The Power of Plasma

How do STERRAD® Sterilization Systems Operate?

✓ STERRAD® Sterilization Systems utilise a combination of hydrogen peroxide (H₂O₂) and low-temperature gas plasma to rapidly and safely sterilize validated medical devices and materials, without leaving toxic residues.
✓ This approach offers safety and efficiency advantages over alternative reprocessing modalities such as ethylene oxide (EtO), formaldehyde gas (FO) and other H₂O₂ systems, as described below.

How Does Plasma Work?

1. H₂O₂, combined with low-temperature gas plasma, results in the production of microbicidal free radicals, such as hydroxyl, which disrupt essential cell components.
2. Plasma dissociates unreacted H₂O₂ into oxygen and water and removes any residual H₂O₂ from the load.

Safe for the User

Commonly used sterilants, including EtO, FO and H₂O₂, and their residues are associated with acute and long-term toxicities, such as chronic irritation, central nervous system depression, severe allergic reactions and many more.2,3,4,5,6

- Sterilizers which lack gas plasma technology risk exposing users to such residues or require lengthy and disruptive measures to eliminate them.
- Sterilization with EtO requires aeration of the load to help keep staff safe, with typical sterilization cycles lasting 16–17 hours.
- Sterilization with H₂O₂ does not typically require aeration of the load before handling, however, sterilizer models without gas plasma technology have been shown to produce H₂O₂ emissions above that deemed safe by the American Conference of Governmental Industrial Hygienists (ACGIH®).8

In contrast, by utilising gas plasma technology to remove residual H₂O₂, STERRAD® Sterilization Systems reduce exposure to harmful residues, to safe levels.
In line with this, STERRAD® Sterilization Systems’ H₂O₂ emissions, at the user’s breathing zone level, are up to 67 times lower than for STERIS V-PRO® sterilizers:⁹

<table>
<thead>
<tr>
<th>STERRAD® 100NX System STANDARD Cycles</th>
<th>V-PRO® maX lumen Cycles</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Morning</strong></td>
<td><strong>Afternoon</strong></td>
</tr>
<tr>
<td>ppm</td>
<td>ppm</td>
</tr>
<tr>
<td>0.0</td>
<td>0.0</td>
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<tr>
<td>0.3</td>
<td>0.2</td>
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<td>0.2</td>
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Key: Above ACGIH® Permissible limits (5ppm) Peak concentration (ppm)

**STERIS V-PRO®** sterilizers showed instantaneous peak measurements of H₂O₂ reached up to 20ppm at the user’s breathing zone level, contributing to a more hazardous working environment⁹

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**Safe for the Patient**

- Sterilants, including EtO, FO and H₂O₂, can leave toxic residues on medical devices, putting patients at risk of health complications.⁹,¹⁰,¹¹
- By utilising gas plasma technology, STERRAD® Sterilization Systems leave medical devices free from toxic residues, ensuring that they are safe for the patient.
- In addition, lengthy instrument turnover times, such as those associated with EtO, may delay operating schedules due to unavailability of surgical instruments, compromising patient safety.¹⁵

**Key TAKEAWAYS**

- STERRAD® Sterilization Systems minimize exposure to harmful sterilant residues by utilizing plasma.
- Other sterilizers, which utilize H₂O₂ without gas plasma technology, produce H₂O₂ emissions that exceed recommended exposure thresholds. STERRAD® Sterilization Systems reduce these emissions to safe levels, ensuring that users, patients and the environment are protected, without the need of weekly chamber leak tests or quarterly gasket inspection required.

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**EtO and H₂O₂ can have a toxic impact on the environment and so need to be strictly regulated in order to reduce their environmental impact.**¹⁶,¹⁷

Gas plasma eliminates potentially harmful emissions, allowing efficiency without compromising the environment.