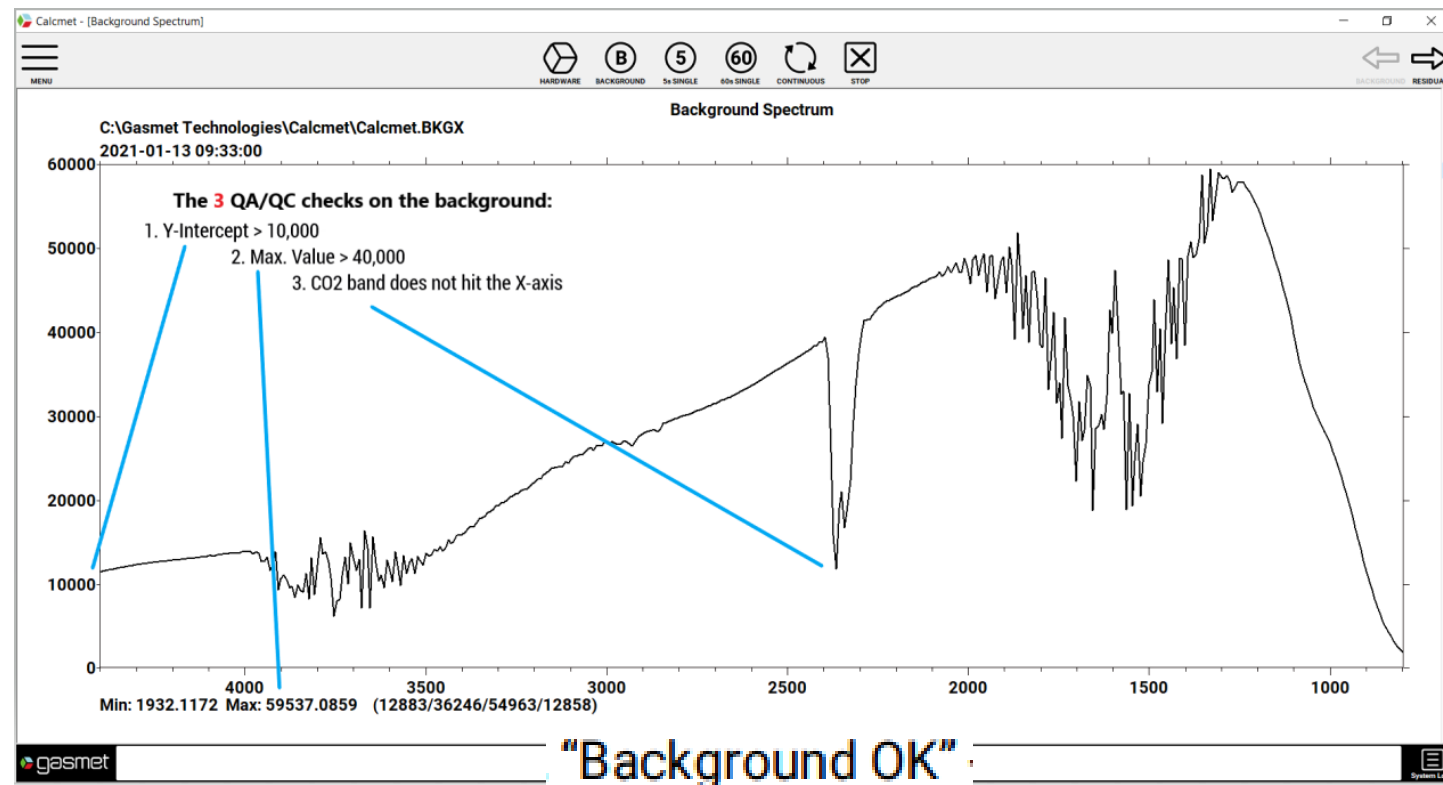


# CHECKING BACKGROUND

Check these two parameters :

- 1). Max value \_ **Pass** if reading  $> 40,000$
- 2). Y-intercept \_ **Pass** if reading  $> 10,000$

Contact Gasmeter or your representative if there is a Fail for either above parameters.



- 3). The CO<sub>2</sub> band should not reach the x-axis. (refer line 3.above)

If this fails \_ Repeat Background but first check following :

- a. Is (N<sub>2</sub>) gas turned on & contain pressure ?
- b. Is (N<sub>2</sub>) gas connected to GT5000 zero gas connector ?



This message is displayed if background successful



# GT6000 Taking Measurements



1. Install Heated Sample probe into stack. Use Gasmeter supplied “donut foam” or equivalent to ensure no cold spot between sample probe and heated line.

2. Start a continuous measurement started by clicking  the sample pump in PSS will start.

3. Continuous measurement starts, countdown clock appears counting down from 60s .

4. At completion of 60s the gas readings or Analysis Results will be updated for all gases.

5. Historical measurement data can be viewed on the Trend Graph page.



Calcmeter - [Analysis Results - Hazmat\_Identify\_Unknowns\_Application\_SN41343.CLL...]

MENU	IDENTIFY	HARDWARE	BACKGROUND	5s SINGLE	60s SINGLE	CONTINUOUS	STOP	SPECTRUM	TREND
0001	Carbon monoxide (CO)	0.31	ppm					200	0.0044
0002	Nitrogen monoxide (NO)	0.00	ppm					200	0.0045
0003	Sulfur dioxide (SO2)	0.00	ppm					50	0.0054
0004	Hydrogen cyanide (HCN)	0.00	ppm					50	0.0011
0005	Hydrogen fluoride (HF)	0.00	ppm					50	0.0006
0006	Hydrogen chloride (HCl)	0.00	ppm					50	0.0006
0007	Ammonia (NH3)	0.00	ppm					50	0.0053
0008	Methane (CH4)	1.79	ppm					100	0.0009
0009	Carbon dioxide (CO2)	412.00	ppm					2000	0.0044
0010	Water vapor	1.49	vol-%					3	0.0009
3003	Cell temperature	37.31	C					70	0.0000

gasmeter OK System Log

Perform any site performance verification test if measurements being recorded as part of regulatory compliance testing. Refer to specific Test Method.



# Interpreting Analysis Results (1)

Calcmnet - [Analysis Results - SN54955\_c14\_135\_Rev1.CLIB: SAMPLE\_57541.SPEX]

Ch	Component	Concentration	Unit	Co...	Range	Residual
0001	Water vapor H2O	13.52	vol-%	wet	25	0.0062
0002	Carbon dioxide CO2	7.48	vol-%	wet	20	0.0007
0003	Carbon monoxide CO	33.53	ppm	wet	2000	0.0039
0004	Nitrous oxide N2O	2.46	ppm	wet	100	0.0038
0005	Nitrogen monoxide NO	21.43	ppm	wet	1500	0.0048
0006	Nitrogen dioxide NO2	2.62	ppm	wet	250	0.0007
0007	Sulfur dioxide SO2	0.00	ppm	wet	50	0.0095
0008	Ammonia NH3	1.49	ppm	wet	50	0.0006
0009	Hydrogen chloride HCl	2.68	ppm	wet	50	0.0005
0010	Hydrogen fluoride HF	1.55	ppm	wet	50	0.0022
0011	Methane CH4	1.44	ppm	wet	100	0.0028
0012	Ethane C2H6	0.00	ppm	wet	200	0.0033
0013	Ethylene C2H4	1.12	ppm	wet	100	0.0006
0014	Propane C3H8	0.00	ppm	wet	50	0.0029
0015	Hexane C6H14	0.06	ppm	wet	50	0.0028
0016	Formaldehyde HCOH	0.70	ppm	wet	50	0.0005

gasmet OK

## Successful Analysis

What is normal ?

Calcmnet Software is reporting green residuals for all gas components. Concentration Alarms can occur if gas measures higher than Range or  
(if this not the case refer next page)

The two largest combustion gases should have significant values as shown below

1. **Carbon Dioxide (CO2)** : 5 – 20 v/v%
2. **Water Vapor (H2O)** : 5 – 25 v/v%

(If sampling form a vented or non-combustion source these values can be much lower)



# Interpreting Analysis Results (2)

ID	Gas Name	Concentration	Unit	Bar Chart	Residual	Value
0001	Carbon monoxide (CO)	5.39	ppm		Green	200 0.0042
0002	Nitrogen monoxide (NO)	7.39	ppm		Green	200 0.0047
0003	Sulfur dioxide (SO2)	38.38	ppm	Blue bar	Green	50 0.2051
0004	Hydrogen cyanide (HCN)	0.00	ppm		Green	50 0.0028
0005	Hydrogen fluoride (HF)	0.00	ppm		Green	50 0.0011
0006	Hydrogen chloride (HCl)	0.00	ppm		Green	50 0.0477
0007	Ammonia (NH3)	7.28	ppm	Blue bar	Green	50 0.1780
0008	Methane (CH4)	56.34	ppm	Blue bar	Yellow	100 0.2406
0009	Carbon dioxide (CO2)	899.02	ppm	Blue bar	Green	2000 0.0044
0010	Water vapor	0.93	vol-%	Blue bar	Green	3 0.0015
3003	Cell temperature	36.44	C	Blue bar	Green	70 0.0000

gasmeter Alarm System Log

## Unsuccessful Analysis

Calcmeter Easy Software is reporting sample measurement is not normal and needs further review before reporting.

Residual Column turns from **Green** to **Yellow** or **Red** for one or more gases  
AND

**ALARM** Condition



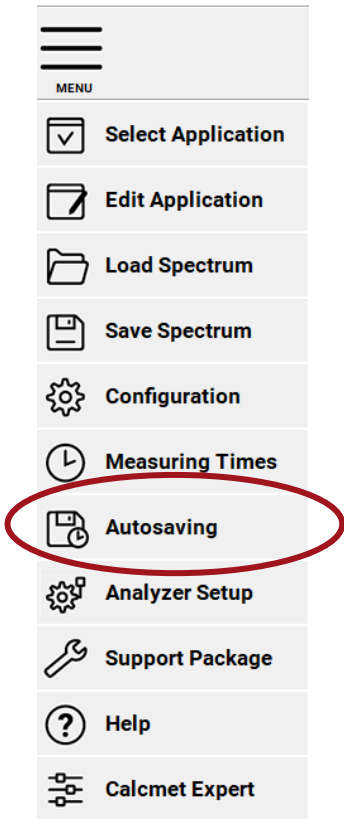
# Adjusting Measurement Time

The image illustrates the steps to adjust the measurement time in the software. It starts with the main menu where 'Measuring Times' is highlighted. This leads to the 'Configuration settings' dialog box, specifically the 'Measuring Times' tab. The 'Sampling time' dropdown menu is shown with '20 seconds' selected, which is circled in red to indicate the target setting.

There may be occasions when the measuring (Called sampling time in software) should be changed from the default of 60 seconds. The 3 common measurement time settings are 5s, 20s & 60s. 60s is recommended when seeking lowest detection levels and leaving the GT6000 stationary for longer term monitoring. 20s or 5s is recommended if the sample stream is dynamic (Shorter measurement times result in gas readings being noisier or more variation).



# Saving Data – Calcmet Easy Settings



Configuration settings

**Autosaving**

Sample Spectra

Autosave Sample Spectra

Autosave Folder: C:\SN26816\CalcmetSamples\ Browse...

Autosave File Name: SAMPLE

Create Folders by Date:  Compress Old Day Folders:

Backgrounds

Autosave Backgrounds

Autosave Folder: C:\SN26816\CalcmetBackgrounds\ Browse...

Results

Autosave Results

Autosave Folder: C:\SN26816\CalcmetResults\ Browse...

Autosave File Name (.TXT): RESULTS

Create Result Files by Date  Save Residuals to Result File

Logs

Autosave Folder: C:\CalcmetLog\ Browse...

OK Cancel

Check that Saving is activated per check marks in the box as shown

Note saving location for the files that are stored  
These include :

1. Text File
2. Spectra File
3. Background File
4. Log File

C:\SN26816 will change according to the serial number of your GT5000

# Saved Data (1) – Results File

All measured samples will be stored as a text file.

Location of saved files is **C:\SNxxxxx\CalcmResults\Date** (Date = when measurements taken)

Text file can be imported into EXCEL® using import wizard.

Date	Time	SpectrumFile	LibraryFile	Water	Unit	Residual	Carbon	Ur	Residu	Me	Ur	Resid	Nitr	Un	Resid	Carbon	Uni
2020-05-01	9:27:39 PM	C:\SN26816\Calcm	GAS-LIB-402_SN26816_c	0.44	vol-%	0.0004	834.57	ppm	0.0013	1.58	ppm	0.0014	0.23	ppm	0.0013	1.89	ppm
2020-05-01	9:28:58 PM	C:\SN26816\Calcm	GAS-LIB-402_SN26816_c	0.8	vol-%	0.0005	760.07	ppm	0.0012	1.66	ppm	0.0015	0.18	ppm	0.0009	1.8	ppm
2020-05-01	9:29:20 PM	C:\SN26816\Calcm	GAS-LIB-402_SN26816_c	1.06	vol-%	0.0005	705.12	ppm	0.0013	1.26	ppm	0.0017	0.25	ppm	0.001	1.61	ppm
2020-05-01	9:29:41 PM	C:\SN26816\Calcm	GAS-LIB-402_SN26816_c	1.09	vol-%	0.0006	704.13	ppm	0.0013	1.28	ppm	0.0018	0.25	ppm	0.0011	1.48	ppm
2020-05-01	9:30:03 PM	C:\SN26816\Calcm	GAS-LIB-402_SN26816_c	1.1	vol-%	0.0005	709.55	ppm	0.0013	1.49	ppm	0.0017	0.26	ppm	0.0011	1.51	ppm
2020-05-01	9:30:25 PM	C:\SN26816\Calcm	GAS-LIB-402_SN26816_c	1.1	vol-%	0.0006	712.02	ppm	0.0013	1.49	ppm	0.0018	0.26	ppm	0.0011	1.51	ppm
2020-05-01	9:31:16 PM	C:\SN26816\Calcm	GAS-LIB-402_SN26816_c	1.1	vol-%	0.0005	711.24	ppm	0.0012	1.31	ppm	0.0017	0.26	ppm	0.0011	1.54	ppm
2020-05-01	9:31:37 PM	C:\SN26816\Calcm	GAS-LIB-402_SN26816_c	1.1	vol-%	0.0006	701.64	ppm	0.0013	1.46	ppm	0.0018	0.26	ppm	0.0011	1.5	ppm
2020-05-01	9:31:59 PM	C:\SN26816\Calcm	GAS-LIB-402_SN26816_c	1.1	vol-%	0.0006	696.42	ppm	0.0011	1.45	ppm	0.0017	0.26	ppm	0.0011	1.54	ppm
2020-05-01	9:32:21 PM	C:\SN26816\Calcm	GAS-LIB-402_SN26816_c	1.1	vol-%	0.0007	700.85	ppm	0.0013	1.49	ppm	0.0018	0.25	ppm	0.0011	1.48	ppm
2020-05-01	9:32:42 PM	C:\SN26816\Calcm	GAS-LIB-402_SN26816_c	1.1	vol-%	0.0006	705.73	ppm	0.0012	1.29	ppm	0.0018	0.26	ppm	0.0011	1.56	ppm

**C:\SNxxxxx** will change according to the serial number of your GT6000



# Saved Data (2) – Calcmeter Sample Spectra

It may be necessary to re-analyze measured test samples

Location of saved sample spectra files is **C:\SNxxxxx\CalcmeterSamples\Date** (Sub-Folder when measurements taken)

These files can be Opened in Calcmeter Software under Load Spectrum

Ch	Component
0001	Carbon monoxide (CO)
0002	Nitrogen monoxide (NO)
0003	Sulfur dioxide (SO2)
0004	Hydrogen cyanide (HCN)
0005	Hydrogen fluoride (HF)
0006	Hydrogen chloride (HCl)
0007	Ammonia (NH3)
0008	Methane (CH4)
0009	Carbon dioxide (CO2)
0010	Water vapor
3003	Cell temperature

Open

Look in: 20220421

Name	Date modified	Type
<input type="checkbox"/> SAMPLE_00111	2022-04-21 6:43 AM	Calcmeter
<input type="checkbox"/> SAMPLE_00112	2022-04-21 6:43 AM	Calcmeter
<input type="checkbox"/> SAMPLE_00113	2022-04-21 8:49 AM	Calcmeter
<input type="checkbox"/> SAMPLE_00114	2022-04-21 8:50 AM	Calcmeter
<input type="checkbox"/> SAMPLE_00115	2022-04-21 8:50 AM	Calcmeter
<input type="checkbox"/> SAMPLE_00116	2022-04-21 8:50 AM	Calcmeter
<input type="checkbox"/> SAMPLE_00117	2022-04-21 8:51 AM	Calcmeter
<input type="checkbox"/> SAMPLE_00118	2022-04-21 8:54 AM	Calcmeter
<input type="checkbox"/> SAMPLE_00119	2022-04-21 8:55 AM	Calcmeter
<input type="checkbox"/> SAMPLE_00120	2022-04-21 8:56 AM	Calcmeter
<input type="checkbox"/> SAMPLE_00121	2022-04-21 8:56 AM	Calcmeter
<input type="checkbox"/> SAMPLE_00122	2022-04-21 8:57 AM	Calcmeter

File name:

Files of type: Calcmeter Spectrum Files (\*.SPEX)

Open Cancel NIST / EPA

Calcmeter will automatically re-analyze all the spectra selected and show the Trend View for all samples.

Note : the last sample is shown when processing finishes. Click on the trend view for Calcmeter to load a specific sample spectra.

Checking this boxes selects all spectra in the folder.

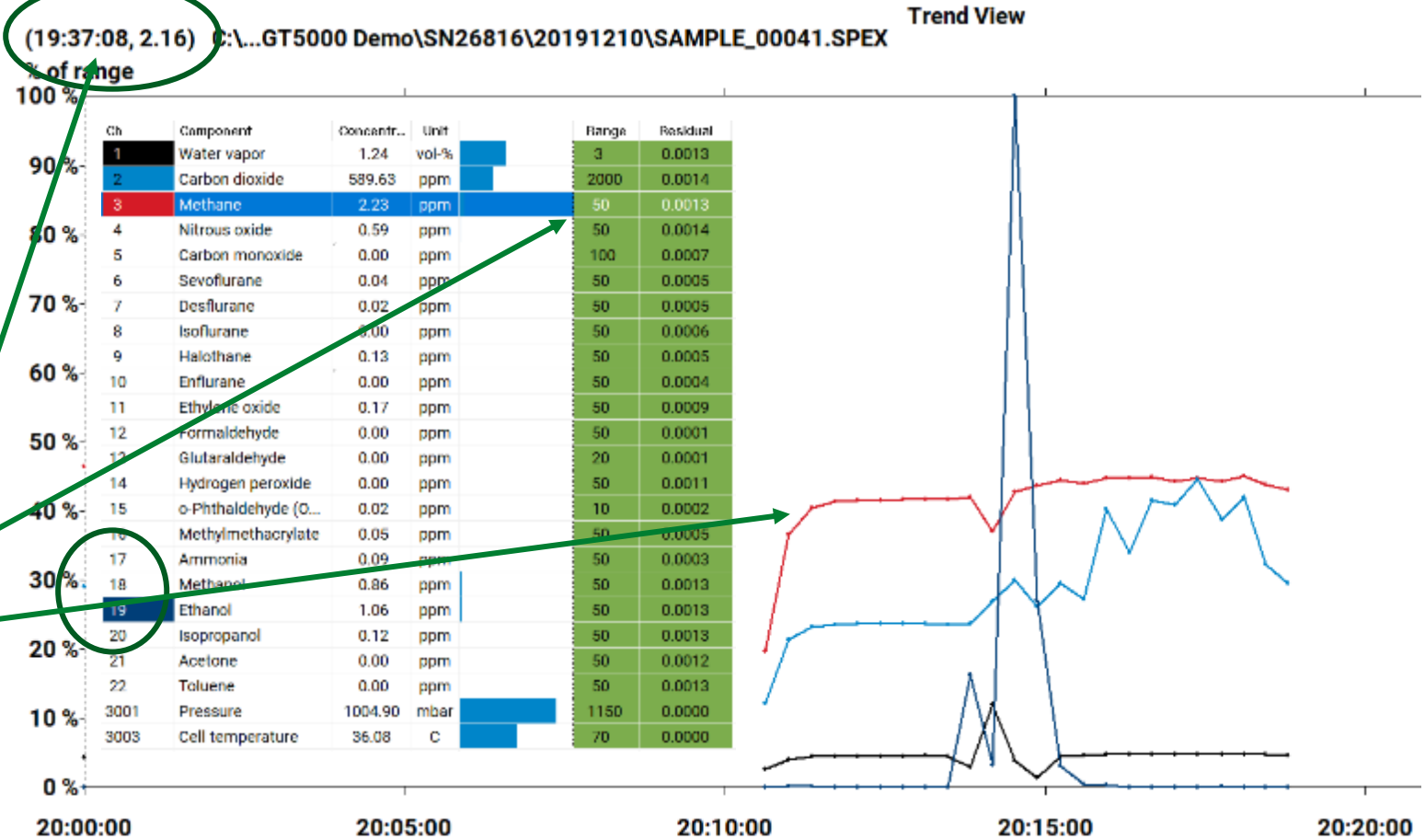


# Using the Trend Graph

- Up to 15 Components can be plotted on the Trend Graph
- Click on **Ch** column and a color will appear for this gas on the Trend Graph
- The 100% Y-axis = gas measurement range.

Example :

- Red gas = Methane
- 100% = 50 ppm
- Black component (always 1<sup>st</sup> gas clicked) shows time & gas concentration.



## About this document

The objective of this guide is to provide GT6000 Mobilis users a quick reference guide to get them familiar with the basic operation. It must be empathized that this guide does not replace the Model GT6000 Mobilis Operations manual, PSS Operation manual or the Calcmeter™ EASY software manual that was supplied with the gas analyzer.

The steps outlined in this guide focuses on a combustion gas tester setting up the standard CEMS application library as part of their testing of various emissions gases projects.

When using the GT6000 Mobilis to accurately quantify gases, it is strongly encouraged that additional quality control steps be initiated to verify further support the gas analysis readings. These steps can be reviewed in the manual(s) or further discussion with your local Gaset office or local representative.

To continued improvement and support of the Gaset portable FTIR gas analyzer users we invite your feedback on this document and/or other Gaset related matters.

**The FTIR gas measurement technology measures an extensive number of gases and vapors. However the following gases are not measured by the GT6000 - Nitrogen, Oxygen, Chlorine, Bromine, Fluorine, Neon, Helium, Argon, Krypton, Xenon, Radon, Mercury and H<sub>2</sub>S (Hydrogen Sulfide)**

