

## Ergonomics approved quality label

Matador Rebel series (S-M-L)



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Authors  
drs. Kees Peereboom  
ir. Bas van Leeuwen

Client  
Matador bv

vhp projectnummer  
000901

# 1 Introduction

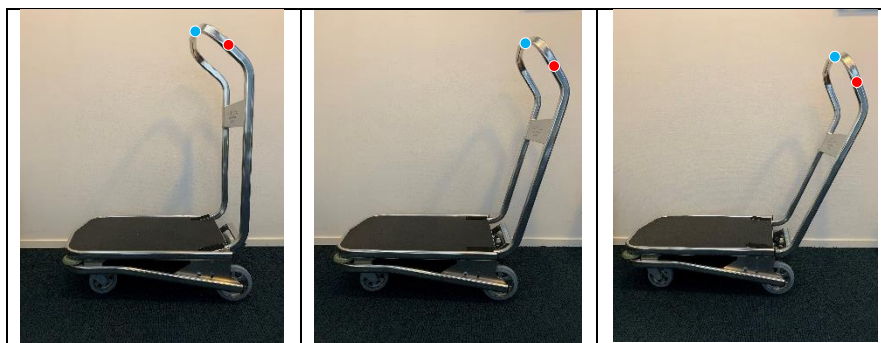
This report contains the assessment for a vhp ergonomics approved quality label for the Matador Rebel series (S-M-L model, this label includes the S and M models with a double platform level). During the assessment concerning the vhp ergonomics quality label the functional and user aspects of the product are assessed for compliance with guidelines originating from the Dutch Handbook of Physical Workload. General regulations from this handbook regarding physical workload include standards for pushing and pulling. Next to this, compliance with the NEN-EN 1757-3 (2002) standard, Safety of Industrial trucks, manual and semi-manual trucks - part 3, Platform trucks, was tested for OSH related aspects. The quality mark does not include a safety assessment.

## 2 Product: Matador Rebel

The Matador Rebel is specifically constructed for transporting loads of various sizes and formats. The maximum load weight of the Rebel is 400 kg. The maximum width of the L model is 65 cm, so the Rebel can pass through doorways from 70 cm onwards.

Model:	Length (incl. folded handle):	Width (incl. handle)	Own weight
Rebel-400S	790 mm	550 mm	9,4 kg
Rebel-400M	970 mm	650 mm	11 kg
Rebel-400L	1260 mm	650 mm	13 kg

The Matador Rebel (series) has a folding handle that can be fixed in 3 positions in addition to the folded position. After pressing the foot pedal, the handle can be taken out of the fixation positions and adjusted.



Handhold	1. Straight up	2. Tilted	3. Brake position
Height <b>horizontal</b>	1140 mm	1110 mm	1070 mm
Height <b>vertical</b>	1030 mm	990 mm	950 mm

The operation of the Matador Rebel is illustrated in this product video:

<https://www.youtube.com/watch?v=u2bHYrlzRV0>

### 3 Features Matador Rebel

The Matador Rebel has the following ergonomic features:

- The handles can be positioned in different ways. This allows for a favourable pushing height, pushing width and neutral hand posture due to the slightly curved tubes with a relatively large tube diameter of > 3 cm. Manoeuvring can also be done easily by placing one hand on top and one hand at the side of the bar. This complies with EN 1757-3 2002.
- Once the handle is set in position '2. Tilt' more legroom is created. The horizontal distance between the platform and the handle is 18 cm. In this way the user faces less risks of bumping shins or hindering the Rebel's movement and the user can manoeuvre more easily. As a result, the user can keep his/her arms closer to the body while pushing or pulling.
- Position '3 Brake position', makes it possible to park a Rebel on a slope without it comes rolling down.
- The Rebel has bearing-mounted, smooth-rolling plastic wheels that provide low rolling resistance through minimal contact with the ground.
- The guided wheels built into the frame allow for smooth transport along walls. Bumps and collisions are largely prevented and passages and doors can be passed smoothly.
- The platform is easily accessible for placing loads of various sizes. Due to the good accessibility, difficult to handle loads can manoeuvre more easily.
- The minimum pedal force required to set the handle is 50 N<sup>1</sup>. When the pedal is fully depressed, the minimum pedal force required is 81 N. This is well below the 150N standard<sup>2</sup>.
- Pushing the Rebel. A practical test has been conducted with a MECMESIN AGF 1000N push and pull meter. The test was carried out on carpet tiles. This is because the Rebel can be used in warehouses as well as offices. This is a worst case approach because on a smooth cast or concrete floor the push/pull values are lower due to a lower resistance of the surface. When starting up (starting value) the Rebel (S) on low carpet the following values were measured (averages of five measurements):

Load <sup>3</sup> :	Slow start, via body weight application:	Fast onset, via fast power application:
50 KG	22,5 N	34 N
100 KG	39,4N	68 N
150 KG	71 N	185 N
200 KG	98 N	254 N
MAX load possible without exceeding 300 N of force <sup>4</sup>	+200 KG : Not possible, one needs force	Force required is 300 N with a Rebel load of 236 KG on carpeted floor

<sup>1</sup> N stands for Newton, 10 N equals 1 KG force

<sup>2</sup> NF X35-106 1985, French Industry Standard with specific values for working with foot operated pedals, standard has been withdrawn in 2002, values are still applicable.

<sup>3</sup> Own weight Rebel not included

<sup>4</sup> Standard MAX pushing/pulling is derived from Mital & Ayoub, 1997, from: Dutch Handbook Physical Workload, 7<sup>th</sup> print, 2015.

MAX load possible without exceeding 300 N of force <sup>5</sup>	+200 KG : Possible, but one moves slowly	Force required is 300 N with a Rebel load of 441 KG on a hard and concrete floor
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- The standard EN 1757-3 2002 states: for flat wagons pushed or pulled by hand: maximum 300 N as propelling force ("starting") for loads up to a maximum of 1000 KG and maximum 200 N to keep it going ("propelling / rolling"). Using MAX 300 N complies with EN 1757-3 2002.
- Assuming a completely flat and non-slip surface (for setting off) and a gentle start-up, the maximum allowed weight level is 441 KG. This value has been determined on the basis of the vhp human performance database on push/pull measurements with hundreds of measurement values. The starting force for moving over a short distance has been used as a reference. This database contains measurement results of pushing and pulling with roll containers and flat carts with comparable weights (floriculture chain/flower auctions, VNU, AHOLD, HEMA, TPG, BLOKKER). Per KG of weight to be moved, an average of 0.68 N of contact force is used on a flat floor. This complies with EN 1757-3 2002.
- A situation must be assumed in which the user wants to start up the Rebel with force, this is simply the practice. The maximum load values for responsible use (MAX 300 N force) are:
  - Carpeted substrate, low carpet: maximum load value 236 KG;
  - Smooth, hard, non-slip floor: maximum load value 441 KG, to be adjusted to 400 KG due the Rebel maximum allowed loading weight.

<sup>5</sup> Standard MAX pushing/pulling is derived from Mital & Ayoub, 1997, from: Dutch Handbook Physical Workload, 7<sup>th</sup> print, 2015.

## 4 Ergonomics approved quality label

### Matador Rebel series (S-M-L)



The Matador Rebel is ergonomically approved and is provided with the vhp ergonomics approved quality label.

The Matador Rebel makes it possible to adopt a good working posture while pushing and pulling and ensures that variation in posture is possible. The position of the hands, in combination with the changeable height and position of the handle bar contributes significantly to this.

Important features further improve working conditions are:

- It is possible to park a Rebel on a slope
- Guided wheels built into the frame allow smooth transport along walls

Pushing and pulling the Rebel complies with the push/pull standard of 300 N, provided the following maximum load weights are observed:

Carpeted type of floor: 236 KG

Hard and flat type of floor: 400 KG

Prerequisite:

- Users have received instruction before operating

