



BREAKING THE CHAIN OF INFECTION

Cleaning and automation solutions for hospitals



SEMI STAAL

CLEANING & AUTOMATION



MEDICLEAN IS OUR BUSINESS

At SEMI STAAL we have made it our core business to develop and deliver innovative sustainable cleaning solutions, with high throughput. Since 2010 it has been our objective to help hospitals break the chain of infection by improving hygiene solutions and internal transport systems that optimize disinfection of hospital beds and mattresses, assistive devices, pillows, plastic boxes, racks, trolleys, O/P trolleys, waste containers etc.

Our Mediclean solutions breaks the chain of infection

Hospitals, growing demands for efficiency, optimized hygiene and patient safety are everlasting agendas in the Healthcare sector. In Denmark every 10th patient is being contaminated with a hospital infection during hospitalization resulting in readmission, equalling approximately 400.000 extra days in beds, every year.

A better hygiene standard at mattresses and beds can, among other things, help reduce the number of readmissions and is therefore a good investment both in terms of patient safety and operating cost. Scientific validated results shows a reduction of contamination of dangerous bacteria by 95-100%, depending on the type of bacteria when our proven cleaning and disinfection technology is used for disinfection of beds and mattresses and hygiene pillows.

An automated cleaning process is faster and more reliable and ensuring a better working environment

We acknowledge the importance of reliable cleaning processes in a busy hospital environment. It is crucial that beds, mattresses, case carts and other equipment in the hospital supply chain are being delivered on time and meet the required hygiene standards.

Manual cleaning of beds, mattresses and assistive devices etc. can be an unreliable, difficult, and slow process, and just a single area overlooked can cause transmission of diseases to the next patient lying in the bed.

With Mediclean solution the staff will experience ergonomically improved workflows and a faster and better bed cleaning process with a washing capacity of up to 25 beds per hour. Mattresses are run through the cleaning system with a capacity of up to 80 mattresses every hour, using the proven SonoSteam®Technology.



*“In everything we do,
we look for the outmost
simplified solution making
it easy for our customers
to manage their work-
flow and comply with
hygiene standards
and safety.”*

Nicolai Meyendorff
CEO

AUTOMATIC CLEANING & DISINFECTION OF HOSPITAL BEDS AND MATTRESSES

HIGH CAPACITY – UP TO 25 BEDS AND 80 MATTRESSES PER HOUR

- *Fastest and most effective system on the market*
- *Time saving cleaning process*
- *Extra automation possible – transport systems
– automatic mattress handling*

PATIENT SAFETY

- *The system breaks the chain of infection*
- *Reduces hospital infections*
- *Documented scientific hygiene results <2,5 CFU/cm²*

LOW VARIABLE RUNNING COSTS

- *Green recirculating disinfection system*
- *SonoSteam technology*

SONOSTEAM®TECHNOLOGY

– EFFECTIVE, SAFE, AND SUSTAINABLE

In cooperation with Force Technology, we have developed an innovative and unique disinfection solution system for hospital mattresses. The technology combines steam and ultrasound and has proven not only to be safe and rapidly killing microorganisms in just 25 seconds, it is a sustainable and environmentally friendly technology.

The SonoSteam®Disinfection process works together and in parallel with an automatic hospital bed cleaning system processing up to 25 beds and 80 mattresses per hour. It is easy to operate, ensures a good working environment and runs at low variable operating costs.

Significant facts about SonoSteam®Technology

SonoSteam®Technology is a chemical free, sustainable and innovative disinfection solution. With an advanced combination of steam and ultrasound the solution secures a rapid and enhanced treatment, ideal for protective disinfection of heat and water sensitive surfaces such as hospital mattresses. The system is recognized for its unique features, such as;

- 1. Significant reduction of microorganisms:** Effective reduction of pathogens and multi-resistant bacteria i.e. staphylococcus, enterococcus, E. coli, streptococcus, MRSA, clostridium difficile, VRE, which are common causes of hospital acquired infections. In addition, SonoSteam®Technology is effective against yeast and fungi.
- 2. Only a few seconds of treatment:** The combination of ultrasound and steam results in a heat transfer so fast that microorganisms are reduced within seconds.
- 3. No use of chemicals:** SonoSteam® only features steam and ultrasound. The process does not use any chemicals or other agents that might otherwise leave residues.
- 4. Reaches the microstructure of the surface:** Microorganisms placed in the microstructure and pits of the mattress surface are reached and reduced by the steam. The ultrasound catalyses the steam to be continuously forced into pits and pores on the surface and all critical areas.



THE BASIC PRINCIPLES BEHIND THE TECHNOLOGY

The ultrasound sets the air of the laminar zone in a state with intensified molecular oscillations, resulting in a destruction of the protective characteristics of the laminar sublayer. Hot steam is then able to reach microstructures and pits in the surface and secures rapid heat transfer.

The continuous feeding of new steam creates a fast, substantial flux of heat to the surface structure. The treatment can be stopped before the surface is sensory affected, causing the effective processing time in a SonoSteam® treatment to be very short.

The SonoSteam® Mediclean solution is recognized as secure, sustainable and effective, which alongside gives the best possible working environment for the staff and for optimal patient safety.

FACTS ABOUT SONOSTEAM® TECHNOLOGY MEDICLEAN SOLUTION:

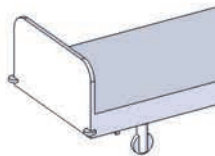
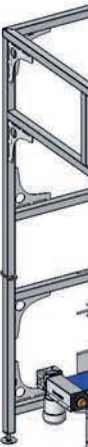
- Most efficient system on the market with highest capacity, up to 80 mattresses per hour.
- Disinfection without chemicals, only steam and ultrasound
- Automatic tunnel system
- Pillows with hygiene membrane in racks
- Mechanical pre-rinse before SonoSteam treatment, removes visible dirt
- Microorganisms are killed faster and with better results by using steam and ultrasound, compared to steam treatment without ultrasound
- Scientific bacterial tests analysed on most common hospital bacteria in a laboratory
- Validated hygiene results <2,5 CFU/cm²
- A timesaving and ergonomic system
- The machine can work together with the automatic bed washer or as a stand-alone system.

MEDICLEAN SOLUTION FOR HOSPITAL BEDS AND MATTRESSES – EASY TO OPERATE AND MAINTAIN

- Fastest and most efficient disinfection system on the market
- Up to 25 beds and 80 mattresses per hour
- Improves hygiene
- Breaks the chain of infections
- Reduces hospital infections
- Same hygiene result on all beds and mattresses
- Documented bacterial results <2,5 cfu/cm²
- Optimize working environment
- Time saving process
- Green recirculating, sustainable system
- Low running costs
- Cleaning system for beds, mattresses, assistive devices, pillows etc.
- Customization
- Possible automation add on's, i.e. transport systems, mattress handling etc.

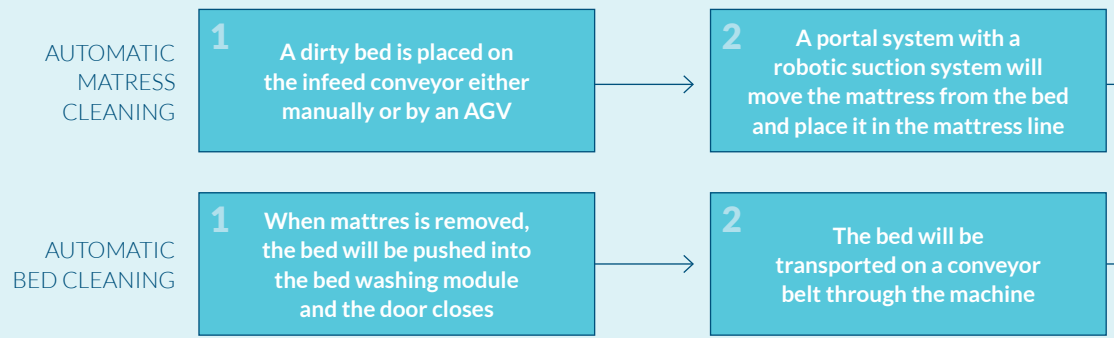
New Stavanger University Hospital, Ullandhaug

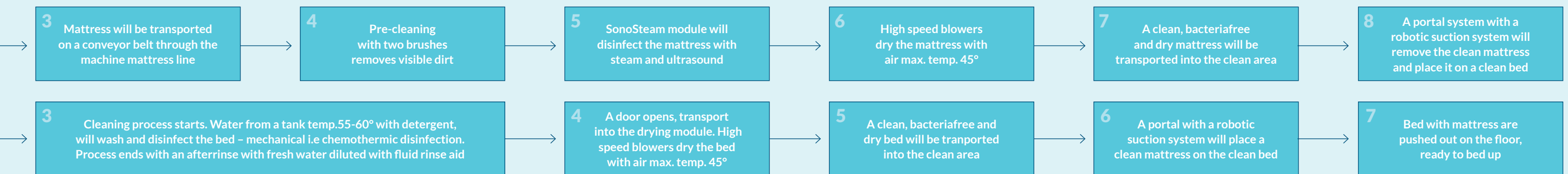
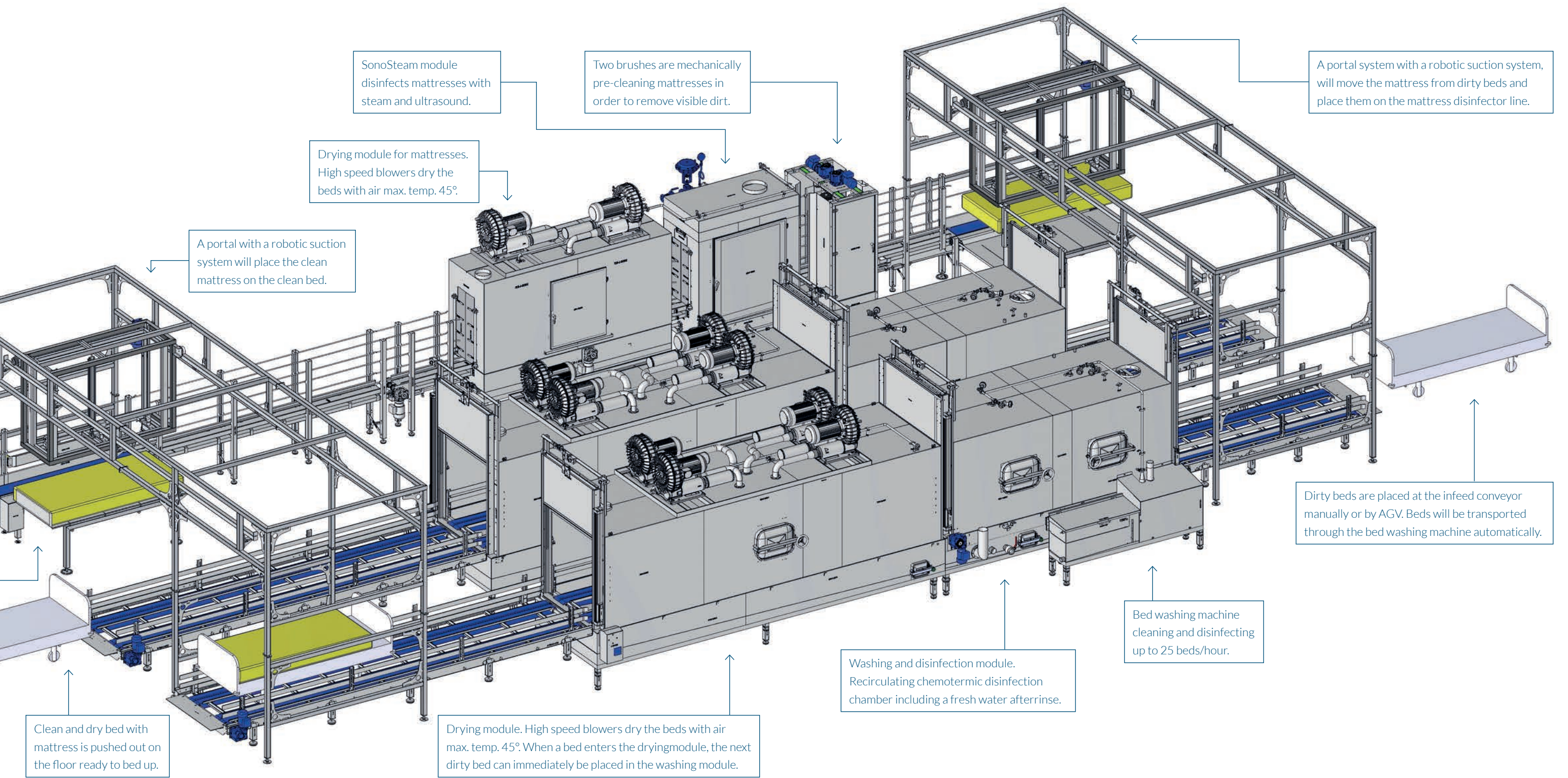
- Bed and mattress disinfection system will be installed during 2021.
- Daily capacity appx. 300 beds and mattresses and assistive aids.
- Fully automated system with a high degree of automation.
- Effective, time saving system.



Clean mattress will be moved from the mattress disinfector lifting table and placed on a clean bed.

PROCES FOR THE CLEANING SYSTEMS







SPECIFICATIONS:

- Optimize hygiene and patient safety
- Process up to 25 beds and 80 mattresses per hour
- High throughput meets the requirements for short hospitalization
- Scientific validated results <math><2,5\text{ CFU/cm}^2</math>
- Sustainable system
- Low variable running costs
- Improve the working environment
- Save time and money

"We are pleased to have found a solution that is forward-looking and effective. This ensures patients, and makes the working day easier for the staff who will handle the cleaning of the beds"

Kari Gro Johanson
Nyt Stavanger Sykehus, Project director

EFFECTIVE AUTOMATIC BED AND MATTRESS DISINFECTION SYSTEMS.

Customization according to available space and good hospital logistics.

01 | PIT BASED SOLUTION

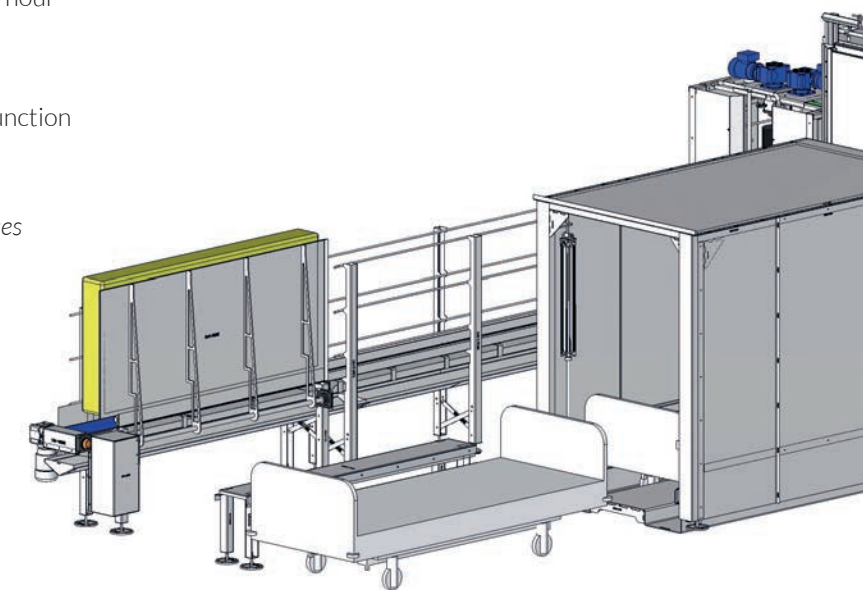
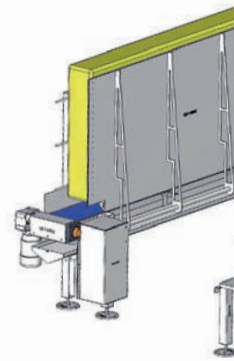
- Capacity 18-20 beds and 80 mattresses per hour
- System cleaning assistive devices
- Easy in and outfeed directly at floor level.
- Bed washer placed in a pit -600 mm
- Foot print appx.: 12.800 x 6.400mm

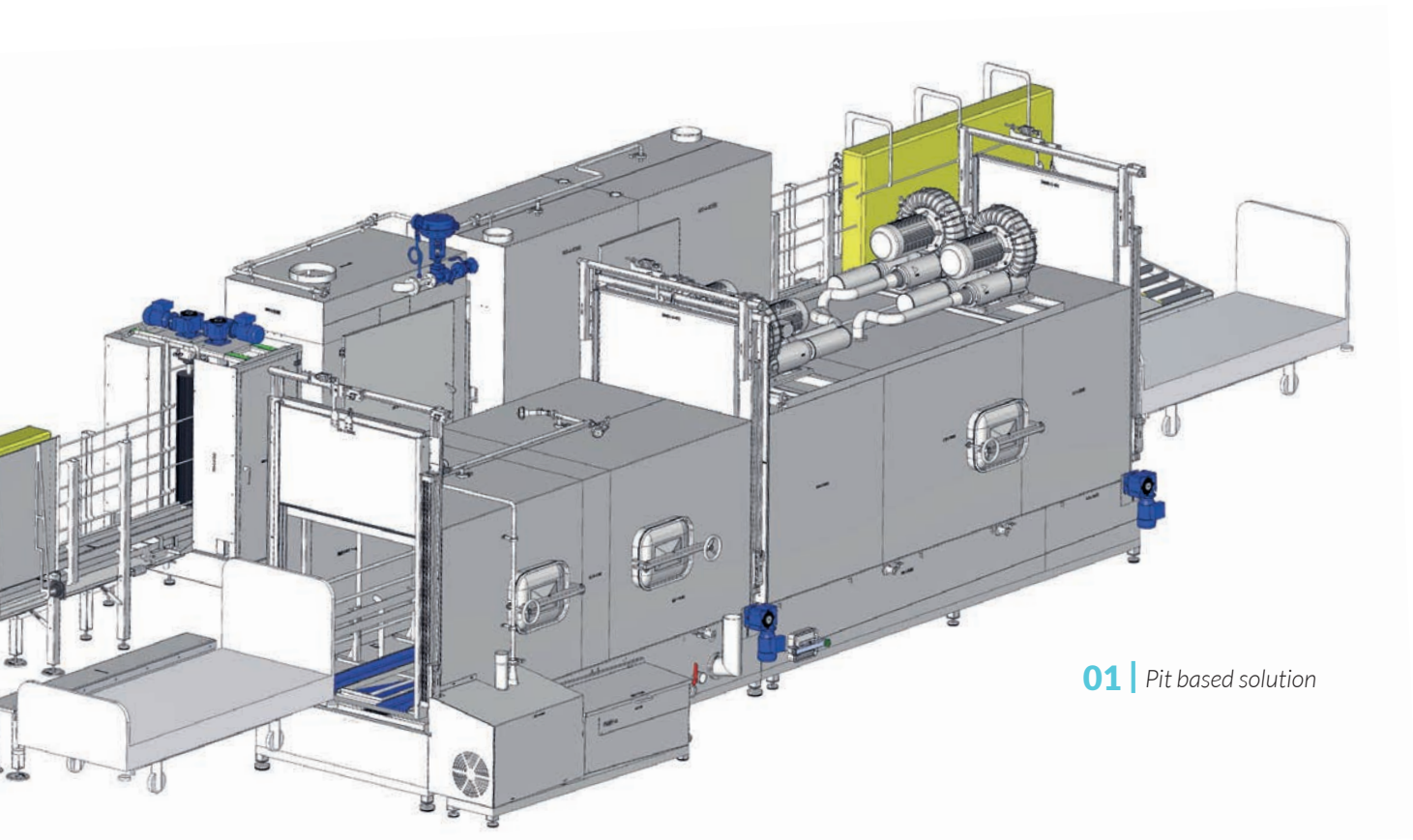
Increased capacity up to 25 beds and 80 mattresses per hour requires extra 1200 mm in length.

02 | FLOOR BASED SOLUTION

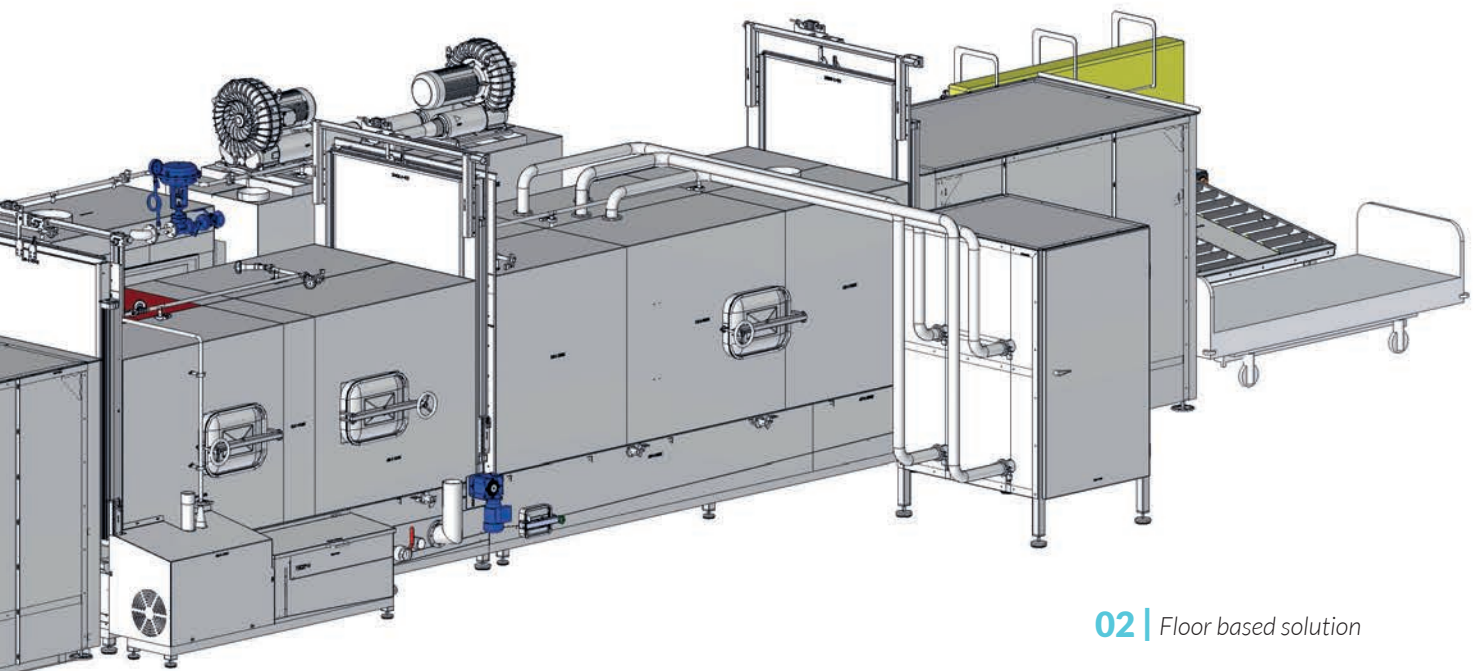
- Capacity 18-20 beds and 80 mattresses per hour
- System cleaning assistive devices
- Easy in and outfeed directly at floor level.
- Bed washer floor mounted with bedlifting function
- Foot print appx.: 12.800 x 6.400mm

Increased capacity up to 25 beds and 80 mattresses per hour requires extra 1200 mm in length.





01 | Pit based solution



02 | Floor based solution

SUSTAINING HYGIENE IN THE HOSPITAL SUPPLY CHAIN

Cleaning systems for trolleys, case carts and plastic boxes – an important part of the supply chain. Hospital's consumables and sterile equipment are supplied in case carts, plastic boxes, and trays and transported in trolleys. As the transport system recirculates between external storage facilities and different wards in the hospital, it is critical that these are disinfected before each cycle to prevent cross contamination. For almost a decade we have specialised in developing and delivering solutions that cleans and disinfect such returnable carrier system.

We have installed automatic cleaning systems handling case carts, plastic boxes, trays and trolleys in several Scandinavian hospitals. All our solutions are tailored to meet individual needs of every single hospital.

Cleaning of case carts, plastic boxes, and trays

Case: One of our automatic cleaning solutions, with a throughput of approximately 150 case carts per day, was installed at Aarhus University hospital – CSSD in Denmark in 2017/2018. The cleaning system consists of two identical machines that are operating in parallel and maintaining redundancy so that a stable constant production is ensured even if breakdowns occur. The capacity of the system is 2x30 cleaning processes per hour.



Fully automated cleaning system, untouched by human hands, installed at Novo Nordisk.



Automatic cleaning system at Aarhus University Hospital for case carts and plastic boxes.



FACTS ABOUT THE CLEANING AND DISINFECTION SYSTEM

- Automatic tunnel system
- High capacity
- Flexible solution cleaning various items
- Integrated CIP
- Automatic draining of machine
- Low water consumption
- Easy access to the inside of machine

AUTOMATIC WASTE CONTAINER CLEANING

We install automatic, flexible, high quality container cleaning systems, which help improving hygiene at hospitals and breaks the chain of infection. Container sizes from 60 up to 1.100 litres.



BWA COMPACT

- Container cleaning system for 2-/4-wheel waste containers up to 1,100 litres capacity
- The automatic interior cleaning is carried out automatically with a three-dimensional spray head.
- The BWA Compact is equipped with a hydraulic tilting device and a safety barrier at the working area.
- It can either be set up with rollers or stationary.
- The cleaning is completely time controlled.
- Optionally, detergents and disinfectants can be added.



BWK 1300

- The shooting star with patented process technology
- Container cleaning systems for automatic inside and outside cleaning of containers from 60 to 1,100 litres capacity in a closed cabin.
- The BWK1300 contains the unique 360° container rotation.
- You can choose between high- or low-pressure pumps.
- The robust and indestructible hydraulic motor guarantees a long service life.



HOSPITAL REFERENCES

- *Hvidovre Hospital*
- *Regionshospitalet Viborg*
- *Hospital Sønderjylland, Aabenraa*
- *DNU Skejby Hospital*
- *Regionshospitalet Randers*
- *Odense University hospital*
- *Region Hovedstaden*
- *Nyt Stavanger Sykehus*
- *Landspítali Faroe Islands*
- *Kungälv Sjukhus*
- *Höglandssjukhuset Eksjö*

SEMI STAAL INSTALLED AN AUTOMATIC BED- AND MATTRESS DISINFECTION SYSTEM AT REGIONSHOSPITALET VIBORG IN 2017

Hanne Louring, has stated:

"Our new bed- and mattress washing machine from Semi Staal has meant a lot to both hygiene and efficiency. When the beds have been cleaned in the bed washing machine, they are clean all over. With manual cleaning of the beds it is difficult to enter all corners, f. ex at the siderails.

In the bed washing machine, water is flushed in all over the beds. The nozzles are positioned to hit the difficult places as well.

We have a very good feeling when the beds have been through the cleaning process. Visually, they beam with cleanness, and a bacterial test have at the same time shown extremely good results.

The mattresses are running in a separate machine, where they are cleaned with ultrasound and steam. Also here with a perfect result. The machine is efficient and running costs is very low. It only takes 3½-4 minutes from the bed is running into the machine until it comes out clean and dry.

Semi Staal has always been ready to help us when needed, which has been very important for us in terms of keeping a stable operation."

Hanne Louring

Service Consultant / Responsible at the hospital for the daily operation of the machines

WE TAKE GREAT PRIDE IN BEING AN INNOVATIVE FAMILY-OWNED BUSINESS

We are a Danish family-owned innovative company with more than 40 years of experience specialized in designing, producing, and installing over 900 solutions around the world.

We began our journey in the early 1970's developing cleaning systems for returnable packaging such as boxes, pallets, bins, tubs, racks etc. for the food industry. Since then, in partnership with some of the leading global food and tech companies, we have developed and advanced our cleaning and conveyor solutions and now provides these services and technologies to hospitals as well. In 2013 the company was fully taken over by the 3rd generation of the family.

Mediclean became our core business

In 2010 one of the founders, Peter Meyendorff, was hospitalized with a minor sickness. During his hospitalization he got severely ill from a bacterial infection causing several months of recovery. This led the company to focus on patient safety in the health care sector and figure out how to fight the lack of hygiene problems at hospitals, using their skills and knowledge gained from the food and pharmaceutical industry. Hygiene around beds and mattresses was identified as a major source for infections.

UN Commitment

The company continues to strive to optimize cleaning and automated solutions for hospitals, food, and the pharmaceutical industry. Solutions that are efficient, safe and tally.

SEMI STAAL SUPPORTS UNS SUSTAINABILITY DEVELOPMENT GOALS, BY ASSIGNING TO:

Goal 3/3.3: Good health and wellbeing by breaking the infection chain in hospitals

Goal 12: Support in using natural resources in a sustainable way.

