

COMPARISON OF HYDROGEN PEROXIDE & EO GAS STERILIZATION SYSTEMS

Hydrogen Peroxide is a new technique of the gas sterilization systems. Compared to the most applied gas sterilization, Ethylene Oxide; all around the World currently;

ADVANTAGES OF THE HYDROGEN PEROXIDE:

- * It is an eco-friendly sterilizer, which is transformed into oxygen or water after process and doesn't create any harmful wastes,
- * It doesn't require long aeration periods after sterilization and provides fast sterilization. But if it is remembered that each advantage of a system also has a disadvantage, it is necessary to know the disadvantages as it is remarked at the national sterilization congresses and in the guide books.

DISADVANTAGES OF THE HYDROGEN PEROXIDE:

- * Hydrogen Peroxide is not a harmless gas. It was stated by **OSHA** and **NIOSH**, the leading occupational health and safety organizations in the World, that the **maximum limit** to be exposed in the air is **1 ppm**.
- * This exposure value for **Ethylen Oxide** is **5 ppm** and for Formaldehyde is 2 ppm. **Hydrogen Peroxide is 5 times more dangerous than Ethylene Oxide** and lots of attention has to be paid for leakage and exposure situations.
- * When the chemical specifications of the hydrogen peroxide are considered, it may be seen that it has the toxic, carcinogenic, mutagenic and etc. specifications just like formaldehyde and ethylene oxide. Its carcinogenic effect on animals has proved.
- * When their sterilization abilities are compared, it is seen that hydrogen peroxide has no effect on linen, paper, dust mixtures, materials with cellulose ingredients, catheters with long and narrow lumen, and has lesser penetration ability. **These limitations are available in FDA 510 (k) Regulations. Also limitations on flexible scopes and jointed/hinged tools are included.**
- * Hydrogen peroxide exhibits a very high level corrosive structure, resulted from its chemical specification. For example: Corrosive salts may be formed on metals. Because of such formation, two patients have become blind during their eye operations in USA and the equipments of two brands were recalled by the order of FDA. Subject matters may be reviewed from the related links below.

When exposed to the Hydrogen Peroxide, irremediable vision losses and tissue burns may be experienced (in addition to these effects, it has corrosive effects on skin, nose, throat and lungs). Also anybody who agrees that that a chemical which has dangerous effects on microorganisms will have the same effect on human beings having the same organic structure. Peracetic acid is also included in this category.

* Ethylene Oxide (EtO) has been used for the sterilization purpose for almost 60 years and all data obtained until now has proved its effectiveness and reliability again and again. **EtO effects microorganism by means of alkalization. It ruins the DNA structure of microorganism and cause their death.** There is no limitation for the sterilization, it is a strong and reliable agent.

* There are no records, indicating that a user has deteriorated his/her health because of EtO. Problems are defined backwards by means of blood analysis. It has more advantages compared to its disadvantages and provides many advantages continuously if used consciously.

* Ethylene Oxide sterilization techniques are strengthened day by day and enables 3-4 hours of total sterilization period by means of gas diffusion systems using low amount of gas.

* EtO sterilizes more volumes compared to the hydrogen peroxide. While Hydrogen Peroxide would be able to sterilize a volume after lots of repeated processes during the whole day, Ethylene Oxide sterilizes the same amount in one process. In that way, It compensate time loss against the hydrogen peroxide.

* On the other hand, there is almost a 100 percent difference between the hydrogen peroxide and EO gas when mounting and sterilizations costs, maintenance, spare parts and amortization expenditures are taken into consideration.

THE REASON WHY THE NEW GENERATION ETO STERILIZERS ARE PREFERRED MORE COMPARED TO THE OLD CYLINDRICAL ETO STERILIZERS.

* Old EtO sterilizers, named 12:88, are operated with Ethylene Oxide (% 40) and carbon-dioxide (% 60) gas mixtures. In such cases, the products to be sterilized are exposed to the Ethylene Oxide gas much more than required. The same sterilization is realized with the 10/1 Ethylene Oxide gas amount in the EtO sterilizers operated with the gas diffusion technique. Furthermore, no carbon-dioxide, causing residues on materials is used with the diffusion technique. This makes the EtO gas to be removed and discharged from the materials easily by aeration.

* Leakages which may happen on EtO and Carbon-dioxide tubes, used at cylindrical systems can cause environmental big fires and deadly hazards. This problem is completely eliminated at the new generation EtO sterilizers by way of single use cartridge system and environmental and occupational safety is provided.

* The cost of cylindrical system EtO sterilizers are at least 5 times more expensive than the sterilizers operated with diffusion technique.

ADVANTAGES OF THE ETO STERILIZERS WITH DIFFUSION SYSTEM

- * Depreciation/Amortization costs are cheaper compared to the others.
- * It consumes 10/1 less gas compared to the cylindrical system ETO sterilizers.
- * It has the minimum personnel and occupational safety risks.
- * It has the most common User Reference all over the World.
- * It doesn't require any water drainage or filtration systems for the installation.
- * All kinds of materials/products can be sterilized.

REFERENCE DATA ABOUT HYDROGEN PEROXIDE.

* FDA SAFETY REPORT ABOUT PLASMA, PUBLIC HEALTH SERVICE, April 10, 1998.

* THE LAST EUROPEAN COMMUNITY OFFICIAL PUBLICATION ABOUT PLASMA, ZENTRAL STERILIZATIN SERVICE ZENTRAL STERIL. 1995.3:65, 1995, 3:67ff.

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