The New lumox™ Technology

lumox™ technology

The new lumox™ technology offers cell culture systems based on an optically clear gas-permeable film. The lumox™ multiwell plate consists of a black polystyrene body the external dimensions are conforming to the recommendations of the Society for Biomolecular Screening (SBS).

The transparent base of lumox™ multiwell is made of an ultra thin (50 µm) gas-permeable film with very low autofluorescence. The particular specification of the film results in excellent optical features making the lumox™ multiwell plates suitable for microscopy, in particular for fluorescence microscopy.

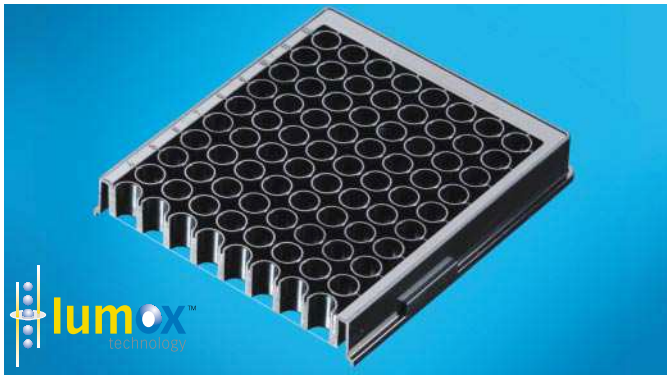


Figure 1

The principle of the lumox™ technology

The lumox™ film base is permeable for gases, e.g. O_2 and CO_2. By this means, optimal growth conditions and therefore homogeneous cell growth can be achieved (Fig. 2).

Depending on the cell types, a choice of lumox™ surfaces ensures the ideal cultivation environment.

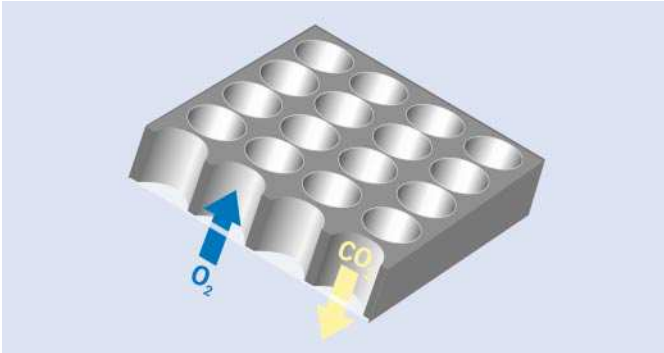


Figure 2

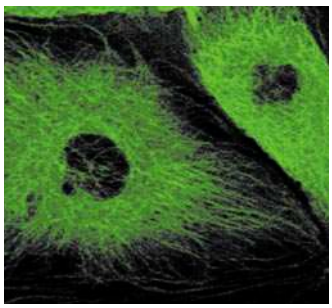
Applications

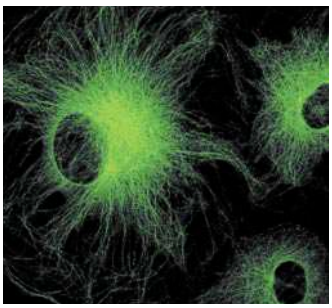
The range of applications for lumox™ multiwell, from cell culture to automated analysis of fluorescent cell-based assays for drug screening:

- Cell assays
- Drug Discovery
- High-Throughput Screening
- Sub-cloning
- Cryopreservation
- ADME / Tox
- Fluorescence microscopy
- Phase contrast microscopy
- FCS
- LSCM
- FISH
- FRET

Cell culture data

A stable cell line of PTK2 cells expressing beta-tubulin construct (see reference: Nat Cell Biol 2001 Feb; 3(2):140-9) was cultivated and visualized in lumox™ multiwell plates, with resultant excellent image quality.





Tips and Tricks

lumox™ film is thinner than cover glass. Therefore we suggest the following:
Conventional light microscopy: If cover glass corrected objectives with a focus above 1mm are used, it might be necessary to use cover glass caps to achieve maximum image quality.

Laser Scanning Microscopy/ Confocal Microscopy:
For best performance, the use of non-cover glass objectives is recommended (focus 0 - ∞).

Phase contrast microscopy/ Varel contrast microscopy/ Hoffmann contrast microscopy:
The applications work perfectly with lumox™ if an objective lens with a focus of 0 - ∞ is used. Otherwise it is necessary to utilise a cover glass cap to achieve excellent results.

Oil immersion: Application of oil immersion is not recommended.

Mounting media: Fixation with standard mounting media can be easily performed (see table 1 p. IVSS I 14 for chemical compatibility).

Technical Information

1. Optical data

To evaluate autofluorescence, emission spectra were investigated in empty multiwell plates. lumox™ multiwell plates show a very low autofluorescence independent from chosen excitation wave length resulting in a unique suitability for fluorescence applications (Fig. 2). Measured background signal was 10 times lower in lumox™ multiwell plate compared to polystyrene plates (Fig. 1).

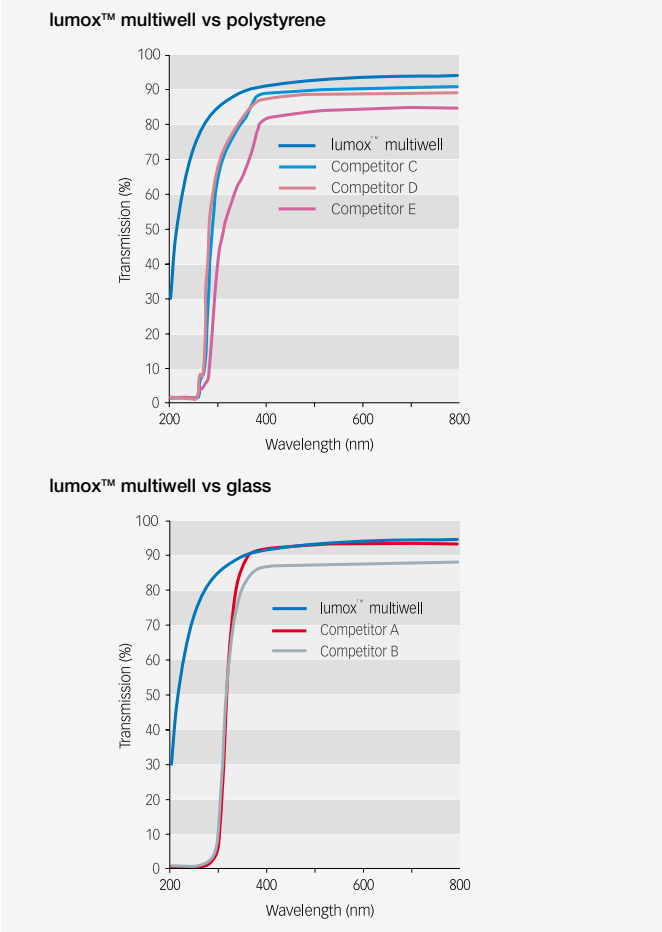
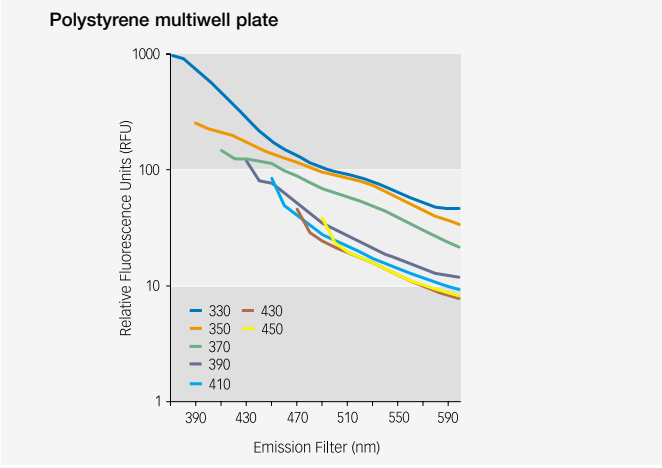


Figure 1: Transmission of lumox™ multiwell compared to glass and polystyrene plates



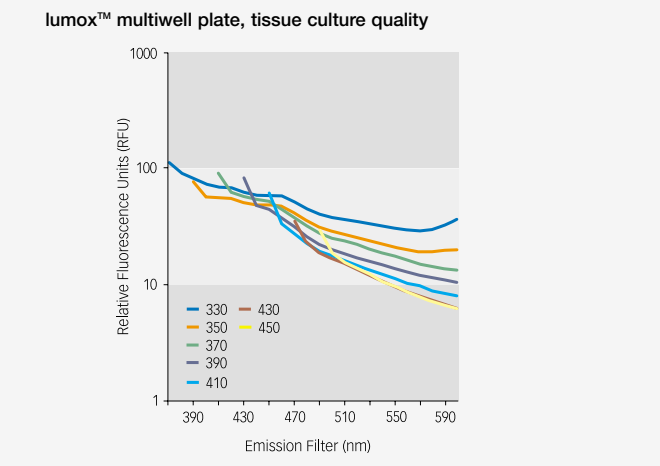


Figure 2: Emmission spectra with fixed excitation, lumox™ multiwell plates, tissue culture quality vs polystyrene multiwell plate

2. Growth Curves

Cells were seeded in different concentrations in the lumox™ multiwell plate. Independent from cell type and concentration, cells grow much faster in lumox™ multiwell in comparison to the given reference data (Fig. 3, 4).

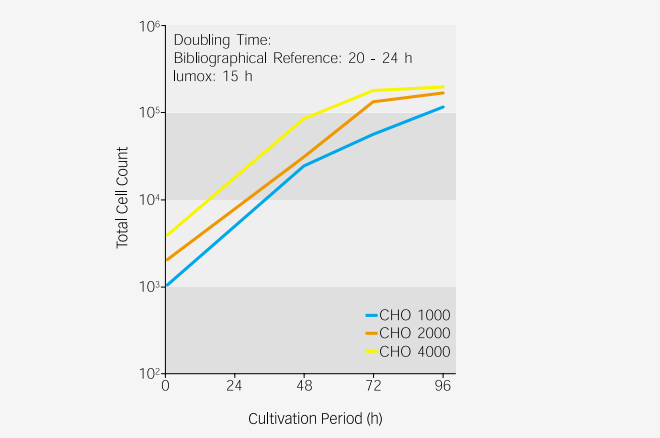


Figure 3: CHO cells in lumox™ multiwell, tissue culture quality

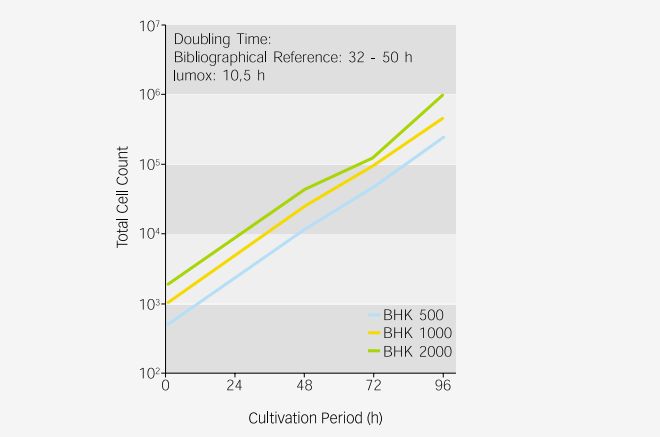
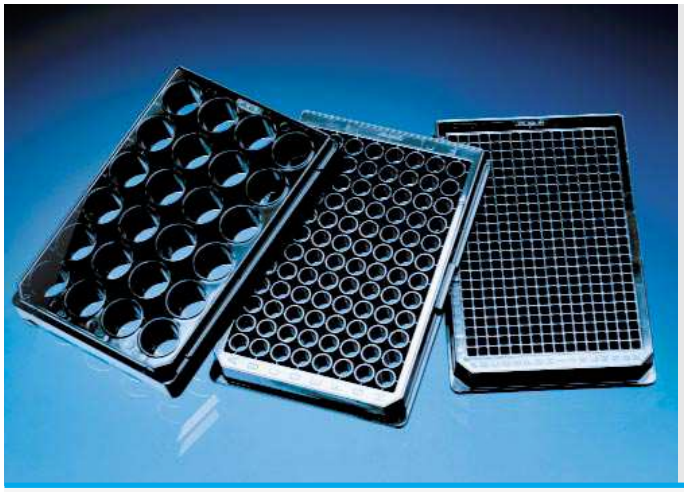


Figure 4: BHK cells in lumox™ multiwell plates, tissue culture quality

Solvent	Temperature	Time of Exposure	Conc.	Result
DMSO	Room temperature	24 h and 72 h	10 %	✓
Ethanol	Room temperature	24 h and 72 h	70 %	✓
	and 37 °C	24 h and 72 h	70 %	✓
Methanol	Room temperature	24 h and 72 h	50 %	✓
	and 37 °C	24 h and 72 h	50 %	✓
Formaldehyde	Room temperature	24 h and 72 h	4 %	✓
Glutaraldehyde	Room temperature	24 h and 72 h	5 %	✓
Paraformaldehyde	Room temperature	24 h	4 %	✓
Acetone	Room temperature	15 min.	100 %	✓
		(Polystyrene of the plate body affected, membrane slightly arched in)		
Tris HCl	37 °C	24 h and 72 h	100 %	✓
Tween 20	37 °C	24 h and 72 h	20 %	✓
Trypsin	37 °C	24 h and 72 h	0.25 %	✓
EDTA-Trypsin	37 °C	24 h and 72 h	0.03/0.25 %	✓
Triton X 100	Room temperature	24 h and 72 h	20 %	✓
	and 37 °C	24 h and 72 h	20 %	✓
Distilled Water	37 °C	3 weeks	100 %	✓
PBS	37 °C	3 weeks	100 %	✓
DMEM	37 °C	3 weeks	100 %	✓
RPMI	37 °C	3 weeks	100 %	✓
Immersion Oil	Room temperature	3 weeks	10 %	✓
	Room temperature	3 weeks	100 %	✓
Glycerol	Room temperature	3 weeks	50 %	✓

Table 1: Solvent Compatibility

lumox™ multiwell



lumox™ multiwell

Advantages

- Very low autofluorescence
- Optical clarity
- Suitable for microscopy
- Gas-permeable base
- Optimal oxygen supply / CO_2 removal
- Optimal growth conditions
- Homogenous cell growth
- Different growth surfaces
- Excellent temperature transfer

Formats

lumox™ multiwell plates are available as:

- 24 well format
- 96 well format
- 384 well format

All lumox™ multiwell plates have TC surface for ultra sensitive cells.

Cat.No.	9611 0024	9600 0014[1)]	9612 0096	9600 0024[1)]	9613 0384	9600 0034[1)]
Well format	24 well	24 well	96 well	96 well	384 well	384 well
Well profile			F-bottom/ chimney well	F-bottom/ chimney well	F-bottom	F-bottom
Bottom	lumox™ film	lumox™ film	lumox™ film	lumox™ film	lumox™ film	lumox™ film
Growth area per well [cm²]	1.9	1.9	0.34	0.34	0.11	0.11
Working volume per well [µl]	5000 - 15000	5000 - 15000	25 - 340	25 - 340	10 - 130	10 - 130
Lid	+[2)]	+[2)]	+[2)]	+[2)]	+	+
TC surface treatment	+	+	+	+	+	+
Sterile	+	+	+	+	+	+
Quantity per bag/case	1/20	1/4	1/20	1/4	1/20	1/4

[1)] Trial Kit [2)] with condensation rings