Function Matrix – Prosthetic Feet

ottobock.

Indoor Walker

MOBIS 1

Gait:
- Very low walking speed at a single cadence (less than 4 km/h)
- Short step length and usually an asymmetrical gait
- Walking duration and distance are significantly restricted
- Walking aids typically used

Main priorities:
- High need for stability during standing and walking
- Preferably light weight

Primary Properties: Heel Stiffness (soft – firm), Midstance Flexibility (low – high), Forefoot Dynamics (low – high), Effective Foot Length (low – high)
Secondary Properties: Heel Lever (low – high), Torsional Compliance (low – high), M/L Compliance (low – high), Foot Flat Plantarflexion (low – high), Vertical Deflection (low – high)

Foot		Features
1S... SACH foot		• Basic functionality • Wide range of different heel heights and shapes • Max. body weight: 125 kg • System Height*: starting from 60 mm / Clearance*: starting from 79 mm (size 26)
1D10 /1D11 Dynamic		• Easier rollover and higher forefoot dynamics than SACH foot • Max. body weight: 125 kg (without adapter) / 150 kg (with adapter) • System Height*: starting from 67 mm / Clearance*: starting from 86 mm (size 26)
1M10 Adjust		• High standing and walking stability combined with multi-axial behaviour to compensate for uneven terrain • Adjustable heel stiffness for adaption to requirements of the amputee without need for realignment of prosthesis • Max. body weight: 125 kg • System Height*: 57 mm (N), 49 mm (S) / Clearance*: 76 mm (N), 68 mm (S) (size 26)

Restricted Outdoor Walker

MOBIS 2

Gait:
- Low walking speed at a single cadence (between 4–4.7 km/h)
- Almost normal step length and gait symmetry
- Limited amount of walking time and distance, but more than MG 1
- Able to traverse low level environmental barriers like curbs

Main priorities:
- Moderate need for added stability from the prosthesis
- Increased compliance from the prosthetic foot necessary due to the demands of varying terrain

Primary Properties: Heel Stiffness (soft – firm), Midstance Flexibility (low – high), Forefoot Dynamics (low – high), Effective Foot Length (low – high)
Secondary Properties: Heel Lever (low – high), Torsional Compliance (low – high), M/L Compliance (low – high), Foot Flat Plantarflexion (low – high), Vertical Deflection (low – high)

Foot		Features
1S... SACH Foot		• Basic functionality • Wide range of different heel heights and shapes • Max. body weight: 125 kg • System Height*: starting from 60 mm / Clearance*: starting from 79 mm (size 26)
1D10 /1D11 Dynamic		• Easier rollover and higher forefoot dynamics than SACH foot • Max. body weight: 125 kg (without adapter) / 150 kg (with adapter) • System Height*: starting from 67 mm / Clearance*: starting from 86 mm (size 26)
1M10 Adjust		• High standing and walking stability combined with multi-axial behaviour to compensate for uneven terrain • Adjustable heel stiffness for adaption to requirements of the amputee without need for realignment of prosthesis • Max. body weight: 125 kg • System Height*: 57 mm (N), 49 mm (S) / Clearance*: 76 mm (N), 68 mm (S) (size 26)
1D35 Dynamic Motion		• Dynamic, all-around foot with progressive roll-over characteristics • Max. body weight: 100 kg • System Height*: 68 mm / Clearance*: 87 mm (size 26)
1C30 Trias		• Lightweight carbon fiber foot • Unique conjoint dual spring elements for excellent heel shock absorption, rollover and energy efficient characteristics • Max. body weight: 125 kg • System Height*: 92 mm / Clearance*: 111 mm (size 26)

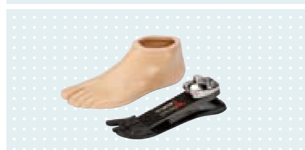
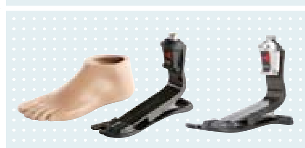
Unrestricted Outdoor Walker

MOBIS 3

Gait:
- Ability to vary cadence and ambulate at a normal walking speed (4.7–5.4 km/h)
- Symmetry, step length, walking distance and duration differ only minimally from those of non-amputees
- Most environmental barriers can be traversed

Main priorities:
- Easy rollover, good energy return from the foot and the ability to accommodate uneven terrain
- Higher demand for compliance of the prosthetic foot due to a broad spectrum of activities of daily life
- Individuals may participate in moderate recreational activities such as golf, biking and hiking

Primary Properties: Heel Stiffness (soft – firm), Midstance Flexibility (low – high), Forefoot Dynamics (low – high), Effective Foot Length (low – high)
Secondary Properties: Heel Lever (low – high), Torsional Compliance (low – high), M/L Compliance (low – high), Foot Flat Plantarflexion (low – high), Vertical Deflection (low – high)

Foot		Features
1D35 Dynamic Motion		• Dynamic, all-around foot with progressive roll-over characteristics • Max. body weight: 100 kg • System Height*: 68 mm / Clearance*: 87 mm (size 26)
1C30 Trias		• Lightweight carbon fiber foot • Unique conjoint dual spring elements for excellent heel shock absorption, rollover and energy efficient characteristics • Max. body weight: 125 kg • System Height*: 92 mm / Clearance*: 111 mm (size 26)
1C40 C-Walk		• Easy roll-over, good energy return and harmonious transition from stance phase to swing phase due to the controlled interaction of the design elements • Multi-axial behaviour to compensate uneven terrain • Max. body weight: 100kg • System Height*: 81 mm / Clearance*: 100 mm (size 26)
1E56 Axtion		• Lightweight carbon-polyurethane design with particularly low structural height • Adjustable heel stiffness by using heel wedges • Max. body weight: 125 kg • System Height*: 35 mm / Clearance*: 54 mm (size 26)
1C63 Triton Low Profile		• Excellent dynamics and flexibility of 1C60 Triton • For users with limited clearance • Water resistant • Max. body weight: 150 kg up to MG 4 • System Height*: 45 mm / Clearance*: 63 mm (size 26/normal footshell)
1C60 Triton/1C64 Triton Heavy Duty		• Excellent dynamics and flexibility for highly active users • Multiaxial behaviour to compensate uneven terrain • Water resistant (Triton HD) • Max. body weight: 150 kg in MG3 (Triton HD: 150 kg up to MG4) • System Height*: 131 mm / Clearance*: 149 mm (size 26/normal footshell)
1C61 Triton Vertical Shock/1C62 Triton Harmony		• Excellent dynamics and flexibility of 1C60 Triton • Reduced vertical and torsion forces between residual limb and socket • Harmony P3 vacuum technology (Triton Harmony) • Improved shock absorption • Max. body weight: 150 kg in MG3 • System Height*: 177 mm / Clearance*: 195 mm (size 26/normal footshell)

Unrestricted Outdoor Walker with Especially Rigorous Demands

MOBIS 4

Gait:
- Walking speed and cadence vary over a broad range (over 5.4 km/h)
- Symmetry, step length, walking distance and duration correspond to those of non-amputees
- Often times the amputee is able to run, jump and change direction quickly

Main priorities:
- Excellent energy return and forefoot support at toe off
- Large demand upon the flexibility, dynamics and durability due to a broad spectrum of activities of daily life and moderate recreational activities like jogging, running, basketball or tennis

Primary Properties: Heel Stiffness (soft – firm), Midstance Flexibility (low – high), Forefoot Dynamics (low – high), Effective Foot Length (low – high)
Secondary Properties: Heel Lever (low – high), Torsional Compliance (low – high), M/L Compliance (low – high), Foot Flat Plantarflexion (low – high), Vertical Deflection (low – high)

Foot		Features
1C40 C-Walk		• Easy roll-over, good energy return and harmonious transition from stance phase to swing phase due to the controlled interaction of the design elements • Multi-axial behaviour to compensate uneven terrain • Max. body weight: 100kg • System Height*: 81 mm / Clearance*: 100 mm (size 26)
1E56 Axtion		• Lightweight carbon-polyurethane design with particularly low structural height • Adjustable heel stiffness by using heel wedges • Max. body weight: 125kg • System Height*: 35 mm / Clearance*: 54 mm (size 26)
1C63 Triton Low Profile		• Excellent dynamics and flexibility of 1C60 Triton • For users with limited clearance • Water resistant • Max. body weight: 150 kg up to MG 4 • System Height*: 45 mm / Clearance*: 63 mm (size 26/normal footshell)
1C60 Triton/1C64 Triton Heavy Duty		• Excellent dynamics and flexibility for highly active users • Multiaxial behaviour to compensate uneven terrain • Water resistant (Triton HD) • Max. body weight: 150 kg in MG3 (Triton HD: 150 kg up to MG4) • System Height*: 131 mm / Clearance*: 149 mm (size 26/normal footshell)
1C61 Triton Vertical Shock/1C62 Triton Harmony		• Excellent dynamics and flexibility of 1C60 Triton • Reduced vertical and torsion forces between residual limb and socket • Harmony P3 vacuum technology (Triton Harmony) • Improved shock absorption • Max. body weight: 150 kg in MG3 • System Height*: 177 mm / Clearance*: 195 mm (size 26/normal footshell)

* including footshell and adapter

Legend

For each foot there is a set of both – Primary and Secondary Properties. The Primary Properties are considered essential to the basic functioning of the foot. The Secondary Properties provide additional information that can help take into account special environmental or physical characteristics of the individual.

Primary Properties

are the main sagittal plane functions for a prosthetic foot describing walking on level ground. The Mobility Grade (MG) show differences in individual needs as the MG changes. These differences need to be taken into consideration when examining the functional properties of a foot. For example, an amputee in MG 3 will need a foot with higher Forefoot Dynamics than an amputee in MG 2. The information shown in this chart has taken these differences into consideration. Therefore the standard to receive an "MG-appropriate rating" for Forefoot Dynamics is different for MG 3 versus MG 2.

Secondary Properties

include useful information for distinguishing specific needs that a patient may have such as need for coronal or transverse plane motion. These needs may vary greatly. Therefore the values within the Secondary Properties are not meant to impart a positive or negative judgement. For Example, a long heel lever may be useful for a transtibial amputee with a strong residual limb to assist knee flexion during Loading Response. But a short heel lever would be better to ensure a secure, fully extended knee during Loading Response for a transfemoral amputee who is using a nonstance control knee.

There are cases where certain properties do not apply to a certain Mobility Grade. For example, walking on uneven terrain is not done by an individual in Mobility Grade 1. Therefore, there is no value listed for ML Compliance for Mobility Grade 1. Any time a property does not apply to a Mobility Grade, the cell will be left blank in the chart.

Primary Properties

Heel Stiffness

This parameter describes the deflection of the heel and combines the initial deflection at heel strike with the stiffness of the heel all the way to foot flat. This entails both the shock absorption felt at heel strike and the feeling of the heel as the limb is fully loaded.

- lower Heel Stiffness (softer)
- appropriate for the MG, low Heel Stiffness (soft)
- appropriate for the MG, medium Heel Stiffness
- appropriate for the MG, high Heel Stiffness (firm)
- higher Heel Stiffness (firmer)

Because the heel characteristics of both the 1M10 Adjust and 1E56 Axtion can be altered, two possible values apply.

Midstance Flexibility

Midstance Flexibility demonstrates the amount and stiffness of the forward motion over the planted foot. This is felt as how easily someone rolls over the foot. Standing stability is influenced by this property as well.

- lower Midstance Flexibility
- appropriate for the MG, low Midstance Flexibility
- appropriate for the MG, medium Midstance Flexibility
- appropriate for the MG, high Midstance Flexibility
- higher Midstance Flexibility

Because the heel characteristics of both the 1M10 Adjust and 1E56 Axtion can be altered, two possible values apply.

Forefoot Dynamics

Forefoot Dynamics combines the stiffness of the forefoot with the energy being stored and returned. The individual will feel this as the support of the forefoot and also as the spring effect helping to move into swing phase.

- lower Forefoot Dynamics
- appropriate for the MG, low Forefoot Dynamics
- appropriate for the MG, medium Forefoot Dynamics
- appropriate for the MG, high Forefoot Dynamics
- higher Forefoot Dynamics

Effective Foot Length

This property describes the part of the foot that is effectively used during a walking step. Effective foot length is felt as providing support throughout all of stance phase enabling a good step length.

- lower Effective Foot Length
- appropriate for the MG, low Effective Foot Length
- appropriate for the MG, medium Effective Foot Length
- appropriate for the MG, high Effective Foot Length
- higher Effective Foot Length

Secondary Properties

Heel Lever

Heel Lever looks at the movement of the ground reaction force vector during loading response and how this movement affects flexion of the knee. The individual will feel the heel lever as a tendency to push the knee into flexion during loading of the limb. The shorter the heel lever, the greater the tendency to keep the knee in full extension during loading response. The longer the heel lever, the greater the tendency to push the knee into flexion during loading response.

- short Heel Lever
- medium Heel Lever
- long Heel Lever

Because the heel characteristics of both the 1M10 Adjust and 1E56 Axtion can be altered, two possible values apply. In this case, the box is marked with a shaded field instead of solid field.

Torsional Compliance

Torsional Compliance describes the transverse plane rotation of the foot when under load. This is felt as a reduction in the shear forces when walking and turning.

- low Compliance
- medium Compliance
- high Compliance

M/L Compliance

This characteristic examines frontal plane motion in both an inversion/eversion situation where the foot is flat on the floor and a pronation/supination setup where the weight is more to the front of the foot simulating late stance ground conformance. Medial-Lateral Compliance influences the stability of the individual when walking on uneven terrain.

- low Compliance
- medium Compliance
- high Compliance

Foot Flat Plantarflexion

This characteristic demonstrates the amount of plantarflexion available in a foot. Increased plantarflexion motion is helpful when going down a ramp or hill since the range of motion to reach a foot flat state has increased.

- low Plantarflexion
- medium Plantarflexion
- high Plantarflexion

Because the heel characteristics of both the 1M10 Adjust and 1E56 Axtion can be altered, two possible values apply. In this case, the box is marked with a shaded field instead of solid field.

Vertical Deflection

This property examines the amount of vertical deflection when the foot is fully weighted flat on the floor. This is similar to landing with a flat foot when stepping off of a stair, curb or other object. More vertical deflection in this situation can provide absorption of the shock forces in this case.

- low Deflection
- medium Deflection
- high Deflection