

# pE-340<sup>fura</sup>

LED Illumination  
for Fura-2



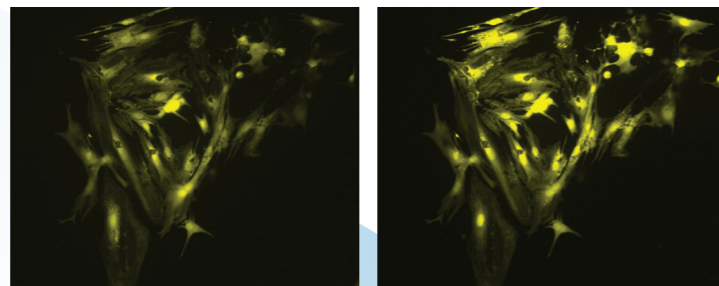
Fast, Controllable LED  
Illumination for Fura-2  
Ratiometric Calcium Imaging

**CoolLED**  
Simply Better Control



# pE-340<sup>fura</sup> LED Illumination for Fura-2

Utilising the highly successful pE-300 Series platform, the pE-340<sup>fura</sup> is a bespoke LED Illuminator for Fura-2 ratiometric calcium imaging, which also supports everyday fluorescence microscopy in a compact and affordable package. The 340 nm & 380 nm LED Illumination System provides the optimum excitation wavelengths for Fura-2-based calcium imaging allowing high-precision, stable, high-throughput imaging with video-rate time resolution.



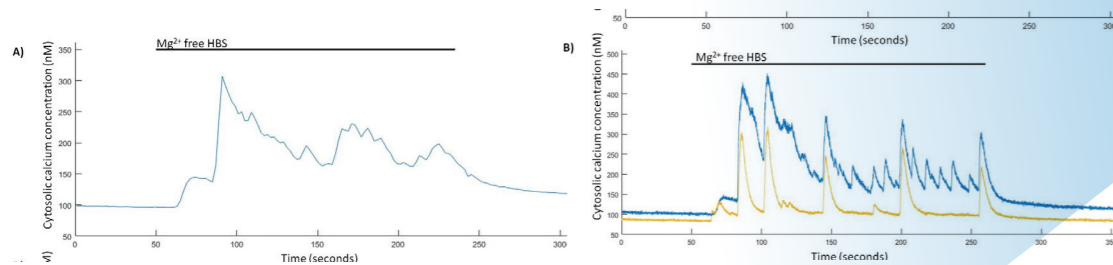
The images show a field of cardiac myocytes (heart cells). The cells were loaded with Fura-2 using standard conditions (i.e. incubation with 2 micromolar Fura-2 acetoxymethyl ester for 30 minutes, followed by an additional 30 minutes for de-esterification).

Images obtained by Martin Bootman and Katja Rietdorf, School of Life, Health and Chemical Sciences, The Open University

The manual control pod offers instant on/off operation with 0-100% intensity control in 1% steps. It allows the control of each wavelength independently, so fluorophores can be viewed in isolation or in combination. The user then can colour balance the wavelengths to optimise their experiment set up.



Until recently, the response time of illumination systems used for Fura-2 imaging has been limited to milliseconds due to mechanical switching of the wavelengths in arc lamp and monochromator systems. However the new pE-340<sup>fura</sup> can be controlled via convenient BNC TTL connections for precise illumination control in as little as 20 microseconds.



Synaptically-driven Ca<sup>2+</sup> events captured at a rate of A) 0.5 Hz in one neuron and B) 24.39 Hz in two neurons \*

TINNING, P.W., FRANSSSEN, A. J. P.M., HRIDI, S. U., BUSHELL, T. J. and MCCONNELL, G. (2017), A 340/380 nm light-emitting diode illuminator for Fura-2 AM ratiometric Ca<sup>2+</sup> imaging of live cells with better than 5 nM precision. *Journal of Microscopy*. doi:10.1111/jmi.12616

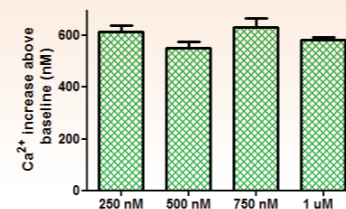
We have harnessed our expertise with LEDs to ensure the internal optics within the pE-340<sup>fura</sup> are optimised to transmit 340 nm. The pE-340<sup>fura</sup> is also configurable to accept a particular UV compatible 3mm liquid light guide, which will ensure high transmission of the 340 nm wavelength. An optional pE-340<sup>fura</sup> Universal Collimator is available if required.



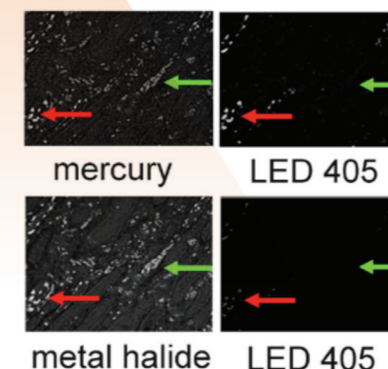
**SPEED**

**STABILITY**

**CELL VIABILITY**



TINNING, P.W., FRANSSSEN, A. J. P.M., HRIDI, S. U., BUSHELL, T. J. and MCCONNELL, G. (2017), A 340/380 nm light-emitting diode illuminator for Fura-2 AM ratiometric Ca<sup>2+</sup> imaging of live cells with better than 5 nM precision. *Journal of Microscopy*. doi:10.1111/jmi.12616



Using the new pE-340<sup>fura</sup> LED illumination system, less Fura-2 dye can be loaded into the cells whilst still maintaining the same measured calcium concentration and good signal-to-noise ratio. The reduction in required dye not only improves cell-viability due to reduced dye toxicity, but also results in a cost reduction per experiment.

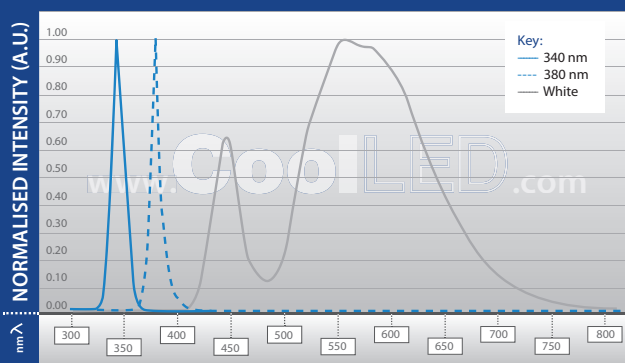
High levels of autofluorescence and fast photobleaching of specific fluorescence when illuminating Qdots with metal halide

Prost S et al (2016) Choice of Illumination System & Fluorophore for Multiplex Immunofluorescence on FFPE Tissue Sections. *PLoS ONE* 11(9): e0162419. doi:10.1371/journal.pone.0162419

Features	Benefits
Dedicated 340 nm & 380 nm outputs	Required for Fura-2 ratiometric calcium imaging
Broad white output (435 nm-645 nm)	Everyday imaging also possible with fluorophores including GFP/FITC, Tritic/TxRed/mCherry, Cy5 and similar
Microsecond switching (340/380)	Better temporal resolution
Stability of LED illumination	Reduction in noise level of the light source to a range below that of the wider experiment, reducing false positives and increasing overall precision. Accuracy of the Fura-2 dye is now the limiting factor
Higher signal-to-noise	Gives cleaner images and data whilst requiring less Fura-2 dye, reducing toxicity and costs
UV optimised optics	Maximum power delivery on standard microscope configurations
Simple to fit and use	No alignment – once only adjustment
Direct or light guide delivery options	Flexibility of UV optimised attachment options
Individual channel intensity control (0-100%)	Offers ability to colour balance to optimise experiment set up
Individual channel selection	Control the level of excitation of each stain independently on a multi stained sample
Compatible with most imaging software	Integrated control with your imaging set up time after time
Individual channel triggering (TTL, microsecond)	Fast remote control operation
Removable inline filter holders	No moving parts
Sequence runner	Facility to run through a sequence of excitation channels using equipment with only a single TTL out

# Specification

## Performance:



## Control & Interface

Manual:	Manual control pod
Remote:	Via global and individual channel TTL <20 $\mu$ s at full power
Connectivity:	Remote via USB (B type) for imaging software control
Sequence Runner:	Single TTL input to step through user defined sequence. <20 $\mu$ s at full power

## Power

Power Requirements:	100-240 VAC, 50.60 Hz, 1.4 A
Power Consumption:	Standby Max 2 W 1 band (White) at 100% intensity Max 24 W 2 bands (340 + White) at 100% intensity Max 30 W 3 bands (All) at 100% intensity Max 36 W

## Dimensions

Light Source:	77 mm (w) x 186 mm (d) x 162 mm (h) Weight 1.40 kg
Control Pod:	88 mm (w) x 125 mm (d) x 37 mm (h) Weight 0.32 kg
Power Supply:	167 mm (w) x 67 mm (d) x 35 mm (h) Weight 0.62 kg

## To Order

pE-340-FR-D-YYY-ZZ :	pE-340 <sup>ltra</sup> Illumination System. Direct Fit. Includes Light Source, Control Pod, set of three Excitation Filter Holders (25 mm dia.) & Excitation Filters for 340 nm & 380 nm, Power Supply, YYY Adaptor & ZZ Plug
pE-340-FR-L-ZZ:	pE-340 <sup>ltra</sup> Illumination System. For use with 3 mm UV Liquid Light Guide. Includes Light Source, Control Pod, set of three Excitation Filter Holders (25 mm dia.) & Excitation Filters for 340 nm & 380 nm, Power Supply & ZZ Plug
pE-1910	3 m long, 3 mm diameter liquid light guide for use with pE-340 <sup>ltra</sup>
pE-340-FR-COLL-YYY	pE-340 <sup>ltra</sup> Universal Collimator & customer specified adaptor

To specify microscope adaptor (YYY), see Adaptors (<http://www.cooled.com/product-detail/adaptors-2/>)  
To specify local power cable (ZZ): 10 = Australia, 20 = Europe, 30 = UK, 40 = USA

Warranty:	System = 36 months LEDs = 36 months (NB 340 nm LED warranted for 3000 hours accumulated use)
-----------	---

## Environment & Safety

LED products are more sustainable and energy efficient than conventional illuminators. CoolLED's products have the following benefits:

- Mercury-free and Laser-free
- Energy Efficient: 80% less power
- Long lifetime
- No bulb replacements
- Reduced risk of eye damage
- Quiet operation
- No special disposal regulations or issues



For more information on how CoolLED products can help you, contact us now:  
t: +44 (0)1264 323040 (Worldwide) 1-800-877-0128 (USA/Canada)  
w: [www.CoolLED.com](http://www.CoolLED.com)  
e: [info@CoolLED.com](mailto:info@CoolLED.com)

