





## INDIVIDUALLY VENTILATED CAGES







TECNIPLAST HAS BEEN INVOLVED FOR MORE THAN 60 YEARS IN THE FIELD OF LAB ANIMAL RESEARCH AND IN ITS INNOVATIONS TO ACHIEVE THE CHALLENGING GOALS SET BY THE SCIENTIFIC RESEARCH.

THE ORIGINAL NEED TO HAVE JUST A “CONTAINER” FOR RODENTS HAS EVOLVED OVER TIME TO MEET THE NEED OF A RANGE OF PRACTICAL, SCIENTIFIC REQUIREMENTS.

THESE INCLUDE: HEALTH STATUS, BIO-CONTAINMENT OR BIO-EXCLUSION, SEPARATION OF SMALL GROUPS OF ANIMALS, SPACE SAVING, ERGONOMICS, PRACTICALITY OF USE, AND LAST BUT NOT LEAST, ANIMAL AND HUMAN WELFARE. COMPLIANCE WITH THESE CRITERIA IS ESSENTIAL IN ORDER TO AVOID UNDESIRABLE VARIABLES AND ACHIEVE RELIABLE SCIENTIFIC OUTCOMES. THE STATE OF ART IN TERMS OF CAGING SYSTEMS FOR RODENTS IS REPRESENTED BY MODERN INDIVIDUALLY VENTILATED CAGES (IVCs).

IMPROVING THE OUTCOME OF BIOMEDICAL RESEARCH REQUIRES MORE THAN JUST KEEPING PEOPLE SAFE AND ENSURING ANIMAL WELL-BEING – IT REQUIRES US TO PARTNER WITH OUR CLIENTS. ONLY IN THE SPIRIT OF TRUE PARTNERSHIP AND SUPPORT WE CAN HELP OUR CLIENTS TO ACHIEVE THEIR GOALS.

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(DOUBLE DECKER)



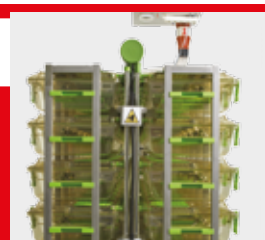
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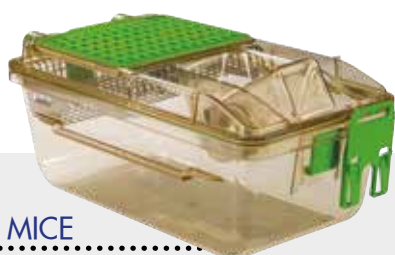
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# GREEN LINE



FOR MICE

GM500

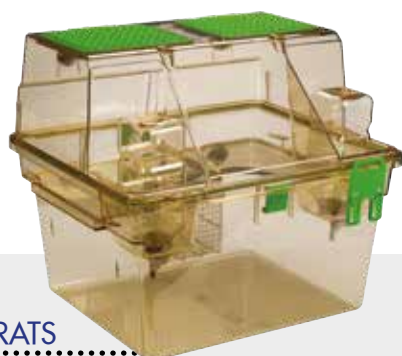
SEALSAFE® PLUS



FOR RATS

GR900

SEALSAFE® PLUS



FOR RATS

GR1800  
DOUBLE  
DECKER

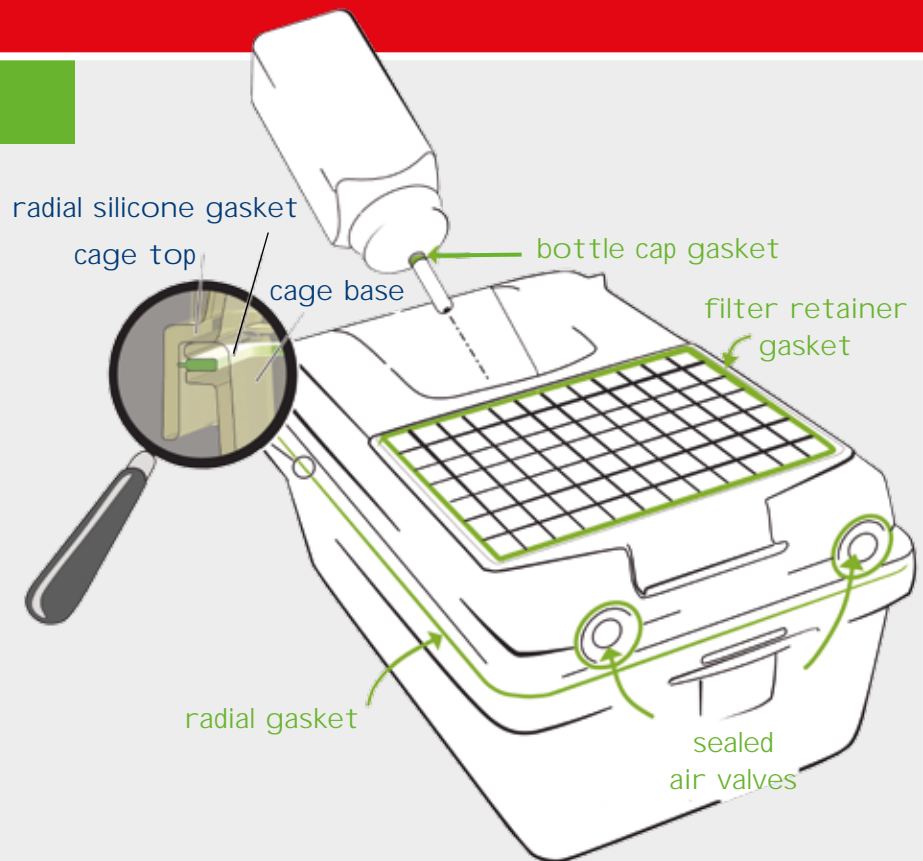
SEALSAFE® PLUS

THE SEALSAFE PLUS, ALSO KNOWN AS THE GREEN LINE, IS THE WORLDWIDE RECOGNIZED IVC STANDARD. IT PROVIDES THE BEST PERFORMANCE IN TERMS OF PROTECTION, ERGONOMICS AND DENSITY. DGM IS THE LATEST DIGITAL-READY IVC RACK THAT GIVES YOU THE KEY TO ENTERING INTO THE FUTURE, BEING PREARRANGED FOR THE REVOLUTION OF THE INDUSTRY, THE DVC™.



## SEALSAFE® PLUS

Sealsafe® Plus  
cage sealing design  
is patented:  
enjoy Tecniplast  
solutions  
unique benefits!

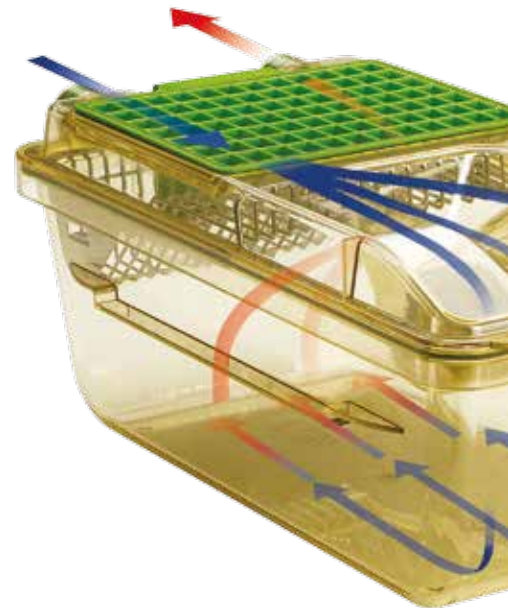


The Sealsafe® PLUS range of IVC products features a PATENTED cage design, consisting of a soft silicone gasket that protrudes radially all around the cage base rim. The perfect sealing is simply achieved by placing the top on the cage body, through the radial interference between gasket and cage top. Consequently, the vertical compression (commonly provided by the use of latches) of the silicone gasket between cage base and top is not required:

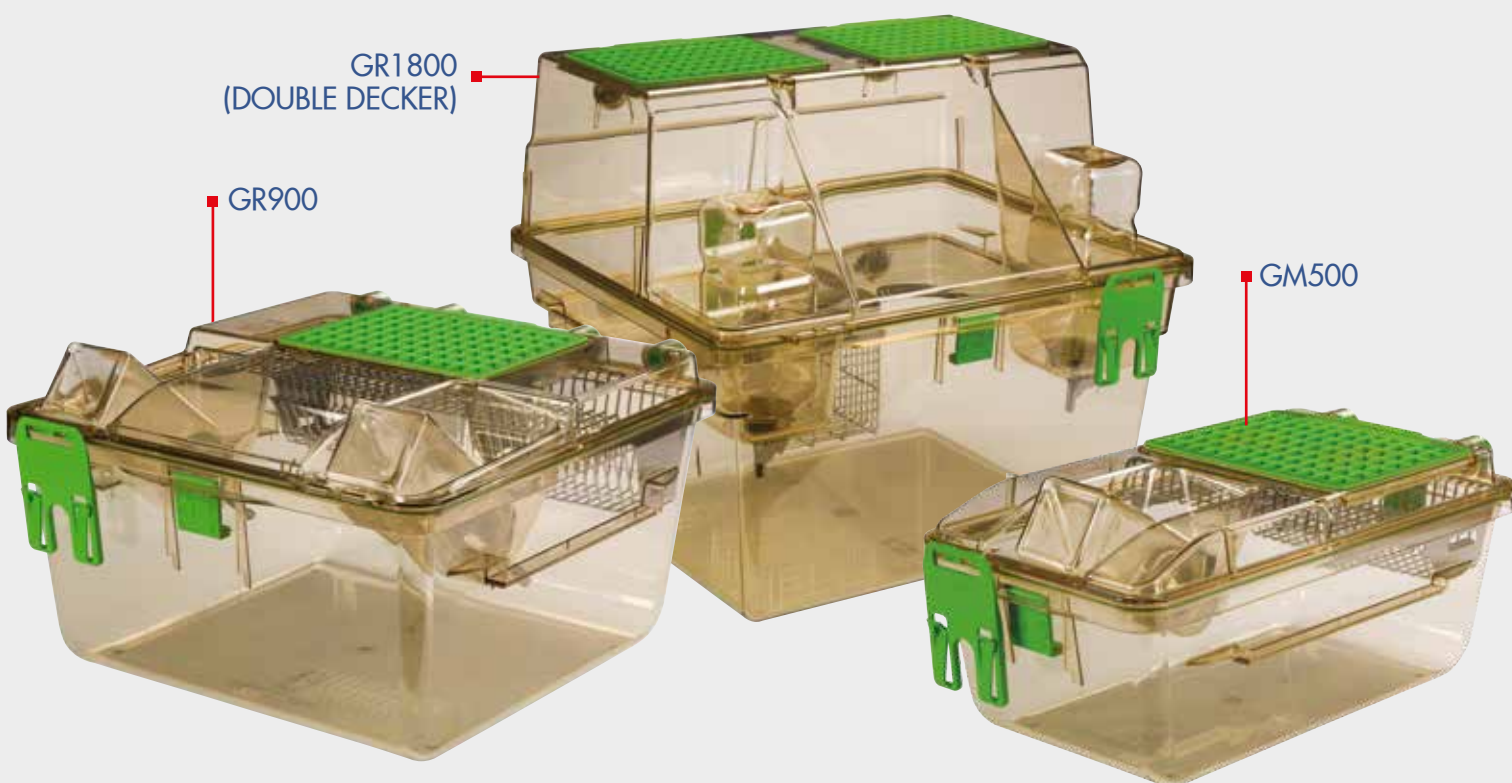
- no latches for the best ergonomics
- no need for latches to achieve excellent containment and high protection

#### PROTECTION FOR OPERATORS AND ANIMALS

- PATENTED cage sealing design: optimal seal and protection without need for latches
- Multiple sealed cage: silicon gasketed valves (not invasive to the cage), bottle cap, cage base and filter retainer ensure maximum sealing
- Large Microbiological filter (VFE\*  $\geq 99.999987\%$ , BFE\*  $\geq 99.9999937\%$ ) at cage level, ensures optimal gas exchange as well as an ideal protection also during procedures or in case of power failure
- DOP tested Air Handling Unit's HEPA Filters provide high protection against bacteria, viruses and allergens



...every time two cage parts meet  
there is a seal that provides containment



GR1800  
(DOUBLE DECKER)

GR900

GM500



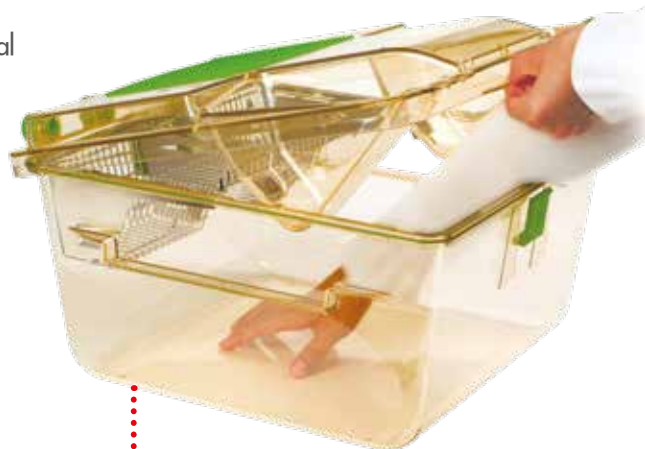
MAX AIR  
SPEED AT  
ANIMAL  
LEVEL:  
0.05 M/SEC

### ANIMAL WELFARE

- Air inlet and outlet valves in the top: no air draft at animal level, avoiding risk of stress and heat loss, as reported in the scientific literature
- Stand-alone Air Handling Unit: Easy, Smart, Sky and Wi Flow provide safe ventilation without transmitting vibrations to the rack, ensuring standardization of the experiment. The system is independently certified by TÜV

### ERGONOMICS

- No latches for a faster cage change, while protection is always ensured by the patented cage sealing; ideal for Automation
- Half length wire bar lid: easy access for a quicker cage change, minimizing the risk of musculoskeletal disorders as well as reducing the cage weight
- Great visibility-focused design and Automatic Visual Docking Indicator with Cage Self-Locking System to help operators perform a quicker daily check
- External self-centering water bottle: quicker bottle change without removing the cage from the rack



HALF LENGTH LID

### LOW RUNNING COSTS

- Stand-alone air handling unit can manage up to 4 single sided racks (or 2 double-sided): energy saving with lower maintenance costs
- ECM DC-Blowers mean low power consumption and less maintenance
- Quick daily check, easy access to the cage and quicker bottle change mean low labour costs



## GM500 & DGM RACK

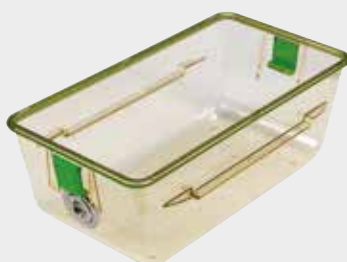
DGM rack and GM500 cage have been designed in order to provide maximum visibility, improving the ease, the speed and the quality of daily room checks.

Digital  
Ready  
IVC!

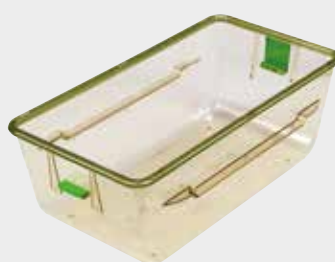
FLOOR  
AREA:  
501 CM<sup>2</sup>/  
77.66 IN<sup>2</sup>

Cage	Rack configuration	
GM500	DGM54	54 cages (6w x 9h), single sided
	DGM60	60 cages (6w x 10h), single sided
	DGM63	63 cages (7w x 9h), single sided
	DGM70	70 cages (7w x 10h), single sided
	DGM72	72 cages (8w x 9h), single sided
	DGM80	80 cages (8w x 10h), single sided
	DGM108	108 cages (6w x 9h), double sided
	DGM120	120 cages (6w x 10h), double sided
	DGM126	126 cages (7w x 9h), double sided
	DGM140	140 cages (7w x 10h), double sided
	DGM144	144 cages (8w x 9h), double sided
	DGM160	160 cages (8w x 10h), double sided

## OPTIONS AND



CAGE FOR AWS



UNI-HAND CAGE BODY



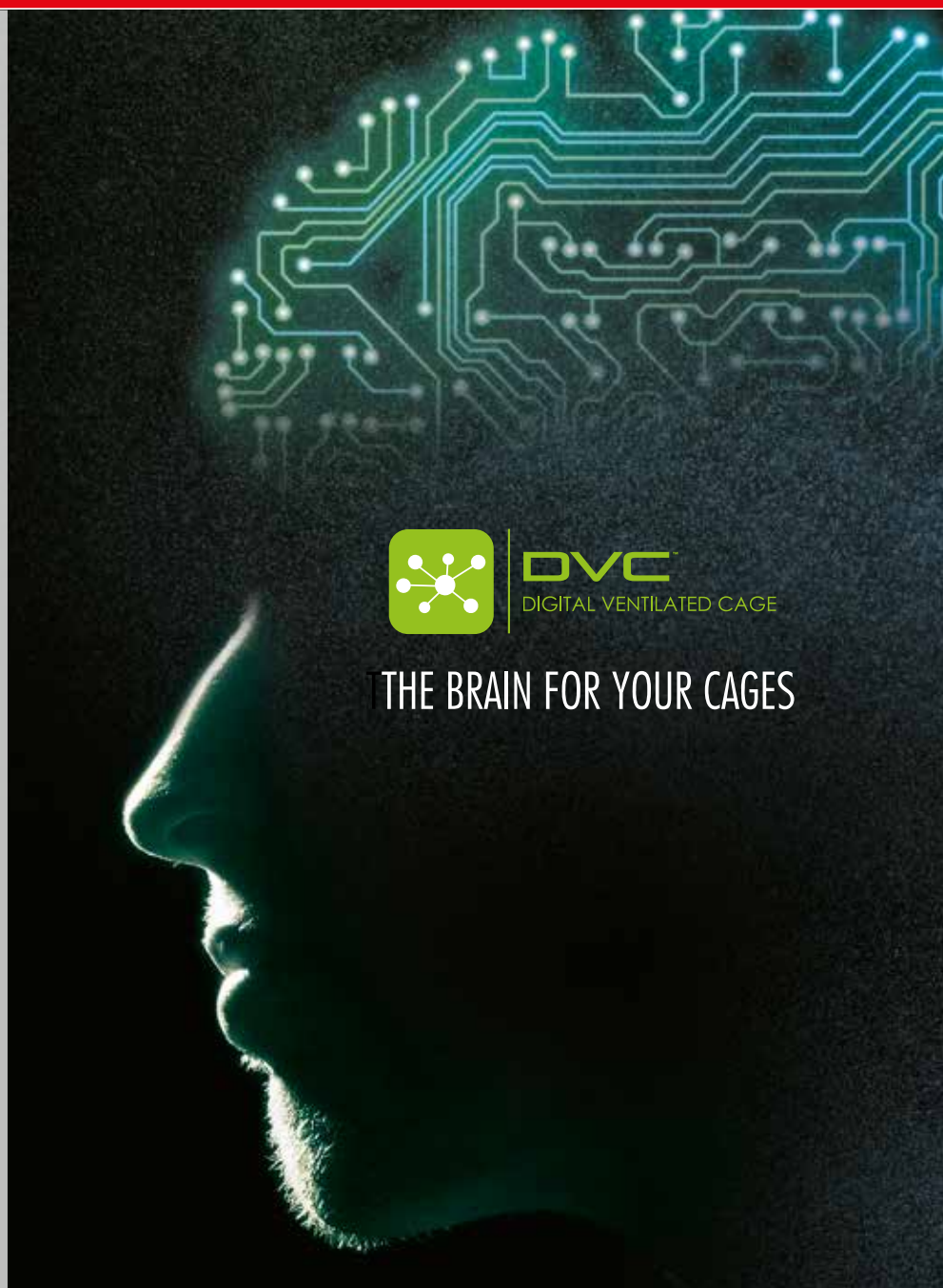
GM500 PLUS



## DIGITAL READY

THE NEW DGM RACK IS  
FULLY COMPATIBLE WITH  
STATE-OF-THE-ART  
REVOLUTIONARY  
TECHNOLOGIES SUCH AS:

- DVC™ Digital Ventilated Cage - a revolutionary technology able to enhance standardization and reduce running costs through the optimization of the facility cage-related operations and management
- Inventory Stand Alone Module (DVC™-INVENTORY)- the unique system able to automatically perform accurate "Real Time Census", occupancy and location of all your cages
- Leak Detection System (LDS) - the smart system able to detect at the earliest stage any cage flooding due to Automatic Watering System valves failure, thus providing additional safety for the animals and reliability of the research

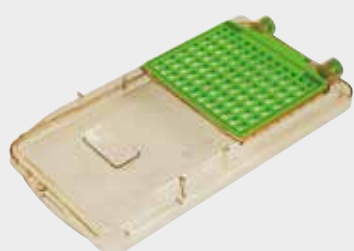


**DVC™**  
DIGITAL VENTILATED CAGE

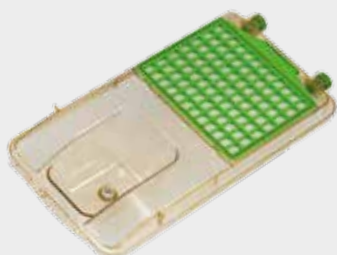
THE BRAIN FOR YOUR CAGES

TAKE A LOOK AT TECNIPLAST **DIGILAB** BROCHURE TO FIND OUT MORE!

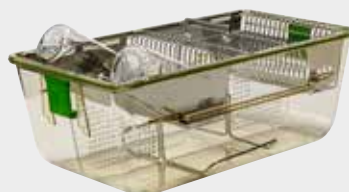
## ACCESSORIES



FLAT TOP



TOP FOR  
WATER POUCHES



CAGE DIVIDER



FULL LENGTH LID

## GR900

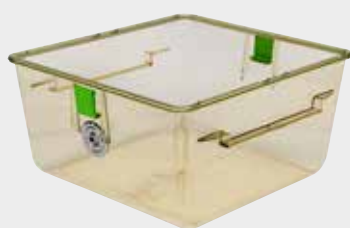
Cage	Rack configuration	
GR900	2GR28	28 cages (4w x 7h), single sided
	2GR35	35 cages (5w x 7h), single sided
	2GR56	56 cages (4w x 7h), double sided
	2GR70	70 cages (5w x 7h), double sided

Seven-row rack under 2 meters high in a small footprint for maximized density: optimized floor area usage with consequent reduction of the facility running costs.

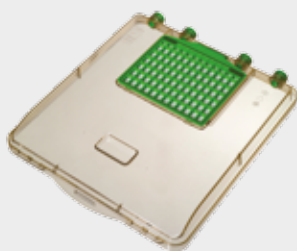
FLOOR AREA:  
904 CM<sup>2</sup>/140.12 IN<sup>2</sup>



## OPTIONS AND ACCESSORIES



CAGE FOR AWS



FLAT TOP



TOP FOR  
WATER POUCHES



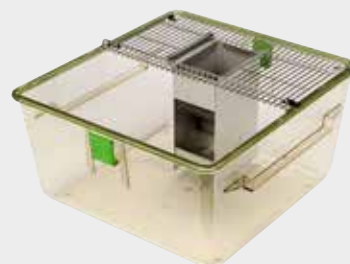
CAGE DIVIDER



LID FOR MICE



LID FOR MICE  
WITH MOUSE LOFT



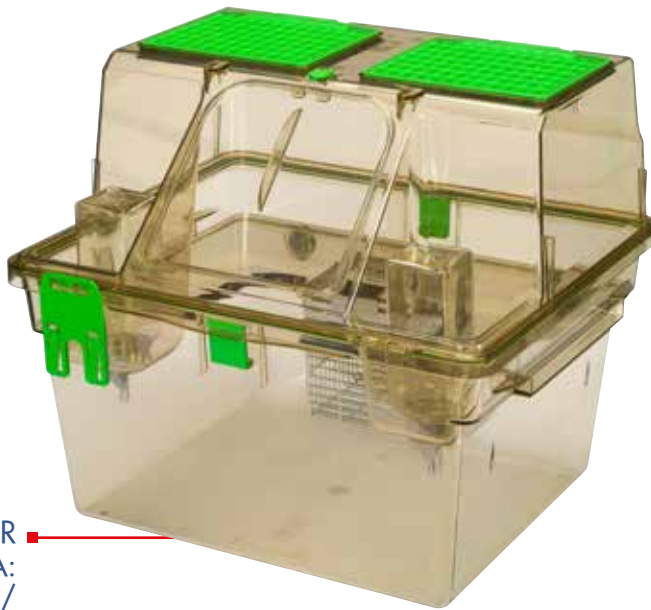
GUINEA PIGS CONFIGURATION



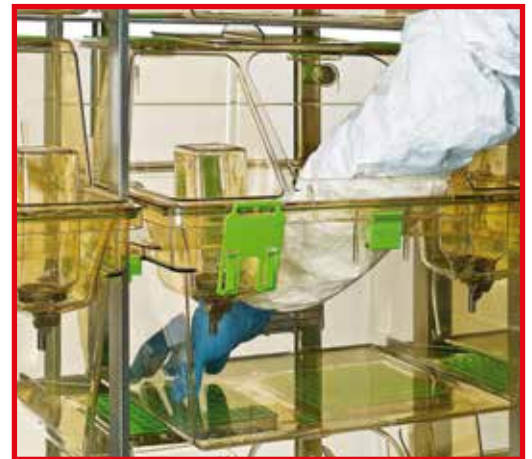
...life is better on two floors!

Double Decker is the only rat cage featuring a two-level, enriched environment, with an internal height of 38 cm: thanks to this three-dimensional space, animals exhibit more positive behaviour like climbing, jumping and standing in bi-pedal posture. Increased positive behaviour means more reliable research outcomes.

- Over 1800 cm<sup>2</sup> floor area designed to ensure perfect visibility on both floors and reduce the cage footprint for easy handling

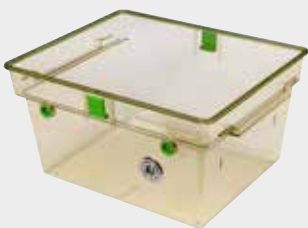


FLOOR  
AREA:  
1862 CM<sup>2</sup>/  
288.61 IN<sup>2</sup>

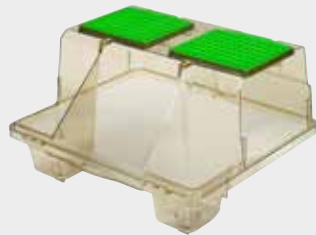


Cage	Rack configuration	
GR1800	2GR12DD	12 cages (3w x 4h), single sided
	2GR16DD	16 cages (4w x 4h), single sided
	2GR24DD	24 cages (3w x 4h), double sided
	2GR32DD	32 cages (4w x 4h), double sided

## OPTIONS AND ACCESSORIES



CAGE FOR AWS



TOP WITHOUT HATCH



TOP FOR WATER POUCHES



RED SKY DECK



ENLARGED CAPACITY  
FOOD HOPPER



CAGE DIVIDER



TOP FOR STATIC APPLICATION



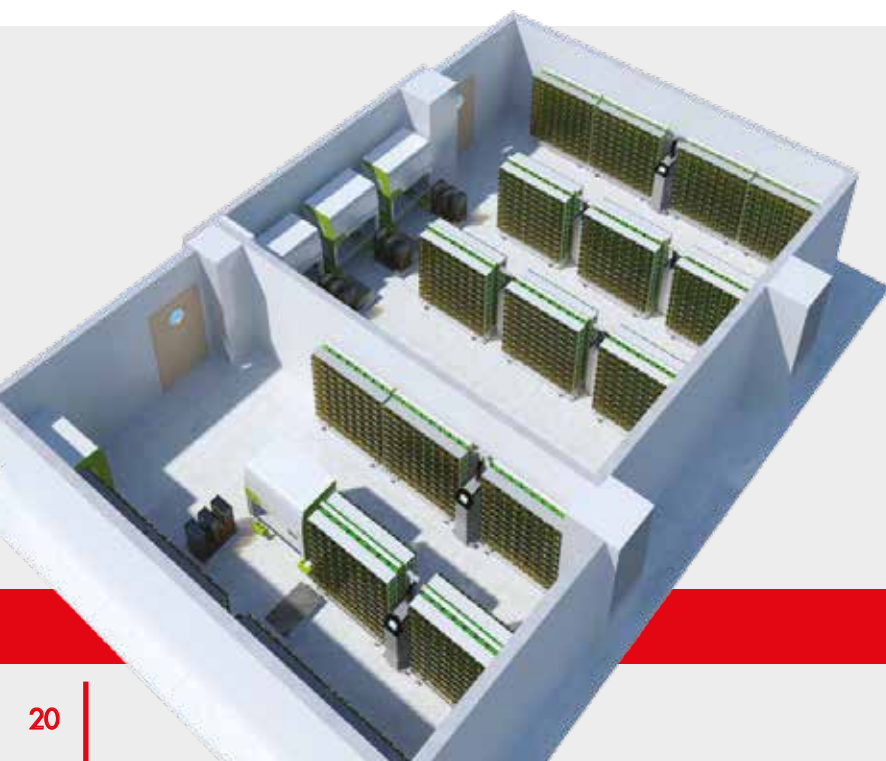
TECNIPLAST IS NOT JUST A PROVIDER OF LAB ANIMAL EQUIPMENT AND RELATED SERVICES BUT IS THE IDEAL PARTNER FOR YOUR VIVARIUM PROJECT.

Our **PROJECT MANAGEMENT SUPPORT** is an integral part of the service that we offer to clients.

From requirements review to design stage to implementation, the project management team is available to handle all project aspects on behalf of the customer. A project leader will be assigned to work directly with the customer's staff, consultants and designers to ensure a single point of communication and responsibility for the project.

All drawings, layout and technical information will be coordinated by our project management staff and they will be available for meetings via teleconference or videoconference and for site meetings, as required.

Whether we are dealing with small individual projects or multiyear programs, the project manager's top priority is to deliver products which exceed the client's expectations.



You are at the heart  
of what we do

LET US HELP YOU TO DESIGN YOUR FACILITY: THE RIGHT EQUIPMENT IS JUST THE BASIC STEP TO ACHIEVE AN ACCURATE PLANNING OF SPACES, RESOURCES AND WORKFLOWS AND, ULTIMATELY, MEET YOUR EXPECTATIONS.





Once the equipment is installed and running, at Tecniplast we take very seriously the continuous professional support and problem-solving through our **POST-SALES SERVICE PROGRAM**. It goes hand in hand with the qualification of our Service Engineers: only those who attend regular training courses at the headquarter and pass complex exams achieve the Competence Certificate that qualifies them to work on our equipment. The Competence Certificate identifies the Engineers with picture and personal data, clearly stating what tasks they are qualified to perform on which machines. We know that your long term satisfaction can only be assured by professional and competent Engineers who know well both the equipment and your needs.

## The importance of maintenance

AN APPROPRIATE PREVENTIVE MAINTENANCE PROGRAM IS CRITICAL TO GUARANTEEING BOTH THE OPERATOR AND ANIMAL PROTECTION OVER TIME, ASSURING THE FUNCTIONALITY OF THE EQUIPMENT IN ACCORDANCE WITH THE MANUFACTURER SPECIFICATIONS.









# AIR HANDLING UNITS



WI FLOW



SMART FLOW



EASY FLOW



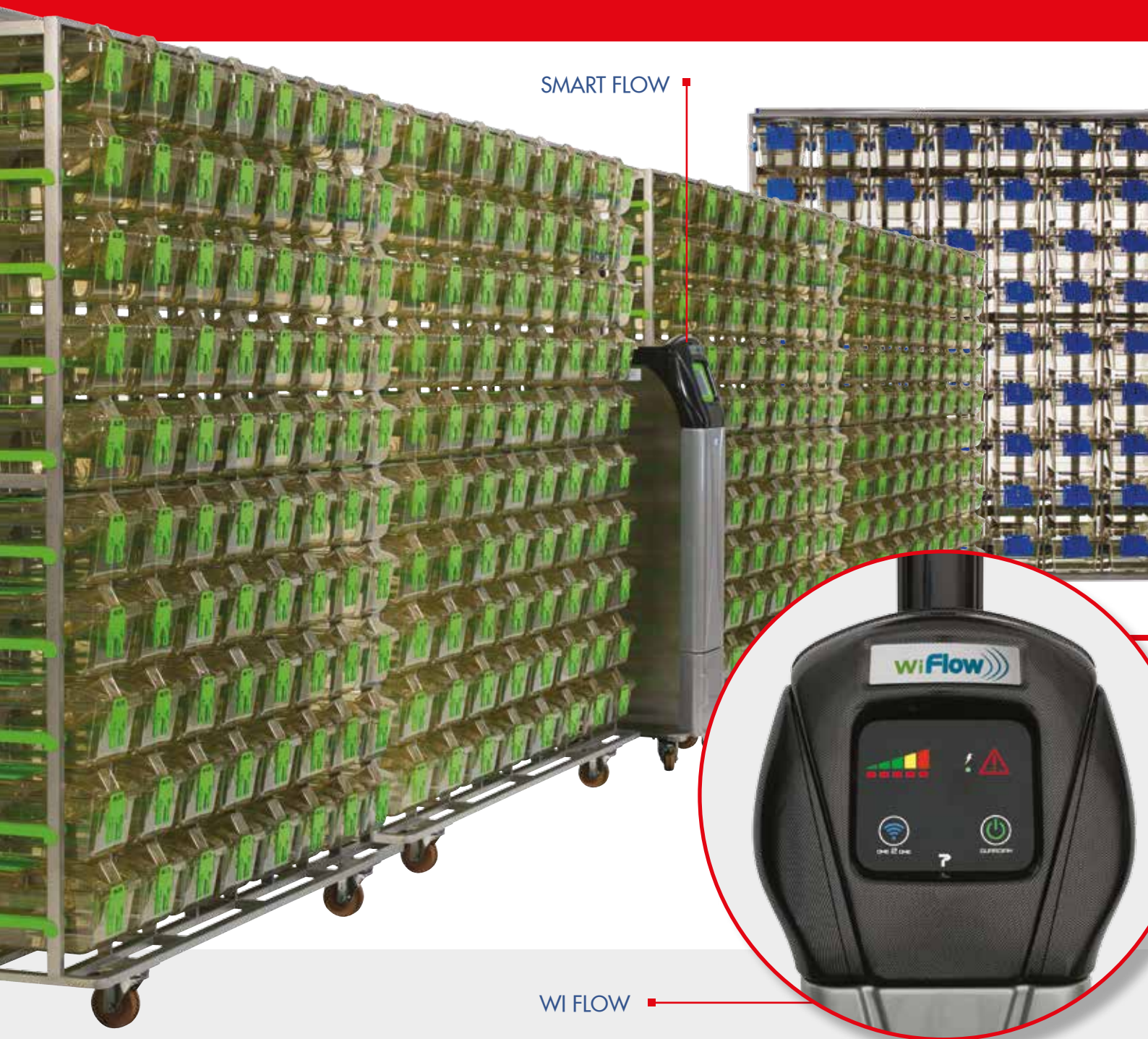
SKY FLOW



AS THE HEART OF AN IVC SYSTEM,  
THE PRIMARY OBJECTIVE OF ANY AIR  
HANDLING UNIT IS TO PROVIDE  
AND MAINTAIN A STABLE ENVIRONMENT  
FOR THE CAGE INMATES.

SAFETY AND TOTAL CONTROL AT  
YOUR FINGERTIPS, WHEREVER AND  
WHENEVER IS OUR LEITMOTIV.

FROM SMALL TO HUGE FACILITIES,  
TECNIPLAST IS READY TO SOLVE ANY NEED  
THROUGH THE MOST COMPLETE RANGE  
OF AIR HANDLING UNIT SOLUTIONS.



SMART FLOW

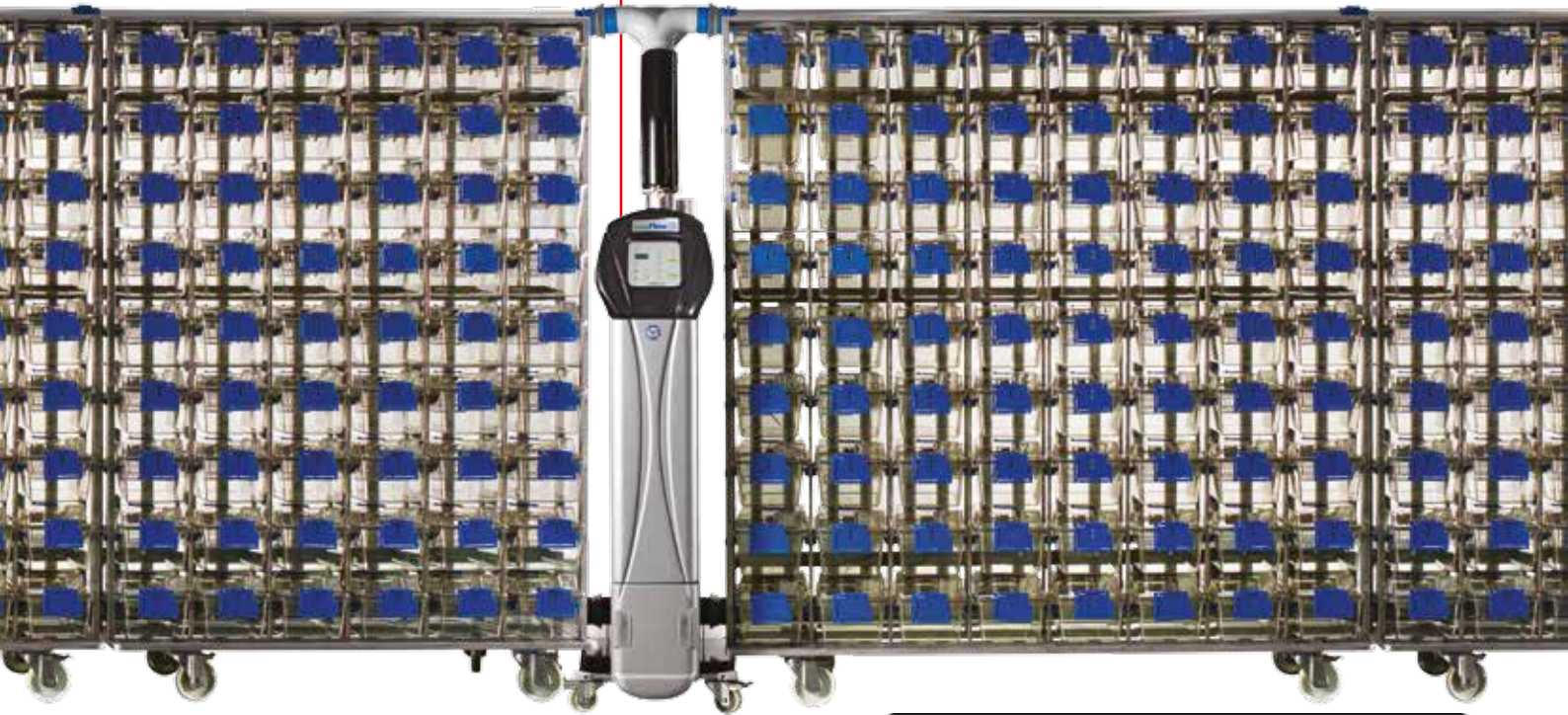
WI FLOW

WI FLOW, SMART FLOW, EASY FLOW AND SKY FLOW ARE THE LATEST GENERATION OF AIR HANDLING UNITS. MICROPROCESSOR DRIVEN (AUTOMATIC CONSTANT FLOW RATE AND FILTER LOAD COMPENSATION), THEY GUARANTEE SAFETY FOR ANIMALS, OPERATORS AND THE ENVIRONMENT.

- **WI FLOW**, THE NEW AHU DESIGNED TO BE CONTROLLED BY PORTABLE DEVICES, IS EQUIPPED WITH A STATE OF THE ART TOUCH PANEL
- **SMART FLOW** FEATURES A NEW GENERATION OF TOUCH SCREEN CONTROL PANELS OFFERING ADVANCED SETTING FEATURES AND ENHANCED FLEXIBILITY
- **EASY FLOW** IS OPTIMAL IN TERMS OF SIMPLICITY OF USE
- **SKY FLOW** CAN BE EITHER WALL MOUNTED, CEILING MOUNTED AND INTEGRATED INTO THE MEZZANINE



## EASY FLOW



### SAFE VENTILATION

- Stand-alone Air Handling Unit: Wi Flow, Smart Flow, Easy Flow and Sky Flow provide safe ventilation without transmitting vibrations to the rack, ensuring standardization of the experiment and stress-free animals
- Performance Monitoring Device (PMD) constantly controls blower and filters load status: monitored performances with an intuitive interface
- Every single air handling unit undergoes several tests including the DOP test proving the system filtration efficiency: validated safety for both operators and animals

### LOW RUNNING COSTS

- Multilinking feature allows up to 4 single sided-racks (or 2 double-sided) to be served: reduction of maintenance and consumables costs
- New DC Electronically Commuted Motor (ECM): 50% less power consumption and 90% less heat loss than the previous generation of AHUs, guaranteeing longer lifespan

### ERGONOMICS

- Control panel at eye level and easy pre-filter access: user-friendly system
- Light and easy to move

### FUTURISTIC REMOTE CONTROL AND SAFE TECHNOLOGY

All the Air Handling Units are compatible with state-of-the-art technologies for remote monitoring and control:

- **ONE 2 ONE:** allows each and every AHU to be controlled via any portable device through a modern interface. One control device for all AHUs
- **GUARDIAN:** the system allows all the AHUs in the facility to be remotely monitored and controlled, forwarding notifications in case of alarm and recording all parameters' trends. Global view and remote control of all AHUs

## WI FLOW

Connectivity at your fingertips:  
wherever and whenever!

- Integrated **ONE 2 ONE**:
  - Complete control of all settings and parameters via portable device (any tablet, smartphone or laptop). One control device for unlimited AHUs
  - Full access to the advanced features of the AHU, including power-saving mode and night mode: reduced running costs and undisturbed environment for the animals
- Pre-arranged for **GUARDIAN** (optional): the state-of-the-art system that allows to remotely control all units, receive notifications of alarms and record all the parameters' trends
- PMD (Performance Monitoring Device) allows for blower and HEPA filter status monitoring with a user-friendly indicator: safe and monitored ventilation



**ONE 2 ONE**



**GUARDIAN**





## SMART FLOW

- All functions are accessible through a user-friendly touch screen: ease of use
- Wide variety of functions available and editable: ventilation parameters, alarm thresholds, passwords and many others
- PMD allows for blower and HEPA filter status monitoring with a user-friendly indicator: safe and monitored ventilation
- Compatible with the GATEWAY, that enables the **ONE 2 ONE** control via portable device and the **GUARDIAN** (optional)



USER-FRIENDLY TOUCH SCREEN



GATEWAY ENABLES THE **ONE 2 ONE** AND THE **GUARDIAN**



MULTILINKING FEATURE ALLOWS ONE AHU TO SERVE UP TO 4 SINGLE-SIDED RACKS (OR 2 DOUBLE-SIDED)

# AIR HANDLING UNITS

## EASY FLOW

- Eye-level control panel allowing basic functions to be operated: simple and intuitive controls
- Compatible with the GATEWAY, that enables the **ONE 2 ONE** control via portable device and the **GUARDIAN** (optional)
- Provides safe ventilation of up to 4 single sided racks (or 2 double sided)



SOFT TOUCH PANEL



GATEWAY ENABLES THE  
**ONE 2 ONE** AND  
THE **GUARDIAN**



Which type  
of ventilation  
best suits  
your needs?



THE DECISION REGARDING THE TYPE OF VENTILATION TO USE SHOULD BE MADE ONLY AFTER EVALUATING THE RISK/COST BENEFIT OF EACH SOLUTION WITH RESPECT TO REDUNDANCY, FILTRATION, TOTAL CONSTRUCTION COSTS, ERGONOMICS, FLEXIBILITY AND RELIABILITY. TECNIPLAST IS ABLE TO ASSIST THE CUSTOMER IN THE DECISION PROCESS, BASED UPON THE SPECIFIC NEEDS WITH A SPECIFIC PRODUCT FOR EACH SPECIFIC REQUIREMENT.

TAKE A LOOK AT TECNIPLAST **ARIA** BROCHURE TO FIND OUT OUR BUILDING INTEGRATED AIR FLOW SOLUTIONS



## SKY FLOW



Sky Flow can be either: wall mounted, ceiling mounted and integrated into the mezzanine.

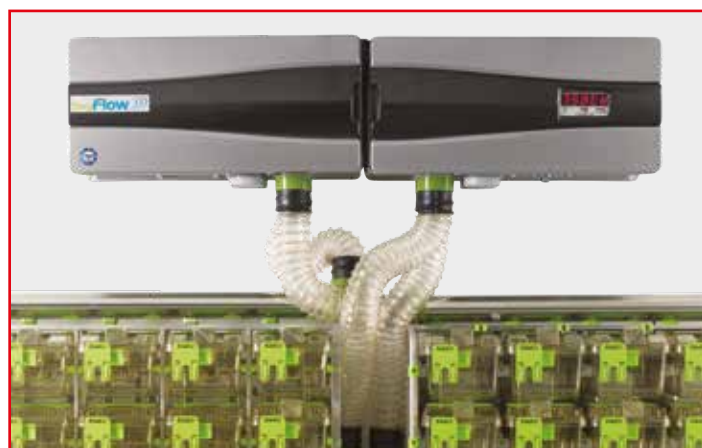
Sky Flow is available in two different configurations: with wired Touch Screen and wireless. The supply and exhaust modules can be separated allowing a maximum flexibility of the layout.

### LOW RUNNING COSTS

- Multilinking feature allows up to four single sided racks (or two double sided) to be served: reduction of maintenance and consumables costs
- New DC Electronically Commuted Motor (ECM): 50% less power consumption and 90% less heat loss than the previous generation of AHUs, guaranteeing longer lifespan

### SAFE AND STANDARDIZED VENTILATION

- HEPA filters are DOP tested on every single unit, assuring a high level of safety for operators and animals
- Stand-alone air handling unit: Sky Flow provides safe ventilation without transmitting any vibration to the rack, ensuring standardization of the experiment



WIRELESS CONTROL (SKY PAD OR MOBILE DEVICE) OR WITH WIRED TOUCH SCREEN

### HIGH MONITORING AND SECURITY

- Performance Monitoring Device (PMD) constantly monitors blower and filters load status: Monitored performances and intuitive interface
- Compatible with the GATEWAY, that enables the **ONE 2 ONE** control via portable device and the **GUARDIAN** (optional), the remote control of all AHUs in the facility. State-of-the-art technology in the facility









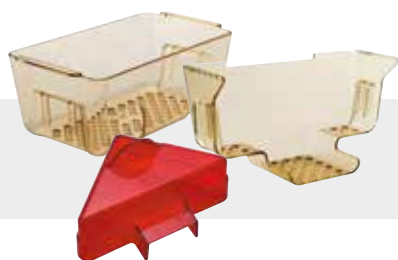
IVC  
MICROBIOLOGICAL  
MONITORING



ML+  
MML+



TRANSIT



AMOUSEMENT



CAGE LINERS



SUMC

# DEDICATED SOLUTIONS

TECNIPLAST, PARTNERING WITH CLIENTS,  
HAS DEVELOPED OVER THE YEARS THE  
WIDEST RANGE OF IVC ANCILLARY  
PRODUCTS AND DEDICATED SOLUTIONS.

## IVC MICROBIOLOGICAL MONITORING



Tecniplast has developed a system that improves the microbiological environmental monitoring of IVCs: Interceptor collects particles moving from cages to the exhaust filtration area, that are thus ready for microbiological screening.

### QUICK AND EFFECTIVE DETECTION OF MICROORGANISMS

Interceptor shows higher sensitivity vs the bedding sentinels traditional methodology. Data demonstrate that difficult-to-detect pathogenic microorganisms (FELASA panel, 2014) are more quickly identified, even with a low infection prevalence.

### CLOSED SYSTEM TO AVOID CONTAMINATION OF SAMPLES (PATENT PENDING)

Once Interceptor is removed from the AHU, the filter is protected by its cardboard folder and it is ready to be sent for PCR testing.

### EASIER AND CHEAPER THAN BEDDING SENTINELS

Interceptor is easy and quick to install. It is cheaper than bedding sentinels because it avoids the use of extra animals and the related costs of labor, handling and shipment. A step forward for the 3Rs (Reduction, Refinement, Replacement).

### VALIDATED SYSTEM

Interceptor is the result of four years of studies to find a reliable and efficient microbiological screening method.





## ML+ & MML+

The system follows the bookshelves concept to increase the density: the Library system is available as Mouse Library Plus (ML+) where the racks are moved by the operator and as Motorized Mouse Library (MML+) where a motorized wheel activated by a button moves the racks.

### INCREASED DENSITY

- Library system features reduced distance between racks, since it allows them to be moved thus creating the necessary space for daily check or cage change: up to 30% more density when 100% occupancy is not enough
- Create your space for easy daily check, cage change or mice observation: more density, same ergonomics

### ERGONOMICS AND FLEXIBILITY

- The system is easy to install
- Racks can be easily moved to washing area and autoclave with no need for any tool
- ML+ can be upgraded to MML+ with the retrofit motorized wheel kit

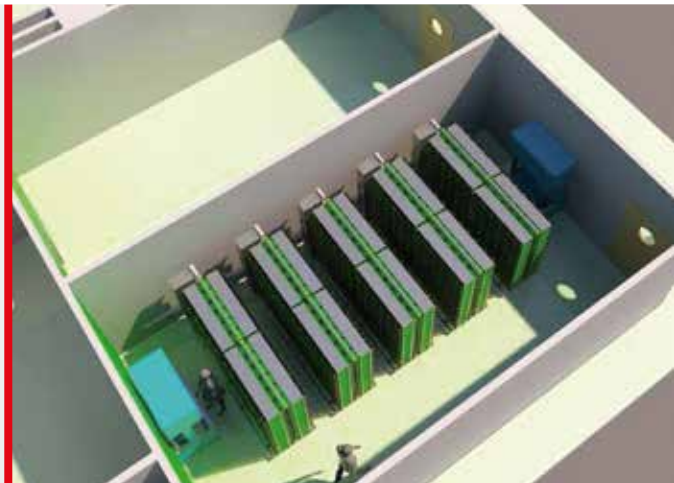
### ANIMAL WELFARE

- The library system moves silently: no stress for the animals

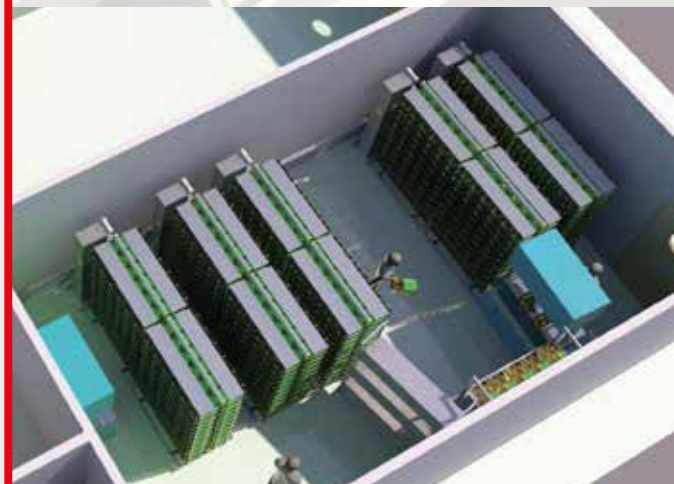
Up to  
30% more density!



MML+



PARKING POSITION



CAGE CHANGING POSITION



MML+ MOTORIZED WHEEL



## IVC TRANSPORT UNIT

The IVC Transport Unit has been developed to move the cages from a stock/breeding rack to an experimental area and/or to move the animal groups between units, maintaining the same ventilating conditions of the IVC rack.

It can also be used as an emergency IVC unit for a small number of animals of high value or as a waiting rack for animals under experimental procedures.

No more non-ventilated cages with animals waiting around.

### SUITABLE FOR DIFFERENT TYPES OF CAGES

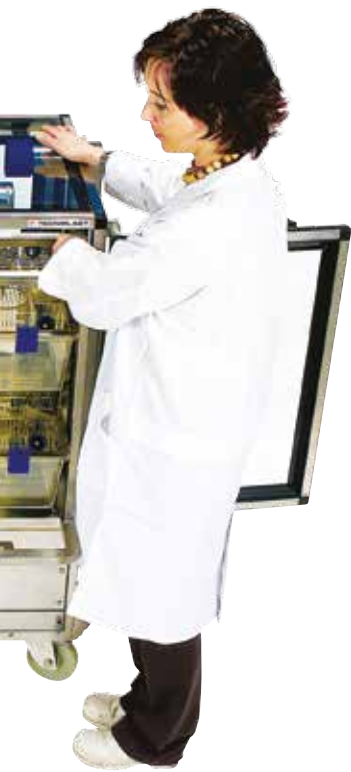
Different mini-racks can be installed on the same trolley.



IVC TRANSPORT UNIT



## IVC RECOVERY UNIT

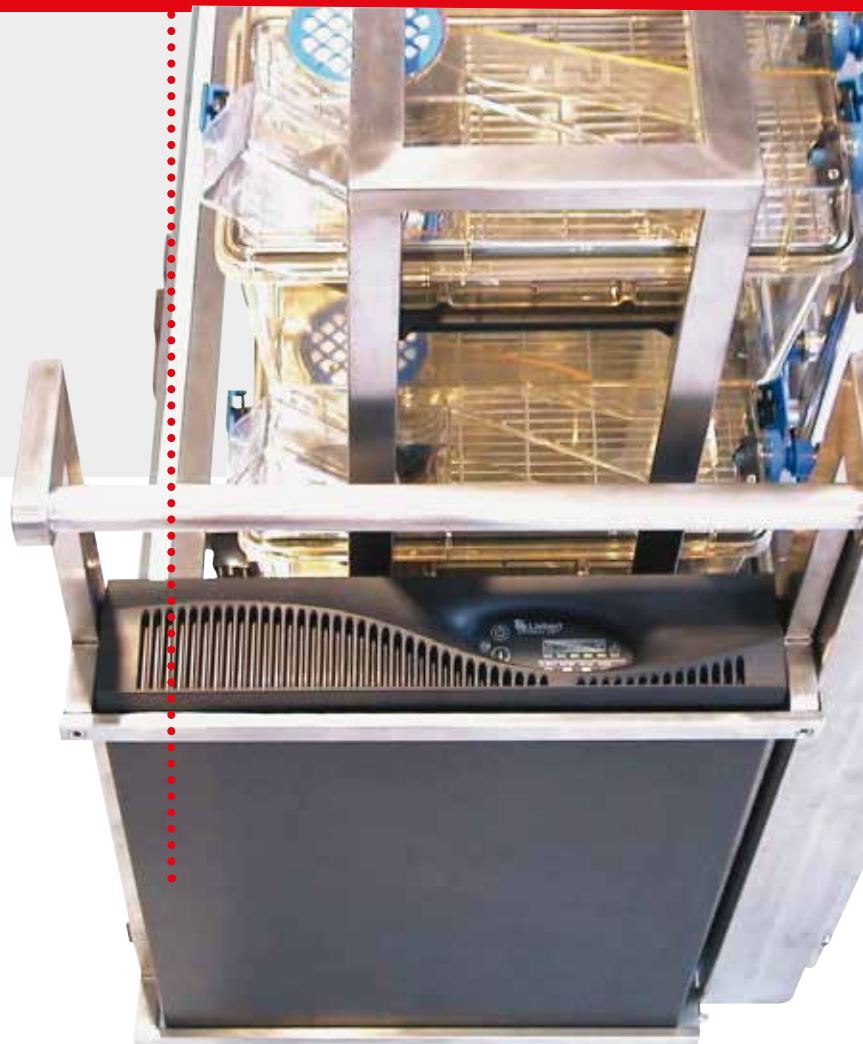


The IVC Recovery Unit is a Tecniplast product designed to ensure a controlled temperature and ventilation environment for animals during post-surgical treatment and isolation of selected weak/sick groups of animals for Veterinary inspection or treatment.

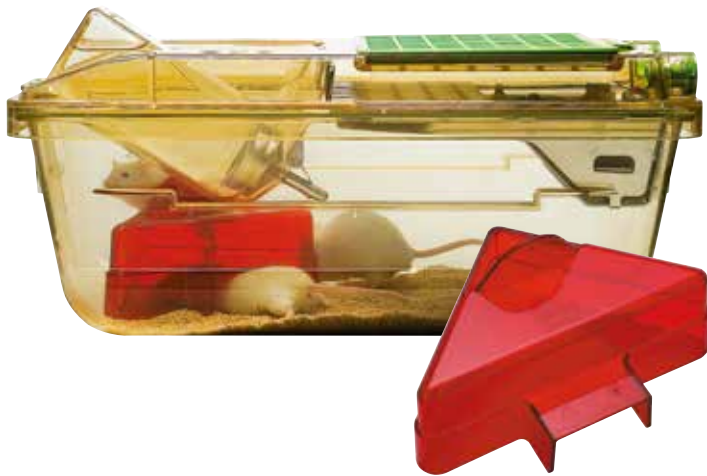
### GOOD VISIBILITY & THERMAL AND ACOUSTIC ISOLATION

The IVC Recovery Unit has an enclosure made of glass which allows to see inside and insulates the chamber thermally and acoustically. The air inside the chamber is warmed by the heating element controlled by the software.

The battery backup system ensures power without mains supply for both Transport and Recovery units



## AMOUSEMENT



Let your mouse...  
amouse!

### MOUSE HOUSE

The MOUSE HOUSE provides a complex three-dimensional environment, within standard laboratory caging. It incorporates entrances, a shelf and a large nesting area. Its design maximises the use of floor area and encourages mice to zone their cage space.

An independent study concluded that with Mouse House "several positive behavioral traits had increased significantly", "mice used the third dimension" and "there was a continued interest and use of the Mouse House".

D. Key, A. Hewett - "Developing and testing a novel cage insert, the Mouse House, designed to enrich the lives of laboratory mice without adversely affecting the science" - Animal Technology and Welfare August 2002, 55-64

### MOUSE MEZZANINE

The Mouse Mezzanine is attached to the wire bar lid and works as a lounge for the cage inhabitants.

It can be added to all the existing GM500 cages with standard lid.

Mouse Mezzanine is available in polysulfone or red polyetherimide to create a more intimate environment.



### MOUSE POUCH LOFT

The Mouse Pouch Loft is a Dual-Use Mouse loft designed for facilities with Automatic Watering System that choose water pouches for special applications.

In combination with the  $\frac{3}{4}$  length wire bar lid, it can accommodate the water pouch. If turned 180 it works as a loft in cages with AWS.



.....  
ENRICHMENT  
WITH AWS



.....  
HOLDER FOR  
WATER  
POUCHES





## MOUSE LOFT MOUSE BALCONY

The Mouse Loft and the Mouse Balcony are suspended environmental enrichments that create a more complex 3D environment in the cage in order to allow the mice to display positive behaviour patterns.

Both environmental enrichments are made of transparent polysulfone plastic for easy daily inspection and since they are placed in the front of the cage, they allow a very good visibility of the animals.



*"The primary aim of environmental enrichment is to enhance animal well-being by providing animals with sensory and motor stimulation, through structures and resources that facilitate the expression of species typical behaviors and promote psychological well-being through physical exercise, manipulative activities, and cognitive challenges".*

Guide for the Care and Use of Laboratory Animals: Eighth Edition" Committee for the Update of the Guide for the Care and Use of Laboratory Animals; National Research Council

*"Establishments shall have appropriate enrichment techniques in place, to extend the range of activities available to the animals and increase their coping activities including physical exercise, foraging, manipulative and cognitive activities, as appropriate to the species".*

DIRECTIVE 2010/63/EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 22 September 2010 on the protection of animals used for scientific purposes

*"Cage enrichment and social interaction are considered to be of more value to the animal than simple floor space allocation".*

Code of Practice for the Housing and Care of Animals, used in Scientific Procedures, Home Office Animals (Scientific Procedures)

*"To reduce the incidence of stereotypic behaviour, nesting material, an incage shelter and environmental enrichment should be provided".*

RRP Guideline 22: Guidelines for the Housing of Mice in Scientific Institutions Animal Welfare Branch - <http://www.animaethics.org.au>

*"The Mouse House [...] resulted in significant increases in several positive behaviours and significant reductions in negative behaviours".*

D. Key, A. Hewett "Developing and testing a novel cage insert, the Mouse House, designed to enrich the lives of laboratory mice without adversely affecting the science" Animal Technology and Welfare August 2002, 55-64

# DEDICATED SOLUTIONS

## CAGE LINERS



### DISPOSABLE CAGE INSERTS

Tecniplast has developed a series of liners to be used inside existing plastic cage bodies. Those are made of a very thin layer of polyethylene stackable one inside the other.

### COMBINING THE ADVANTAGES OF DURABLE AND DISPOSABLE

Tecniplast disposable cage liners are designed to be used in a durable plastic cage, combining the solidity and reliability of a durable plastic cage with the advantages of a disposable one.

### COST EFFECTIVE SOLUTION

Disposable liners can be used in specific situations, in contingencies where washing capabilities are limited or non-existent.

## SUMC

FROM  
TRANSPORT  
TO IVC AND  
VICE-VERSA



FLEXIBILITY:  
ONE CAGE FOR  
MANY PURPOSES

The SUMC system is the disposable housing solution made of recycled plastic providing the traditional Tecniplast IVC performance and reliability, designed for special/temporary applications and to be complementary to durable cages.

### FLEXIBILITY: ONE CAGE FOR MANY PURPOSES

SUMC can be the ideal solution for specific needs:

- Animal transportation
- Quarantine
- Stocking contingency caging in case of an emergency
- Temporary housing solutions
  - Irradiation studies
- Satellite facilities with limited washing capabilities
  - Work in biotech start-up companies with limited resources

FLOOR AREA: 501 CM<sup>2</sup>/77.66 IN<sup>2</sup>



## FLEXIBILITY

Cage liners have been developed in order to address unmet market needs for special applications as:

- Irradiation studies
- Imaging
- Toxicology studies
- Quarantine
- Disaster planning



## Product specifications

Available for:	1145T - 1284L - 1285L - GM500 - GM500P - 1245ISO - 1290D - 1291H - GR900
Material	APET - FDA approved

## FROM TRANSPORT TO IVC AND VICE-VERSA

- Receiving SUMC cages in transport configuration, it is enough to fit the IVC adaptors and top to get the IVC configuration, which is compatible with all Green Line racks
- Transport bottle is specially designed to avoid vibration related water leaks

## ANIMAL WELFARE AND ERGONOMICS

- In IVC configuration air inlet and outlet nozzles are placed in the top to avoid air drafts and consequent animal stress
- Designed in transparent A-PET to provide better visibility
- Possibility to stack 115 cage bases in 1 meter to save space

## READY TO USE CONFIGURATION

SUMC can be delivered with pre-bedded cage body and pre-filled water bottle (*please refer to your local dealer to check availability of this product*).

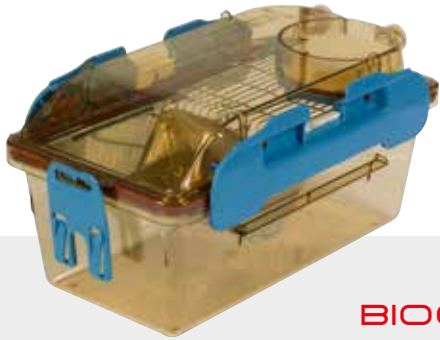
Sterile bedding and irradiated water for a ready to use configuration: easier and quicker handling of the cages

- Bedding delivered in paper tissue tea-bag placed inside the cage base: built-in paper enrichment. No need for extra purchases and component processing
- Possibility to choose between Aspen and Corn Cob bedding
- Reverse Osmosis (RO) water, gamma irradiated

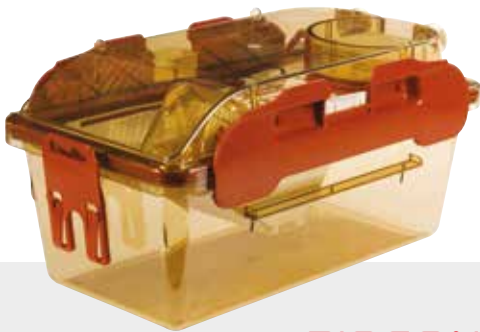




# IVCs FOR SPECIFIC APPLICATIONS



BIOEXCLUSION



BIOCONTAINMENT

WHETHER YOU WORK IN A HIGH RISK BIOSAFETY ENVIRONMENT OR WITH GNOTOBIOTICS, GERM-FREE AND IMMUNOCOMPROMISED ANIMALS, TECNIPLAST CAN PROVIDE SPECIAL IVCS DESIGNED TO SOLVE YOUR SPECIFIC APPLICATION NEEDS.

# SPECIFIC APPLICATIONS

## ISOCAGE P

ISOcage P system has been designed in order to achieve the safety and protection of an isolator coupled with the advantages of an IVC, in terms of ergonomics, flexibility and density.

ISOcage P is an isolator at cage level that allows the carrying out of multiple studies on the same rack, providing strong bioexclusion for maximum animal protection, excluding any possibility of cage-to-cage contamination.

It is especially designed for gnotobiotics, germ-free and immunocompromised animals.

Rack configuration	
ISO30P	30 cages (6w x 5h), single sided
ISO36P	36 cages (6w x 6h), single sided
ISO60P	60 cages (6w x 5h), double sided
ISO72P	72 cages (6w x 6h), double sided



### IDEAL BIOEXCLUSION

- Twin clamps and double gasket self-closing nozzles: ISOcage P is a real airtight, hermetic cage. Once removed from the rack, it remains pressurized for a long time: safety and protection for the animals
- Pressure driven microprocessor based ventilation control: constant high positive pressure to provide safe intra-cage environment

### ANIMAL SAFETY

- Two blowers working simultaneously: redundancy in the unfortunate case of a blower failure
- Battery back-up system can provide adequate ventilation for more than 24 hours in case of power failure
- Automatic Visual Docking Indicator and great visibility: operator can immediately see if the cage is properly in place
- Possibility to export data via USB, error recording, on-line help menu, UPS-saver mode, connection to BMS: safety and easy data monitoring



### DENSITY AND ERGONOMICS

- ISOcage P allows the carrying out of different studies on the same rack, achieving an IVC-like density
- Large touch screen with user-friendly interface

### ANIMAL WELFARE

- Air valves placed on the top: no air drafts to minimize anxiety- and stress-induced behaviours. Protection and welfare for gnotobiotics, germ-free or immunocompromised animals
- The Air Handling Unit provides ventilation without transmitting vibrations to the rack, ensuring standardization of the experiment

### LOW RUNNING COSTS

- New low consumption ECM DC-Blowers together with protection-related lower personnel costs reduce the overall system's running costs





## AUTOCLAVE DECONTAMINATION RACK

ISO decontamination rack allows the complete closed and clean cages, filled with bedding, food, and water to be placed in the autoclave. The open valve allows the steam to enter and decontaminate the whole cage. No more worries about contaminants.

### ERGONOMICS AND FLEXIBILITY

- ISO decontamination rack is modular: possibility to stack multiple racks to fit in most autoclave sizes
- The easy locking system and the light weight of the rack make it easy to be used by just one person



## ISO MINI P

ISO Mini P is a compact, mobile unit designed to ensure an ideal bioexclusion. Thanks to the battery backup system it can also be used to move the animal groups between units, maintaining the same ventilating conditions and safety of an ISOcage P standard rack.



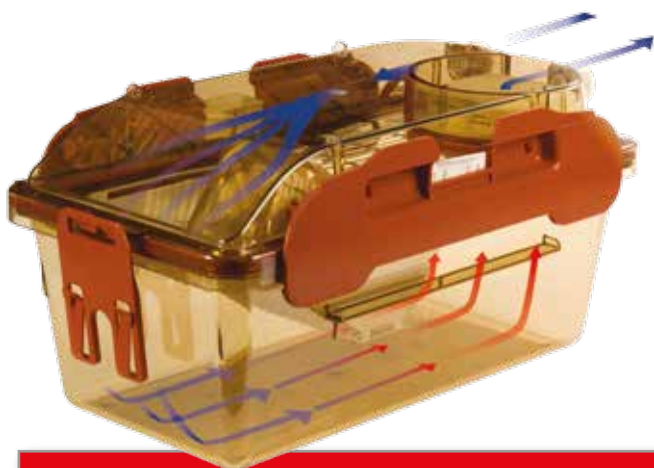
ISO P integrated  
solution for  
germ-free,  
gnotobiotics and  
immunocompromised  
animals

IBS GERM-FREE

TAKE A LOOK AT  
TECNIPLAST  
**LAMINAR FLOW**  
BROCHURE  
TO FIND OUT MORE

## ISOCAGE N

ISOcage N system has been designed to achieve the safety and protection of an isolator coupled with the advantages of an IVC, in terms of ergonomics, flexibility and density. ISOcage N is an isolator at cage level that allows the carrying out of multiple studies on the same rack, providing strong Biocontainment for maximum personnel protection.



Rack configuration

ISO30N	30 cages (6w x 5h), single sided
ISO36N	36 cages (6w x 6h), single sided
ISO60N	60 cages (6w x 5h), double sided
ISO72N	72 cages (6w x 6h), double sided

### IDEAL BIOCONTAINMENT

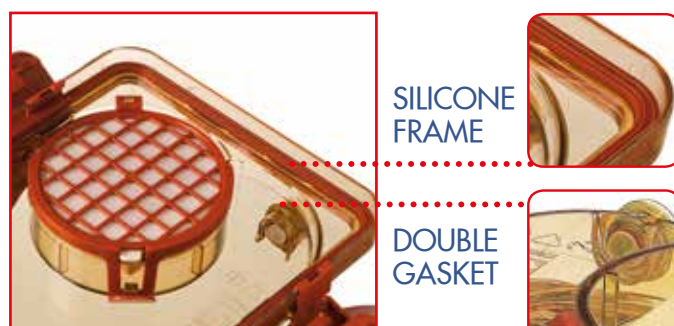
- Exhaust air is HEPA filtered at cage level: complete confinement of biohazards at cage level, keeping the air circuits sterile
- Twin clamps and double gasketed self-closing nozzles: ISOcage N is a real airtight, hermetic cage. Once removed from the rack, it remains pressurized for a long time: safety and protection for operators
- Pressure driven microprocessor based ventilation control: constant high negative pressure to provide safe environment



SPECIAL CLOSURE CLAMPS

### OPERATORS' SAFETY

- High resistant Polyphenylsulfone cage to ensure the integrity of the cage even if dropped, hit or mechanically stressed
- Two blowers working simultaneously: redundancy in the unfortunate case of a blower failure
- Battery back-up system can provide adequate ventilation for more than 24 hours in case of power failure
- Possibility to export data via USB, error recording, on-line help menu, UPS-saver mode, connection to BMS: safety and easy data monitoring



CAGE LEVEL HEPA FILTER FOR EXHAUST AIR

### DENSITY AND ERGONOMICS

- Being an isolator at cage level, ISOcage N allows the carrying out of different studies on the same rack, achieving an IVC-like density
- Large touch screen with user-friendly interface: easy to use and check parameters or eventual alarms
- Automatic Visual Docking Indicator and great visibility: operator can immediately see if the cage is properly in place for a safer and easier daily check

### ANIMAL WELFARE

- The Air Handling Unit provides ventilation without transmitting vibrations to the rack, ensuring standardization of the experiment
- Air valves placed in the top in order to avoid undesired variables that may affect research outcomes, such as air drafts at animal level

### LOW RUNNING COSTS

- New low consumption ECM DC-Blowers together with protection-related lower personnel costs reduce the overall system's running costs



## AUTOCLAVE DECONTAMINATION RACK

ISO decontamination rack makes for easier Standard Operating Procedures and related workflows, allowing to autoclave the complete closed cage, always providing maximum protection.

### ERGONOMICS AND FLEXIBILITY

- ISO decontamination rack is modular: possibility to stack multiple racks to fit in most autoclave sizes
- The easy locking system and the light weight of the rack make it easy to be used by just one person



## ISO MINI N

### SAFETY FOR OPERATORS AND ANIMALS

- Designed to move cages across different areas maintaining the same pressure-driven ventilation as in the ISOcage N rack
- Can be used as an emergency/temporary rack: no more logistic and procedural problems

### UNINTERRUPTIBLE POWER SYSTEM (UPS)

- Safety for animals, people and research



ISOcage  
+  
ISOcage  
Biosafety Station  
=  
Tecniplast  
ISOcage System



TAKE A LOOK AT TECNIPLAST LAMINAR FLOW BROCHURE TO DISCOVER OUR IBS!

## ISO XL

The BSL3 & BSL4 containment system for ferrets.

### MAXIMUM SAFETY

- INLET AND OUTLET ULPA FILTERS - The cage achieves biocontainment at cage level, minimising costs for building ABSL3/4 laboratories. The negative pressure works so that the air flows into the cage through the INLET ULPA filter, removing odours and dander from the cage floor and the excreta pan, while protecting technicians from exposure to allergens

### PRACTICALITY OF USE

- EXTERNAL WATER BOTTLE AND FEEDER - Bottles can be changed and food refilled without disturbing or stressing the animals. Safety is guaranteed also by the presence of a 0.2 micron PALL filter between the drinking valve and the bottle
- TRANSFER BOX - To move the animal under a bio-containment cabinet without touching it
- OPENING FOR BAG IN-BAG OUT PROCEDURE - The waste tray may be changed during the experiment without opening the main door of the cage
- The system is fully autoclavable



### TECNIPLAST: A PARTNER AT YOUR SIDE!

TECNIPLAST IS A COMPLETE SOLUTION PROVIDER: TOGETHER WITH IWT, WE CAN OFFER EVERYTHING YOU NEED FROM THE CAGES FOR RODENTS TO THE AQUATIC SYSTEMS, FROM BIOSAFETY CABINETS TO CHANGING STATIONS, FROM WASHING EQUIPMENT TO THE MOST SOPHISTICATED AUTOMATED SYSTEMS.

Tecniplast cages are automation-friendly in their integral setup: cage base, wire bar lid and top, as well as accessories



TAKE A LOOK AT IWT  
AUTOMATION  
BROCHURE TO  
FIND OUT MORE





## NOT ALL IVCS ARE EQUAL!

SOME FUNDAMENTAL FEATURES PERTAINING TO PERFORMANCE STANDARDS OF IVCS HAVE BEEN INVESTIGATED IN DEPTH IN ORDER TO UNDERSTAND THE POSSIBLE EFFECTS OF THE CAGING ENVIRONMENT, NOT ONLY ON THE PHYSIOLOGY AND BEHAVIOR OF MICE, BUT ALSO ON SCIENTIFIC RESEARCH AND ON THE WORKING ENVIRONMENT OF PEOPLE.

IT GOES WITHOUT SAYING THAT DIFFERENCES EXIST BETWEEN IVCS FROM VARIOUS MANUFACTURERS IN TERMS OF CAGE DESIGN AND PERFORMANCES. NEVERTHELESS, SOME STUDIES HAVE SHOWN CERTAIN COMMON ASPECTS AND DEFINED MINIMUM OPERATING REQUIREMENTS SO AS TO AVOID WELFARE PROBLEMS IN RODENTS, HUMAN HEALTH AND SAFETY AND SCIENTIFIC RESEARCH.

TAKE A LOOK AT OUR **SCIENTIFIC BROCHURE** TO FIND OUT MORE!

The effect of two different Individually Ventilated Cage systems on anxiety-related behaviour and welfare in two strains of laboratory mouse<sup>☆</sup>

O. Burman<sup>a,\*</sup>, L. Buccarello<sup>b</sup>, V. Redaelli<sup>c</sup>, L. Cervo<sup>d</sup>

<sup>a</sup> School of Life Sciences, University of Lincoln, Brayford, Lincoln, UK  
<sup>b</sup> Veterinary Sciences for Animal Health and Food Safety, University of Milan, Italy  
<sup>c</sup> Veterinary Sciences for Animal Health and Food Safety, University of Milan, Italy  
<sup>d</sup> Veterinary Sciences for Animal Health and Food Safety, University of Milan, Italy

### A comparison of various IVC systems: the comfort of the mouse

A project submitted in partial fulfilment of the requirements for the award of BSc (Hons) Animal Technology

### Mice prefer draught-free housing

T C Krohn and A K Hansen  
*Lab Anim* 2010 44: 370  
DOI: 10.1258/la.2010.009132

The online version of this article is available at <http://la.sagepub.com>

### Effect of multilevel laboratory rat caging system on the well-being of the singly-housed Sprague Dawley rat

R R Wheeler, M P Swan and D L Hickman  
*Lab Anim* published online 12 August 2014  
DOI: 10.1177/0023677214547404

The online version of this article can be found at:  
<http://lan.sagepub.com/content/early/2014/08/12/0023677214547404>

### Influence of 5 Different Caging Types and the Use of Cage-Changing Stations on Mouse Allergen Exposure

2014, Volume 40, Number 2  
ISSN 2002-0112

Double Decker Enrichment cages have no effect on long term nociception in neuropathic rats but increase exploration while decreasing anxiety-like behaviors



 **TECNIPLAST**  
*i n n o v a t i o n   t h r o u g h   p a s s i o n*

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