MAX-Bev™

The New Standard in Beverage Grade CO_2 Purity Monitoring

Airborne Labs International

Exclusive Distributor of Max-Bev™ Systems

What can a MAX-Bev™ Offer you?

Whether you are a CO_2 supplier or a bottler, a Max-Bev™ system will help to ensure product quality and reduce food safety risks to the consumer.

- Food Safety
- CO_2 Quality Assurance
- Fast, Reliable Data
- Low Operating Costs

The Basics

What is MAX-Bev™?

MAX-Bev™ is an integrated, On-Line CO_2 Monitoring System based on infrared (IR) & UV fluorescence spectroscopy for the rapid & accurate measurement of sensory active & harmful impurities in CO_2

Can Max-Bev™ meet ISBT CO_2 Impurity Guidelines?

- **YES**! It meets or exceeds **ALL** ISBT CO_2 test method performance criteria!

Why is MAX-Bev™ better than other solutions?

- Faster Analysis (every 6 sec update!!)
- Intuitive, Easy to Operate, Highly Automated
- Push Button CoA generation
- More ISBT Impurities Detected & at Lower Detection Limits
- Significantly Lower Operating & Maintenance Costs vs Competition
- More Robust Measurement Methods which Minimizes Analysis Errors & Costly Rejections of Perfectly Good Product – or release of Off-Spec Batches

Airborne Labs International

Exclusive Distributor of Max-Bev™ Systems

ACCURATE, EASY, RELIABLE AND *FAST*

ALL ISBT measurement results updated *every 6 seconds!!*

- MAX-Bev™ provides rapid "**Early Warning**" response to any developing process upset & produces rapid off-spec concentration alarms
- Faster analysis results in quicker truckload offloads & *lower demurrage costs*
- Compare vs. GC based systems (4 to 10 min. per update) or Older IR-based technology (10 – 15 min. per update!!)
- Easy to operate – Intuitive, large screen display of all impurity levels & limits
- Pushbutton CoA Generation!
- Secure Data Storage & Back-up
- Highly Automated & PLC friendly – Remote Monitoring Capability

Lower Operating & Maintenance Costs

MAX-Bev™ requires only *4 hours* of annual preventative maintenance (ex. Filter changes)

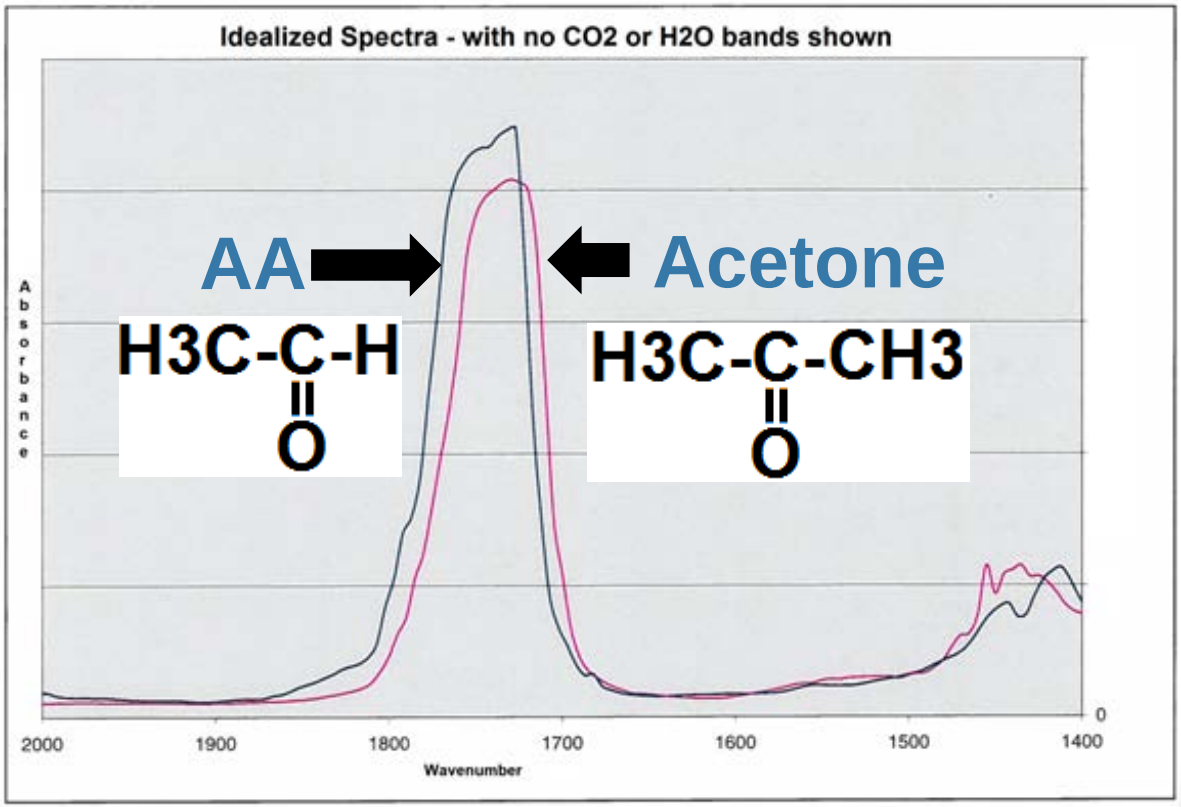
- Constant automatic / internal IR self-calibrations
- Calibration gas standards unnecessary - but available for periodic performance *verification*
- Automated periodic calibration / verification of TSC analyzer
- No high purity carrier gases needed (unlike GC)
- No annoying, expensive, “every 10 month” PID lamp replacements needed (unlike GC)
- Nitrogen purge gas only (no Helium or Hydrogen needed) = Simple Supply Logistics
- NO Expensive, Mandatory Yearly Service Contracts
- Fast Service network (not weeks or months like some competitors)
- Spare IR & UVF Modules available for Rapid Field Change-out & minimal down-time - if these units require return & repair

Airborne Labs International

Exclusive Distributor of Max-Bev™ Systems

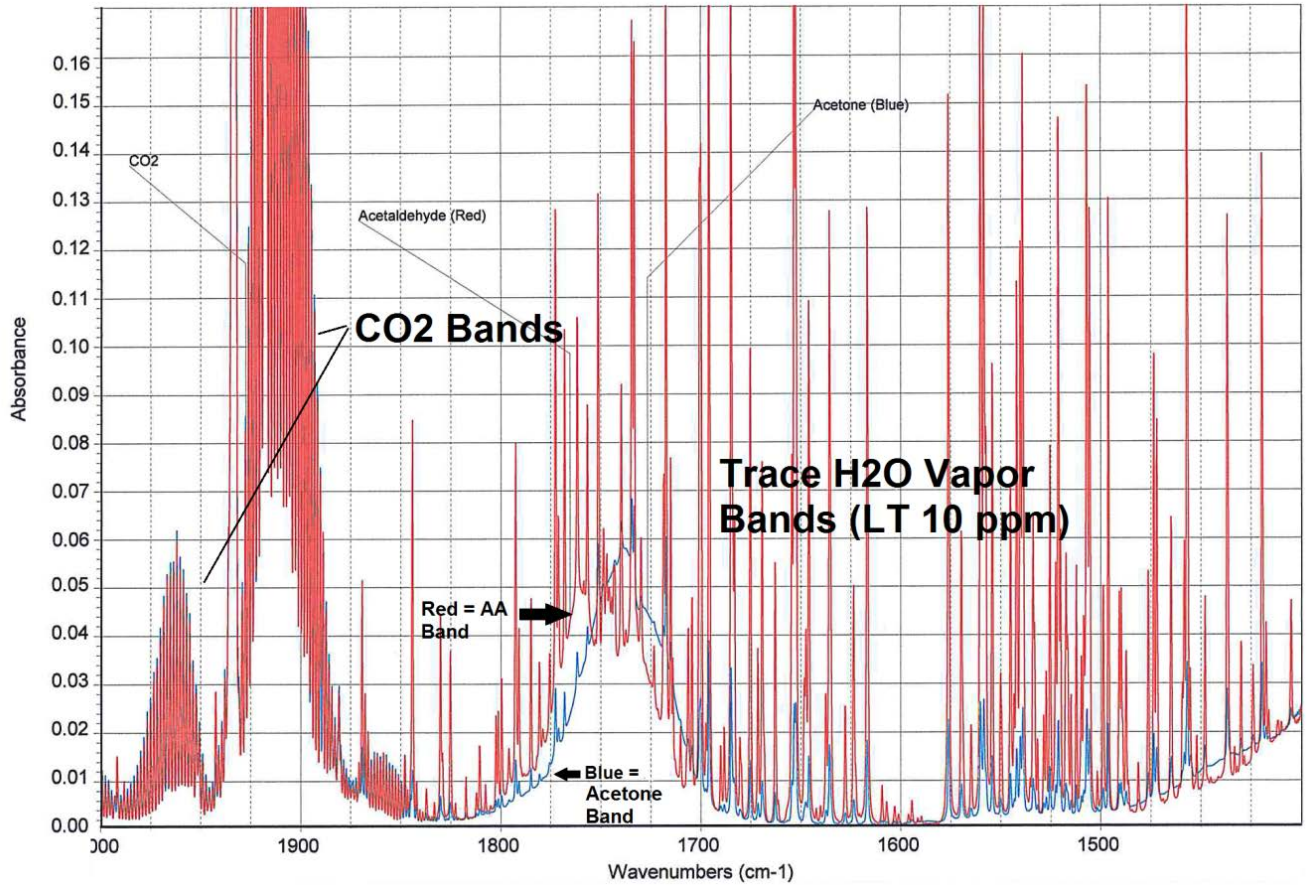
The Challenges of IR Measurements in CO_2

- *High AA is a common source of odor complaints & an ISBT Target Impurity*
- *AA is common in Fermentation & Combustion Feed Gas Sources*
- *Acetone is also a common impurity – but NOT an ISBT listed Target*



The Challenges of IR Measurements in CO_2

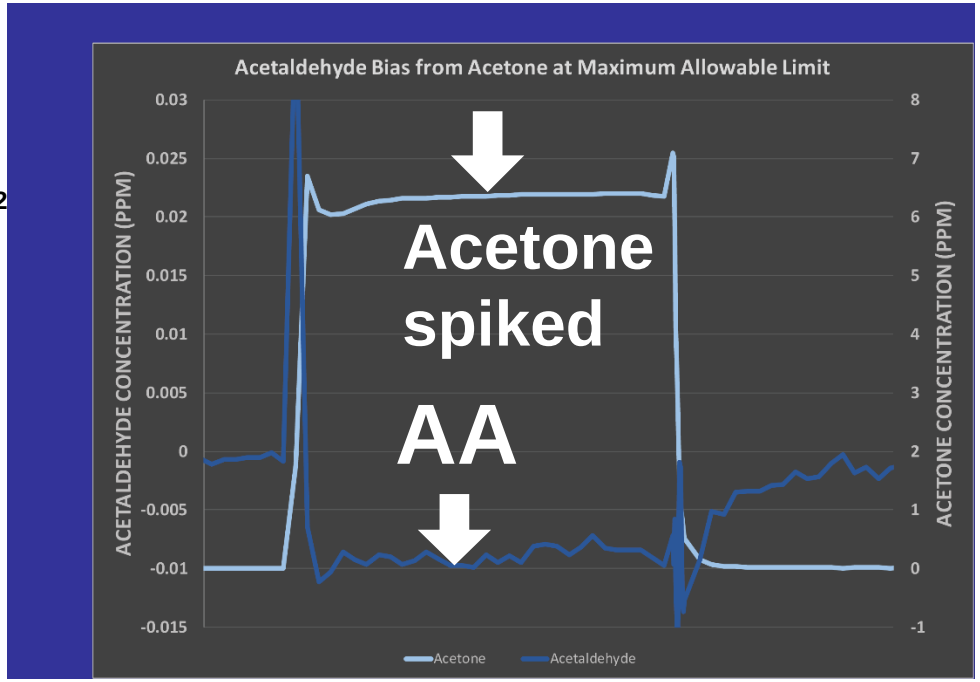
The Real World



MINIMIZE INTERFERENCES & REJECTED GOOD PRODUCT & LOST PRODUCTION!

MAX-Bev™ has superior impurity discrimination vs Older Generation IR & UV-based CO_2 Analyzers

- No more erroneous, false positive Acetaldehyde (AA) alarms that result in **rejection of good CO_2 loads & packaged bev-products**.
- Max-Bev™ eliminates issues with Acetone interference as it *easily distinguishes* between impurities with very similar IR spectra.
- Moisture at ISBT acceptable levels can create significant false positives for NO, NO_2, SO_2 detection in older IR-based systems. The MAX-Bev™ greatly reduces this influence to minimal, acceptable levels.
- As CO_2 Feed gas sources are increasingly diverse & complex – interference **robustness** is becoming a **critical consideration** in new analyzer selections!

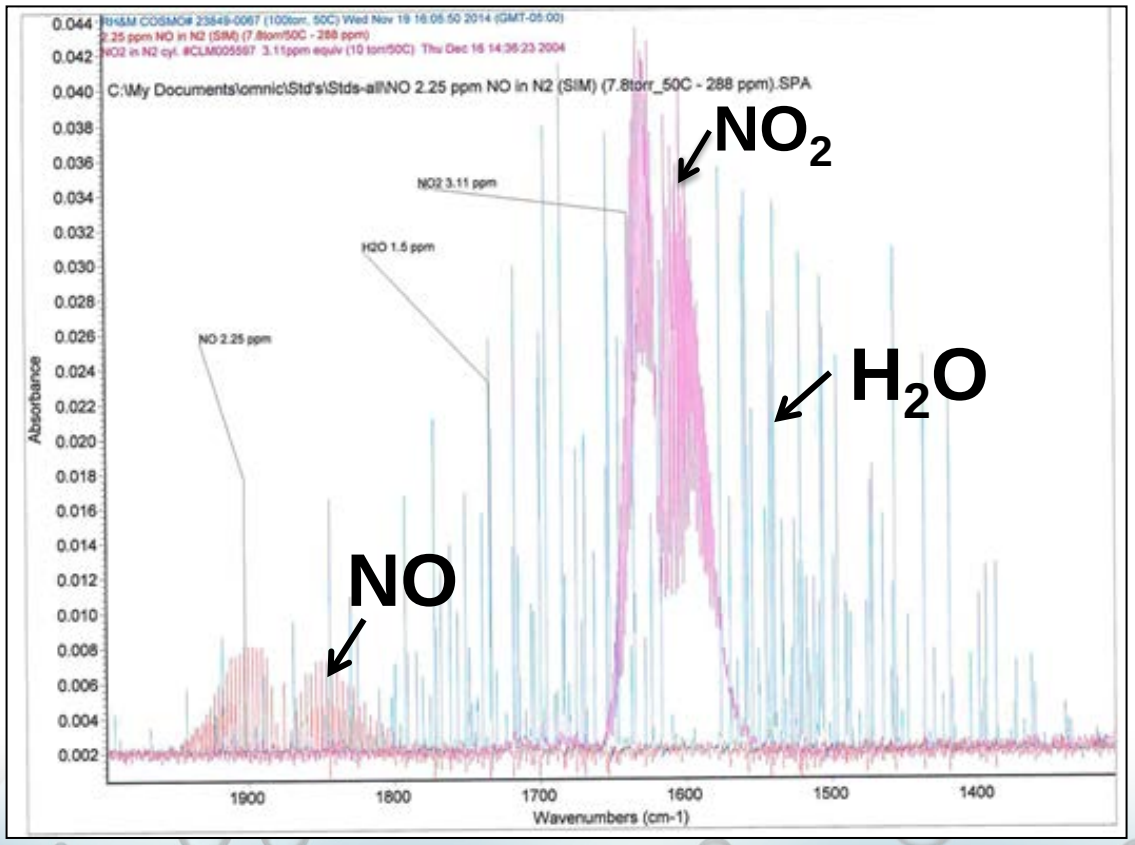


Airborne Labs International

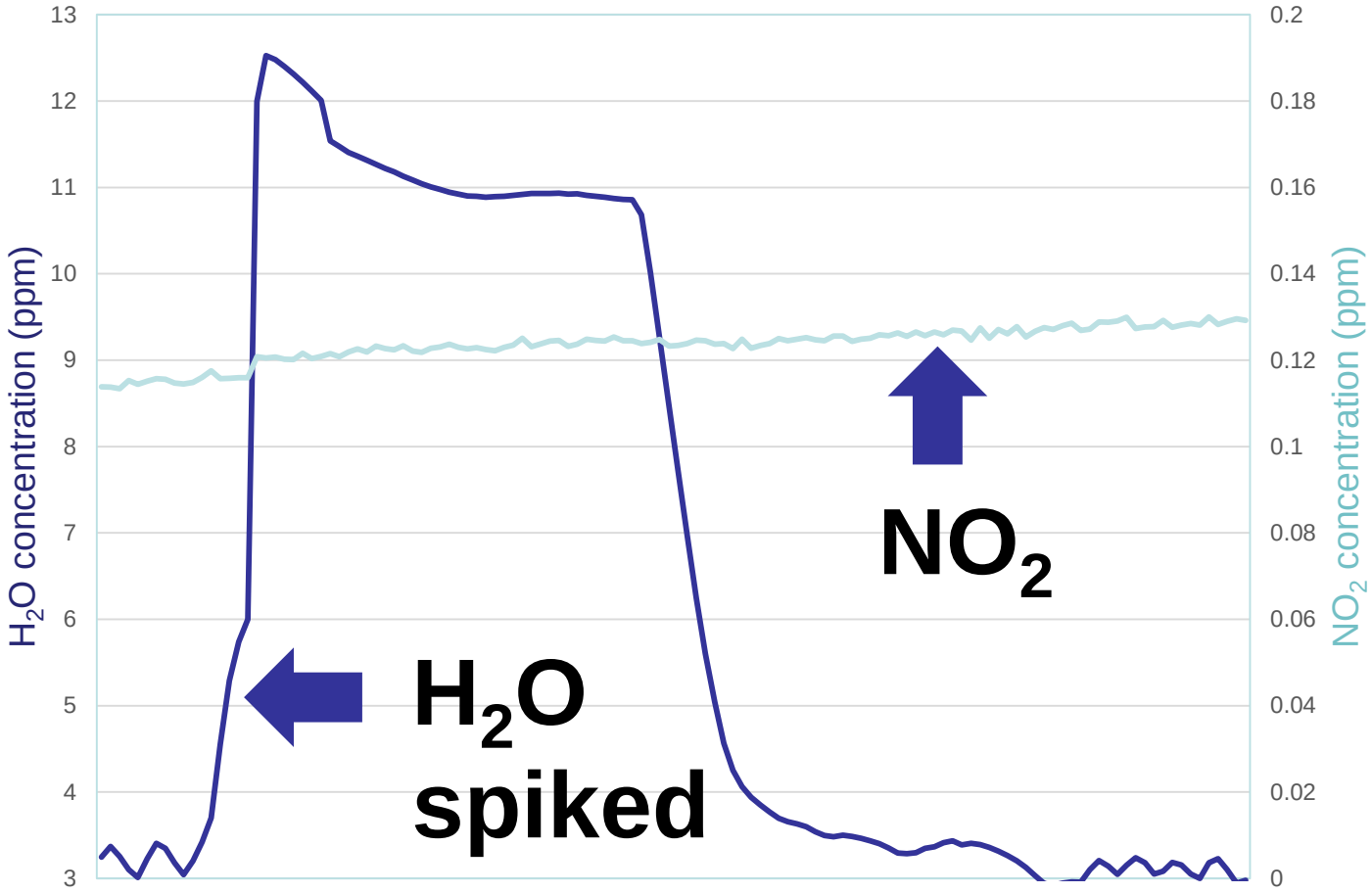
Exclusive Distributor of Max-Bev™ Systems

The Challenges of IR Measurements in CO_2

- *NO & NO_2 (NO_x) are ISBT Target Impurities*
- *NOx is common in Fermentation & Combustion Feed Gas Sources*
- *NO & NO_2 IR bands are superimposed by H_2O vapor bands*
- *NO band is superimposed by a CO_2 Band*

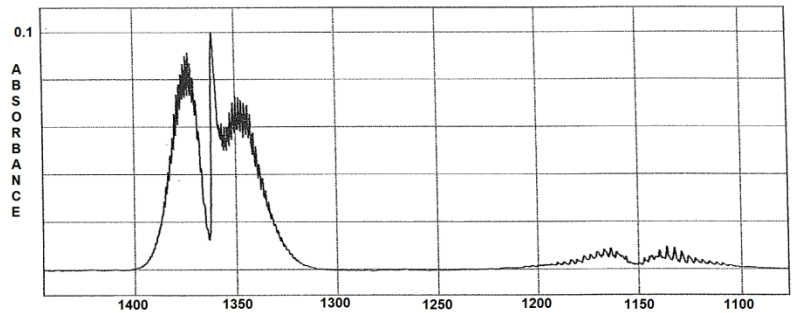


Effect of H_2O on NO_2 using MAX Bev

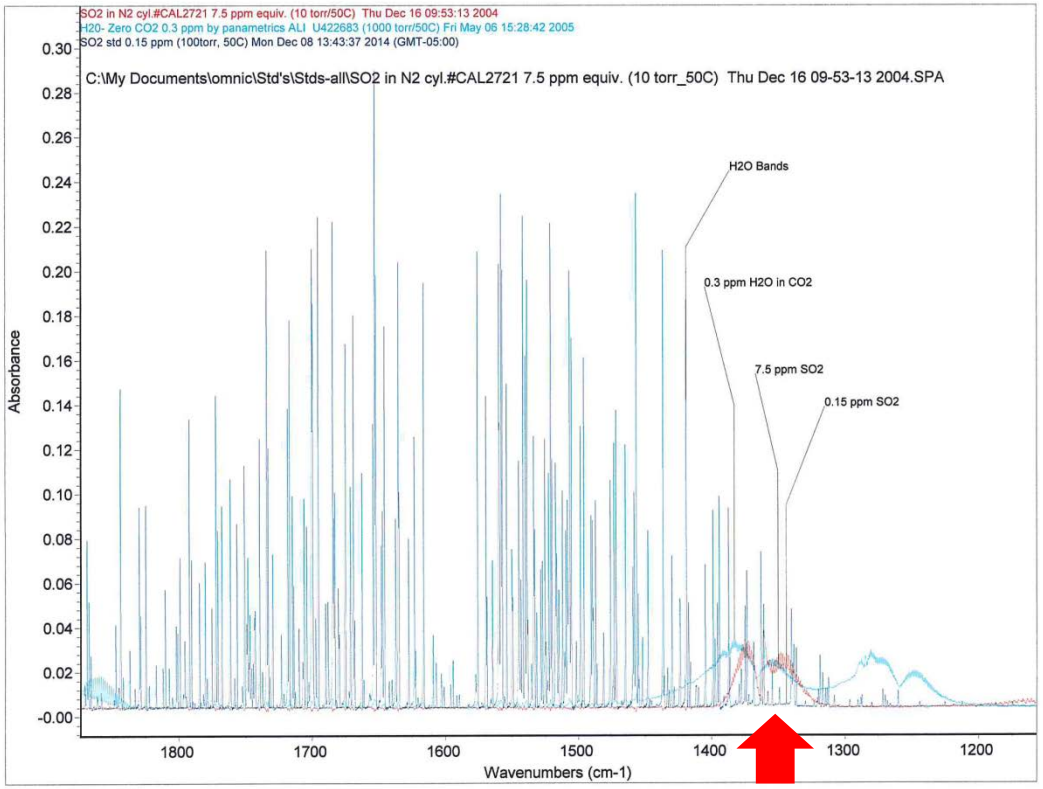


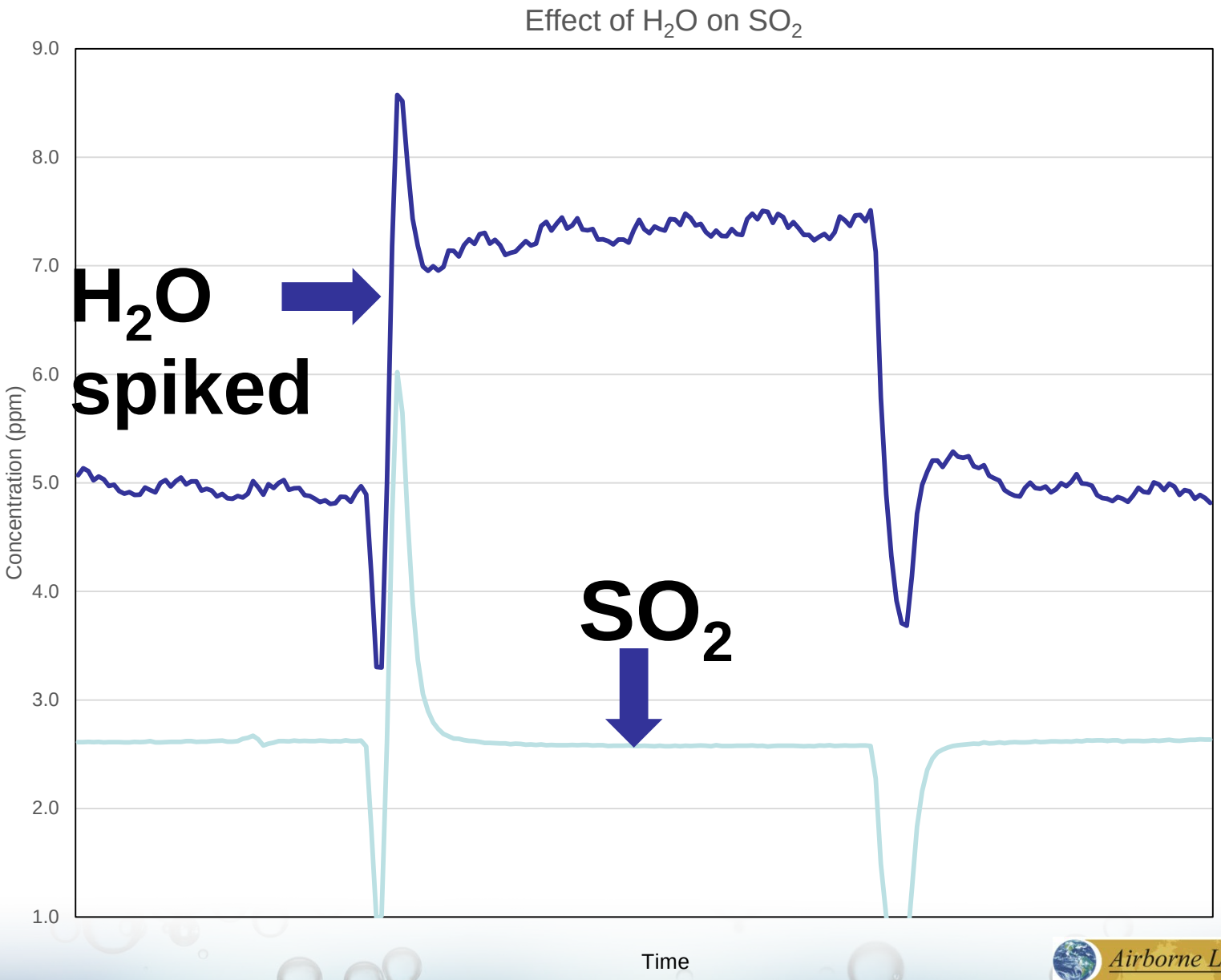
The Challenges of IR Measurements in CO_2

- *SO_2 is an ISBT Target Impurity*
- *SO_2 is common in Combustion Feed Gas Sources*
- *SO_2 IR bands are superimposed by H_2O vapor bands*



SO_2 IR Bands (No CO_2 or H_2O bands shown)




Effect of H_2O on SO_2
9.0
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
Concentration (ppm)
Time
H_2O spiked
SO_2

The Challenges of IR Measurements in CO_2

- *% CO_2 Purity is an ISBT Target Impurity*
- *% CO_2 is commonly measured by a Zahm-Nagel Device & use of 40-60% Caustic Agents = a relative hazardous field test method!!*
- *ISBT % CO_2 Purity = 99.9% which requires a very precise & time-stabile measurement method – so as not to create "false alarms" for low (ex. 99.8%) purity – if the analyzer drifts!*

Airborne Labs International

Exclusive Distributor of Max-Bev™ Systems

The Challenges of IR Measurements in CO_2

The Max Bev™ Solution

A = ε *l* c (Beer - Lambert Law)

Where: A = Absorbance, ε = molecular absorptivity constant, *l* = pathlength
c = analyte concentration (molecules/ mL)

For Maximum Analyte Sensitivity & Freedom From Interferences

- Maximum pathlength (multiple reflections)
- For Gases = Maximize Cell Pressure (psig)* (increase the number density); use a highly stable IR source, good optics & **very low noise proprietary detector**; precise cell Pressure & cell Temperature control!!

Max-Bev's IR selectivity, robustness & freedom from spectral interferences are accomplished by:

- Proper / clever selection of wavelength & bandwidth for each analyte
- Signal Averaging for S/N enhancement
- "Picket Fence" & Algorithmic discrimination of interferences

ALL KEY ISBT LIST IMPURITIES MEASURED @ LOWER DETECTION LIMITS

IMPURITY	MAX Bev MDL	IR Competitor MDL
Benzene (AHC)	**2 ppb**	5 ppb
Total Sulfur (TSC)	**2 ppb**	30 ppb
SO_2	2 ppb	30 ppb
TNMHC	20 ppb	4,000 ppb
THC	20 ppb	4,000 ppb
CH_4	6 ppb	1,000 ppb
H_2O	40 ppb	5,000 ppb
Acetaldehyde	**3 ppb**	50 ppb
Acetone	3 ppb	N/A
CO	20 ppb	2,000 ppb
NH_3	20 ppb	1,000 ppb
HCN	40 ppb	N/A
NO	**20 ppb**	1,000 ppb
NO_2	**6 ppb**	1,000 ppb
Ethane	5 ppb	1,000 ppb
Propane	5 ppb	1,000 ppb
Pentane	5 ppb	N/A
Methanol	10 ppb	1,000 ppb

MAX-Bev™ = Maximum *Advantage*

- MDLs up to ***200x lower*** than competitors
- Easy to operate, highly automated with long-lasting parts (no more 10 month PID lamp replacements!!)
- High resolution & proprietary data processing ***prevents getting false positive results*** caused by H_2O vapor & benign, non-regulated, trace impurities (ex. acetone on critical AA measurements) – ***this eliminates the cost of rejecting good product & the delays involved with production restart***
- Measurement speed can greatly reduce your yearly truck offloading demurrage costs.
- Max-Bev™ also precisely monitors CO_2 % Purity directly – NO Highly Caustic ZAHM NAGEL Glassware Needed

CO_2 ANALYZER COMPARISON SUMMARY

	MAX-Bev™	UV-Based Systems	Older IR-Based Systems	GC-Based Systems
Detection Limits	ppb	ppb	ppm / ppb	ppb
Analysis Speed	Seconds	Seconds	Minutes	Minutes
Maintenance Requirements	Low	N/A	High	High
Impurity Discrimination	Yes	No	No	Yes

Coca-Cola™ Approved

- **Coca-Cola™ Certification achieved February 2018 & WIKKI listed.**
- **MAX-Bev™ is currently installed at Coca-Cola™ Northern New England.**
- **Max Analytical Technologies has worked closely with CCNNE to develop a custom product that is made to meet the specific demands of the carbonated beverage bottling plant.**

Tank Truck Sampling Station

Vaporizer-Pressure Regulator

Airborne Labs International

Exclusive Distributor of Max-Bev™ Systems

SPECIFICATION SUMMARY

- **Integrated Technology**
  - FTIR Gas Analyzer
  - Total Sulfur (UV Fluorescence) Analyzer
- **Automated Gas Handling System**
  - 4 sample line inputs can be increased to 10
  - 1L Cylinder samples can be measured
- **Custom Enclosure (IP5X rated)**
  - Truck Interface NEMA 4
- **Ancillary & back-up analyzers available**
  - **Detector Tube-based Analyzers**
  - **Trace Oxygen Analyzer**
- **Gas Delivery System**
  - 5 LPM (MFC)
  - Gas cell back pressure
  - Gas Line switching valves (automated)
  - Flash Vaporizers / Pressure Regulators
- **Data Output**
  - Intuitive, Easy to use HMI with Large Screen
  - 20+ measurable analytes
  - PLC friendly
- **FTIR dynamic range**
  - 0 – 500 ppm
- **Accuracy / Linearity/Drift**
  - ± 1%
- **CO_2 measurement**
  - 100% ± 0.1%
- **Power requirements**
  - 200-240 VAC, 50/60 Hz
  - 2000 W
  - Surge protector / Uninterruptible Power Supply (UPS) recommended
- **Dimensions**
  - 26" (W) x 74" (H) x 35" (D) [66 cm x 188 cm x 89 cm]
  - 600 lbs. (272 kg)

MAX-BEV™ = *The Maximum Advantage*
HARDWARE, SOFTWARE & SUPPORT SERVICES

HARDWARE

Rack and Analyzers

HMI + MAX-Bev™ Software Package

Sample Multiplexer (5 – 10 lines) & Controls

CDA Generators & CDA-CO_2 Generators

OPTIONAL HARDWARE & SUPPLIES

Passivated Flash Vaporizers – Pressure Regulators

Truck Interface Station

Power Conditioning - Uninterruptible Power Supply

Trace Oxygen Analyzer

Certified Gas Standards & Delivery Systems

Passivated or SS Transfer Lines & Hardware

Passivated, Multi-channel Detector Tube Analyzers – with TSC capability (Back-up Insurance)

Printers

AVAILABLE CUSTOMER SUPPORT SERVICES

Installation & Commissioning

On-Site, NJ or CT-based Training Options

Web-based Training Option

Telephone / Skype / E-mail Tech Support

Remote Internet Data & Analyzer Status Review

Annual Preventative Maintenance Visit Options

Repair & Maintenance Services

Int'l Service Agents with Rapid Response Capability

Back-up emergency analyzer rentals

Consumables Maintenance Kit

Replacement Parts Maintenance Kit

Software Rev. Updates

Expert Back-up ISO-17025 CO_2 Lab support

Is a MAX-Bev™ the “right fit” for your business?

- ✓Improved Product Quality Assurance & Food Safety
- ✓Fast Analysis – Beats all other technologies
- ✓More Impurities Measured (at no extra charge)
- ✓Lower Detection Limits – compare MDL’s vs the others
- ✓Lower Operating & Maintenance Costs
- ✓No Perpetual, Mandatory $ervice Contracts Required!
- ✓Minimize False Alarms that cause Rejected Good Product
- ✓No annoying “Unknown Impurity” Alarms
- ✓Better Cost of Ownership – No PID lamps & Carrier Gases!
- ✓Installation, Training, Back-up Expert ISO-17025 Lab Support
- ✓Rapid PM & Repair Service network – no waiting “months”
- ✓Swap out FTIR & UVF units to reduce out-of-service time

Airborne Labs International

Exclusive Distributor of Max-Bev™ Systems

For More Information – Please Contact

Airborne Labs International to arrange a Max-Bev™ demonstration, obtain more literature or request a quote

Mark Taylor, Vice President – Gas Analyzer Division
Airborne Labs International, Inc.
22C World's Fair Drive
Somerset, NJ 08873
1-732-302-1950
e-mail: Sales@airbornelabs.com
www.airbornelabs.com

Airborne Labs is an exclusive distributor of Max-Bev™products & certified services

Max Analytical Technologies
East Windsor, Connecticut, USA
www.maxanalytical.com