



**TELEDYNE**  
**ADVANCED POLLUTION INSTRUMENTATION**  
A Teledyne Technologies Company

Greetings Russ,

The ambient concentrations of hydroxyls would have to be immense to cause any type of UV scatter that would affect measurement. Attached is a link to some information regarding hydroxyls interfering with UV. <http://www.esrl.noaa.gov/gmd/ozwv/dobson/papers/report13/11th.html> let me know if you have any questions.

11.3 Interfering emission

Very little has appeared in the literature on the subject of atmospheric emissions in the near UV region, which is probably indicative of its overall insignificance. As was discussed in the Introduction, 11.1, there are fundamental reasons why this is likely to be so.

Kulkarni (1968) discusses the question of UV airglow interfering with Dobson B bandpair measurements made on the moon and concluded that the Herzberg band of molecular oxygen and the hydroxyl radical, OH, are possible sources. In their search for explanations for anomalous backscattered UV spectral features, McPeters and Bass (1982) suggested NO emission as the cause for a band at 272 nm, but they considered that the only possible source for emission in the 300 to 310 nm region was oxygen, and even then the intensities required would be unreasonably large. Aerosols might possibly be a source of fluorescent emission. The backscattering of night lighting by aerosols and air molecules, though not an emission, might be a small source of interference to moonlight measurements, especially when the ground is snow covered. **In total, the above evidence is weak and does not point to any significant interference.**

Brian Kramer

**Customer Service Engineering Technician**

Teledyne Advanced Pollution Instrumentation

9480 Carroll Park Drive

San Diego, CA 92592

858-657-9800

**From:** API-Sales

**Sent:** Tuesday, June 22, 2010 1:25 PM

**To:** API-CustomerService

**Cc:** API-InsideSales; Doug Haugen

**Subject:** FW: Analyzer Accuracy Question - International Ozone Tech Group

**From:** Russ McCubbin [mailto:[russm@internationalozone.com](mailto:russm@internationalozone.com)]

**Sent:** Tuesday, June 22, 2010 11:44 AM

**To:** API-Sales

**Subject:** Analyzer Accuracy Question

Hello Technical Department,

We have one of your #465 units and love it. My question is as follows:

When reading the ozone output from a UV generated (185/254nm) ozone generator or residual ozone in the air from the same UV ozone source will atmospheric hydroxyls (which are generated by the UV process) in any way affect the accuracy of your UV absorption technology High Concentration or Ambient Safety Analyzers?

Anxiously awaiting your answer,

Russ McCubbin



Hello

I have asked Product Management about your request below and here is the response: Please find out what the hydroxyls is specifically. I don't expect it to be a problem, because we use the same colorimetric indication chemicals as we use in the tubes and I don't recall this ever being an issue.

If you could please let me know what the hydroxyls is specifically I can get an accurate answer for you

Thanks and have a great day

LaVerne Walker

Draeger Safety Inc, Inside Sales, Detection

Ph# 1-412-788-5526

Cell# 1-412-320-3902

laverne.walker@draeger.com

From: noreply@draeger.com [mailto:noreply@draeger.com]

Sent: Friday, July 09, 2010 10:40 AM

To: noreply@draeger.com

Subject: General contact request Dräger Internet

Form-data:

Salutation: Mr.

First name: Russ

Last Name: McCubbin

Company: International Ozone

Position: President

Street: 860-6 N. 8th. St.

Street Number:

ZIP: 33462

City: Lantana

Region: Florida

Country: US

E-Mail: russm@internationalozone.com

Phone: 561-733-8955

URL: \${refererURL}

Message:

When measuring ozone in the air produced by an Ultraviolet Source Ozone Generator is the accuracy of you CMS instrument affected in any way by the hydroxyls produced from the Ultraviolet Ozone Generator. Has this ever been a concern in the past.



Good question Russ. In general, UV Ozone generation does not affect the A21ZX readings, actually it is the method we use for our calibration process.

Coronic discharge method of Ozone generation produces nitrous oxide as a side affect which has a slight cross sensitivity effect on the sensors.

UV generation is the most inert method of generation for our products.

Oliver

On Tue, Jun 22, 2010 at 11:36 AM, Russ McCubbin  
<[rusism@internationalozone.com](mailto:rusism@internationalozone.com)> wrote:

- > Hello Technical Department,
- >
- >
- >
- > We have one of your A21ZX units and love it. My question is as follows:
- >
- >
- >
- > When reading the ozone output from an UV generated (185/254nm) ozone
- > generator or residual ozone in the air from the same UV ozone source will
- > atmospheric hydroxyls (which are generated by the UV process) in any way
- > affect the accuracy of any of your analyzers.
- >
- >
- >
- > Anxiously awaiting your answer,
- >
- >
- >
- > Russ McCubbin





Russ,  
This was something I was unaware of until you raised the question.  
Thanks  
Eric

From: Russ McCubbin [mailto:russm@internationalozone.com]  
Sent: Thursday, July 15, 2010 4:53 PM  
To: Eric Dunay Intertek  
Subject: Fw: Atmospheric Hydroxyls

Hello Eric,  
I'd appreciate it if you could take a minute to send your thoughts on this question. I'll take a simple yes or no on: Have hydroxyls ever been a concern to you as far as getting an accurate ozone reading from these units?

Thanks a lot,  
Russ McCubbin  
----- Original Message -----

From: Russ McCubbin  
To: Eric Dunay Intertek  
Sent: Tuesday, July 06, 2010 4:23 PM  
Subject: Re: Atmospheric Hydroxyls

Hello Eric,  
We are not concerned with outside atmospheric hydroxyls. There is a company that manufactures a unit with ozone producing ozone lamps (185nm - 254nm) and is telling all his dealers and customers that there is not an analyzer in the world that can accurately read the ozone output of his unit due to the fact that it also produces atmospheric hydroxyls. As you know all UV systems produce hydroxyls and have done so since the first one was produced decades ago. I'm sure since you test for CARB that you have tested Ultraviolet Ozone Generators and Ultraviolet Air Purifier ozone outputs in the past. Have hydroxyls ever been a concern to you as far as getting an accurate ozone reading from these units?

Thanks in advance for your response.  
Russ

----- Original Message -----

From: Eric Dunay Intertek  
To: russm@internationalozone.com  
Cc: Denis Niggli Intertek ; Chris Stone Intertek  
Sent: Tuesday, July 06, 2010 3:39 PM  
Subject: Atmospheric Hydroxyls

Russ,  
I did a bit of research on your question. I spoke to Teledyne, CARB, and a contact from Syracuse University. Teledyne said you had contacted them a couple days before I did (their response is below. CARB has referred me to Teledyne and the contact from Syracuse University mentioned filtering removes atmospheric hydroxyls. Our facility has extensive filtering which will remove atmospheric hydroxyls from the outside air. Does this answer your question or do you still have a concern? Are you concerned about these hydroxyls being generated by a test sample?

The ambient concentrations of hydroxyls would have to be immense to cause any type of UV scatter that would affect measurement. Attached is a link to some information regarding hydroxyls interfering with UV.

<http://www.esrl.noaa.gov/gmd/ozwv/dobson/papers/report13/11th.html> let me know if you have any questions.

Let me know if you still have a concern,

Eric Dunay  
Engineer  
Phone: 607-758-6519  
Intertek

3933 US Rt 11  
Cortland, NY 13045  
E-mail: [eric.dunay@intertek.com](mailto:eric.dunay@intertek.com)  
From: Russ McCubbin [mailto:russm@internationalozone.com]  
Sent: Tuesday, June 22, 2010 2:04 PM  
To: Chris Stone Intertek  
Subject: Ozone Testing Question

Hello Chris,  
A question has come up about the accuracy of ozone reading in the presence of atmospheric hydroxyls. My question is:  
When reading the ozone output from a UV generated (185/254nm) ozone generator or residual ozone in the air from the same UV ozone source will atmospheric hydroxyls (which are generated by the UV process) in any way affect the accuracy of your Ozone Concentration/PPM readings?

Anxiously awaiting your answer,  
Russ McCubbin  
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<http://www.intertek.com>



Russ,

After researching on the internet, I have found that OH will not interfere with our monitors due to the fact that OH absorbs at 278-335 NM in the UV spectrum. Our bulbs are 254 NM. As such, I believe that OH will not be a problem for our high or low concentration monitors.

If you have any further questions or want to chat on the phone I can be reached at 781-444-2929 ext 227.

Hoping this helps. Glad to hear that our ozone equipment is working well. Please advise how things are going with your ozone business and what potential projects we can work together on in the future.

Regards,

Kevin Bento  
IN USA Sales  
781-444-2929 ext. 227  
kbento@inusacorp.com



Dear Russ,

Thank you for your call yesterday. As we discussed, the SafeAir ozone badges are designed to detect ozone in air for industrial hygiene applications. The SafeAir badge consists of a colorimetric sensor married with a clear plastic cut-out of an exclamation mark. The badge body and an adhesive pocket hold these materials together to form the SafeAir ozone badge. The colorimetric sensor is a proprietary formulation coated on an inert sensor designed to detect ozone at or above a specific exposure dose.

With regards to your question specifically about hydroxyls, the ozone sensor will not react with hydroxyls. Thus hydroxyls do not affect the performance of the SafeAir ozone badge. However, hydroxyls will react with ozone thus reducing the ozone concentration in the environment.

Thanks again for your time. Please let me know if you need any additional information. I look forward to hearing from you! I hope you have a wonderful weekend!

Take Care,

Kim

Kimberly Chapman

VP, Sales and Marketing

800-808-2234 office

757-675-0473 cell

kchapman@morphtec.com

Morphix Technologies

James Madison

From: Russ McCubbin [mailto:[russm@internationalozone.com](mailto:russm@internationalozone.com)]

**Ozone Engineering**  
2530 Patra Drive  
El Sobrante, CA 94803  
[cindy@ozone-engineering.com](mailto:cindy@ozone-engineering.com)

Hi Russ,

The hydroxyl radicals will not affect the accuracy of any of the UV absorption monitors as they are not absorbed at the same wavelength.

Best regards,

Cindy Slezak

Ozone Engineering, Inc.

510-758-5570

510-758-5571 FAX

510-853-6479 MOBILE

**From: Russ McCubbin [mailto:[russm@internationalozone.com](mailto:russm@internationalozone.com)]**

Sent: Tuesday, June 22, 2010 11:44 AM

To: API-Sales

Subject: Analyzer Accuracy Question

**Hello Technical Department,**

**We have one of your #465 units and love it. My question is as follows:**

**When reading the ozone output from a UV generated (185/254nm) ozone generator or residual ozone in the air from the same UV ozone source will atmospheric hydroxyls (which are generated by the UV process) in any way affect the accuracy of your UV absorption technology High Concentration or Ambient Safety Analyzers?**

**Anxiously awaiting your answer,**

**Russ McCubbin**





Dear Mr. McCubbin

the answer is no Our institution is not a manufacturer of instrumentation. We have an IH laboratory and we manufacture only radiello diffusive samplers.

best regards

Fondazione Salvatore Maugeri  
Centro di Ricerche Ambientali  
Via Svizzera, 16  
I-35127 PADOVA  
Phone ++39 049 8064511  
Fax ++39 049 8064555

> ----- Original Message -----

> From: Russ McCubbin

> To: radiello.com@radiello.com

> Sent: Friday, June 25, 2010 9:47 AM

> Subject: Re: OzoneSampler & Hydroxyls

>

> Thank you for getting back to us so fast.

>

> Another question we have is:

>

> Does The Salvatore Maugeri Foundation or any of its subsidiaries manufacture an ozone analyzer that utilizes UV Absorption technology based on the Beer-Lambert law?

>

> If you do manufacture a UV Absorption Ozone Analyzer please send literature and pricing for this unit.

>

> Thank you in advance for your response.

>

> Russ McCubbin

>

> ----- Original Message -----

> From: <radiello.com@radiello.com>

> To: "Russ McCubbin" <russm@internationalozone.com>

> Sent: Friday, June 25, 2010 4:20 AM

> Subject: Re: OzoneSampler & Hydroxyls

>

>> Dear Russ McCubbin

>>

>> we have no data on this matter, but we believe that even hydroxy radicals will react with dipyridylethylene, like ozone does.

>>

>> best regards

>>

>> Fondazione Salvatore Maugeri

>> Centro di Ricerche Ambientali

>> 35127 PADOVA (Italy)

>> phone +39 049 8064511

>> fax +39 049 8064555

>>

>> Scrive Russ McCubbin <russm@internationalozone.com>:

>>

>>> Hello,

>>>

>>> Will atmospheric hydroxyls interfere in any way with an accurate ozone reading from your Radiello Ozone Sampler?

>>>

>>> Anxiously awaiting your reply.

>>>

>>> Russ McCubbin

>>>

>>> russm@internationalozone.com

>>>





Russ

Sorry for the slow response, its been very busy lately. I hope this will be helpful to you.

The detection of ozone molecules is based on absorption of UV light due to an internal electronic resonance of the Ozone molecule.

Light from UV source is located at one end of the optic bench and a UV Detector is located at the opposite end.

.Every 24 seconds the Dasibi Ozone Analyzer completes a measurement cycle consisting of two (12 secs) periods , during the first period the sample gas is routed through an "ozone specific" scrubber by a photometer valve to remove all ozone from the sample gas before entering the optic bench where the light intensity of this ozone free sample gas is read to determine the "I<sub>0</sub>" value. Then the second period begins with the photometer valve switching to allow the sample gas to be routed directly to the optic bench (bypassing the ozone scrubber). Once the bench is filled with the unaltered sample gas another reading is taken to determine the "I" value.

The ratio of the intensity of light passing through the altered sample gas to that of the unaltered sample gas forms a ratio I/I<sub>0</sub>. This ratio forms the basis for the calculation of the ozone concentration.

Where: I = Intensity of light passed through the unaltered sample gas  
I<sub>0</sub> = Intensity of light passed through altered sample gas free of ozone

Due to this ratio all other interference components in the sample gas stream that attenuates the UV light intensity will be automatically cancelled and have no effect on the final ozone concentration measurements. Since the ozone scrubber is specific to ozone molecules only all other components passes through the scrubber unaffected allowing the ozone analyzer to be interference free.

Best Regards  
Anthony

----- Original Message -----

From: Russ McCubbin  
To: info@tanabyte.com  
Sent: Tuesday, June 22, 2010 2:30 PM  
Subject: Analyzer Accuracy Question

Hello Technical Department,

We have a Dasibi #1008AH and love it. My question is as follows:

When reading the ozone output from a UV generated (185/254nm) ozone generator or residual ozone in the air from the same UV ozone source will atmospheric hydroxyls (which are generated by the UV process) in any way affect the accuracy of your UV absorption technology analyzers be it the #1008AH or your new model #72X?

Anxiously awaiting your answer,

Russ McCubbin

Tanabyte Engineering, Inc. was founded by Anthony (Tony) Reneau and Roger Jordan in May of 2002 after the closing of the Dasibi Environmental Corporation factory earlier that year. Tanabyte was incorporated for the purpose of providing innovative and unique products as well as service and support to the Air Quality Monitoring community.

Both of Tanabyte's founders had been employed by Dasibi prior to the unfortunate closure. Since 1993, Tony had been involved with virtually all aspects of the production and service of Dasibi's instruments. For several years prior to the factory closure, Tony was the director of sales and support at Dasibi and the customer's main point of contact. Roger had been involved with Dasibi since 1988 as head engineer and director of research and development. In addition to numerous improvements in Dasibi's instruments, Roger was the designer of Dasibi's Model 5008 calibrator, Model 7001 Particulate Monitor and Model 8001 Data Acquisition System.

Initially, Tanabyte primarily provided much needed parts, service and support for Dasibi products, however soon began development of a gas calibrator, the popular Model 300. Recognizing that a void had been left in the marketplace by the discontinuation of Dasibi's most popular product, the Model 1008 Ozone Analyzer, Tanabyte then began development of a replacement - the Model 72x Series of ozone analyzers.

Dear Mr. McCubbin,

The UL test laboratory utilizes Thermo Scientific ozone analyzer, model 49i. This analyzer is a dual cell, UV photometric gas analyzer. Ozone is measured based upon its absorption of ultraviolet light and this measurement is not expected to be impacted by the existence of the referenced hydroxyls.

Thanks,

Richard Odell  
Staff Engineer 3011CCAM  
UL Silicon Valley  
455 E. Trimble Rd  
San Jose, CA 95131-1230  
ph. 408-754-6699 fax 408-689-6699  
richard.a.odell@us.ul.com

UL Quotes: <http://www.ul.com/appliancequote/>  
UL Website: <http://www.ul.com/>  
UL Directories On-Line: <http://www.ul.com/database>  
UL Plastics Database: <http://data.ul.com/iqlink/>  
UL Logotype Artwork: <http://www.ul.com/mark/art.htm>  
UL Standards Information: <http://ulstandardsinfont.net.ul.com>  
UL Standards - Ordering: <http://www.comm-2000.com/>

Hello Scott,

A question has come up about the accuracy of ozone reading in the presence of atmospheric hydroxyls. My question is:

When reading the ozone output from a UV generated (185/254nm) ozone generator or residual ozone in the air from the same UV ozone source will atmospheric hydroxyls (which are generated by the UV process) in any way affect the accuracy of your Ozone Concentration/PPM readings?

Anxiously awaiting your answer,

Russ McCubbin