



# HAPO - Internal use presentation

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## Context

Despite working conditions changes and improvements, back MSDs still persist. *"While low back pain accounted for 13% of work-related accidents in 2005, this figure rises to 20% ten years later, i.e. 170,000 work-related accidents in 2017"* (See Assurance Maladie Risques Professionnels – Mission statistiques).

Beyond the disorganization, loss of motivation and business performance's decline, low back pain represents more than one billion euros of direct cost for companies. *"Estimated 12.2 million working days, or 57,000 full-time jobs are lost due to back pain."* *"Equal to the cost of other musculoskeletal disorders."*

See Rapport de l'Assurance Maladie – Risques professionnels « Les lombalgies liées au travail : quelles réponses apporter à un enjeu social, économique et de santé publique ? », Santé travail : enjeux & actions, january 2017.

**The HAPO reduces back and lumbar problems.**

# For who?

This new posture harness is for people requiring lumbar support and/or for those working causes back pain. We can find these situations in all sectors : logistics, personal care, health, construction...

The HAPO is available in three sizes covering 90% of the Caucasian population (fits 98% of the shapes) and is designed to be used by both men and women.

HAPO **reduces lumbar stress and preserves the intervertebral discs**, regardless of the posture :

- In a **static standing position**, it enables physical support, as soon as the back forms an angle greater than 5°.
- In **dynamic flexion**, it allows, from the crouching position hands on the ground to the position arms at height (at hip level), to assist the lower back.

The HAPO partially transfers the forces from the upper body (chest support) to the thighs with the help of springs. The belt hold the lumbar vertebrae without restraint.

# How does it work?

. This solution is a real innovation in the field of physical assistance devices called "exoskeleton"! We are distinguished from our competitors thanks to our knowledge of composite material. The composite spring produce the same resistance in every position which is a key feature.

There are lots of solutions on the market but our knowledge of exoskeletons enable us to consider a new one with four necessary qualities :

- **Easy to use:** It can be put on like a backpack in 20 to 30 seconds.
- **Light:** 1.2 Kg (2.4 lbs).
- **Close to the body :** Great freedom of movement: you can do everything such as sitting, driving, walking, take a stair.
- **Efficient:** Adjustable power : up to 14 kg (30,9 lbs) of assistance.

# Market:

Price positioning: great price/efficiency ratio.

Performance: 14 kg (30,9 lbs) support.

Simple to use, close to the body and easy work deployment : unlike other sophisticated harnesses and bulky exoskeletons.

	<b>HAPO</b>	<b>Textile harness</b>	<b>Back Exoskeletons</b>
<b>Pluses (+)</b>	<ul style="list-style-type: none"> <li>• Effective from the beginning of the bending.</li> <li>• Multi-postural: Standing in slight flexion until working on the knees. Bending on one leg.</li> <li>• Disengageable.</li> <li>• Long-lasting efficiency of the springs over time.</li> <li>• Lightweight.</li> <li>• Close to the body.</li> <li>• Freedom of movement (sitting, walking...).</li> <li>• Easy to use.</li> <li>• Quick installation and removal.</li> <li>• Price/efficiency ratio.</li> <li>• Available in 3 sizes for 90% of women and men.</li> </ul>	<ul style="list-style-type: none"> <li>• Close to the body.</li> <li>• Light.</li> <li>• Freedom of movement.</li> <li>• Attractive price.</li> </ul>	<ul style="list-style-type: none"> <li>• No less effective than the HAPO.</li> <li>• Useful and well-known.</li> <li>• Resistant to collisions.</li> </ul>
<b>Minuses (-)</b>	<ul style="list-style-type: none"> <li>• Risk of being perceived as minimalist in terms of price and simplicity.</li> <li>• Remains a Postural Assistance Device with its uncomfortable aspects (pectorals, ribs... if used all day long. Respect the use recommendations).</li> <li>• Risk of thermal discomfort.</li> <li>• Keep the good postures as much as possible : risk of injuries and lack of support.</li> <li>• <b>RISK OF BREAKAGE</b> : Composite fibre springs are sensitive to collisions, sharp edges, torsion (fasten the blue strap at the level of the</li> </ul>	<ul style="list-style-type: none"> <li>• Permanent constraint even at rest, compression of the back.</li> <li>• Possible efficiency decrease over time.</li> <li>• Weak assistance at the beginning of flexion.</li> <li>• Remain physical assistance devices.</li> </ul>	<ul style="list-style-type: none"> <li>• Cumbersome (hard to move, to sit down...).</li> <li>• Heavier.</li> <li>• Fits unwell to all morphologies.</li> <li>• Sometimes requires maintenance (see Paexo Shoulder).</li> <li>• More expensive.</li> <li>• Hard to handle and adjust.</li> <li>• Symmetrical flexion required (e.g. kneeling on the</li> </ul>

	sleeves to avoid it).		ground). <ul style="list-style-type: none"> <li>• No upper body rotation.</li> <li>• Remain physical assistance devices.</li> </ul>
<b>Price</b>	990 €	< 500,00€	1 200 € à > 6 000 €

## Terms and conditions:

Warranty: 1 year

## Sizes:

Taille	1m55	1m60	1m65	1m70	1m75	1m80	1m85	1m90	>1m90
HAPO	S	S	S	S/M	M	M	M/L	L	L

## Technical features:

Operating temperature: -20°C / +50°C

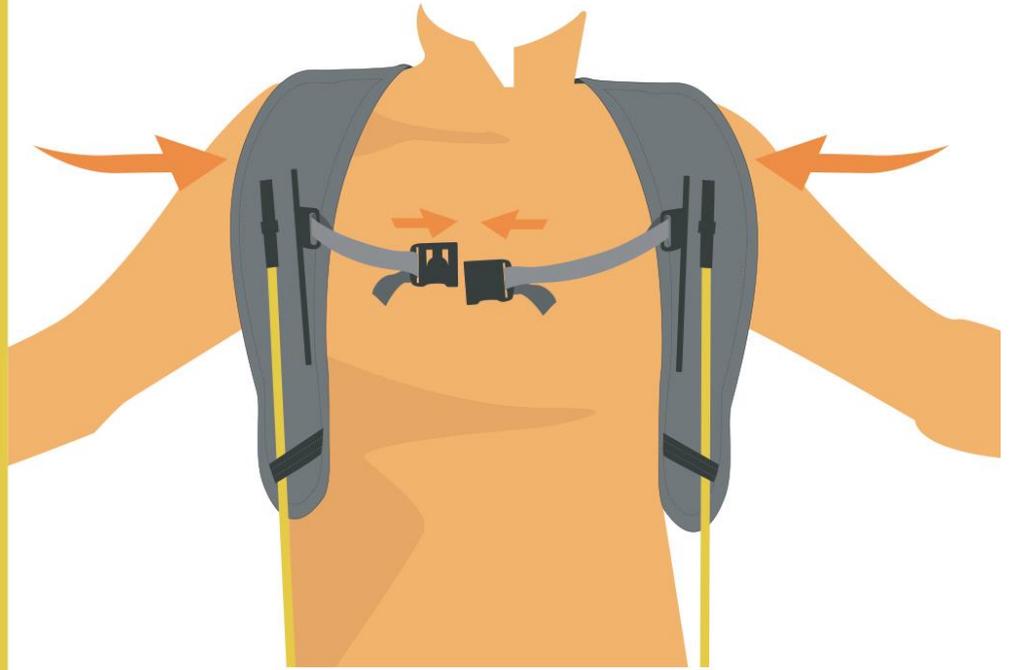
## Set-up :

1

**FR** Enfilez le système comme un sac à dos. Puis accrochez le clip au niveau de la poitrine.

**EN** Put it on like a backpack. Fasten the clip at chest level.

**NL** Trek het als een rugzak aan. Maak de borstsluiting vast.



**Step 1: Tighten the chest strap more or less for a morphological adjustment.** Adjust the tightness according to the user's feeling:

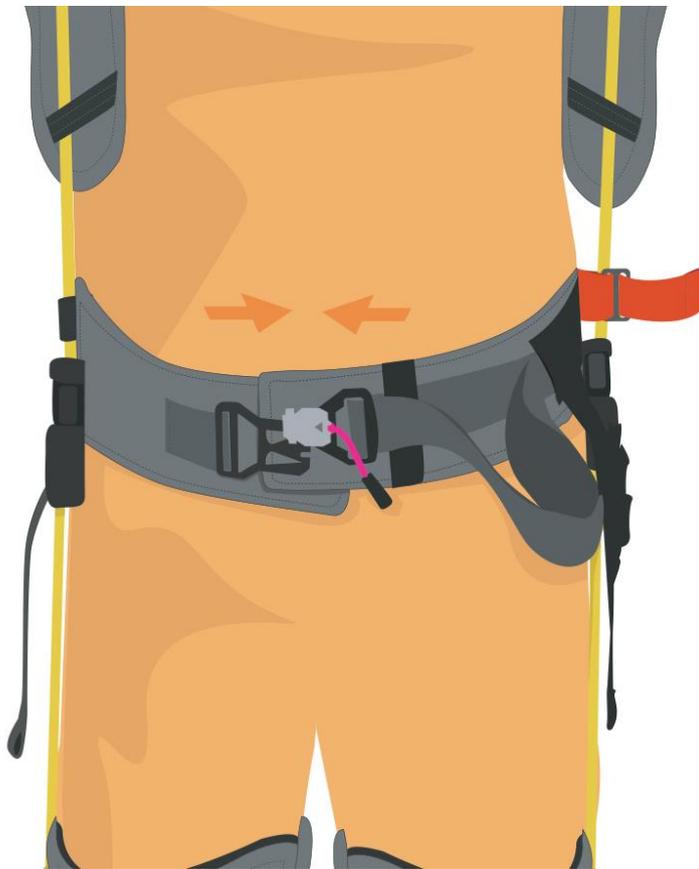
- An overtight strap will force the springs on the ribs producing discomfort.
- When the strap is too loose, the springs will lodge under the armpit, producing discomfort during bending the upper body.

2

**FR** Accrochez la ceinture. A l'aide de la sangle, serrez légèrement puis ranger la sangle dans la poche.

**EN** Fasten the belt. Tighten it slightly using the strap, then put it back in the pocket.

**NL** Haak de riem aan. Trek hem een beetje aan en berg de band op in de daarvoor bestemde zak.



**Step 2:** Position the belt in the low back hollow.

It is not necessary to tighten the belt.

Put the strap in its pocket along the belt.

3

**FR** Mettez le manchon sur la cuisse. Attachez à l'aide du scratch. Accrochez la sangle et la tendre légèrement.

**EN** Put the sleeve on the thigh. Fasten it. Fasten the strap and stretch it slightly.

**NL** Plaats de dijbeenmouw op de dij. Maak het vast met het klittenband. Haak de band aan en trek hem en beetje aan.



**Step 3: Position the sleeve above the knee.** This way, you can check if the HAPO fits you:

→ The HAPO is too big: the springs go beyond the shoulders.

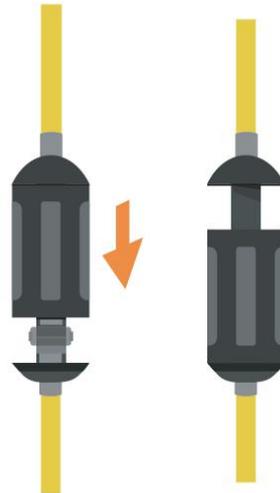
→ The HAPO is too small: the spring tops are below the pectorals and lodge under the armpit.

# 4

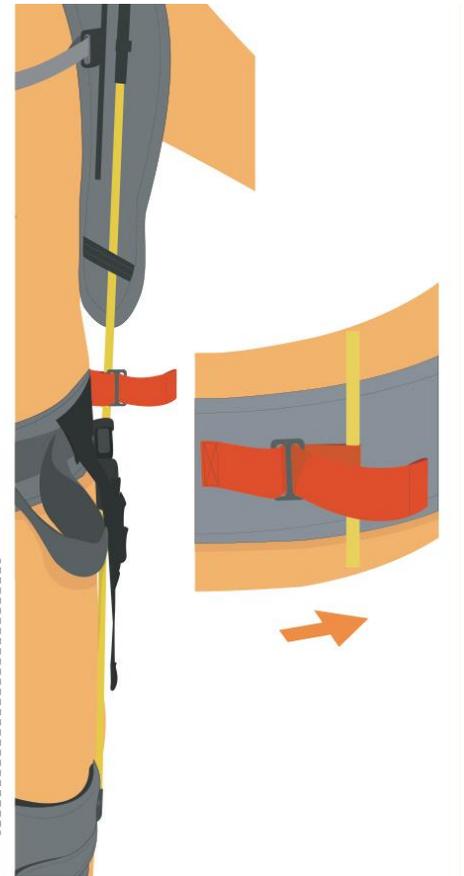
**FR** Verrouiller le système au niveau des hanches. Réglez la tension des ressorts à l'aide des sangles positionnées de chaque côté de la ceinture.

**EN** Lock the system at hip level. Adjust the spring tension using the straps positioned on both sides of the belt.

**NL** Vergrendel het systeem ter hoogte van de heupen. Stel de veerspanning in door aan de banden die aan elke kant van de riem zitten te trekken.



**FR** Pensez à déverrouiller le système lorsque l'assistance n'est pas nécessaire. **EN** When assistance is not required, remember to unlock the system. **NL** Vergeet niet het systeem te ontgrendelen als er geen assistentie nodig is.



## Step 4: Lock the system:

- 1) Grasp the shift rail between your thumb and forefinger (thumb pointing down).
- 2) Align the springs by pushing them, the mechanism stops once - no risk of going too far.
- 3) Hold the spring alignment and lower the shift rail until you hear the ball clip.
- 4) Follow the steps in reverse order to unlock.

## Use the red strap to align the springs at hips level for a morphological adjustment..

This will simplify upper body flexion.

→ If the springs are too far forward during the upper body flexion, they lodge themselves under the armpits making the HAPO uncomfortable.

→ Stretching the springs utmost is not a problem because it is useful to assist the very beginning of upper body flexion.