



MATE-XB Rel. 2 PPE

October 2025

MATE-XB: Overview

MATE_{XB}

IS A LUMBAR EXOSKELETON

- is a non-powered exoskeleton for relieving the muscular effort at the lumbar district for workers who have to move weights.
- It supports the user while working in different positions, e.g., when bending with the legs (squat), bending with the back (stoop) or repetitive lifting of loads.
- The device is designed to reduce back strain during these activities and improve the quality of the user's work.



Main components

Kinematic Chain

Kinematic system designed to replicate the natural movement of the trunk, ensuring fluid movement and full operational freedom.

Belt Adjustments System

Adjustable system that adapts to all body types, wrapping around the user.



Textile Interface

Body-contact components are removable and washable, made with comfortable and breathable materials for safe and prolonged use.

Assistive mechanism

Intelligent system that accumulates and releases energy, providing adjustable assistance based on the user's physiological needs.

ON/OFF Assistance Mode

Quick system to switch from transparent mode to active mode: allows temporary deactivation of assistance to facilitate sitting down, climbing, and descending stairs. Improves usability, safety, and operational continuity in dynamic activities.

Technical features



Assistance level regulation
(the level can be adjusted without stop working)



Switch knob to enable/disable the mechanism

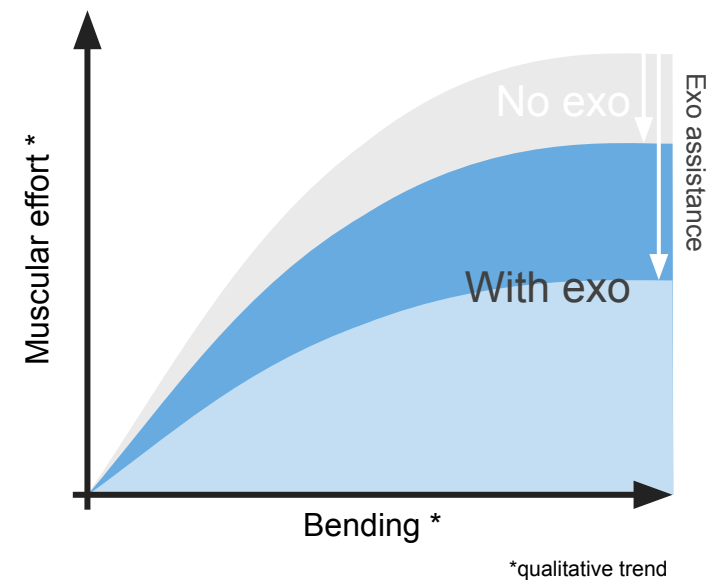
Technical features



- **5** assistance levels, up to **25-kg support**
 - **Weight: 4kg**
 - **2 available sizes::** Large (L) and Extra Large (XL)
 - **High breathability**
 - **Removable** textile components
 - **Labels** on textile and rigid components for **simple** and **repeatable adjustments**
 - **Quick switch** from transparent mode to active mode
 - **Adjustable belt positioning**
 - **Adjustable vest fitting**
 - **Lightweight** and **resistant** carbon fiber back structure
 - **IP54 protection rating**, resistant to dust and atmospheric agents
- **Tested to be adopted/used in coastal areas**, other locations near oceans, seas, other saltwater bodies, or in shipboard environments: the effects of high salinity atmospheres and salt-water sprays would not affect the device.

Working principle

MATE-XB GIVES YOU THE EXACT LEVEL OF SUPPORT
WHEN AND WHERE YOU NEED IT



- No hindrance while walking
- Zero torque at 0°

The assistance torque provided by the MATE-XB exoskeleton mimics the effect of the trunk flexion on the lower back

Additional features

MATE-XB MOVES IN HARMONY WITH YOUR BODY



Thanks to a chain of passive degrees of freedom, the exoskeleton allows to move while moving in the space

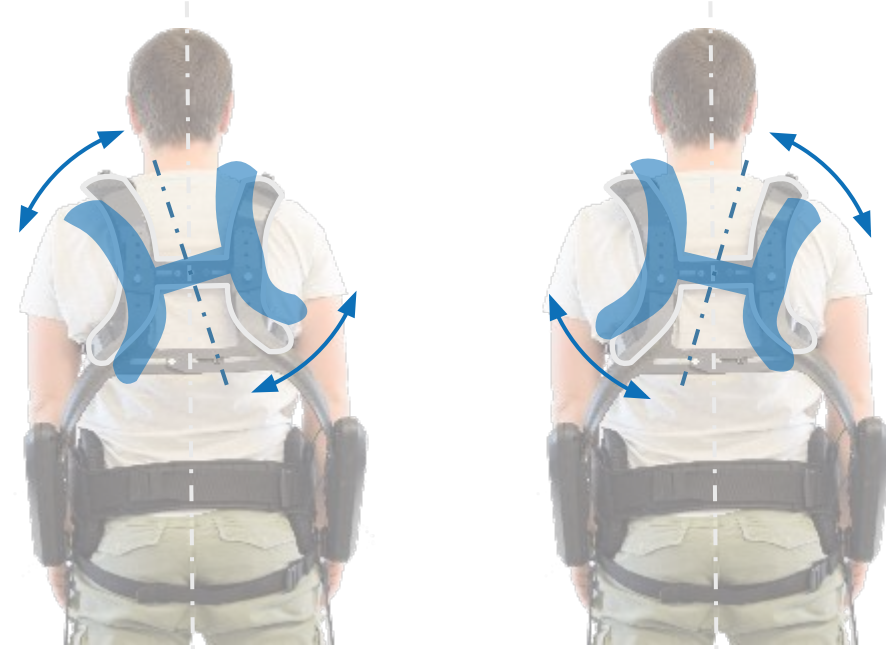
- both flexion-extension of the back and the legs
- trunk torsion
- lateral trunk tilt

The possibility of combining these movements with the exoskeleton guarantees the whole user's freedom of movement

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MATE-XB certified Category II Personal Protective Equipment



This certification marks an important milestone: it validates MATE-XB not only as an advanced ergonomic device, but as **a proven protective tool.**

- formally integrated into corporate safety systems and risk assessments
- simplifies adoption processes
- supports compliance
- reinforces the trust of employers consultants and workers alike

How MATE-XB can help workers and companies

WORKERS

50%



**REDUCED
MUSCULAR
EFFORT**

ON THE
BACK

Using MATE generates a steady reduction in back muscle activation during activities, reducing muscular strain

50%

ON THE LOW BACK ZONE



**PERCEIVED
EFFORT
REDUCTION**

PERFORMING ACTIVITIES

Workers' perception highlighted high correlation between perceived strain reduction and the measured reduced muscular effort

COMPANIES

**POSITIVELY
IMPACT YOUR
ERGONOMICS**

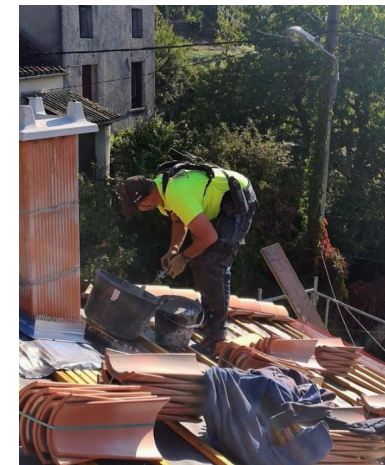
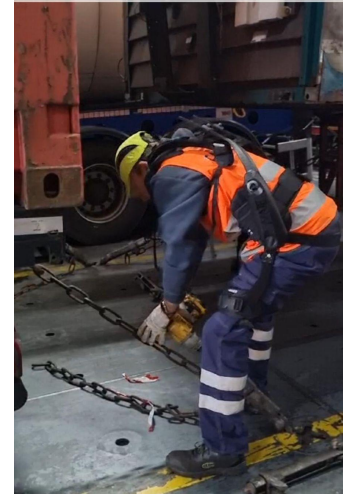
**LOW-COST FLEXIBLE
ERGONOMIC
SOLUTION**

**DEPLOYABLE IN
AREAS WHERE
AUTOMATION IS NOT
POSSIBLE**

**ADDRESS
WORK-RELATED
MUSCULOSKELETAL
DISORDERS**

MATE-XB: Target applications overview

- Logistics and retail operations
 - Manual shelf restocking in supermarkets at ground-level positions
 - Loading/unloading crates or packages from delivery trolleys
 - Picking and sorting goods placed on the lower levels of shelving units
- Construction and building trades
 - Floor tiling and alignment of ceramic or stone tiles
 - Ground-level electrical conduit installation
 - Grouting or sealing tasks in low postures
 - Laying materials along base structures
- Cargo handling
 - Manual positioning and securing of twist locks and chains on containers
 - Fastening and unfastening of lashing systems at ground or low levels
- Manufacturing and industrial maintenance
 - Low-position welding for automotive frames or machinery bases
 - Installation of sensors, wiring, or piping systems near ground level
 - Assembly of components under conveyor belts or at floor level



...and other application cases



MATE website
& Application cases



YouTube



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