



## TECHNICAL BULLETIN

### Occupational Health and Safety

#### Situation:

A recent document was published by the Occupational Health and Safety Agency for Healthcare (OHSAH) in British Columbia, Canada that is titled, "Exposure hazards that may arise from the use of CaviWipes in combination with Virox 5 RTU Wipes and/or Accel TB Wipes".

*This document will help to clarify the comments put forth by OHSAH (BC), highlight some of the wisdom OHSAH (BC) passed along and most importantly outline the unfortunate misinformation in their communication. This misinformation has caused many of you to contact us for clarification and we thank you for doing so, otherwise we may not have been aware this document existed. At no time did OHSAH (BC) contact Virox to indicate their intention to publish this document nor do we know if they did actual testing, if the document was solely based on opinion or if the conclusions in the document were based on theoretical models. We do applaud OHSAH (BC) for taking the initiative to remind everyone that mixing chemicals should be minimized and even avoided when possible.*

#### Background:

As is clearly implied in the release, it is without a doubt best practice to not mix chemicals of any sort whether at home or at work. This is especially true with Chlorine-based compounds such as bleach and highlights one of the reasons fewer and fewer facilities use bleach. Regardless of chemistry, whenever chemicals can be standardized including cleaning products and disinfectant products it is preferable as this reduces the potential risk for adverse outcomes. With that said the information published by OHSAH (BC) is very misleading as there are a number of scientific errors.

#### Article Overview:

##### **Issue 1: Second paragraph:**

"CaviWipes are pre-saturated with CaviCide and are intended as cleaner and disinfectant wipes for Tuberculosis (TB) and Hepatitis B Virus (HBV) contaminated equipment. The disclosed ingredients in the Material Safety Data Sheet (MSDS) are: Isopropanol, Butylcellosolve and Hyamine 1622. Hyamine 1622 (CAS Number 121-54-0), also known as Benzathonium Chloride, is a quaternary ammonia compound that contains Chlorine. Water and strong oxidizing agents should be avoided when using products containing this particular molecule"

#### Comment

Benzathonium Chloride does not contain Chlorine. This statement is categorically incorrect. Similarity in names does not mean that two chemicals have similar properties or are even from the same family. This is a common mistake made by many decision makers but is not a mistake made by many chemists.



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With respect to the last sentence, it too requires clarification as it is also incorrect. The writer is correct that one should avoid mixing strong oxidizers with a Quat, with chlorine compounds or with any other chemical or vice versa as there could be neutralization of the active ingredient rendering them ineffective or even cause a reaction. However, water does not react with Quats or with Chlorine. Water is required to be used as a dilution media when working with concentrated product and can be used as a rinse following cleaning and disinfection. Accelerated Hydrogen Peroxide (AHP) at the Use Dilution (Virox 5 and Accel among other licensed AHP brands) contains 0.5% hydrogen peroxide. This concentration is six (6) times lower in concentration than the 3% over the counter (OTC) hydrogen peroxide used for wound care. In accordance with the National Fire Protection Association, Hydrogen Peroxide at concentrations of less than 8% is rated as "0" for Health, Flammability and Reactivity. A rating of "0" is defined as materials that are normally stable, even under fire exposure condition & which are not reactive with water. With respect to the WHMIS Oxidizing classification, hydrogen peroxide at concentrations less than 8% does meet the criteria of Oxidizing Material. With respect to the classification as a strong oxidizer hydrogen peroxide would have to exceed a concentration of greater than 8% active hydrogen peroxide. Information on Hydrogen Peroxide from the Canadian Centre for Occupational Health and Safety also concurs with the above information.

### **Issue 2: Third Paragraph:**

"Virox 5 RTU Wipes and Accel TB Wipes are products intended for the same purpose. While no ingredients are disclosed on the Accel TB Wipes MSDS, Hydrogen Peroxide is the active ingredient in Virox 5 RTU Wipes. Hydrogen Peroxide is one of the strongest oxidizing agents available".

### **Comment**

All MSDS for products manufactured by Virox Technologies are generated by Del Tech Laboratories of London, ON. Del Tech is reputable, independent, third party facilitator with over 25 years experience in generating MSDS. We do not tell Dell Tech what to put on an MSDS. As such the information contained and included on the MSDS for each AHP-based product meets Canadian regulatory requirements for registered disinfectants in accordance with Health Canada and WHMIS standards. Due to the level of testing requirements required for submission to obtain DIN registration with Health Canada, disinfectants are exempt from WHMIS regulation.

Similar to Virox 5, Accel TB contains 0.5% hydrogen peroxide which is not required (due to the low level) to be listed as a hazardous ingredient on the MSDS. AHP does include other ingredients in the formulations, however, each ingredient is at concentrations that have been determined as non-hazardous and therefore, are not required to be reported on the MSDS. All ingredients in disinfectants that are above non-hazardous levels are required to be reported on the MSDS for safety reasons.

While the writer is correct that hydrogen peroxide is a strong oxidizing agent it is important to reiterate that hydrogen peroxide is not classified as a strong oxidizing agent until concentrations exceed 8%. When choosing hydrogen peroxide as the active ingredient for developing AHP, the trick was to learn how to harness its known microbial effectiveness but do it with low levels at the Use Dilution. This is the reason Accelerated Hydrogen Peroxide (AHP) is patented around the world. It is innovative and unique.



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In fact, based on toxicity testing, the US EPA (U.S. Environmental Protection Agency) has rated our 0.5% surface disinfectant as a Category IV. This is safest category available for a disinfectant.

### **Issue 3: Fourth Paragraph:**

“Application of CaviWipes to clean necessary surfaces may leave Hyamine 1622 residue. Accel TB Wipes should not be used in places where chlorine containing compounds may be available. Application of Virox 5 RTU wipes may lead to exposure to hydrochloric acid gas, with a sharp pungent irritating odor, and other organic substances resulting from the interaction of the quaternary amine and hydrogen peroxide. The water present in the Virox 5 RTU Wipes may also create potential hazards if residue of Hyamine 1622 is available on the surface being cleaned.....”

### **Comment**

OHSAH (BC) once again makes a serious mistake in confusing Quats and chlorine. The reaction of a 0.5% AHP solution (Virox 5 and Accel and others) with the residue of CaviWipes will not lead to the reactions indicated by the OHSAH. Both CaviWipes and Accelerated Hydrogen Peroxide at the Use Dilution are not concentrates. Hydrochloric Acid gas would not be created. The only risk with respect to infection control is that the two formulas may have the potential to neutralize each other and therefore decrease the germicidal potency. Since Quats remain behind on a surface even when dry any change of chemistry from a best practice perspective would indicate that any residual chemistry be removed before applying another chemical, not just hydrogen peroxide.

Additionally, the writer states that the water in the diluted AHP may create potential hazards. While it is true that during disinfection contact time, soap, water or other liquids should not be applied to the surface as this can dilute the disinfectant (this applies to all disinfectant chemistry) and thus decrease germicidal potency. Also soap (surfactants) can neutralize Quats. Most soap products contain anionic surfactants while Quats contain cationic surfactants. The differing charge between these molecules can neutralize the germicidal effectiveness.

In terms of potential adverse reactions between the use of Accelerated Hydrogen Peroxide-based product and Quaternary Ammonium-based products such as CaviWipes, we would like to make the following observations. Oxidizing chemistries such as hydrogen peroxide or bleach have the ability to breakdown organic matter trapped on the surface into its basic level of Carbon or Sulphur molecules. However, the concentration of hydrogen peroxide at the Use Dilution of 0.5% does not exhibit the ability to breakdown the large molecular structure of quaternary compounds. Quaternary Ammonium compounds are positively charged while the surfactants used in AHP are negatively charged and will in fact bind together to create a larger non-charged molecule. This reaction will not create or release any harmful chemicals.

### **Issue 4: Fifth Paragraph:**

“.....The CaviWipes ingredients listed are organic in nature and are not miscible with water, thus washing with water does not guarantee the residue will be removed”.



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### **Comment**

The organic solvents found in the CaviWipes formula that OHSAH (BC) is referring to will in fact evaporate well before the surface is rinsed with water. We feel it very important to point out that these same solvents are in fact soluble in water. It is actually the Benzathonium Chloride (the Quat) that will remain on a surface even with rinsing.

### **Issue 5: Last Paragraph:**

“The concern regarding the sulfur odour cannot be resolved without further information from the manufacturer. To date requests have been refused on the grounds that it may involve revealing proprietary information”.

### **Comment**

Virox's Accelerated Hydrogen Peroxide is a patented technology therefore we are required under patent law to provide full disclosure. Our ingredients can be found on both the US and Canadian Patent websites. With that said, we don't randomly provide the formulation to every inquiry unless we know the intent. Virox is a transparent company willing to help all decision makers resolve issues and make informed and educated choices. The ingredients contained in AHP have been classified as indirect food additives and / or appear on EPA inerts list 4 or the FDA GRAS listing. All chemicals used in the AHP formulations are sustainable, environmentally sound, and have excellent health and safety profiles. We indeed do not easily give our formulation up; it is, however, readily available with a little research.

Lastly with regards to the sulfur odour, AHP itself does not give off this odour. The odour is a result of the reaction between hydrogen peroxide and sulphur-based compounds. The odour is the result of oxidation of trace sulphur-based compounds that can be found on the surface of the latex gloves and environmental surfaces etc when it comes in contact with Hydrogen Peroxide.

### **Conclusion:**

Always avoid mixing any chemicals at home and at work. The article by OHSAH in B.C contains some unfortunate but not uncommon fundamental misunderstandings about chemicals and their interactions. We hope that this document will assist you, your users and your facilities.