



Cleaning techniques for used mattresses

Overview of existing cleaning techniques for used mattresses in industry and private homes

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CLEANING TECHNIQUES FOR USED MATTRESSES

Overview of existing cleaning techniques for used mattresses in industry and private homes

Keywords: Cleaning techniques, reuse

SUMMARY

We have examined eight different cleaning techniques consisting of a combination of industrial methods, techniques used by smaller companies, and do-it-yourself solutions. These techniques were compared in a weighted matrix to identify which performs best quantitatively. The results show that RehaWash, TFR Group, and Dansk Rense Service perform best in the overall assessment. All three represent industrial mattress cleaning techniques and can therefore be recommended for further investigation. However, it is also crucial to include qualitative aspects such as documented cleanliness, environmental impact, and wear on the mattresses. These considerations complement the quantitative analysis and provide a more holistic basis for decision-making.

BACKGROUND FOR THE STUDY

The Research brief has been prepared in connection with the project M-RRS (Mattresses – Recycle and Reuse Systems). The project focuses on increasing the reuse and recycling of discarded mattresses in Denmark. This Research brief focuses on the possibilities for reusing these mattresses and on cleaning methods that can be applied to increase their reuse potential. We have previously described how a significant proportion of customers in second-hand shops would not buy used mattresses, primarily for hygienic reasons. It was shown that if the mattresses were cleaned and accompanied by a cleanliness guarantee, half of the surveyed customers would be inclined to buy a used mattress. Therefore, this brief examines the possibilities for cleaning mattresses, as this would increase interest in reuse.

An investigation of the possibilities for cleaning mattresses has been carried out through internet searches, input from project partners, and interviews with various companies that perform cleaning. A number of companies were identified, of which eight were selected. These were chosen with the aim of representing the different cleaning methods identified. The cleaning methods can be divided into three categories, each representing a segment:

- Industrial mattress cleaning
- Cleaning for private individuals/small businesses
- Do-it-yourself (DIY) methods for cleaning mattresses

The brief presents an overview of the methods used in each category and evaluates their advantages and disadvantages in relation to the M-RRS project.

INDUSTRIAL MATTRESS CLEANING

Among the eight companies examined, three primarily target the industrial sector: Semi Staal, RehaWash, and TFR Group. These companies specialize in machines designed to clean large numbers of mattresses, typically within the healthcare sector. The machines are automated and adapted to industrial requirements. The prices of the machines and their cleaning systems are not stated on the companies' websites, as they are usually customized solutions ordered according to the customer's specific needs; however, it is assumed that the acquisition costs are likely at the higher end precisely due to these individual adaptations.

On their websites, these companies often specify mattress cleanliness requirements in accordance with CE, ISO, and DIN standards, including bacterial levels of less than 2.5 cfu/cm² and IIA standards for medical devices. The cleaning processes carried out by these companies are comprehensive, and they employ various methods:

- Semi Staal – Medi Clean: Mechanical cleaning with brushes followed by SonoSteam technology (ultrasound and steam). Capacity: 80 mattresses/hour. Reduces harmful bacteria by 95–100% (1).
- RehaWash: Uses chemical cleaning, which is gentle on mattresses. Can wash 1–4 mattresses per cycle and performs hygiene checks (2,3). Complies with all relevant European and Danish standards for bed and aid reprocessing.
- TFR Group: Uses biocide spraying and UV sterilization. Guarantees 100% surface cleanliness based on BS1425 1991 standard (5).



In the image, a mattress and bed are cleaned using the Semi Staal Medi Clean system. The bed is rolled into the machine and cleaned efficiently and ergonomically for the staff (1).

Photo reproduced with permission from Semi Staal Medi Clean.

CLEANING TECHNIQUES BY SMALL BUSINESSES

Among the eight companies examined, four primarily target private individuals. These companies offer cleaning services either carried out in the customer's home or allow customers to deliver their mattresses to the companies. The cleaning techniques used here are generally simpler than those used in the industrial sector. It is rarely specified how cleanliness is measured, and there is no guarantee of complete cleanliness of the mattress. Prices for mattress cleaning vary depending on size, type, and quantity, and range between DKK 200 and 1,300. The companies are as follows:

- **Dansk Rense Service:** Uses a carbon dioxide method where bubbles penetrate fabric fibers and rise to the surface for removal. Leaves a protective layer (6,7).
- **De Hygienique:** Four-step process: vibration loosens dirt, particle extraction via filter, UV disinfection, and chemical sanitization, which kills bacteria and delays subsequent infection of the mattress (8).
- **Hello Cleaners UK:** Deep cleaning involves vacuuming followed by steaming (9).
- **Total Rens:** Deep steam cleaning and disinfection with bio-enzymes, followed by bacteria killer and odor remover (10).

For further information, three companies were contacted by phone, as details about their mattress cleaning methods were not available on their websites. Two of the companies stated that they used water and soap for cleaning, while the third company only cleans mattress toppers, as they had experienced rust formation on metal components inside mattresses after cleaning with soap and water. In general, it was challenging to find detailed descriptions of how the cleaning processes are carried out by the smaller companies.

DIY CLEANING TECHNIQUES

The final category of cleaning techniques concerns DIY, the do-it-yourself method, where individuals clean their mattresses by themselves using common household products. Compared to the other methods, the costs of this type of cleaning are minimal, and it is easier to perform. However, there is no guarantee of complete cleanliness with this method, as the result depends on the condition of the mattress. These methods primarily focus on surface stains and do not offer the same deep cleaning as professionals in the industry or smaller cleaning businesses. Here are some recommended methods for do-it-yourself mattress cleaning at home:

Vacuuming: A thorough vacuuming removes dust particles and similar debris from the mattress (11).

Baking soda and vinegar: Using baking soda and vinegar on stains can refresh the mattress and help eliminate odors (11).

By following these steps, according to these sources, one can improve the hygiene of their mattress at home.

Discussion and conclusion

In relation to the M-RRS project, four parameters are particularly relevant to consider when choosing a cleaning method:

Wear: This parameter assesses how much the chosen cleaning method wears down the mattresses and affects their lifespan.

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Environmental impact: This parameter evaluates the environmental impact of the chosen cleaning method, including the use of chemicals, water consumption, and energy consumption.

Cleanliness after cleaning: This parameter indicates how reliable the cleaning method is in achieving a satisfactory level of cleanliness on the mattresses after the process.

The table below shows how well each company performs on the three parameters (1=poor, 2=average, and 3=good), weighted according to importance, where cleanliness has the highest weight (3=cleanliness, 2=environment, 1=wear). The assessment is based on desk research, citizens' statements on their needs, assumptions, and the companies' information on their websites. A more comprehensive study is necessary, particularly regarding environmental impact, if cleaning tests are to be performed on the discarded mattresses to increase reuse potential.

Technique/ company	Wear x 1	Environment x 2	Cleanliness x 3	Score
Semi Staal Medi Clean	2	1	3	13
RehaWash	3	1	3	14
TFR Group	3	1	3	14
Dansk Rense Service	3	2	2	13
De hygienique	2	1	2	10
Hello Cleaners	2	2	2	12
Total rens	2	2	2	12
Private cleaning	3	3	1	12

Table 1: Scoring of the cleaning techniques among the 8 companies

Based on the quantification of the cleaning techniques, Reha Wash, TFR Group, and Dansk Rense Service perform best in the overall assessment. These three companies can therefore be recommended for further investigation as potential choices of cleaning techniques if the reuse potential of discarded mattresses is to be increased. However, it is important to carry out an economic and qualitative assessment of these techniques, particularly regarding whether the cleaning method includes a cleanliness guarantee that can provide customers with sufficient assurance that the mattress is 100% free of bacteria and similar contaminants. In addition, the environmental impact should be examined more closely, as well as how abrasive or damaging the methods are to the mattresses. These qualitative aspects will complement the quantitative assessment and contribute to a broader evaluation of the available cleaning technique options. It should also be noted that the above-mentioned cleaning companies do not constitute an exhaustive list, but rather examples of different techniques that may be considered if the goal is to promote the reuse potential of used mattresses.

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