LivaNova

Health innovation that matters

Frequently Asked Questions (FAQs) Regarding Use of Sorin Group Deutschland GmbH heater coolers in combination with certain oxygenators with polymer heat exchanger designs

1. Which laboratory conducted LivaNova's toxicological assessment?

The toxicological assessment from which LivaNova determined the Allowable Limits for presence of hydrogen peroxide in the patient blood was conducted by IASON Consulting, a specialized laboratory located in Germany (Muehlenstrasse 26A D – 52382 Niederzier / Germany)

2. Was this assessment confirmed by one or more other institutes/experts?

This assessment was confirmed by two other firms: Walker Downey & Associates is a privately-owned, independent consultancy firm and Bibra Toxicology Advice & Consulting Ltd is a large, independent consulting firm that provides a comprehensive range of advisory and consultancy services on all aspects of chemical toxicological hazard and human health risk.

3. Will the LivaNova's toxicological assessment be published or distributed to customers?

The toxicological assessment is part of our Design History File which contains proprietary information related to our design. We are in a regulated industry where products are cleared or approved by Competent Authorities and/or Notified Bodies considering the results of our Verification and Validation activities (V&V). We do not provide the results of the V&V to customers who purchase our products to guarantee that our products are safe and effective but they can rely on our final product certification (CE mark, 510k approvals, … other local approvals) to get this insurance.

4. In the FSN you refer to a category of *''patients with greater susceptibility to hydrogen peroxide''*. Does it mean that there are different ALs for these patients?

For patients exposed over the duration of a CPB procedure (typically 6 hours or less), Allowable Limits were determined for the general population and also for patients who might exhibit greater susceptibility to hydrogen peroxide exposure. For INSPIRE, our toxicological assessment has demonstrated that use of the 3T System devices for durations of six hours or less remains within Allowable Limits for patients with greater susceptibility to hydrogen peroxide. Allowable limits are lower for patients with increased H2O2 sensitivity.

5. How can a clinician identify a patient with greater susceptibility to hydrogen peroxide, prior to starting the case?

Patients with greater sensitivity to H2O2 include those with conditions such as Vitamin E deficiency, heritable deficiencies of the enzymes responsible for breakdown of H2O2 and certain types of hemolytic anemia. However, this is not intended to be a complete list of all conditions that could impart greater H2O2 susceptibility, but should alert clinicians to general classes of patients who might demonstrate greater susceptibility. Patient monitoring and management should then be based on best clinical practices.

6. As a clinician, what practical options I can have to treat patients with greater susceptibility with 3T?

Ensure that the Oxygenators/Heat-Exchangers used to treat these patients are presenting a permeability to hydrogen peroxide that is below the AL specified by LivaNova.

8. In the FSN, you say that LivaNova tested their oxygenators. Which conditions were used for INSPIRE tests?

LivaNova has performed in vitro testing using water (worst case situation) and bovine blood for the evaluation of hydrogen peroxide diffusion across the Inspire heat exchanger polymer fibers. The conditions used in these tests consisted of circulating water or bovine blood on the patient side of the CPB circuit simulating different patient body weights and H2O2 at a concentration of 330 ppm in the 3T heater-cooler water circuit for a duration of 6 hours.

9. What is the H2O2 permeability rate of INSPIRE and what is the safety factor vs. the AL?

The quantity of hydrogen peroxide transferred from the water side to the blood circuit an adult patient of 60Kg connected to an Inspire oxygenator was found to be 57 times below the Allowable Limit (AL) for daily systemic exposure to hydrogen peroxide.

10. Will LivaNova provide an official Dear Customer Letter on INSPIRE permeability rate to be delivered to your customers?

Yes, an official customer letter is available for customer distribution and can be downloaded from the 3T Heater-Cooler section of the LivaNova web site at http://www.livanova.sorin.com/products/cardiac-surgery/perfusion/hlm/3t-out-us

11. Do you have a comparison of all oxygenators (including third parties) tested in the same conditions?

Yes, we have performed tests with several oxygenator models, including third parties oxygenators which confirmed variable permeability of the heat-exchangers depending on their design and construction.

12. Which third party oxygenators are non-compatible with the 3T instructions for use?

According to a letter dated April 2016 distributed by Maquet, use of H2O2 is prohibited with all Maquet oxygenators, as per their IFUs. According to a letter dated July 2015 distributed by Terumo, all Terumo oxygenators are compatible with use of H2O2. According to the information currently available, Medtronic distributed in March 2016 a customer letter in Europe and Middle East confirming compatibility after initial tests and further tests in progress. We are not aware of other letters distributed by other oxygenator manufacturers.

13. How do you explain that different oxygenators (all with polymer HE) have different behaviors in terms of diffusion?

Heat Exchanger design, manufacturing process and fiber characteristics may all play a role with respect to diffusion through the HE fibers. We do not have access to these data for competitive device for us to be able to understand the variability observed from one device to the other one

14. Why is 3T requiring disinfection every two weeks and addition of H2O2 as a preservative between two disinfection cycles, while other H/C are much less demanding and do not need to add any preservative?

Our tests have demonstrated that even if you fill a clean tank with filtered water, the number of microorganisms present is going to grow (because neither the tank not the water are sterile just as what we have in a heater-cooler) and they will develop biofilm over time. The hydrogen peroxide is acting as a preservative limiting the development of the microorganisms and preventing biofilm formation. The longer is the time interval between water changes and disinfection, the more is the need to use something to control the microorganism development. Alternative solutions, such as UV, have been proven ineffective.

15. Is LivaNova indicating a max time limit for the daily water change on the 3T while the institution is looking for a replacement of the oxygenator with a compatible one, to ensure the H/C cannot get contaminated?

No. This timeframe should be limited but there is no technical limitation other than the burden for the clinical centre to perform this operation every day.

If you have questions that are not answered within this document or the linked information, please contact your local Sales Representative. IM-00691/A