MASTER'S THESIS CATALOGUE 2023

Industrial Design

AALBORG UNIVERSITY

ARCHITECTURE & DESIGN
MASTER'S THESIS CATALOGUE

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INDUSTRIAL DESIGN

Aalborg University

Master's Thesis Projects

Summer 2023

AALBORG
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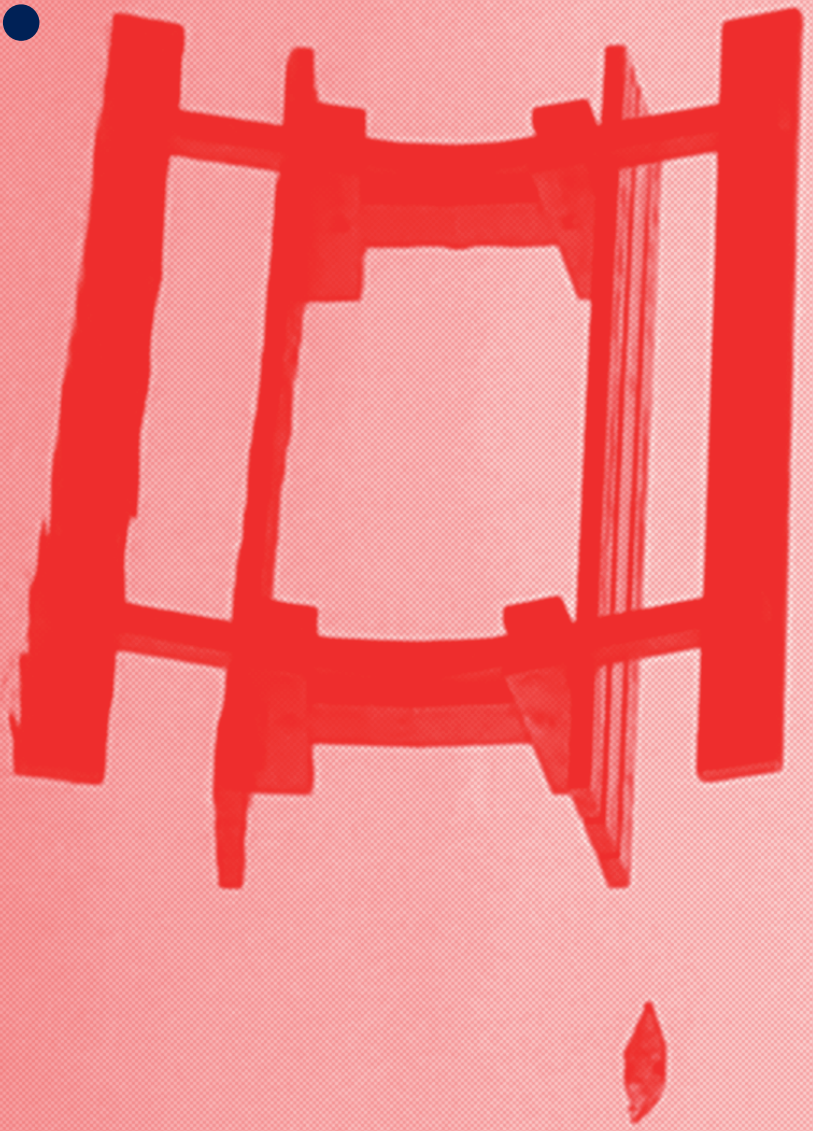
INDUSTRIAL DESIGN:



PORTABLE GYNOCARE/

W-METER/

MŌTUS/

ARMD/

PIVOT/

EXHUME/

CLEANETIC PRO/

VIBRASHIFTER/

ARACING/

ENWOUND/

NILFISK KEEP/

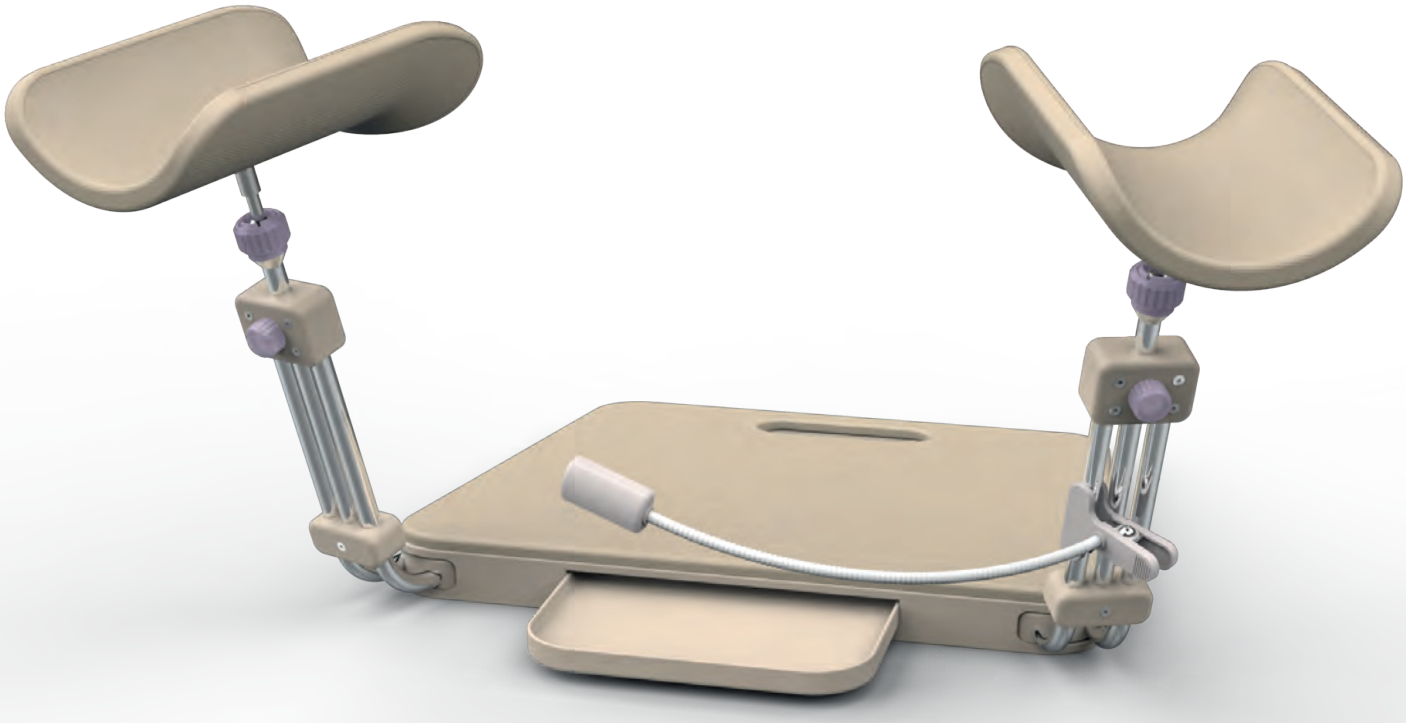
LIFELINE BEACON/

ALPLINER/

HARMONY 10/

Portable GynoCare

/ Suturing postnatal tears at home births



Portable GynoCare with an instrument tray in front and an attachable light clicked onto the stirrup.

Today mothers can give birth either at the hospital or at home. Due to the secure setting at home, home births have several advantages. However, the working conditions for midwives are more difficult, since they do not have the same setup as the hospital, especially when suturing postnatal tears. 86% of all first time mothers get one or several tears that needs suturing. Therefore, Portable GynoCare is designed to assist the midwife by holding the mother's legs in the correct position when suturing, similar to the stirrups used at the hospital for suturing today. Thereby, also improving the working position of the midwife. Portable GynoCare is a rigid bottom plate designed with adjustable stirrups to accommodate the optimal position of the legs for different mothers in a home birth setting. Portable GynoCare can potentially standardise the procedure and quality of suturing tears at home births.

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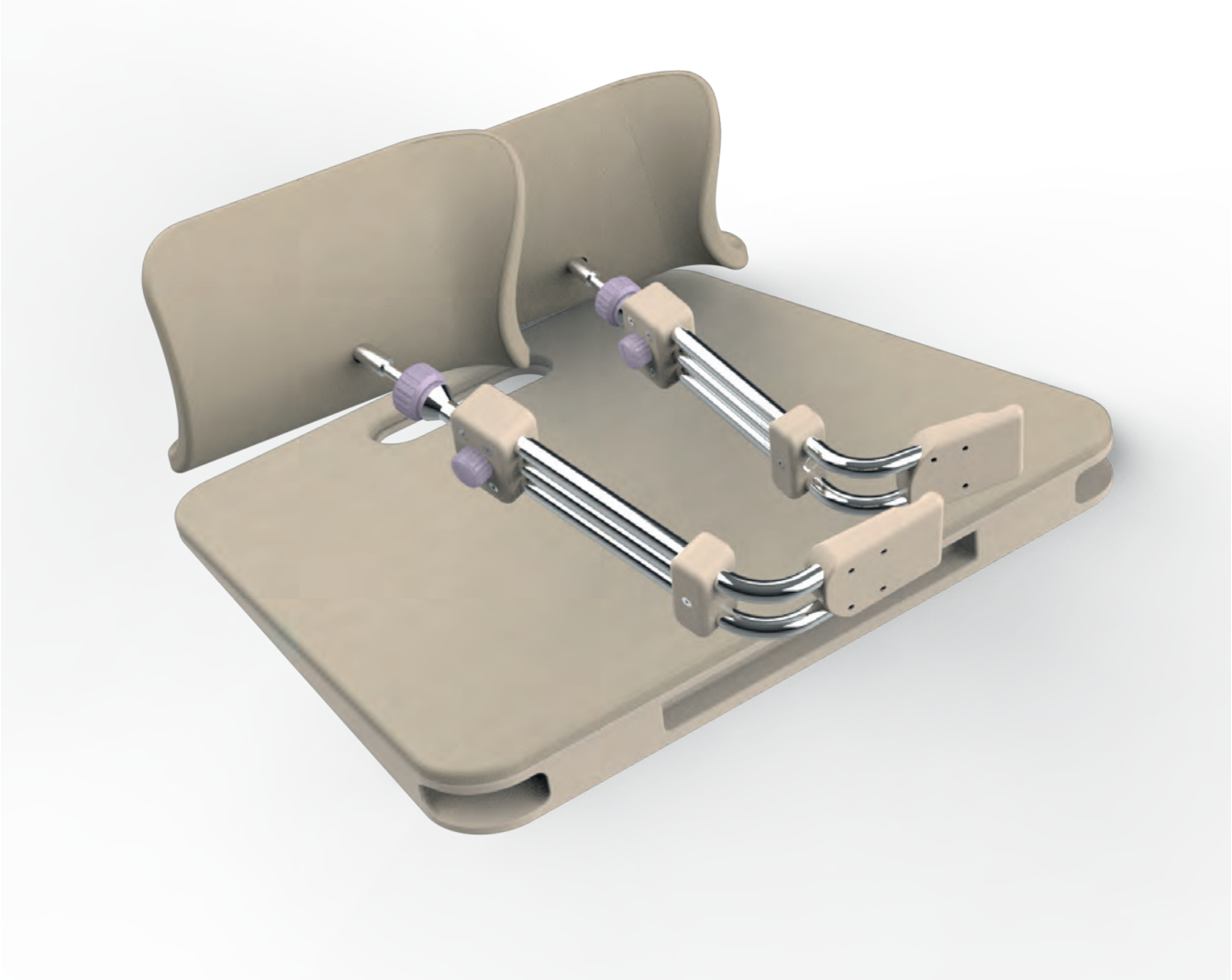

The stirrups can be detached for transportation.

Usable for suturing on the couch.

Usable for suturing on the dining table.

W-meter

/ A measuring tool for the hydration level of the body

The W-meter,
a hydration measuring tool.

In 2022, the Danish municipalities used 50 million DKK on hospitalizing dehydrated elderly. The W-meter is a tool designed for healthcare workers that enables them to quantify their perception of the elderly's hydration level. By doing this, it gives the healthcare workers the ability to prevent hospitalization.

The healthcare worker's current tools are depending on observations and perceptions of the elderly, allowing for interpretations between co-workers. These subjective tools can create mistrust between the elderly and the healthcare worker, as the elderly might be telling the truth about their water intake. This is a critical point as a good relationship between them enables the healthcare worker to do better caretaking.

The W-meter can change this scenario by quantifying the hydration level and embracing the elderly in the measurement, giving them a sense of empowerment.

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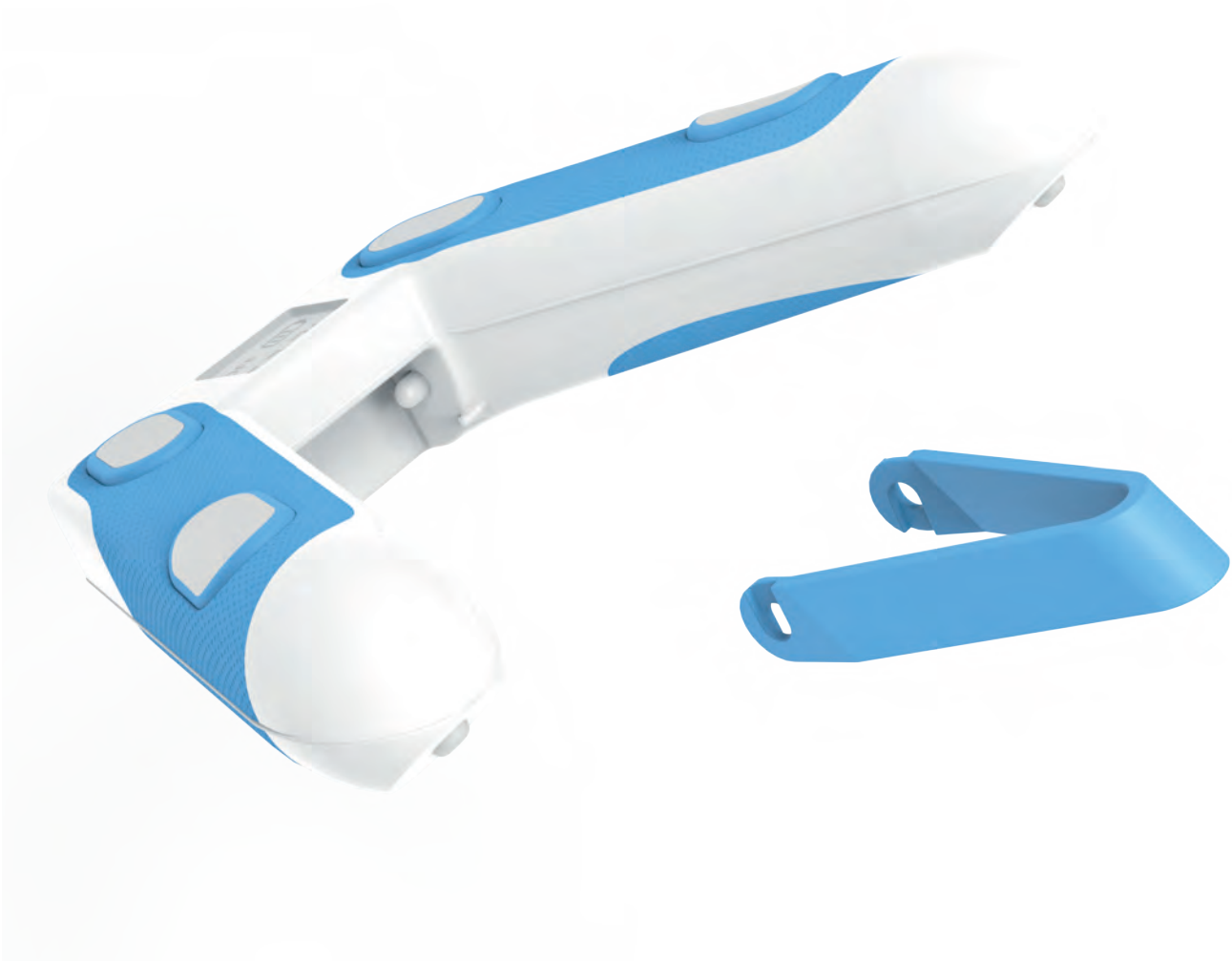
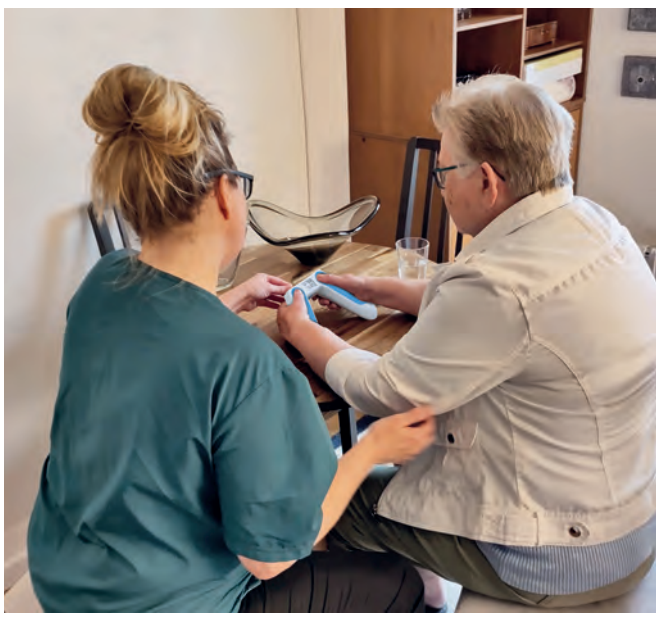


Hygienic design, easy to clean with a wipe.

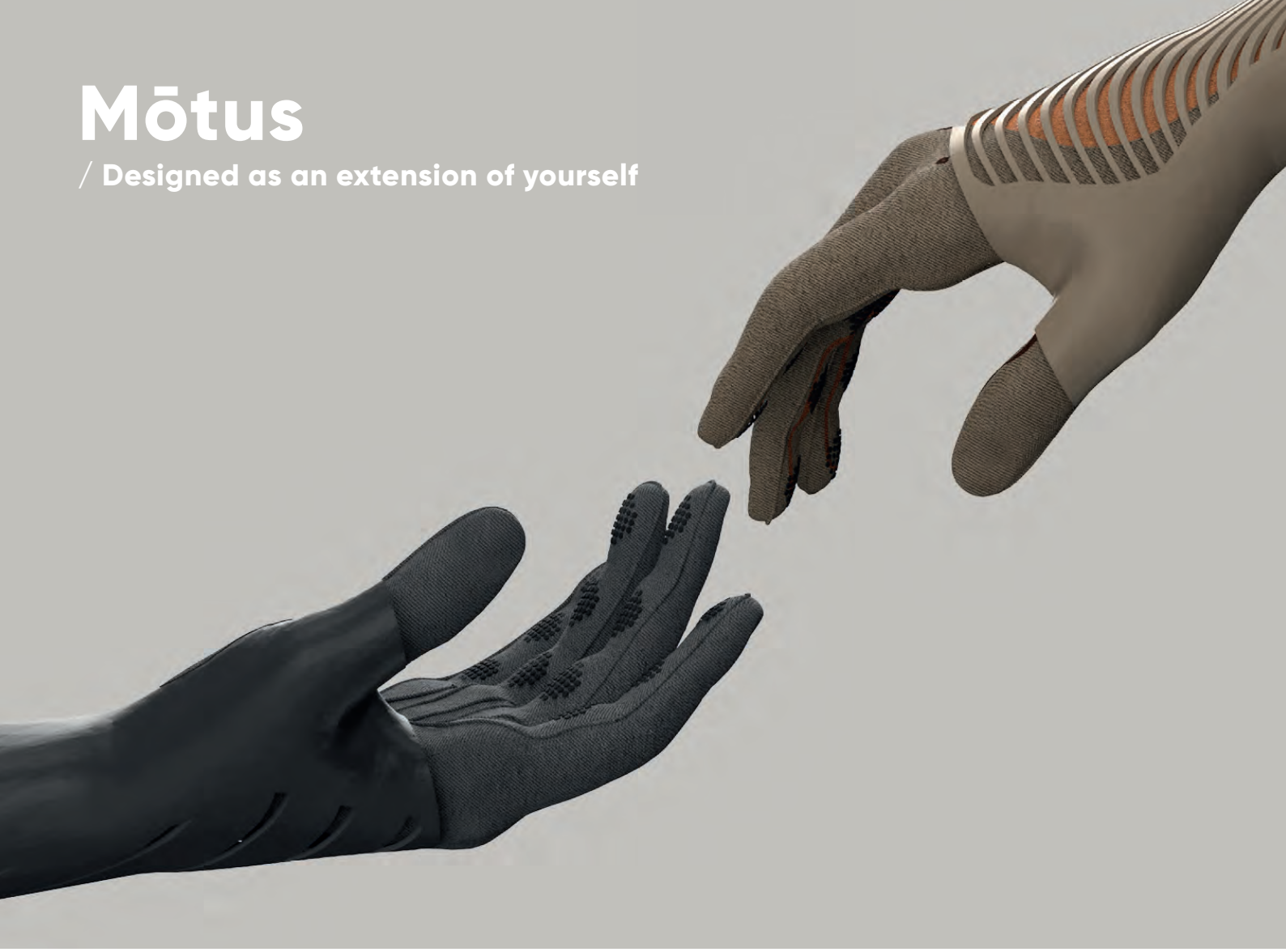


Embrace the elderly in their health.

Ensures an elderly-friendly position during the measurement.

Mōtus

/ Designed as an extension of yourself



Presentation of mōtus showcased in two different design styles.

Individuals with tetraplegia have tragically lost most mobility in their hands and arms and thereby their independence in the blink of an eye. This makes them highly dependent on their surroundings and relations, which reduces their life quality and desire to participate in social settings. The growing robotic development in exoskeletons focuses on functional principles but neglects to account for integrability and dissociation from rehabilitation and disability.

mōtus is designed to challenge the paradigm of exoskeletons. Through a holistic design approach, mōtus forms a new design language inspired by the clothes we wear and the adaptability to our personal preferences and identity. The functionality of mōtus is made invisible to an outside perceiver through textile and a flexible artificial tendon-actuation system. By enabling customizability and colour options, the user can make it occasion-based as we would our clothes and thereby make it an extension of ourselves - both physically and emotionally.

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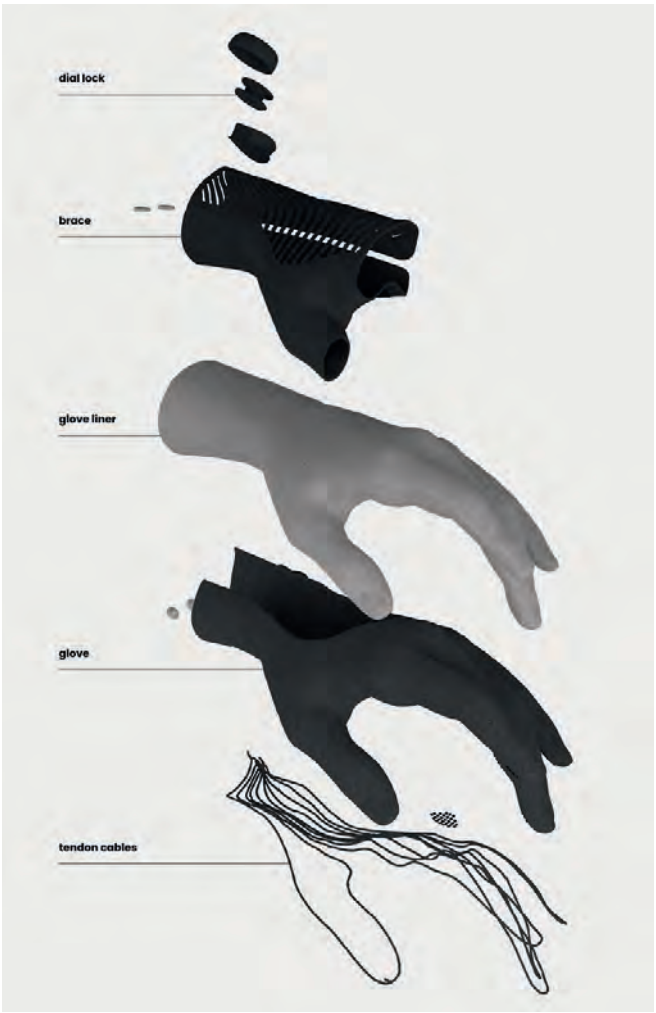
mōtus placed on the hand.

Cable routing and gestures.

Detail shots of mōtus, fiction pads and cable routing.



Exploded view and components overview.

ARMD

/ Self-training for stroke patients

ARMD & its three different sized cursors.

You cannot prepare yourself for a stroke. In a second, life changes, making what was once simple complicated. No stroke incident results in the same disabilities, but 50% will experience loss in their armfunctions and have to undergo arm rehabilitation at the hospital.

ARMD is a tool for arm rehabilitation that motivates to do self rehabilitation on the ward through levels of complexity, progress detection, exciting repetitions, and fun to make the patients forget time and place when exercising.

ARMD consists of a projector part that creates a gameboard at the table. It communicates with three different sized cursors, that the patient has to move around on the gameboard, to make the hand lead the arm. ARMD exercises the hand and arm in regaining the functionality to drink a glass of water on their own. With focus on reach, grasp & release, and wrist rotation this becomes closer to reality - faster!

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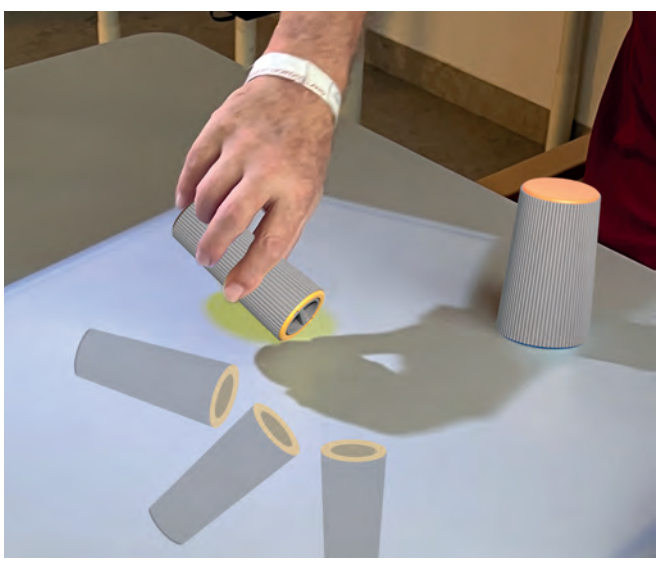
ARMD

Pre-setting & progress detection in the app

Guidance for the first time use.



Higher skilled patient using 3 cursors.

Pivot

/ A living table

Pivot is in its standard position a 4-person table.

We live in a time where furniture is being produced like never before. Therefore, there is a crucial need to think more circularly and increase the lifespan of furniture. New takes on furniture must be presented to the market to push the limits towards what furniture is capable of and what the actual needs are - now and in the long perspective.

Pivot is a new take on a dining table that can change size, both as a temporary solution, but also permanently. Pivot further allows to keep up with current trends and colors by allowing to change the reversible tabletop. And then Pivot can offer a new atmosphere by changing form to square.

The needs for a dining table change over time, and the table must be able to meet those changes, which is the purpose of Pivot - not only a table for dining but a table for living.

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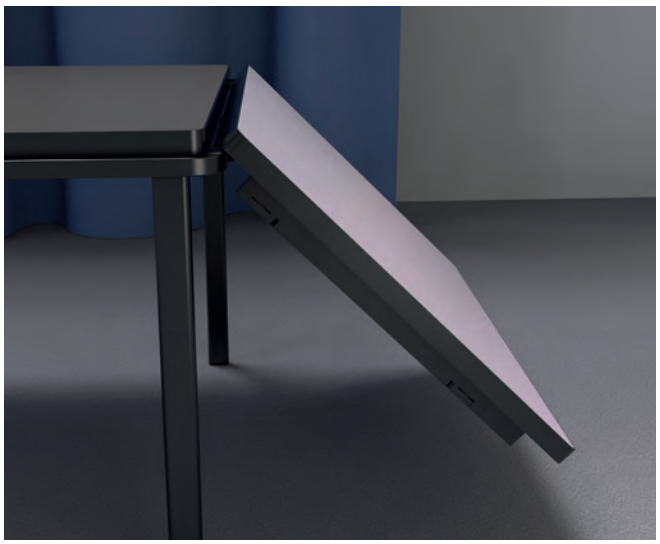
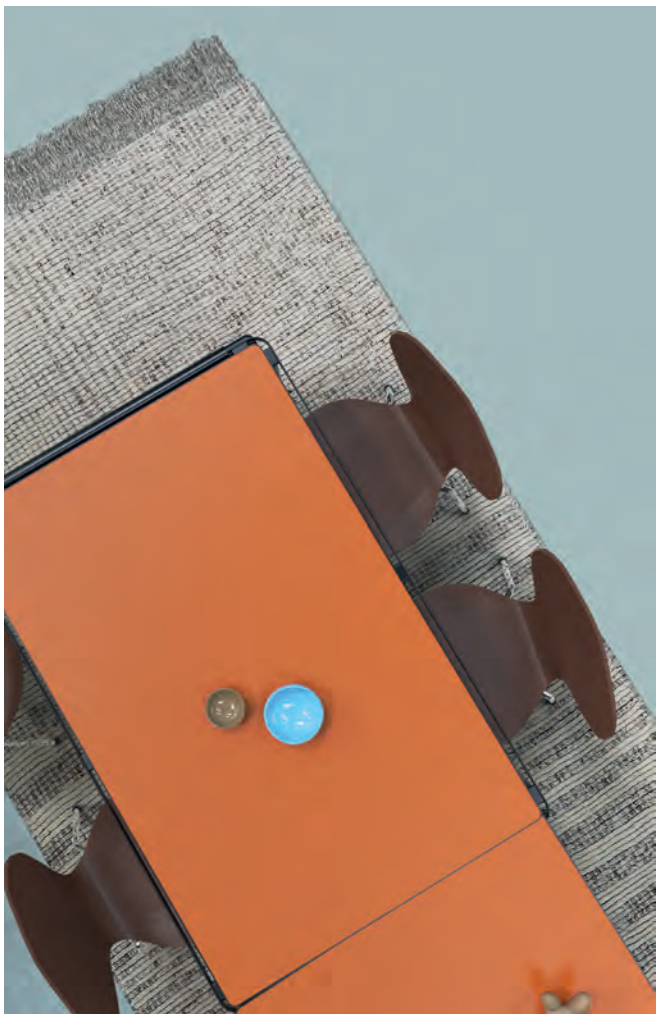
Bring it along in all homes of yours – from studio apartment to a home with children.



By swinging up the secondary plates the table can extend from 4 to 10 persons.

Extend the table permanently.



The tabletop is reversible and offers aesthetic renewal in terms of colors.

Exhume

/ The future of mountain bike cleaning

This illustration captures the dream. As a mountain biker it is important to explore nature - in the future Exhume is a part of the exploring.

This project is the industrial design master thesis consisting of the product Exhume. The project has roots in existing knowledge of mountain bikers and their wish to clean their bikes near the trail, before returning home. Several mountain bikers have contributed throughout the process to the success of the development of Exhume. Currently the mountain bikers have to bring inadequate cleaning equipment that ends up scattered all over or wait to clean the bike until returning home, when they've gotten tired and cold. With a dramatic rise of mountain bikers in the aftermath of Covid, the need for such a product is larger than ever.

Exhume intends to solve the aforementioned issues of cleaning a mountain bike by the trail while trying to become a part of the arms race that rages within the mountain biking world in regards to equipment and accessories. This is achieved by the opening- and user experience, which differentiates the product from competition.

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The mechanical opening presents both gun and tool for cleaning by the push of the handle.

Exhume allows for the cleaning of mountain bikes in full control over both bike and equipment.

With its compact sizing, Exhume allows for both comfortable cleaning, transport and storage.

Cleanetic PRO

/ The future of sterilisation containers

Cleanetic PRO

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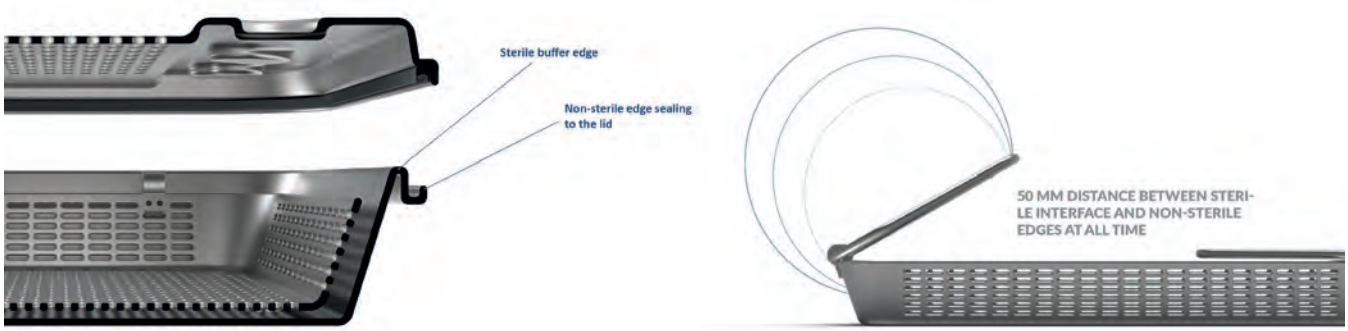
An increase in reusable medical instruments will increase the burden on sterile processing departments (SPDs) and, as a result, the demand for single-use packaging, such as autoclave pouches. Cleanetic PRO is a reusable sterile container system that minimises the use of disposable autoclave pouches for smaller instruments. It is the result of iterative exploratory work on design principles that comply with the needs of nurses and preserve the structure of the SPD, and how the hospital industry can accommodate both a greener transition and the essential needs of personnel.

Qualitative analyses have shown that procurement drives the introduction of new products to the market, whereas operational requirements for the individual determine the final adaptation. The subject of analysis has been the sterile processing department and surgery nurses at Farsø Hospitals, where a focus on ergonomics, control, and the operational challenges of handling autoclave pouches has produced a framework for a possible sustainable alternative to autoclave pouches.

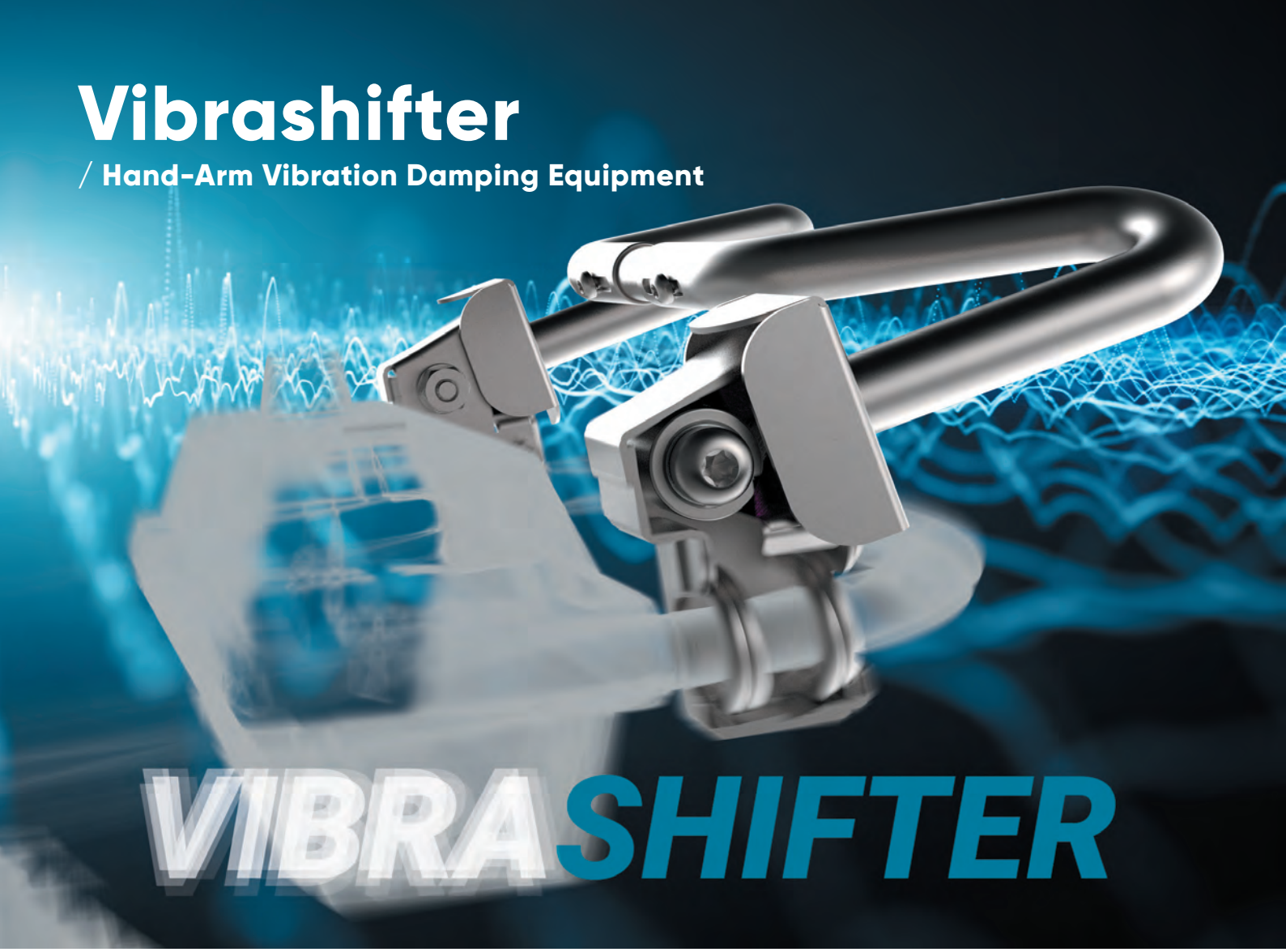
Use and retreatment of reusable surgical instruments.



Section cut Cleanetic PRO

Vibrashifter

/ Hand-Arm Vibration Damping Equipment



Conceptual visualization of how Vibrashifter stands still while the machine vibrates.

Vibrashifter is a system of vibration damping equipment that fits several hand operated machines such as the ones used in the construction industry.

The project revolved around reducing the risk of HAVS, short for Hand-Arm vibration Syndrome. It is a category of illnesses that affects workers who operate vibration tools or machines on a regular basis. The most common types of HAVS are Vibration-induced White Finger and Carpal Tunnel Syndrome. Both will, depending on the vibration magnitude, frequency, and exposure time, cause long-term or permanent damage to the hands, entailing cramps and a loss of agility, motor control, and strength. Currently, complying with the regulations of vibration exposure hinders construction managers' ability to compete. Essentially, their dilemma is: Ensure employee well-being or stay in business.

Vibrashifter provides vibration damping without compromising the workers' control and ability to operate efficiently, rendering the dilemma obsolete.

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Vibrashifter solves the dilemma between efficiency and damping with MODE SHIFT. A feature that allows the operator to quickly adapt to the ever-changing conditions of tasks. The operator does not need to endure high vibration exposure when less control is needed.

Vibrashifter is a system that is compatible with the machines presented. Every product for the machines includes the carryover components. The stop damper is available in different material stiffnesses.

ARacing

/ A new go-kart experience

Person driving in a go-kart with ARacing mounted.

The project deals with the problem of go-karting being a rarely visited activity within the segment of young people Here, due to it being based on an experience most fitting for people having an interest in racing, hence its focus lies on individual performance and the singular goal of getting the fastest lap time.

To counter this, ARacing was created; an interactive gaming solution system for electric rental go-karts based on augmented reality technology providing a new immersive go-kart activity emphasizing team play and a unique driving experience. ARacing is a three-part solution consisting of a redesigned front part, an integrated display and camera, and a redesigned steering wheel accommodating the interactive experience. While driving, a videogame emerges through the display, combining the real and digital world, creating an exciting track layout varying from lap to lap.

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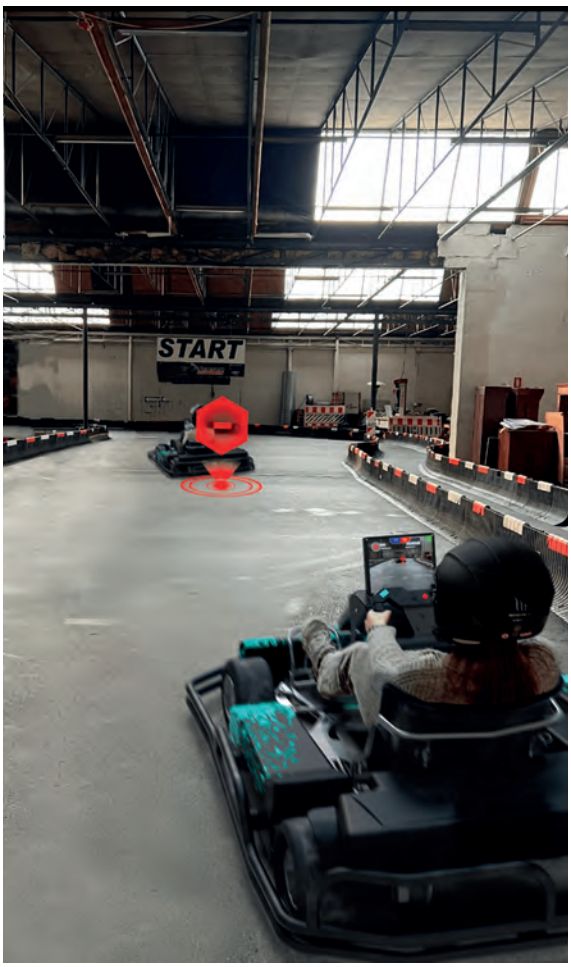
First-person view, sitting in the go-kart.

Presentation of ARacing.



Users trying the experience.

ENWOUND

/ Empower the nurse when doing wound care in private homes.

ENWOUND creates a systematic overview of the equipment for wound care treatment.

ENWOND is a product proposal for the nurse, who performs wound care treatment in private homes. ENWOUND is a systematic storage solution for wound care equipment, which has been developed to provide an overview and raise the safety of the patient. The product divides the nurse's equipment into two drawers and their tools into dirty and clean.

Furthermore, the purpose of ENWOUND is to minimize the preparation time for the treatment and thus provide more time for the treatment and patient. By placing the product close to the patient, the equipment is easily accessible throughout the treatment.

ENWOUND should be placed permanently in the patient's home during the treatment period, which can vary from a couple of months to several years. ENWOUND is replacing the current solution, which is typically three normal plastic boxes - and thus be included in the same cycles due to its size and choice of material. Therefore, the product can be reused and placed at a new patient.

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The small and compact size of ENWOUND makes it possible to place it on the dining chair, and in the bed so the equipment is within an arm's reach.

ENWOUND collects all the equipment in one product together with a holder for a garbage bag, storage surface, and access to gloves, resulting in an improved workflow for the health care nurse.

A small tray with dirty tools can easily be taken out by using the small grip. As the tray indicates it can be cleaned with 100 degrees hot water to kill all bacteria.

Nilfisk Keep

/ User Centered Repairable Vacuum Cleaner

Nilfisk Keep

Currently, e-waste is one of the fastest growing waste stream in the world and vacuum cleaners are a major contributor of e-waste. Today's vacuum cleaners are not designed to be repaired by the ordinary consumer and having the vacuum cleaner professionally repaired can be very expensive.

Nilfisk Keep is a user-centered repairable vacuum cleaner that features easy access to key components that can be replaced by the consumer without a hassle. The key components are collected in two electronic cylinders that can be retracted from the product with a single twist. Each component in the cylinder is rotated off through a modular system. Visibility into the cylinders, as well as other important areas gives the consumer an understanding of how the product works. An internal safety fuse indicates when maintenance is critical and guides the consumer through integrated maintenance steps found on the product.

Nilfisk Keep is a long-lasting vacuum cleaner that you can keep for years.

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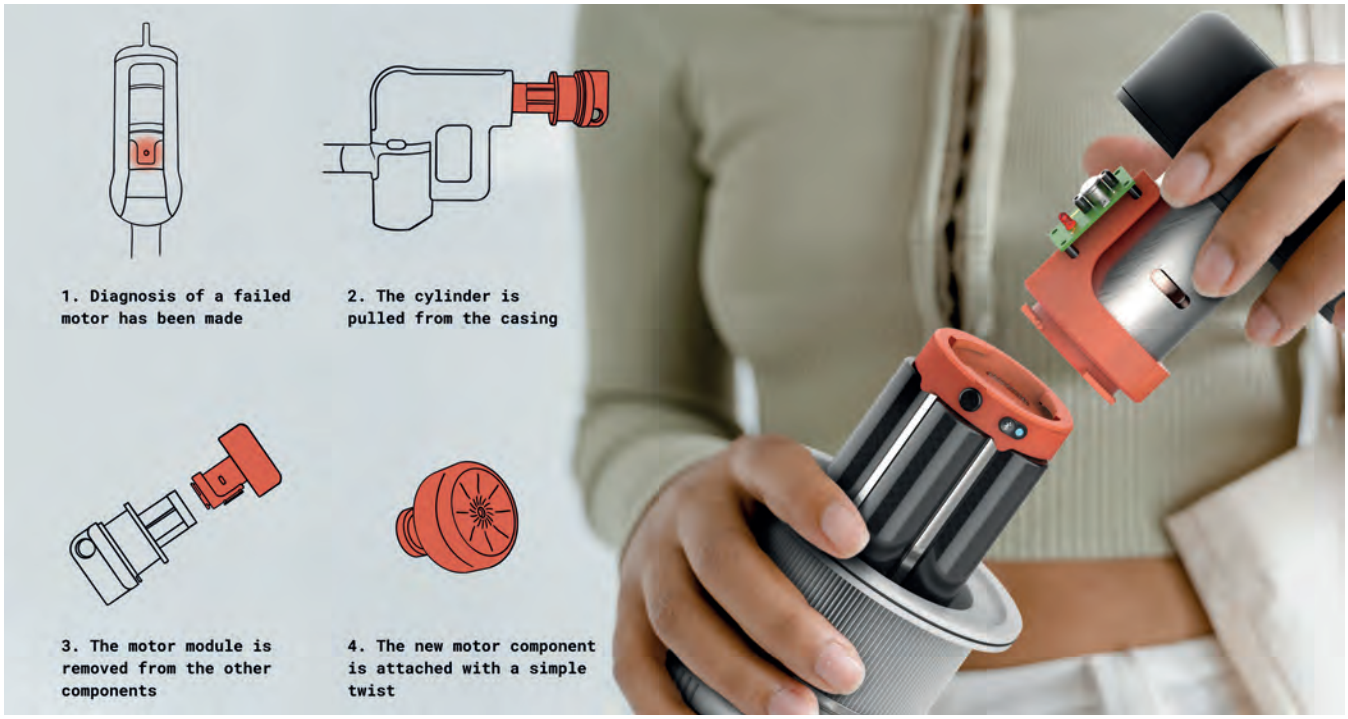

Modular connections allow for easy repair as well as upgrade.

Airflow in the vacuum cleaner

The two electronic cylinders

Nilfisk Keep

Lifeline Beacon

/ Firefighter Safety Equipment

The device monitors firefighters' crucial vital signs and activity levels in real-time, enabling dynamic strategic deployment by commanders and timely provision of rescue assistance, thereby minimizing casualty risks among firefighters without compromising mission efficiency. Abnormal monitoring results trigger alerts to firefighters and teammates, aiming to augment their situational awareness and mutual assistance. Vibration at different frequencies during non-emergency situations allows firefighters to keep track of their physical condition, increasing their consciousness.

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This graduation project showcases an innovative sock-embedded wearable device specifically designed for firefighters and in compliance with professional standards. The design goal is to enhance firefighter safety during mission execution through proactive protection.

The core functionality of the device is to monitor crucial vital signs and activity levels of firefighters in real-time, enabling dynamic strategic deployment by commanders and timely provision of rescue assistance, thereby minimizing casualty risks among firefighters without compromising mission efficiency. Abnormal monitoring results trigger alerts to firefighters and their teammates, aiming to augment their situational awareness and mutual assistance. Vibration at different frequencies during non-emergency situations enables firefighters to keep track of their physical condition, elevating their consciousness.

Besides firefighting scenarios, the device also considers personnel involved before and after a fire incident, aligning with occupational health and safety standards to continuously improve the working safety of firefighters in a proactive and sustainable manner.

Customizable colors to match different fire station identities and customer preferences.

The device's sleek and simple design makes it easy to embed in socks, minimizing discomfort. A One-touch on/off button simplifies operation. The power indicator bar changes with power consumption, allowing users to grasp the power status.

The device can be "hidden" in custom-made firefighter socks, allowing firefighters to have it available at all times without adding to the turnout time. Its shape only protrudes where it needs to contact the skin, allowing maximum skin contact with comfortable fabric. It will be embedded in a pocket near the sock opening, minimizing contact with firefighter boots and thus reducing potential discomfort.

AlpLiner

/ A custom skiing experience

AlpLiner

The project examines the characteristics of rental boots and how they are designed to fit all, but in turn, fit no one. Typically, rental skiers pick the boots that feel the best in the shop though often prove to be too big when on the slopes. This leads to little control, resulting in over tightening the buckles to regain control. This creates pressure sores which can lead to cold, numb and cramping feet which can end up taking the joy out of the skiing holiday. Through analysing, as well as testing prototypes in Trysil Norway, the design team produced the final product proposal; AlpLiner, a radical ski boot liner combining without compromising key aspects of both comfort and performance, aiming at improving the experience through an integrated air system in the liner, giving each customer a custom fit when renting.

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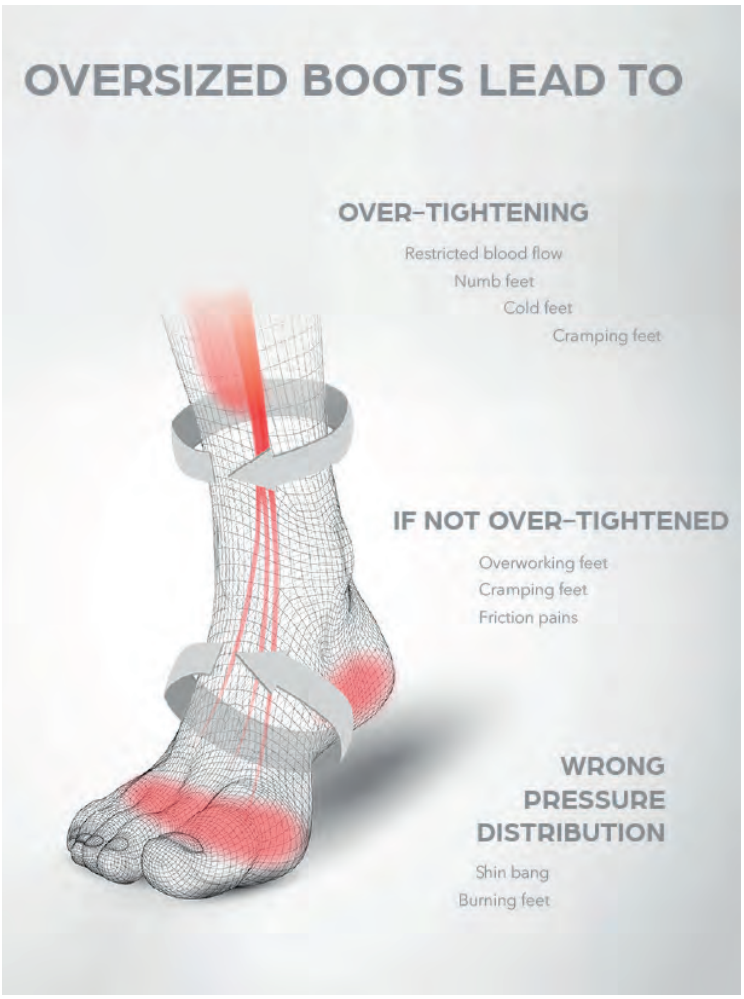
AlpLiner

AlpLiner rear view

AlpLiner Air system



Pains

Harmony 10

/ A Home Harmony

Harmony 10 presenting both sides of the speaker.

Sound is an inherent part of young adults live, they are constantly moving around their house while streaming music, podcasts, or movies. The Harmony 10 speaker is designed to target the young audiophile adult who seek a seamless and harmonious home environment, it blends in their apartment, providing the freedom of enjoying the quality of a stereo sound system while having the convenience of a portable speaker.

The design of Harmony 10 respects the principles of New Nordic Design, including its aesthetic codes to trigger the customers' attention. However, it ensures to stay a captivating product for the users as it avoids being simply a trendy speaker. The timeless elements of this style are expressed through a wooden finish cabinet and a metal frame. By evolving into a speaker on a stand with a full sound range the product can take a whole new meaning and prevent the user from getting bored of it when growing into an adult.

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The product can evolve on be placed on a stand with the front grill removed for full sound range.

Grab Harmony 10 around your home and enjoy your favourite music or podcast in the background while cooking.

Use the product in stereo.

The product can evolve on be placed on a stand with the front grill removed for full sound range.

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