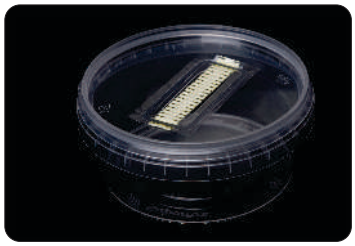
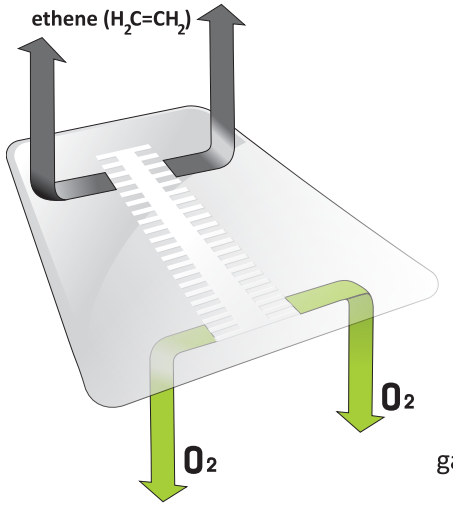


the FULL-GAS microbox

a new generation of tissue culture vessels with a revolutionary breathing system
your guarantee for carefree micropropagation!



gas exchange through filter plugs

Description:

- the **Microbox** is a clear polypropylene box with a hermetically closing polypropylene cover.
- the **cover** is made of clear plastic and contains a filter.
- **each filter** consists of a double row of filter wicks, i.e. micro-channels filled with hydrophobic filtering material.

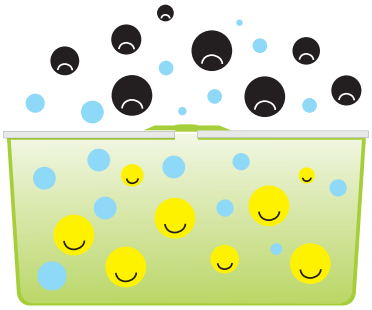
Its advantages:

- **adjustable gas exchange:** according to filter type.
- **no danger of infection:** the wicks are made of resilient filter material, which forms a perfect barrier against pests and contamination.
- **transparency:** the transparency of the plastic film enables optimal visual quality control.
- **temperature resistance:** both container and filter retain their propertiesbetween -5°C and +135°C (23°F and 275°F), and can be autoclaved several times.

Gas exchange through depth filters

The principle of our filters is depth filtration, in contrast with membranes, that are surface filters.
We only speak of pore size with respect to surface filters.

- with surface filtration, the pore size is of importance
  because the micro-organisms migrate directly through the membrane;
- with depth filtration, the micro-organisms are retained
  by the tangled fibers in the same way as cotton plugs do.



Depth filters also limit dehydration as to the length of each of the filter plugs.

The gas exchange capacity of our filters depends on a number of factors that are linked to the filter:

- the nature of the filter material
- the length and width of the filter plugs

But the real gas exchange throughout the filters also depends on external conditions such as:

- quantity and type of medium
- incubation temperature
- ventilation in the rooms
- amount and size of plants per container
- temperature fluctuation due to lighting, etc.

Measurements in this case are difficult to express and Professor Joris Hoozee of the Ghent Engineering College (KAHO) has been working on a standardization method. This resulted in a calculation system for the Microsacs, which is based on the Kv value.

Volumetric gas exchange coefficient

Gas exchange through filters used in Microboxes for the production of mycelium is governed by the law of Fick: the concentration of a gas in the void volume (air space above the plants) inside a box is at all times given by following formula:

$$\frac{dC}{dt} = -k'C$$

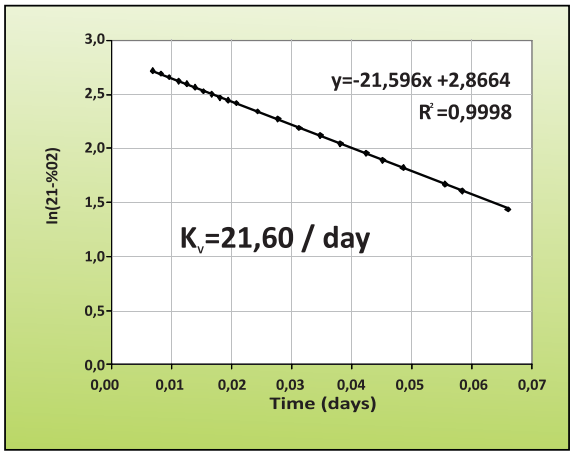
$(C^{atm} - C^{measured})$

K_v being the volumetric gas exchange coefficient (units: time^{-1} or h^{-1} or days^{-1})

C^{atm} being the concentration in the surrounding atmosphere

$C^{measured}$ being the concentration measured inside the substrate (void space).

After rearranging and integration we find: $ln = - K_v.t$. This equation represents a straight line with a slope $= - K_v$ or **the number of gas replacements (GR) per time unit**. This is the most valuable method to evaluate filter performance.



The figure shows an example of such a determination.

As a conclusion one can state that there are no significant differences between long and short filters, for the yellow ones as well as for the white ones. There is a difference between the white and the yellow filters, which has always been the purpose.

The table below gives a comparison of Kv value:

- **of different filter types**
- **in round and oval Microboxes**

Kv value for:	round Microboxes	oval Microboxes
White filter (**L**)	9,87 GR / day	7,44 GR / day
Yellow filter (**XL**)	13,09 GR / day	9,84 GR / day
Red filter (**XXL**)	15,58 GR / day	10,83 GR / day
Green filter (**XXL+**)*	81,35 GR / day	62,87 GR / day

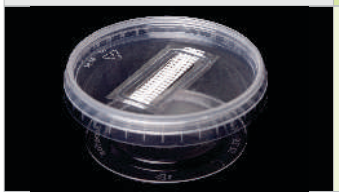
*XXL+ leaves very much air through the filter, which could possibly cause dehydration.

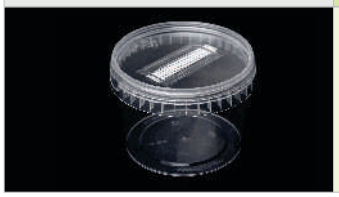
PRODUCTS

Available filters

Transparent polypropylene containers with cover
Hermetically closing cover with filter – autoclavable (if not treated) or gamma irradiated (not autoclavable)

POLYPROPYLENE CONTAINERS

O118/50 + OD118	Dimensions	Packaging
	Cover: 118 mm diameter Base: 95 mm diameter Height: 50 mm Volume: 300 ml	400 covers + 400 vessels / box 10 bags of 40 covers + 10 bags of 40 vessels box dimensions: 59x40x45cm box weight: 10kg

O118/80 + OD118	Dimensions	Packaging
	Cover: 118 mm diameter Base: 100 mm diameter Height: 80 mm Volume: 565 ml	240 covers + 240 vessels / box 12 bags of 20 covers + 12 bags of 20 vessels box dimensions: 59x40x45cm box weight: 8,5kg

O118/120 + OD118	Dimensions	Packaging
	Cover: 118 mm diameter Base: 90 mm diameter Height: 120 mm Volume: 870ml	240 covers + 240 vessels / box 12 bags of 20 covers + 12 bags of 20 vessels box dimensions: 59x40x45cm box weight: 11kg

OS140 + ODS140	Dimensions	Packaging
	Cover: 118 mm diameter Base: 90 mm diameter Height: 140 mm Volume: 1000 ml	180 covers + 180 vessels / box 12 bags of 15 covers + 12 bags of 15 vessels box dimensions: 59x40x45cm box weight: 9kg

OS114 + ODS114	Dimensions	Packaging
	Cover: 95 mm diameter Base: 75 mm diameter Height: 114 mm Volume: 520 ml	400 covers + 400 vessels / box 10 bags of 40 covers + 10 bags of 40 vessels box dimensions: 59x40x45cm box weight: 11kg

OS60 + ODS60	Dimensions	Packaging
	Cover: 95 mm diameter Base: 80 mm diameter Height: 60 mm Volume: 280 ml	440 covers + 440 vessels / box 10 bags of 44 covers + 10 bags of 44 vessels box dimensions: 59x40x45cm box weight: 10kg

PRODUCTS

Available filters

Transparent polypropylene containers with cover
Hermetically closing cover with filter – autoclavable (if not treated) or gamma irradiated (not autoclavable)

POLYPROPYLENE CONTAINERS

OS40 + ODS40	Dimensions	Packaging
	Cover: 95 mm diameter Base: 80 mm diameter Height: 40 mm Volume: 210 ml	500 covers + 500 vessels / box 10 bags of 50 covers + 10 bags of 50 vessels box dimensions: 59x40x45cm box weight: 8,5kg

OV80 + OVD80	Dimensions	Packaging
	Cover: 150 x 90 mm Base: 125 x 65 mm Height: 80 mm Volume: 540 ml	350 covers + 350 vessels / box 14 bags of 25 covers + 14 bags of 25 vessels box dimensions: 59x40x45cm box weight: 13kg

TP1200 + TPD1200	Dimensions	Packaging
	Lenght: 181 mm Width: 120 mm Height: 73 mm Volume: 1200 ml	150 covers + 150 vessels / box 10 bags of 15 covers + 10 bags of 15 vessels box dimensions: 59x40x45cm box weight: 10kg

TP1600 + TPD1600	Dimensions	Packaging
	Length: 182 mm Width: 120 mm Height: 92 mm Volume: 1600 ml	150 covers + 150 vessels / box 10 bags of 15 covers + 10 bags of 15 vessels box dimensions: 59x40x45cm box weight: 10kg

TP2100 + TPD2100	Dimensions	Packaging
	Length: 195 mm Width: 195 mm Height: 78 mm Volume: 2100 ml	100 covers + 100 vessels / box in overbag box dimensions: 59x40x45cm box weight: 10kg

TP2500 + TPD2500	Dimensions	Packaging
	Lenght: 195 mm Width: 195 mm Height: 89 mm Volume: 2500 ml	100 covers + 100 vessels / box in overbag box dimensions: 59x40x45cm box weight: 10kg

PRODUCTS

Rectangular polystyrene containers and separate covers without filter
Single use, gamma irradiated, not hermetically closing. Heat resistance 85°C

POLYSTYRENE CONTAINERS AND COVERS

	Dimensions	Packaging
RA40 	Length: 145 mm Width: 100 mm Height: 40mm	600 vessels / box 12 bags of 50 vessels box dimensions: 59x40x45 cm box weight: 7kg
RA60 	Length: 145 mm Width: 100 mm Height: 60mm	600 vessels / box 12 bags of 50 vessels box dimensions: 59x40x45 cm box weight: 9kg
RA85 	Length: 145 mm Width: 100 mm Height: 85mm	600 vessels / box 12 bags of 50 vessels box dimensions: 59x40x45 cm box weight: 11kg
RDA145 	Length: 145 mm Width: 100 mm Height: 10mm fits on RA40, RA60 and RA85	600 pcs / box 12 bags of 50 containers box dimensions: 59x40x45 cm box weight: 4kg
RDA145/60 	Length: 145 mm Width: 100 mm Height: 60 mm fits on RA40, RA60 and RA85	600 pcs / box 12 bags of 50 covers box dimensions: 59x40x45 cm box weight: 9kg

GUIDELINES CONCERNING THE USE OF THE MICROBOX

1. To sterilise in the autoclave ("to autoclave")

Preferable procedure: to autoclave containers and medium separately.
This way the PP containers keep their shape and they can be re-used:
- pile containers and lids separately in an autoclavable bag
- fill containers under LAF with warm sterilized medium
- click to close lid brims all around
- keep containers with medium in a well-ventilated room

Alternative procedure: to autoclave containers with medium.
The following procedures avoid that the containers are deformed or burst while autoclaving:
- fill containers with medium
- place the lids on the containers and press gently along 3/4 of the surface leaving one border of the lid open
- after sterilization, slowly reduce the pressure in the autoclave back to atmospheric pressure

Corner of lid left open: no deformation	**Hermetically closed lid: containers garble with pressure changes**	
		
gas has free passage	quick pressure increase	quick pressure reduction

- immediately after emptying the autoclave, click to close the lids all around
- keep containers with medium in a well-ventilated room

2. Gas exchange

Depth filters
The filters are effective in the following conditions:
- keep the filter zones free of labels or any other object
- keep the filters well dry:
  - before re-using the lids, clean them by means of a moist cloth (do not soak)
  - leave a border of the lid open during sterilization (see above)
  - dry filters in circulating air
- choose the suitable filter type (L, XL, XXL, XXL+) and adjust the ventilation ratio in order to obtain an ideal gas exchange in combination with a minimal dose of dehydration

FREQUENTLY ASKED QUESTIONS

Can the Microbox be re-used?

The vessels made of polypropylene are autoclavable at 121°C, and can be re-used 7 to 10 times. In order to prolong the life of the containers and the covers, sterilize them separately, and fill them with sterilised medium afterwards. Just before autoclaving, make sure to leave one corner of the lid open. This is to avoid the formation of a vacuum in the container deforming the plastic.

Another possibility is to fill the vessel with medium and close it, leaving one corner open while autoclaving. Immediately after autoclaving, the lids should be closed completely! This way there is no risk for deformation of the plastic or contamination of the medium.

Does the medium in the Microbox dry out with plants that stay in the boxes for a long time?

The principle of the filters is depth filtration, in contrast with membranes, that are surface filters. Depth filters limit dehydration as to the length of each of the filters (see folder).

Do the plantlets grown in the Microbox have problems with weaning?

No: thanks to an adequate gas exchange, the plantlets are already autotrophe during their stay in the vessels, so weaning is no problem.

CONTACT

ECO2 NV

Hasseltkouter 51

B-9500 Ophasselt

TEL +32(0)54 300 697

FAX +32(0)54 300 696

info@eco2box.com

www.eco2box.com