

Sable Metabolic Treadmill

Measuring the metabolic costs of exercise

The Sable Metabolic Treadmill is an enclosed, single chamber treadmill designed specifically for the metabolic measurement of mice. The treadmill optimizes metabolic measurement with a wide range of settings for inclination, speed, and acceleration—including four options for stimulating the mouse to exercise. Integrated with the Promethion Core metabolic system and Promethion Live software, the treadmill provides real-time system monitoring and graphing of experimental data.



FEATURES

Industry highest resolution for mouse treadmill metabolic measurements

Automated self-leveling ensures incline accuracy

Mouse-activated auditory, blue light and shock stimuli as well as manual brush stimulus

Programmable incline, speed, and acceleration

Chamber design eliminates user air contamination

Optimized for metabolic measurement with no dead space

Includes several high contrast backgrounds to enhance video recording

Real-time experiment monitoring by Promethion Live software

Sable Metabolic Treadmill



Incline adjustment from -20 to +40 degrees with black high contrast background.

Flexible Design

The treadmill provides exceptional flexibility to choose how to design your experiment. You have fine control of speed, acceleration, and incline as well as wide adjustable ranges for each parameter. These parameters are changed via the treadmill controller box, eliminating the need to manually adjust the treadmill. Unique to the Sable Metabolic Treadmill design is automatic chamber leveling to ensure accurate incline and trusted results. Four stimulus choices are available, including electric shock, light, sound, and a manually-operated push brush. Clear chamber windows and insertable backgrounds for contrast enhancement optimize video recordings.

To clean the treadmill, simply lift the chamber off the treadmill for full access to the running belt. The running belt, chamber, and the two removable waste trays may be cleaned with routine animal husbandry cleaning products.

Programmable

The user can program and store up to fifteen unique exercise profiles, with each profile containing up to 45 individual changes in speed, inclination and acceleration. The intensity and duration of the voltage, light, and sound stimuli are also programmable and can be set to run in combination or individually. These automated stimuli trigger when the mouse steps on the shock grid. Programming is performed with the treadmill controller box through

a user-friendly touch screen interface via gloved hand, stylus or by loading preset templates. Animal metadata can be included in the datafiles for traceability.



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Superior Metabolic Measurement

The treadmill uniquely synchronizes changes in a mouse's metabolism (VO_2 - rate of oxygen consumption, RER - respiratory exchange ratio, and EE - energy expenditure) in response to changes in speed and/or inclination. Pull-mode respirometry and optimal air flow design eliminates air-circulation artifacts generated by the moving belt. Care is taken to ensure the incurrent airstream is not altered by the researcher's respiration. High air flow rate (3.5 liters per minute) and the superior performance of Promethion Core analyzers deliver the industry best metabolic measurement accuracy and resolution, allowing you to see what others miss.

Applications

The Mouse Respirometry Treadmill enables cardiorespiratory fitness tests analogous to human fitness tests. These include sub-maximal and maximal tests to assess VO_{2max} . Tests may be single or multistage. Short test duration enables many tests to be completed per day. The high-performance gas analyzers resolve rapid respirometry changes to quantify the degree of change in response to changing speed or incline (including changes in fuel utilization). Semi-quantitative assessment of fuel utilization is determined by the respiratory exchange ratio.

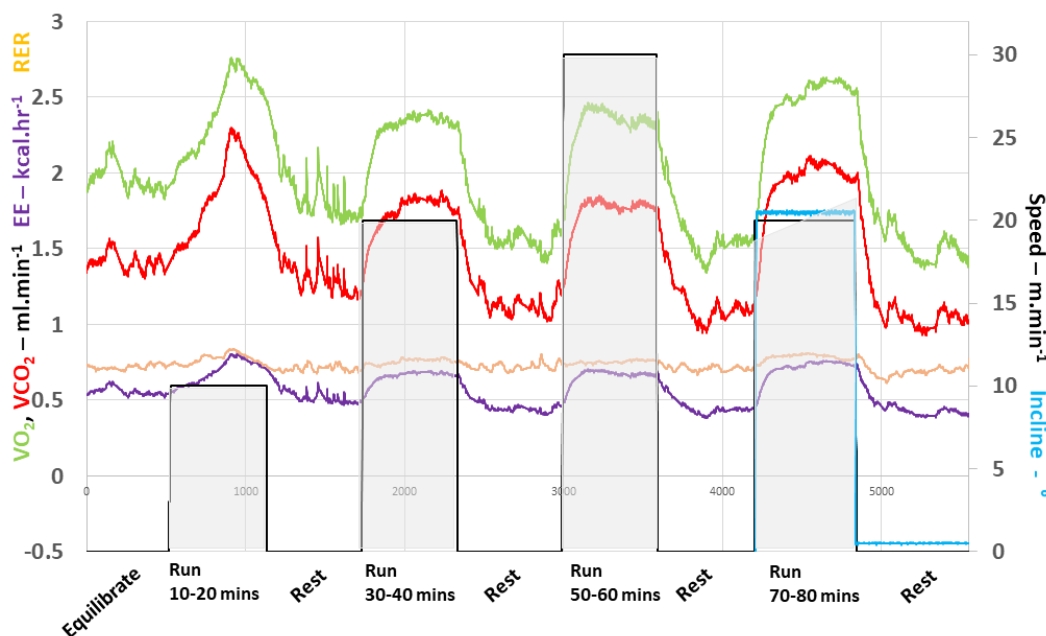
Quantitative fuel utilization is possible when the Promethion Core metabolic system is coupled to our Stable Isotope Analyzer. This analyzer enables the quantitation of the catabolism of specific fuels (such as glucose, fructose, and palmitic acid) in addition to the standard respirometry measurements.

Animal Safety

The treadmill is designed with animal safety as a priority. The shock grid is programmable and cannot exceed 5 mA current. Sable test runs used only 1 mA and required only one or two sessions to train naive animals to run with consistent rhythm. The sound and/or light stimulus provide the researcher notification when the mouse steps on the shock grid and the stabilized belt allows for an emergency stop with access to the experimental animal within 2 seconds.



Large emergency stop button brings the treadmill to full stop within 2 seconds.



Real-time VCO_2 , VO_2 , EE, RER, Speed and Incline shown for a single mouse as recorded by a Promethion Core system connected to the Mouse Metabolic Treadmill.

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Promethion Core®

Promethion Core® is the only metabolic and behavioral phenotyping system that enables you to tightly synchronize metabolic data with behavioral events. You will see every aspect of metabolism and behavior more clearly, with finer detail, quality, and repeatability—giving you complete confidence in your data.



SPECIFICATIONS

PROGRAMMABLE SPEED

0 to 100 m/min

PROGRAMMABLE INCLINE

-20 to 40°

ACCELERATION

0-100 m/min² in 0.1 m/min² increments

CHAMBER VOLUME

3.75 L

AIR FLOW RATE FOR METABOLIC MEASUREMENT

3.5 L/min

PROFILES

15 programmable run profiles, max 45 steps in each

DATA RECORDING

Internal: SD card

External: Promethion Live

OPERATING TEMPERATURE

4° to 45° Celsius

INTEGRATION

Full integration with Promethion Core metabolic phenotyping system

MANUAL STIMULUS

Push Brush

STIMULUS SETTINGS

Shock, Light, Sound

Shock Grid: 0 to 5 mA adjustable in 0.1 mA increments;

duration: 5 to 500 milliseconds

Sound range: 70 to 85 dB and a frequency of 5kHz

Light range: 20 lux to 14000 lux at a wavelength of 450-475nm
blue light flash

TREADMILL DIMENSIONS

12.5" height x 19.1" width x 10.0" depth (31.75cm x 48.5cm x 25.4cm)

TREADMILL WEIGHT

< 30 pounds (< 13.6kg)

PATENT PENDING



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