OxyletPro System

Modular System for Metabolic Phenotyping

The OxyletPro System –
Full Solution for Metabolic Phenotyping

Innovative Metabolic Monitoring

OxyletPro is a modular system integrating:

- Respiratory metabolism
  (VO_2 consumption/VCO_2 production)
- Food and drink intake
- Activity/rearing measurements
- Waste collection (urine, feces)
- Forced exercise
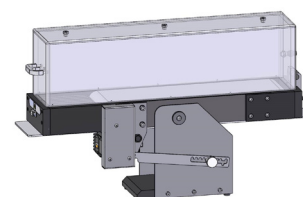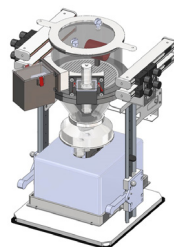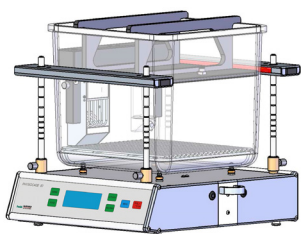- Implantable telemetry & Glucose

A single easy-to-use system for exploring the whole range of metabolic functions in your experimental subjects; Panlab features a user-friendly and cost-saving optimized system for carrying out metabolism studies in small laboratory animal models.

OxyletPro's full modular design allows for simple expandability. Start with the configuration that meets your requirements today and expand as needs change and grow.

Configurations are available for home cage metabolism phenotyping with our Physiocage system, for cardiovascular studies with exercise physiology with our single lane, airtight treadmills and for assessing digestive efficiency with our now available waste collection (urine, feces) experimental chambers.

OxyletPro can be used in the following applications: obesity, diabetes, metabolic disorders, nutrition studies, chronobiology/circadian rhythm studies, drug screening, phenotyping and more!

OxyletPro's unique modular design allows for simple expandability. Start with the configuration that meets your requirements today and expand as needs change and grow.

	Physiocage	Waste Collection	Treadmill
Main functions			
Respiratory metabolism	✔	✔	✔
Food & drink intake monitorization	✔	X Manual measurement	X
Activity & Rearing	✔ Load Cells (integrated in Metabolism software)	✔ Photobeams (independent software)	X
Forced exercise	X	X	✔
Waste collection (urine, feces) – Digestive efficiency	X	✔	X
Compatibility with telemetry	✔	✔	✔
Main applications			
Obesity/diabetes	✔	✔	✔
Nutrition	✔	✔	N/A
Cardiovascular Studies	N/A	N/A	✔
Sport performance	X	X	✔
Software			
METABOLISM software METAOXY module compatibility	✔	✔	✔
METABOLISM software METAINT module compatibility	✔	X	X
METABOLISM software METAACT module compatibility	✔	X	X
SEDACOM software compatibility for activity	X	✔	X

OxyletPro Physiocage – Home Cage Metabolic Phenotyping

The OxyletPro Physiocage configuration offers a fully modular environment for both short- and long-lasting metabolic studies in home cage environment. User-friendly and reliable, the OxyletPro Physiocage system is your best choice for the simultaneous assessment of respiratory metabolism (RQ or RER) through the indirect calorimetry technique, food/drink intake analysis, and spontaneous activity.

Indirect Calorimetry

OxyletPro uses a standard **rodent home cage** ❶ and uses an **airtight lid** ❷ to ensure the integrity of the sample environment. Simply change from a mouse lid to a rat lid — that is how easy it is to adapt the system for both species.

The home cages are autoclavable, making cleaning easy.

The **air supply and switching unit** ❸ allows for independent flow control to each connected cage and sends the cage samples in tandem to the **gas analyzer** ❹ for O_2 and CO_2 concentration analysis. Since the flow is independently controlled for each cage, the system has the flexibility to conduct simultaneous experiments of subjects of varying species and/or size, making OxyletPro extremely efficient.

Our **gas analyzer** ❹ features a high quality laser diode O_2 sensor and Infrared spectroscopy CO_2 sensor, allowing 0.01% resolution.

We offer special configurations for our single lane airtight treadmills.

Key Features

- Home cage advantage, minimizing stress to the subjects
- Easily expanded and upgraded as needs grow and change
- Optimized performance with minimal maintenance
- Unmatched versatility with small footprint; adaptable system for mice and rat models
- Highly accurate monitoring of food and drink consumption; combining our specially designed dispensers with our weight transducer technology

Food and drink intake

Opt for our airtight lids with transducers ⑤ to add on food and drink intake monitoring! High-precision extensiometric weight transducers are integrated into our airtight lid design and feature easy to access food ⑥ and drink dispensers ⑦ This extremely stable technology allows intake monitoring with the highest possible accuracy (0.02 g for food and 0.01 g for liquid).

Activity and rearing

Add on the sensor platform ⑧ which houses a third extensiometric weight transducer and continuously record spontaneous activity to clearly identify circadian patterns and activity levels. This highly precise capability will allow you to detect activity without displacement; even the finest movements by mice are detected.

For additional activity monitoring, our IR sensor bars ⑨ are added to detect occurence and duration fo rearing events.
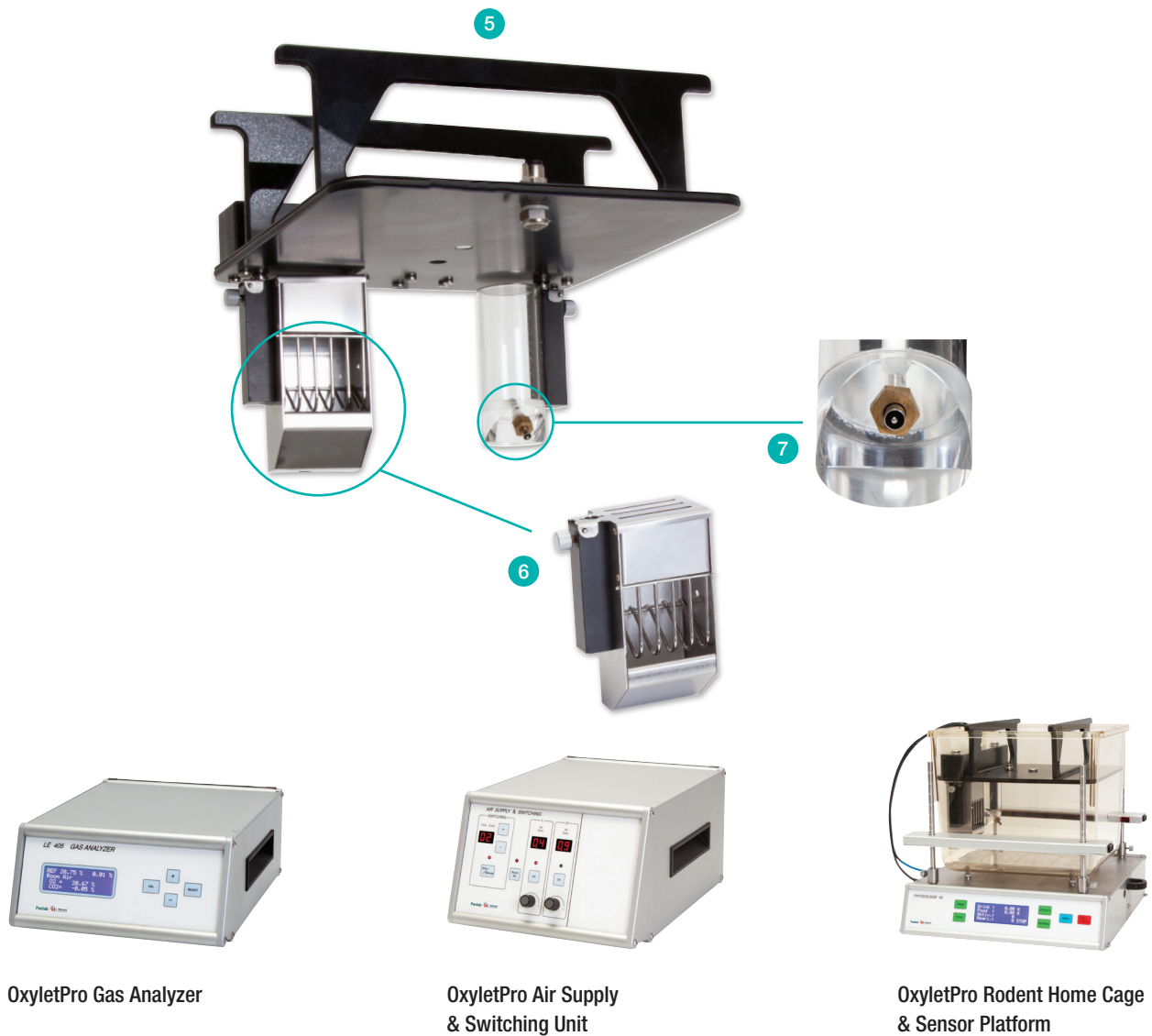
OxyletPro Gas Analyzer

OxyletPro Air Supply & Switching Unit

OxyletPro Rodent Home Cage & Sensor Platform

OxyletPro Waste Collection

Metabolism and Digestive Efficiency

A more holistic approach to understand the animal body mass phenotype by combining the assessment of respiratory metabolism with digestive efficiency through the analysis of collected urine and feces.
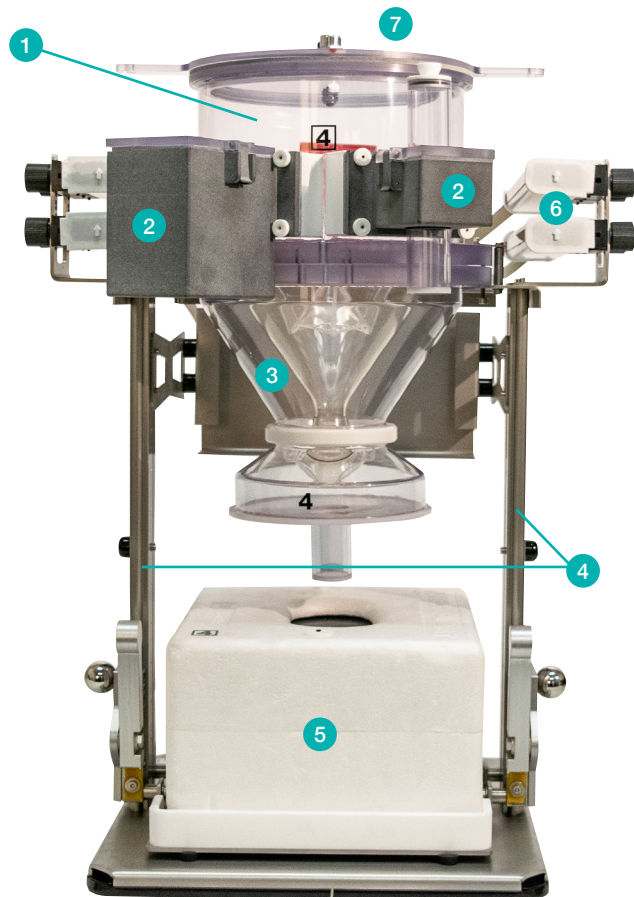
2 Detail of food dispenser unit

Key Features

• Fully validated technology for waste collection (Tecniplast)

• Special smooth floor and resting tube for minimizing stress

• Easy cleaning (Polycarbonate, stainless-steel material)

The OxyletPro waste collection configuration features:

• Top-level home cage section 1 including refillable food and drink dispensers 2 as well as a smooth grid floor and resting tube accessories for ensuring maximum animal comfort and minimize stress

• Low-level waste collection section 3 with separating cone, collections funnel, urine ring and removable sampling tubes.

• Stainless-steel supporting stand 4 for the chamber set up and optional chiller accessory 5

• IR bars set 6, activity logger and SEDACOM software for global activity and rearing assessment (optional).

• Panlab indirect calorimetry control units, accessories, and software: gas analyzer, air flow and switching unit, reference air chamber and METABOLISM software

• DSI implantable accessories for additional physiological data 7 (optional)

OxyletPro Treadmill – Forced Exercise and Cardiovascular Studies

Measurements during forced exercise, such as treadmill running, provide additional insight into cardiovascular phenotyping, aerobic capacity (VO2max) and ability to adapt under physical challenge.
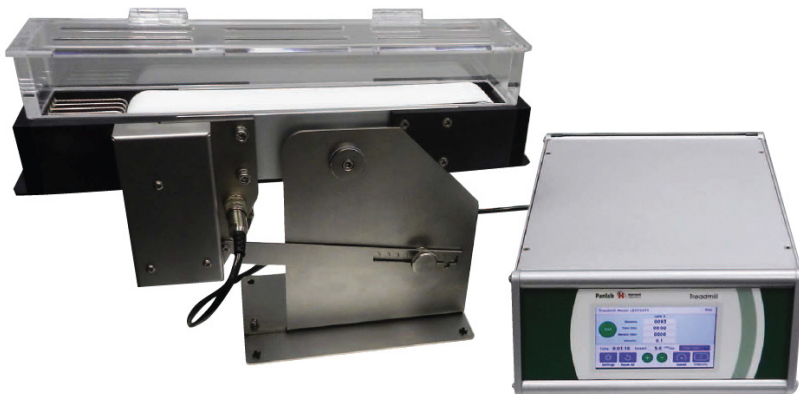
Airtight Single-Lane for Mouse

The OxyletPro system is a modular system enabling forced exercise training on a treadmill combined with indirect calorimetry. Single line treadmill configurations are recommended to integrate respiratory metabolism (O_2 consumption/CO_2 production) with exercise.

Modular components include:

• Single lane treadmill configurations optimized for mice and rats, with air-isolated enclosure

• Highly sensitive and stable sensors for O_2 and CO_2

• Laser O_2 sensor for lower influence of air humidity and temperature on the measurement

• Optimized stabilization of the air flow into the chamber for a higher sensitivity of the measurement

• Real-time numerical and graphical visualization of the VO_2 data from the METABOLISM software

Parameters measured:

• Distance travelled

• Total stimulation duration

• Number of stimulation episodes

• Belt speed

• Trial duration

Key Features

• Only available for mouse models

• Stress-free, reliable physiologic data collection

• Stop worrying about your data acquisition with trustworthy 24/7 sampling

• Reduce animal count and study cost by reusing animals and collecting high-impact data

• Maximize battery life with Battery On-Time Counter
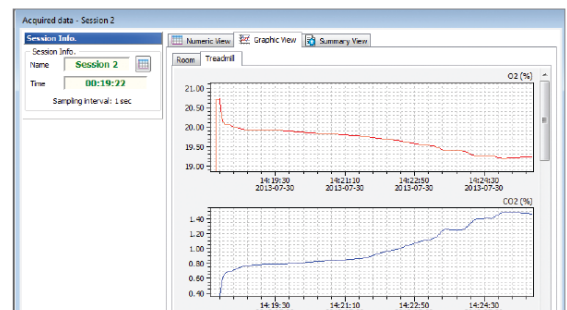
VO_2 and VCO_2 real-time evolution curves

METABOLISM Software

Modular Software Package for a Modular System

METABOLISM offers software modules for respiratory metabolism (METAOXY), intake (METAINT), and activity (METACT) to complement our OxyletPro modular hardware. The NEW user interface features an Experiment Assistant which simplifies and expedites the setup and an Advanced Scheduler Tool for organizing and managing OxyletPro experiments. The Data analysis enhancements include runtime viewers and charts for real time monitoring, batch analysis and an option for data averaging.

Now with an improved, 1-minute switching time, OxyletPro and METABOLISM provides greater resolution

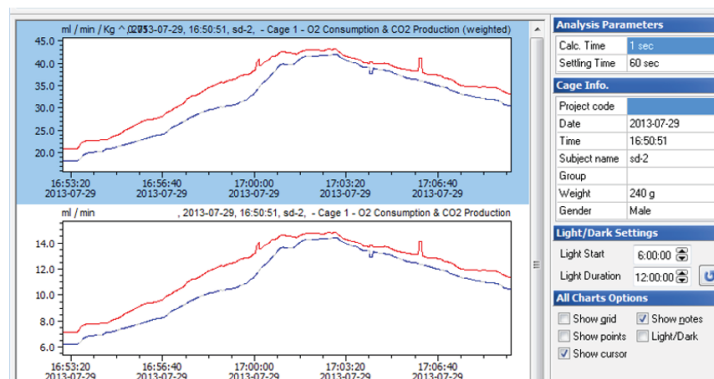for the following parameters for each user-defined time interval:

- VO_2/VCO_2 concentration
- VO_2/VCO_2 consumption
- Air flow rate
- Respiratory Quotient (VO_2/VCO_2)
- Energy expenditure
- Treadmill data (if applicable)
- Food and drink consumption
- Mean spontaneous activity
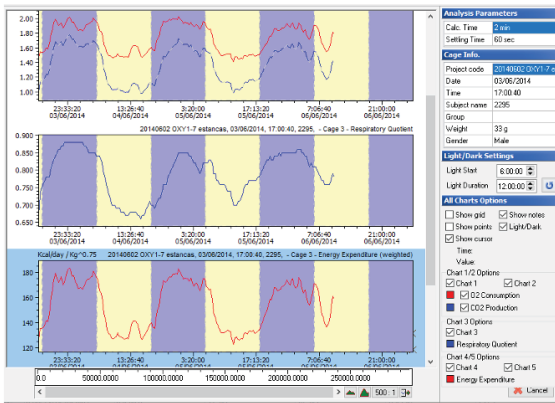
Respiratory quotient and energy expenditure
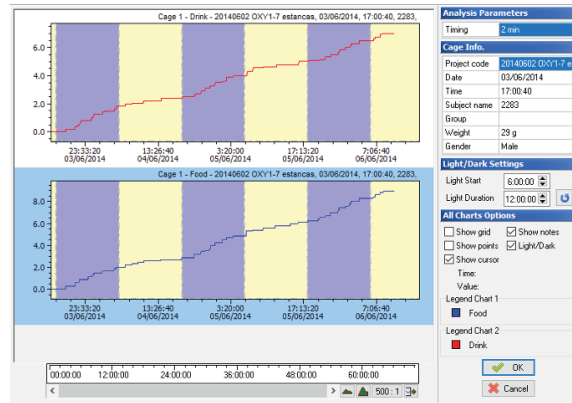
Food and drink intake

Treadmill VO_2 max analysis

Refine your research with DSI implantable telemetry

Combine the OxyletPro indirect calorimetry Physiocage, treadmill and waste collection systems with DSI implantable telemetry solutions for a more comprehensive, holistic picture of whole animal metabolic and cardiovascular physiology.

Physiology measurements include body temperature, heart rate, blood pressure, blood glucose and more.

Key Features

- Stress-free, reliable physiologic data collection
- Stop worrying about your data acquisition with trustworthy 24/7 sampling
- Reduce animal count and study cost by reusing animals and collecting high-impact data
- Maximize battery life with Battery On-Time Counter

Combine respiratory metabolism and continuous recording arterial blood glucose
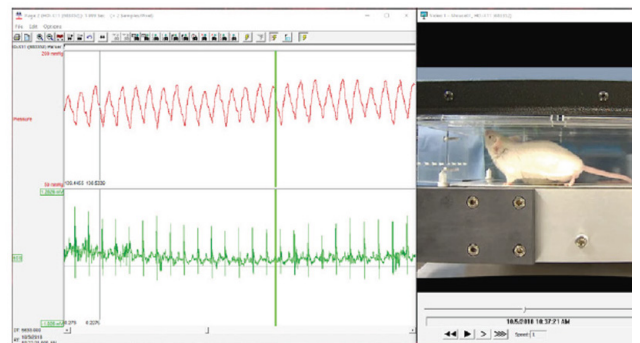
Treadmill study with real time blood pressure, electrocardiogram and integrated video

CHAMBER/UNIT	SPECIFICATION
Physiocage – Home Cage (mouse/rat)	234 x 259 x 209 mm (W x D x H)
Physiocage - Intake/Activity Control unit	294 x 320 x 290 mm (W x D x H)
Waste Collection Cage - Mouse	447 x 409 x 651 mm (W x D x H)
Treadmill	Mouse Lane (int.): 276 x 52 x 50 mm (L x W x H) Rat Lane (int.): 532 x 102 x 144 mm (L x W x H) Control Unit: 232 x 295 x 110 mm (W x D x H)
LE405 Gas Analyzer Units	235 x 300 x 110 mm (W x D x H) O_2 Sensor: Laser Diode Absorption Technology; Resolution: 0.01% CO_2 Sensor:Infrared Spectroscopy Technology; Resolution: 0.01%
LE400xFL Air Flow Unit	230 x 310 x 155 mm (W x D x H) Air Flow: 0.2 to 2.5 l/min

ORDERING INFORMATION

OXYLETPRO PHYSIOCAGE		
Order #	**Model**	**Description**
Home Cage		
76-0800	LE1331	Physiocage Home Cage, Requires Lid
Airtight Lid Options		
76-0801	LE1332	Physiocage Airtight Lid, Rat
76-0802	LE1333	Physiocage Airtight Lid, Mouse
76-0804	LE1338	Physiocage Airtight Lid, No Intake Monitoring, Rat
76-0805	LE1339	Physiocage Airtight Lid, No Intake Monitoring, Mouse
Home Cage Floor Options		
76-0808	LE1312	Plastic Floor, Rat
76-0809	LE1316	Plastic Floor, Mouse
76-0806	LE1317	Grid Floor, Rat
76-0807	LE1318	Grid Floor, Mouse
Indirect Calorimetry Hardware		
76-1386	LE1361	Oximetry Interfaces Bundle (Up to 2 Chambers)
76-1387	LE1362	Oximetry Interfaces Bundle (Up to 4 Chambers)
76-1388	LE1363	Oximetry Interfaces Bundle (Up to 8 Chambers)
76-1389	LE1364	Oximetry Interfaces Bundle (Up to 12 Chambers)
76-1390	LE1365	Oximetry Interfaces Bundle (Up to 16 Chambers)
76-1391	LE1366	Oximetry Interfaces Bundle (Up to 20 Chambers)
76-1392	LE1367	Oximetry Interfaces Bundle (Up to 24 Chambers)
76-1393	LE1368	Oximetry Interfaces Bundle (Up to 28 Chambers)
76-1394	LE1369	Oximetry Interfaces Bundle (Up to 32 Chambers)
76-1403	LE1370	Oximetry Filter Kit (Up to 8 Chambers)
76-1404	LE1371	Oximetry Filter Kit (Up to 16 Chambers)
76-1405	LE1372	Oximetry Filter Kit (Up to 24 Chambers)
76-1406	LE1373	Oximetry Filter Kit (Up to 32 Chambers)

ORDERING INFORMATION		
Order #	Model	Description
Intake Hardware		
76-0821	LE1336R	Drink Dispenser with Bottle, Rat
76-0814	LE1336M	Drink Dispenser with Bottle, Mouse
76-0968	LE1336ML	Drink Dispenser with Bottle (Left position), Mouse
76-0822	LE1337R	Food Dispenser, Rat
76-0815	LE1337M	Food Dispenser, Mouse
76-1165	LE1337MR	Food Dispenser (Right position), Mouse
Activity Hardware		
76-0813	LE1335	Intake and Activity Sensor Platform
76-0830	LE1335IP	Isolation platform
76-0816	LE1308	Rearing Monitoring IR Frames
Software		
76-0817	METABOLISM V3.0	METABOLISM V3.0 Platform
76-0818	METAOXY	Indirect Calorimetry Software Module
76-0819	METAINT	Intake Software Module
76-0820	METACT	Activity Software Module
OXYLETPRO TREADMILL		
Treadmill Models & Accessories		
76-0897	LE8700CTS	Single Lane OxyletPro Touchscreen Treadmill, Rat
76-0891	LE8708TS	Single Lane OxyletPro Touchscreen Treadmill, Mouse (Lid Ordered Separately)
76-0678	LE8708CO	Airtight Lid for the OxyletPro Single Lane Treadmill, Mouse
Indirect Calorimetry Hardware		
76-1386	LE1361	Oximetry Interfaces Bundle (Up to 2 Chambers)
76-1387	LE1362	Oximetry Interfaces Bundle (Up to 4 Chambers
76-1403	LE1370	Oximetry Filter Kit (Up to 8 Chambers)
Software		
76-1397	METAOXYPACK	METABOLISM Software OXY Bundle
OXYLETPRO WASTE COLLECTION		
Waste Collection Cages		
76-1360	LE1359	OxyletPro Waste Collection Chamber Bundle, Mouse (incl. chamber, lid, smooth floor, resting tube, waste collection, stand, food/drink dispensers with dummy covers and supports)

ORDERING INFORMATION		
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76-1386	LE1361	Oximetry Interfaces Bundle (Up to 2 Chambers)
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76-1404	LE1371	Oximetry Filter Kit (Up to 16 Chambers)
76-1405	LE1372	Oximetry Filter Kit (Up to 24 Chambers)
76-1406	LE1373	Oximetry Filter Kit (Up to 32 Chambers)
Software Option		
76-1397	METAOXYPACK	METABOLISM Software OXY Bundle
Activity Option		
76-1361	LE1360	Activity Bundle for 1 Cage (incl. IR bars and data logger for activity and rearing)
76-0406	SEDACOM V2.0	SEDACOM Software
76-1132	CONRS232USBHS	SEDACOM Software Accessory – RS232/USB-HS Adapter
TELEMETRY		
-	-	DSI Telemetry Small Animals System – Contact us for more information