

Briefing Document

RE: Hydrogen peroxide gas detection

22 April 2019

1. The STERRAD® hydrogen peroxide gas plasma sterilizer was introduced in the mid-1990s, touted as a replacement for old standby ethylene oxide (EtO). To be sure, there were factors working against EtO's popularity, including long cycle times, and the well-established human toxicity of the compound.

In favor of this new hydrogen peroxide technology was its much shorter cycle time (under one hour) and the supposed safer nature of the chemical. After all, it's pretty close to water, right? Not exactly.

2. As it happens, hydrogen peroxide really isn't all that safe. Consider this chart, taken from Interscan's [website](#)...

Substance	Regulatory Limits		Recommended Limits		
	OSHA PEL	Cal/OSHA PEL (as of 4/4/2018)	NIOSH REL (as of 7/7/2016)	ACGIH® 2018 TLV ®	NIOSH IDLH
Ethylene oxide	1 ppm (8 hr Time Weighted Average); 5 ppm (15 min Excursion Limit)	1 ppm (8 hr TWA); 5 ppm (15 min Short Term Exposure Limit)	Potential Carcinogen < 0.1 ppm (8 hr TWA); Ceiling: 5 ppm [10-min/day]	1 ppm (8 hr TWA)	800 ppm
Hydrogen peroxide	1 ppm (8 hr TWA)	1 ppm (8 hr TWA)	1 ppm (8 hr TWA)	1 ppm (8 hr TWA)	75 ppm

3. Consistent reports from the field ([early study](#); [2012 study](#); [suspected damage to surfaces](#)) indicate that hydrogen peroxide gas plasma sterilizers can leak, and hydrogen peroxide is certainly subject to regulatory guidelines—just like ethylene oxide. Thus, no logical reason can be proffered why hydrogen peroxide should not be monitored in a sterile processing department.

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4. Once you decide to monitor the air for hydrogen peroxide, a suitable instrument must be chosen. Interscan is the oldest independently-owned gas detection instrument manufacturer, and has always stressed the importance of calibration. Indeed, we often say that proper calibration is 90 percent of successful gas detection.

5. Notably, no commercial standard is available for hydrogen peroxide calibration, although one manufacturer has long recommended the use of sulfur dioxide as a surrogate. As such, a factor is supplied, whereby the sulfur dioxide-caused hydrogen peroxide instrument reading is adjusted to render the true hydrogen peroxide value. However, there are problems with this approach.

First of all, an interference such as SO_2 will likely not have the same response characteristics across the full H_2O_2 measuring range, introducing a random error. Moreover, there is no guarantee that this factor will remain constant for the life of the sensor. In short, surrogate calibration is almost never a good idea.

6. That's why Interscan developed its own in-house calibration technique, using a hydrogen peroxide generator, back-titrated with wet chemistry—for accurate and consistent results. This same accuracy and consistency is passed along to the customer on replacement sensors, via our [SENSOR EXPRESS](#)[®] program.

7. Choose Interscan for all your hydrogen peroxide monitoring requirements!