

C-36-001498

BIOMECHANICAL QUALITY CERTIFICATE

UMANA

Biomechanical Analysis Health Centre (C-36-001498)

CERTIFIES

that the product



BIONTECH INSOLE

(anatomic, thermoformable)



developed and marketed by

GRUPO MORÓN (Antonio Morón de Blas S.L.)

provides

EXCELLENT

ergonomics

for the health and comfort of users regarding thermal behaviour, joint damage (ankle, knee and back), and the regularity and stability of the steps (as described in the technical annex).

UMANA guarantees the accuracy and objectivity of biomechanical tests, which have been carried out under strict study protocols and allow to obtain the values of the analysis parameters in a direct, instrumental way without human intervention.

Technical Director
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lmana
Ingeniería biomecánica
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TECHNICAL ANNEX

Broken down evaluation of the biomechanical quality of BIONTECH insole (MORÓN)

Biomechanical Parameter	Value	Explanation of the results
Thermal Evaluation	Sole	Excellent
		(1) The insoles have an excellent thermal behaviour for users' feet, as the temperature produced on plantar surface does not exceed 31.5°C . (2) The upper temperature limit is within the range of maximum comfort, and minimises the sweating levels of feet, thus eliminating almost entirely the risk of epithelial damage due to friction and pressure.
Evaluation of Joint Damage	Ankle	Good
	Knee	Good
	Lumbar region	Good
		(1) The insoles provide a good reduction of joint damage in users' ankles while walking, as they reduce ankle joint vibrations by up to 12.6% . (2) The reduction of vibrations to the ankle reduces the risk for joint pain during long term activities (walking, running, etc.).
		(1) The insoles provide a good reduction of joint damage in user's knees while walking, as they reduce knee joint vibrations by up to 17.2% . (2) The reduction of vibrations to the knee reduces the risk for joint pain during long term activities.
		(1) The insoles provide a good reduction of joint damage in users' lumbar region while walking, as they reduce vibrations by up to 5.3% in this region. (2) The reduction of vibrations to the lumbar region reduces the risk for lumbar pain during long term activities.
Evaluation of Footstep Dynamics	Regularity	Good
	Stability	Good
		(1) The insoles provide a good regularity of the steps for all users (varying between -8% and 8% in relation to natural regularity), with better results for people with a tendency to tread with hindfoot or valgus foot (>8% improvement). (2) Such increased regularity enhances users' comfort.
		(1) The insoles provide a good improvement of the stability of the steps in the target population (up to 44% in relation to natural stability), with better results for people with a tendency to tread with hindfoot or valgus foot. (2) Such increase in stability leads to a reduced muscle activity to stabilise the steps, and thus reduces the muscle fatigue that may arise during long periods of activity (walking, running, etc.) <i>(* However, the insoles dramatically reduce footstep stability (-35.8%) in people with significant dissymmetry of lower limbs; their use is thus not recommended in such cases.</i>

Type Of User	Biomechanical evaluation of BIONTECH insole	
	(0-10)	Estimate
Neutral-Normal	8.2	Excellent
Neutral-Cavus	9.5	Excellent
Supinated-Cavus	7.4	Good
Valgus-Cavus	8.9	Excellent
Dissymmetry (*)	6.8	Good

Excellent	<8
Good	6,5-8
Correct	5-6,5
Medium	2,5-5
Bad	<2,5