UNIVERSITÄT ZU LÜBECK

TECHNISCHE HOCHSCHULE LÜBECK

Master thesis

Topic:
Conceptual and constructive development to optimize the lifetime of the humidification system for existing thermo therapy devices

Summary:
This thesis deals with the current challenges of the humidification system in the Babyleo TN500 incubator, which could lead to malfunctions and failures. The consequence is a reduced lifetime, which is below the specified requirement of the humidification system and therefore causes additional costs for service work on behalf of Dräger. The aim of the work is therefore to optimize the lifetime of the humidification system in the Babyleo TN500 through targeted design optimization to overcome the current challenges using the systematically development approach according to VDI 2221.

The new developed humidification concept convinces by using a temperature-resistant hose. The simple replacement of the hose due to the push-pull principle of the fastenings enables easy maintenance and reduces the amount of replacement work required in case of failure. Furthermore, the water supply chamber and cooking chamber of the humification system are now manufactured separately and connected with a sheet metal, which ensures better thermal decoupling. This separation enables the cooking chamber to be produced in a simple geometry in a machining process so that an alloy suitable for anodizing can be used, which could significantly extend the lifetime of the humidifier. The grommet is replaced by a lid and further measures now ensure proper and non-destructive assembly.

Initial laboratory tests on the prototypes showed both positive results and further potential for optimization, particularly with regard to the design of the cooking chamber. To fully evaluate the advantages of the new concept, it is necessary to test the functional service life, particularly with regard to the hose, in a long-term test and in this way obtain a reliable statement about the long-term advantages.

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