Class II, Type A2 and B2 Biological Safety Cabinets
The Most Certified Energy-Efficient, Safe, and Ergonomic Biosafety Cabinet in the World
LABCULTURE® CLASS II TYPE A2 (LA2) and B2 (LB2) BIOSAFETY

RS 232 Port and Zero Volt Relay Contact
- RS 232 Port to send operational information to Building Management System (BMS)
- Zero Volt Relay Contact to turn ON/OFF exhaust blower and signal the building alarm

Airflow Sensor
- Monitors real-time airflow for safety
- Alert the user if airflow is insufficient

Sentinel™ Gold Microprocessor Controller
- Displays all safety information on one screen
- Centered and angled down for easy reach & viewing
- Selectable Quickstart mode for fast operation

Single Piece Wall
- Large radius for easy cleaning
- Side-mounted electrical outlets and staggered service fixtures, for easy reach

Single Piece Work Tray
- Recessed to contain spillage
- Curved grill to prevent blockage

Raised Arm Rest
- Helps prevent grille blocking
- Comfortable working posture

Angled Drain Pan
- Easy to clean
- Does not harbor contaminants

Available in 0.9, 1.2, 1.5, 1.8 and 2.4 meter models (3', 4', 5', 6' and 8'). Shown with optional telescoping stand.

Esco Labculture Class II Type A2 (LA2) has passed more performance tests in more languages, for more certifications throughout more countries than any other biological safety cabinet in the world.

Labculture® I Labculture® RELIANT
LA2 & LR2 Class II Type A2 / LB2 Class II Type B2 Biological Safety Cabinets
CABINETS, FEATURING ADVANCED MICROPROCESSOR CONTROLLER

**The Most Certified BSC in the World**

- **Standards Compliance**
  - **Biosafety Cabinets**
    - NSF / ANSI 49, USA*
    - JIS K 3800, Japan**
    - SFDA YY-0569, China
  - **Air Quality**
    - ISO 14644.1, Class 3, Worldwide
    - JS BS0295, Class 3, Japan
    - US Fed Std 209E, Class 1 USA
  - **Filtration**
    - EN-1822 (H14), Europe
    - IEST-RP-CC001.3, USA
    - IEST-RP-CC007, USA
    - IEST-RP-CC034.1, USA
  - **Electrical Safety**
    - UL-C-61010A-1, USA
    - CSA22.2, No. 1010-192, Canada
    - UL61010-1, Europe
    - IEC61010-1, Worldwide


**Note:** LA2 cabinets are certified to NSF, EN, JIS, and SFDA. LB2 cabinets are certified to NSF and SFDA.

**ULPA Filter**
- 10x Filtration efficiency of HEPA filter
- Creates ISO Class 3 work zone instead of industry-standard ISO Class 5

HEPA filters only offer 99.99% typical efficiency at 0.3 microns, while ULPA filters provide 99.999% typical efficiency for particle sizes of 0.1 to 0.3 microns.

**Dynamic Chamber**
- Blower plenum and side walls are surrounded by negative pressure
- Prevent contaminants from escaping outside

- Positive pressure
- Negative pressure

**ulpa Filter**

**ISOcide® powder coat**
- Silver-ion impregnated powder coat
- Inhibit microbial growth to improve safety

**Energy Efficient DC ECM Motor**
- Powered by latest generation DC ECM motor, that is more efficient than legacy ECM and VFD motors
- 70% Energy savings compared to AC motor
- Stable airflow, despite building voltage fluctuations & filter loading
- Night Setback mode to further reduce power consumption by 60%

**Pressure Switch (LB2 only)**
- Temperature independent
- Fast response

**Cooling Chamber**
- Monitors real-time airflow for safety
- Alert the user if airflow is insufficient

**ESCO® CABINETS**
- Energy Efficient DC ECM Motor
- Pressure Switch (LB2 only)
- Dynamic Chamber
- ISOcide® powder coat

**Notes:**
- **JIS K 3800** and **SFDA YY-0569** are applicable in **LA2 models only.**
**LABCULTURE® CLASS II TYPE A2 (LA2) and B2 (LB2) BIOSAFETY CABINETS**

- **Dynamic Chamber**
  - Blower plenum and side walls are surrounded by negative pressure
  - Prevent contaminants from escaping outside
  - Positive pressure
  - Negative pressure

- **Single Piece Wall**
  - Large radius for easy cleaning
  - Side-mounted electrical outlets and staggered service fixtures, for easy reach

- **Single Piece Work Tray**
  - Recessed to contain spillage
  - Curved grill to prevent blockage

- **Raised Arm Rest**
  - Helps prevent grille blocking
  - Comfortable working posture

- **Angled Drain Pan**
  - Easy to clean
  - Does not harbor contaminants

**Rocker Switches and Pressure Gauge**
- Easy to use switches
- Displays filter loading status
- Manually adjustable UV timer

Available in 0.9, 1.2, 1.5, 1.8 and 2.4 meter models (3’, 4’, 5’, 6’, and 8’). Shown with optional telescoping stand.
**Energy Efficient DC ECM Motor**
- Powered by latest generation DC ECM motor that is more efficient than legacy ECM and VFD motors
- 70% Energy savings compared to AC motor
- Stable airflow, despite building voltage fluctuations & filter loading
- Night Setback mode to further reduce power consumption by 60%

**ULPA Filter**
- 10x Filtration efficiency of HEPA filter
- Creates ISO Class 3 work zone instead of industry-standard ISO Class 5

Esco cabinets use ULPA filters (per IEST-RP-CC001.3) / H14 per EN 1822, instead of H13 HEPA filters used on many BSCs in the market.

HEPA filters only offer 99.99% typical efficiency at 0.3 micron, while ULPA filters provide 99.999% typical efficiency for particle sizes of 0.1 to 0.3 micron.

**Adjustable UV Timer**
- Easily adjustable to desired minutes or hours
- Prolongs UV lamp, for not turning it ON overnight

**ISOCIDE® powder coat**
- Silver-ion impregnated powder coat
- Inhibit microbial growth to improve safety

<table>
<thead>
<tr>
<th>Certification</th>
<th>Biosafety Cabinets</th>
<th>Air Quality</th>
<th>Filtration</th>
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*The NSF / ANSI 49 certified models are: LR2-4S1-E, LR2-4S2-E, LR2-4S3-E, LR2-5S1-E, LR2-5S2-E, LR2-5S3-E, LR2-6S1-E, LR2-6S2-E, and LR2-6S3-E.*
Cabinet Filtration System
- Ambient air is pulled through front grille to create inflow, without going into the work surface. Inflow is joined by half of the downflow, to create front air curtain that is fine-tuned to create a large performance envelope. The combined air stream travels through the back air column towards the blower.
- Approximately ½ of the air in the common plenum is exhausted through the ULPA filter to the room. The remaining ½ of the air is passed through the downflow ULPA filter and into the work area as a vertical laminar flow air to create ISO Class 3 work surface and prevents cross contamination.
- Near the work surface, the downflow splits. About half goes to the front grille, and half goes to the rear grille. A small portion enters the side capture zones to prevent dead air corners (small blue arrows).
- The design was optimized to give large performance envelope, that provides operator and product protection at wide inflow and downflow variation from the Nominal point.

The Performance Envelope Concept
- Nominal Airflow
- Personnel / Product Protection
- Area of Personnel / Product Protection

Optional Exhaust Collar Positions for Thimble-Ducting for LA2 and LR2 Models
Ambient air is pulled through the front grille to prevent contamination of the work surface and work product. The inflow does not mix with the clean air within the cabinet work zone.

Ambient air is taken in through a pre-filter at the top of the cabinet, and passes through the downflow ULPA filter, entering the work zone as laminar flow. The uniform, non-turbulent air stream protects against cross contamination within and throughout the work area.

Near the work surface, the downflow air stream splits with a portion moving toward the front air grille, and the remainder moving to the rear air grille. A small portion of the ULPA filtered downflow enters the intake perforations at the side capture zones at a higher velocity (small blue arrows).

A combination of inflow and downflow air streams forms an air barrier that prevents contaminated room air from entering the work zone, and prevents work surface emissions from escaping the work zone. The downflow combined with the inflow air enters the common air plenum.

All air in the common plenum is HEPA-filtered and exhausted via a dedicated ducting system to the external environment.

**Model LB2 Biological Safety Cabinet Engineering Drawing**

1. Sentinel™ Gold Microprocessor Controller
2. Tempered Glass Sash Window
3. Stainless Steel Back Wall
4. Side Panel
5. Pressure Switch Port
6. Exhaust Sensor
7. Electrical Panel
8. Fluorescent Lamp
9. IV Bar Retrofit Kit Provision
10. Service Fixture Retrofit Kit Provision
11. Electrical Outlet
12. Arm Rest
13. Drain Valve
14. Exhaust Ducting
15. Exhaust H14 Filter
16. Energy-efficient DC ECM Blower
17. Downflow H14 Filter
18. Downflow Sensor
19. UV Light Retrofit Kit Provision
20. Single Piece Stainless Steel Work Tray
21. RS232 Port
22. Pre-filter
23. Cabinet Power Inlet
24. Zero Voltage Relay Contact for Exhaust System
25. Zero Voltage Relay Contact for Remote Alarm

**Recommended LB2 Cabinet Installation**

- Exhaust Blower at terminal end (preferably one blower per individual cabinet and connected to emergency power)
- Pitot Tube Duct traverse penetration (drill penetrations in ductwork)
- Air Tight Damper (Optional)
- Anti Blowback Valve (Optional)
- Supply Air (make up for Inflow and Downflow Air), Located far away from exhaust blower

**Note:** Cabinet shown with optional Support Stand, Air-tight Damper, optional Anti Blowback Valve and optional Exhaust Blower. Exhaust ductwork is not provided by Esco.
## Accessories for LA2, LB2 and LR2 Biological Safety Cabinets

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![Image of Direct Mounted / GFCI Outlet](image1)
![Image of EU SF-Gas-40 mm and Solenoid Valve](image2)
![Image of EU SF-Vacuum-40 mm](image3)
![Image of EU SF-Air-40 mm](image4)
![Image of EU SF-Nitrogen-40 mm](image5)
![Image of EU SF-Water-40 mm](image6)
![Image of EU SF-Universal-40 mm](image7)
![Image of Fixed Stand with Leveling Feet, 28” height](image8)
![Image of Fixed Stand with Leveling Feet, 34” height](image9)
![Image of Fixed Stand with Caster Wheels, 28” height](image10)
![Image of Fixed Stand with Caster Wheels, 34” height](image11)
![Image of Telescopic Stand with Leveling Feet, 1” adjustment](image12)
![Image of Telescopic Stand with Caster Wheels, 1” adjustment](image13)
![Image of Motorized Height Stand with Caster Wheels](image14)
![Image of Arm Rest Padding](image15)
![Image of Foot Rest](image16)
![Image of Laboratory Chair](image17)
![Image of IQ OQ Protocol](image18)
## TECHNICAL SPECIFICATIONS

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<tr>
<td>Nominal Size</td>
<td>0.9 meter (3')</td>
<td>1.2 meter (4')</td>
<td>1.5 meter (5')</td>
<td>1.8 meter (6')</td>
<td>2.4 meters (8')</td>
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<tr>
<td>External Dimensions *</td>
<td>1115 x 852 x 1540 mm (44.0&quot; x 33.5&quot; x 60.6&quot;)</td>
<td>1420 x 852 x 1540 mm (56.0&quot; x 33.5&quot; x 60.6&quot;)</td>
<td>1725 x 852 x 1540 mm (68.0&quot; x 33.5&quot; x 60.6&quot;)</td>
<td>2030 x 852 x 1540 mm (80.0&quot; x 33.5&quot; x 60.6&quot;)</td>
<td>2600 x 852 x 1540 mm (102.4&quot; x 33.5&quot; x 60.6&quot;)</td>
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<tr>
<td>Internal Dimensions (W x D x H)</td>
<td>970 x 623 x 670 mm (38.2&quot; x 24.5&quot; x 26.4&quot;)</td>
<td>1270 x 623 x 670 mm (50.0&quot; x 24.5&quot; x 26.4&quot;)</td>
<td>1570 x 623 x 670 mm (61.8&quot; x 24.5&quot; x 26.4&quot;)</td>
<td>1870 x 623 x 670 mm (73.6&quot; x 24.5&quot; x 26.4&quot;)</td>
<td>2440 x 623 x 670 mm (96.0&quot; x 24.5&quot; x 26.4&quot;)</td>
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<td>Usable Work Area</td>
<td>0.45 m² (4.8 sq.ft.)</td>
<td>0.6 m² (6.5 sq.ft.)</td>
<td>0.75 m² (8.1 sq.ft.)</td>
<td>0.9 m² (9.7 sq.ft.)</td>
<td>1.2 m² (13 sq.ft.)</td>
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<td>Tested Opening</td>
<td>229 mm (9&quot;)</td>
<td>229 mm (9&quot;)</td>
<td>229 mm (9&quot;)</td>
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<td>274 mm (10.8&quot;)</td>
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### Airflow Volume

| Inflow                  | 0.53 m³/s (105 fpm) |
| Downflow                | 0.35 m³/h (70 fpm)  |

### Airflow Volume

| Inflow                  | 424 m³/h (251 cfm) |
| Downflow                | 628 m³/h (363 cfm) |
| Exhaust                 | 866 m³/h (406 cfm) |
| Required Exhaust with Optional Thimble Exhaust Collar | 742 m³/h (426 cfm) |
| Static Pressure for Optional Thimble Exhaust Collar | 742 m³/h (467 cfm) |

### ULPA Filter Typical Efficiency

> 99.999% for particle size between 0.1 to 0.3 microns per IEST-RP-CC001.3 / H14 per EN 1822

### Sound Emission**

| NSF / ANSI 49 | 62.5 dBA | 63 dBA | 63.5 dBA | 64 dBA | 64.5 dBA |
| EN 12469      | 59.5 dBA | 60 dBA | 60.5 dBA | 61 dBA | 61.5 dBA |

### Fluorescent Lamp Intensity

> 1230 lux (> 114 foot-candles)

### Cabinet Construction

| Main Body | Electro-galvanized steel with white oven-baked epoxy-polyester Isocide™ antimicrobial powder-coated finish, 1.5 mm (0.06") / 16 gauge thick |
| Work Zone | Stainless steel Type 304 with No.4 finish, 1.5 mm (0.06") / 16 gauge thick |

### Electrical

| Full Load Amps 230 V | 4.5 A | 5.5 A | 5.7 A | 6 A | 6.5 A |
| Full Load Amps 115 V | 9 A   | 11 A  | 11.5 A| 12 A| 13 A  |
| Heat Load            | 853 BTU/hr | 972 BTU/hr | 1177 BTU/hr | 1297 BTU/hr | 1774 BTU/hr |

### Nominal Power Consumption

| 250 W | 285 W | 345 W | 380 W | 520 W |

### Net Weight***

| 243 Kg (536 lbs) | 283 Kg (624 lbs) | 350 Kg (772 lbs) | 426 Kg (939 lbs) | 580 Kg (1279 lbs) |

### Shipping Weight***

| 292 Kg (644 lbs) | 345 Kg (761 lbs) | 410 Kg (904 lbs) | 486 Kg (1072 lbs) | 640 Kg (1411 lbs) |

### Shipping Dimensions, Maximum (W x D x H)***

| 1200 x 950 x 1900 mm (47.2" x 37.4" x 74.8") | 1550 x 950 x 1900 mm (61.0" x 37.4" x 74.8") | 1950 x 950 x 1900 mm (76.8" x 37.4" x 74.8") | 2150 x 950 x 1900 mm (84.6" x 37.4" x 74.8") | 2720 x 950 x 1900 mm (107.1" x 37.4" x 74.8") |

### Shipping Volume, Maximum***

| 2.17 m³ (77 cu.ft.) | 2.80 m³ (99 cu.ft.) | 3.52 m³ (124 cu.ft.) | 3.88 m³ (137 cu.ft.) | 4.91 m³ (173 cu.ft.) |

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*Depth includes the remove-able arm rest and front cover. When they are removed, depth is 790 mm (31.1").

**Noise reading in open field condition / anechoic chamber. Noise reading in normal room varies by room size, layout, and background noise, but may reach roughly 3-4 dBA above these values.

***Cabinet only, excludes optional stand.

Class II Type A2 can be used to handle minute quantities of volatile toxic chemicals and trace amounts of radionucleotides when thimble ducted. Use this option if chemical vapor re-circulation into the work zone is permitted.
**TECHNICAL SPECIFICATIONS**

**Labculture® Class II B2**

<table>
<thead>
<tr>
<th>Nominal Size</th>
<th>LB2-3B_E</th>
<th>LB2-4B_E</th>
<th>LB2-5B_E</th>
<th>LB2-6B_E</th>
<th>LB2-8B_E</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.9 meter (3')</td>
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<tr>
<td>1.5 meter (5')</td>
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<tr>
<td>1.8 meter (6')</td>
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<tr>
<td>2.4 meters (8')</td>
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</tr>
</tbody>
</table>

**External Dimensions**

- Without Base Stand:
  - 0.9 meter (3'): 1115 x 852 x 1610 mm (44.0" x 33.5" x 63.3")
  - 1.2 meter (4'): 1420 x 852 x 1610 mm (56.0" x 33.5" x 63.3")
  - 1.5 meter (5'): 1725 x 852 x 1610 mm (68.0" x 33.5" x 63.3")
  - 1.8 meter (6'): 2030 x 852 x 1610 mm (80.0" x 33.5" x 63.3")
  - 2.4 meters (8'): 2600 x 852 x 1610 mm (102.4" x 33.5" x 63.3")

- With Optional Base Stand, 711 mm (28") type:
  - 0.9 meter (3'): 1115 x 852 x 2321 mm (44.0" x 33.5" x 91.4")
  - 1.2 meter (4'): 1420 x 852 x 2321 mm (56.0" x 33.5" x 91.4")
  - 1.5 meter (5'): 1725 x 852 x 2321 mm (68.0" x 33.5" x 91.4")
  - 1.8 meter (6'): 2030 x 852 x 2321 mm (80.0" x 33.5" x 91.4")
  - 2.4 meters (8'): 2600 x 852 x 2321 mm (102.4" x 33.5" x 91.4")

**Internal Dimensions**

- (W x D x H):
  - 970 x 623 x 715 mm (38.2" x 24.5" x 28.1")
  - 1270 x 623 x 715 mm (50.0" x 24.5" x 28.1")
  - 1570 x 623 x 715 mm (61.8" x 24.5" x 28.1")
  - 1870 x 623 x 715 mm (73.6" x 24.5" x 28.1")
  - 2440 x 623 x 715 mm (96.0" x 24.5" x 28.1")

**Usable Work Area**

- 0.45 m² (4.8 sq.ft.)
- 0.6 m² (6.5 sq.ft.)
- 0.75 m² (8.1 sq.ft.)
- 0.9 m² (9.7 sq.ft.)
- 1.2 m² (13 sq.ft.)

**Tested Opening**

- 203 mm (8.0")
- 203 mm (8.0")
- 203 mm (8.0")
- 203 mm (8.0")
- 203 mm (8.0")

**Working Opening**

- 274 mm (10.8")
- 274 mm (10.8")
- 274 mm (10.8")
- 248 mm (9.8")
- 248 mm (9.8")

**Average Airflow**

- Inflow: 0.53 m/s (105 fpm)
- Downflow: 0.31 m/s (60 fpm)

**Airflow Volume**

- Inflow: 376 m³/h (223 cfm)
- Downflow: 628 m³/h (476 cfm)

**CBV Exhaust Air Volume**

- 1127 m³/h (658 cfm)

**Min Exhaust Static Pressure**

- 400 Pa / 1.6 in H₂O
- 375 Pa / 1.5 in H₂O

**CBV Exhaust Static Pressure**

- 575 Pa / 2.3 in H₂O
- 550 Pa / 2.2 in H₂O

**Supply ULPA Filter Typical Efficiency**

- ≥99.999% for particle size between 0.1 to 0.3 microns

**Exhaust HEPA Filter Typical Efficiency**

- ≥99.9% at 0.3 microns

**Maximum Sash Opening**

- 508 mm (20")

**Sound Emission**

- NSF / ANSI 49: 57 dBA
- EN 12469: 54 dBA

**Fluorescent Lamp Intensity At Zero Ambient Light**

- > 1250 lux (> 116 foot-candles)
- > 1400 lux (> 130 foot-candles)
- > 1200 lux (> 111 foot-candles)

**Cabinet Construction**

- Main Body: Electro-galvanized steel with white oven-baked epoxy-polyester Isocide™ antimicrobial powder-coated finish, 1.5 mm (0.06") / 16 gauge thick
- Work Zone: Stainless steel Type 304 with No.4 finish, 1.5 mm (0.06") / 16 gauge thick

**Electrical**

- Full Load Amps: 230 V 4.5 A, 5.5 A, 6 A
- Full Load Amps: 115 V 9 A, 11 A
- Heat Load: 566 BTU/hr, 645 BTU/hr, 781 BTU/hr

**Nominal Power Consumption**

- 166 W, 189 W, 229 W

**Net Weight****

- 279 kg (615 lbs)
- 317 kg (699 lbs)

**Shipping Weight****

- 318 kg (703 lbs)
- 370 kg (814 lbs)

**Shipping Dimensions, Maximum**

- (W x D x H): 1210 x 950 x 1950 mm (47.6" x 37.4" x 76.8")
- 1520 x 950 x 1950 mm (59.8" x 37.4" x 76.8")
- 1900 x 950 x 1950 mm (74.8" x 37.4" x 76.8")
- 2150 x 950 x 1950 mm (84.7" x 37.4" x 76.8")
- 2720 x 950 x 1950 mm (107.0" x 37.4" x 76.8")

**Shipping Volume, Maximum****

- 2.24 m³ (79.1 cu.ft.)
- 2.82 m³ (99.6 cu.ft.)
- 3.52 m³ (124.3 cu.ft.)
- 3.98 m³ (140.6 cu.ft.)
- 5.04 m³ (178.0 cu.ft.)

**Power Rating**

<table>
<thead>
<tr>
<th>Voltage (VAC)</th>
<th>Frequency (Hz)</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>230</td>
<td>50</td>
</tr>
<tr>
<td>2</td>
<td>115</td>
<td>60</td>
</tr>
<tr>
<td>3</td>
<td>230</td>
<td>60</td>
</tr>
</tbody>
</table>

*Height includes exhaust collar, and depth includes the remove-able arm rest and front cover. When they are removed, depth is 790 mm (31.1").

**This Concurrent Balance Value (CBV) Exhaust Volume (per Pitot Duct Traverse) and Static Pressure at cabinet exhaust connection should be used when sizing the HVAC exhaust and supply.

***Noise reading in open field condition / anechoic chamber. Noise reading in normal room varies by room size, layout, and background noise, but may reach roughly 3-4 dBA above these values.

****Cabinet only, excludes optional stand.

Class II Type B2 can be used to handle volatile toxic chemicals and radionucleotides because by default it's hard ducted. Use this option if chemical vapor re-circulation into the work zone is not permitted.
The Esco Group of Companies is a global life sciences tools provider with sales in over 100 countries. The group is active in lab equipment, pharma equipment and medical devices. Manufacturing facilities are located in Asia and Europe. R&D is conducted worldwide spanning the US, Europe and Asia. Sales, service and marketing subsidiaries are located in 12 major markets including the US, UK, Singapore, Japan, China and India. Regional distribution centers are located in the US, UK, and Singapore.