

Training in hypoxia a novel approach with **AltiTrainer®**

Interest in training at altitude has considerably widened over the past few years. Expressions such as «Training high - sleeping low» or «Training low - sleeping high» are now part of common vocabulary.

Recent developments have led to a new concept: **Training in hypoxia with regeneration in normoxia. Now possible with AltiTrainer₂₀₀®**

The latest work of Professor H. Hoppeler and publications that date back only a few years (Terrados et al. 1992, Desplanches et al. 1993) have shown that training in hypoxia during a period of 4 to 6 weeks (half an hour per day 4 days per week) **encourages the adaptation of muscles to effort.** Studies have demonstrated specific adaptations to hypoxia conditions in muscle ultra-structure with, in particular, **an increase in the myoglobin content, improved capillarisation and oxidative capacity and increased muscle volume.** It has been noted that training in hypoxia, compared with training in normoxia, leads to



a greater increase in performance capacity and VO₂ max. (+8 %)

AltiTrainer₂₀₀® enables the user to **simulate altitudes up to 3500 m** above sea level when on.

the plain at normal atmospheric pressure

AltiTrainer₂₀₀® makes it possible for subjects to undergo intensive training in hypoxia conditions with ventilatory flow up to 200L/min. **The user can modify, at any time, the composition of the air breathed in, and therefore the training altitude,** by means of a simple control button. In this way he can simulate, in just a few seconds, an increase or decrease in altitude of several hundred meters. A microprocessor integrated into the electronic control system supervises all the system's analysis and verification functions and surveys safety during hypoxia training.

Hypoxia training with **AltiTrainer₂₀₀®** can be adapted to all types of sports with training on stationary equipment, such as tread mills, exercise cycles or rowing machines. **AltiTrainer₂₀₀®** is a novel alternative for provoking stimuli during training capable of positive effects on performance, both in the preparation and competition stage.

This hypoxia training equipment, **AltiTrainer₂₀₀®** has already been used with success in many laboratories, training centers, professional cycling teams and by the Swiss national alpine ski team.

AltiTrainer₂₀₀
by SMTEC

Sport & Medical Technologies SA

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AltiTrainer 200®: Technical data

FUNCTIONING PRINCIPLE	DROP IN PARTIAL OXYGEN PRESSURE BY REDUCTION OF THE PROPORTION OF OXYGEN IN THE AIR BREATHED IN
METHOD OF ACTION	ADDITION OF A DETERMINED QUANTITY OF NITROGEN TO THE AIR BREATHED IN
SIMULATED ALTITUDES	FROM 1200M TO 3500M (MORE ON REQUEST)
PERCENTAGE OXYGEN RANGE	FROM 18.0% TO 13.6%
PARTIAL O ₂ PRESSURE PO ₂	FROM 138 TO 103 MMHG
INSPIRED PARTIAL O ₂ PRESSURE PIO ₂	FROM 127 À 93 MMHG
MAXIMUM VENTILATORY FLOW	UP TO 200 L/MIN
ELECTRIC POWER SUPPLY	12 V. CC
POWER CONSUMPTION	15 W. MAXIMUM
CONTROL OF PO ₂	OXYGEN SENSOR
ELECTRONIC CONTROL	MICROPROCESSOR
WEIGHT	15 KG (WITHOUT BOTTLE OF NITROGEN)
DIMENSIONS	HEIGHT 65 CM, LENGTH 40 CM, DEPTH 58 CM
RESPIRATORY TUBE	FLEXIBLE, LENGTHS FROM 60 CM TO 180 CM
RESPIRATORY MASK	IN STERILISABLE SILICONE
VALVES	DOUBLE ANTI-RETURN VALVES WITH MINIMUM DEAD VOLUME



AltiTrainer 200®

Basic model comprising:

- 1 basic equipment
- 1 respiratory mask in sterilisable silicone
- 1 flexible respiratory tube
- 1 power cable –powered by 110V./12V. D.C.
- 1 users' guide with safety instructions

International patent pending

AltiTrainer is a trade mark of SMTEC

Bibliography:

Terrados N. Altitude training and muscular metabolism: Int. J Sports Med 13 (Suppl. 1): pp206-209, 1992
Desplanches D., Hoppeler H., Linossier MT., Denis C., Claassen H., Dormois D., Lacour JR., Geysant A. Effects of training in normobaric hypoxia on human muscle ultrastructure. Pflügers Arch 425:263-267, 1993.
Vogt M., Puntchart A., Geiser J., Zuleger C., Billeter R. Hoppeller H. Molecular adaptation in human skeletal to endurance training under simulated hypoxic conditions. J.Appl. Physiol 91:173-182 2001

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