

CelShaker™

Intuitive, Programmable,
High-Efficiency Cell Harvester



Unlock High-Yield Harvesting for Adherent Cell Platforms

Adherent cell cultures are at the heart of many of today's most promising biotechnologies—from cell and gene therapies to vaccine production, regenerative medicine, and cellular agriculture. As these industries scale toward commercial manufacturing, efficient and reliable cell harvesting becomes increasingly critical to process performance and product quality.

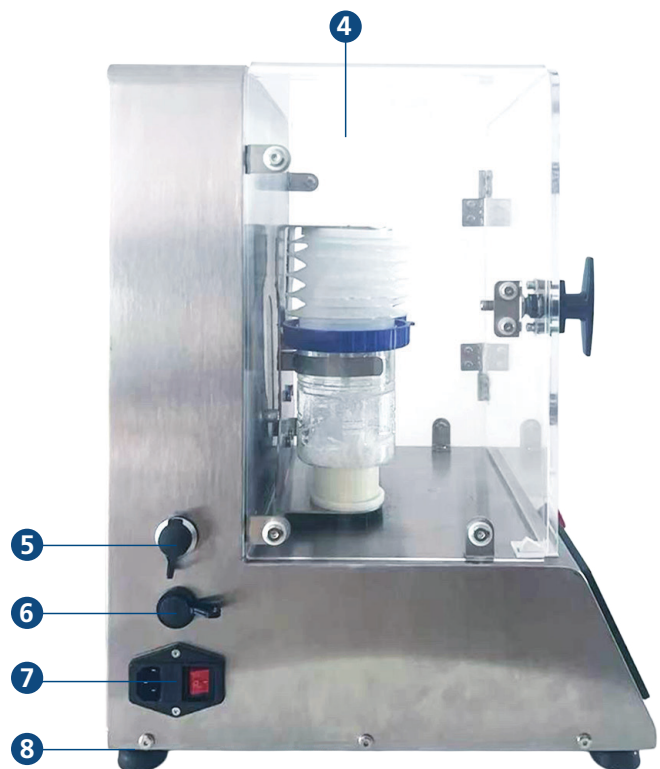
Esco CelShaker™ is designed to automate manual and standardize cell harvesting from Esco BelloCell® and CelCradle® bottles, enabling a programmable, high-efficiency detachment process that helps preserve cell integrity while maximizing recovery. By streamlining the harvesting workflow, CelShaker™ improves productivity and process consistency across a wide range of adherent cell applications.



*BelloCell® Single-Use Bioreactor
with BelloStage™ Cell Culture Device*

Esco CelShaker™





1. TOUCH-SCREEN HMI
2. SAFETY LIGHT CURTAIN SENSOR
3. EMERGENCY STOP BUTTON
4. ACRYLIC ENCLOSURE

5. RJ45 (To Download HMI Program)
6. USB (To Download Operator Parameters)
7. POWER INLET AND SWITCH
8. ANTI-VIBRATION LEVELING FEET

Key Features

Harvesting Control

- Workflow for harvesting cells from BelloCell® and CelCradle® bioreactor bottles
- Adjustable shaking speed (RPM) and programmable harvest duration
- Touchscreen interface with timer and process controls

Data Recording & Traceability

- Local date and time display for process tracking and record keeping
- Operation records can be exported via USB flash drive

Enhanced Operator Safety

- Protective enclosure safeguarding operators from moving parts
- Automatic process interruption when safety enclosure is opened
- Emergency stop (E-Stop) for immediate shutdown
- CE-compliant safety design

Global Facility Compatibility

- Universal power input: 100–230 V, 50/60 Hz
- Built with cUL- and CE-recognized components for global deployment

Regulatory Compliance & Data Management

- 21 CFR Part 11 Readiness: Supports compliant digital workflows when operational data is manually entered into a validated electronic batch record (eBR) system.
- Standard Documentation: Fully compatible with traditional, paper-based batch recording methods by default.
- Customizable Data Export: Optional historian and data download capabilities are available, depending on your chosen HMI/controller configuration.

Applications

Engineered for High Recovery and Cell Integrity

CelShaker™ is engineered to support a wide range of adherent cell applications, enabling seamless scale-up from research and process development to commercial manufacturing.

Cell & Gene Therapy

Enabling scalable manufacturing of mesenchymal stem cells (MSCs), stem cells, induced pluripotent stem cells (iPSCs), fibroblasts, and other therapeutic cell types while preserving viability and functionality.

Biologics, Vaccines & Viral Vectors

Maximizing recovery of adherent cells for the production of cell-associated and intracellular products, including viral vaccines, viral vectors, recombinant proteins, and other biologics.

Cell-Derived Biomolecules

Facilitating efficient recovery of cells for downstream extraction of high-value intracellular products, including mitochondria, structural proteins, cell lysates, and other cell-derived biomolecules.

Cellular Agriculture

Supporting large-scale production of cultivated meat, seafood, fat, collagen, and other cell-based food products through gentle, high-yield harvesting of adherent cell cultures.

Regenerative Medicine & Tissue Engineering

Providing reliable harvest of adherent cells used in tissue-engineered constructs, biomaterials, and regenerative medicine applications where cell quality is critical.



Technical Specifications

Item	Specifications
Weight	25 kg
Dimensions	494.5 x 300 x 381.5 mm (H x W x D)
Power Requirement	100–230 V, 50/60 Hz
Material	Shaker carcass: 304 Stainless steel Enclosure and door: Acrylic
Shaking speed	20 – 300 RPM
Capacity	Up to two (2) BelloCell®/CelCradle® bottles
Touchscreen	TPC4013Ei 4.3" TFT

Performance Comparison

	CelShaker™	CelCradle X® Automated Cell Harvesting System
		
Temperature Control	No	Yes
Shaking speed	20 - 300 RPM	50 - 300 RPM
Microcarrier harvesting	No	Yes
Touchscreen	TPC4013Ei	Siemens HMI/PLC
Inbuilt 21 CFR Part 11 compliant software	No	Yes
Walk-Away Recipe Automation	No	Yes
Grade C/D Closed-System Compatibility	No. Perform manual buffer additions, reagent pouring, and harvest transfers safely within a BSC.	Yes. Integrate seamlessly into closed loops using tube welders or single-use connectors, enabling a secure, sterile transfer to downstream washing and processing equipment.

BelloCell® System Complete

BelloCell® system is simple to operate and virtually no learning curve. BelloCell®-500A bottle is placed in the BelloCell® unit stage for batch and semi-batch operation where process components are easily traceable.



Filtered Cap

0.22 µm ventilation filter provided in the cap

BelloStage™

Stainless Steel 304 L Carcass that can hold up to 4 BelloCell® bottles.

Place inside a 170 L or 6 ft³ CO₂ incubator

Controller

Magnetized back for convenient positioning on the side or on the front of a CO₂ Incubator.

BioNOC II® or BioMESH® macroporous carriers

Cells remain entrapped in the carriers simplifying media replacement and product harvesting.

Polypropylene (PP)

PP demonstrates strong mechanical properties, offers outstanding resistance to a variety of chemicals, can endure moderate temperatures, and is biocompatible.

Polyethylene Terephthalate Glycol (PETG)

PETG displays robust tensile characteristics, is recognized for its glass-like transparency, and displays good resistance to a range of chemicals. Additionally, remains stable at moderate temperatures and is biocompatible.

Low-Density Polyethylene (LDPE) and Ethylene Vinyl Acetate (EVA)

The combination of LDPE and EVA demonstrates significant flexibility and excellent elasticity, provides good resistance to various acids bases, and is biocompatible.

Compressible Bellows

Compresses for nutrition and decompresses for aeration.

Note: We offer bottles containing either half-filled or quarter-filled macrocarrier options to suit your requirements. For more details, please refer to the ordering information on page 11.

BelloCell® Continuous System Complete

Same BelloCell® unit stage but utilizes BelloCell® -500AP bottle for recirculation/continuous processes.

Each BelloCell® system accomodates up to four single-use bottles, making this an ideal screening device to test varying medium formulations or cell lines.

No steam or water lines, autoclave or utilities required, just a power outlet and CO₂ incubator

Fits in a 240 L or 8.5 ft³ CO₂ incubator

Media Reservoir

Fresh culture medium bottle in either 1 L or 2 L volume.

Note: Media reservoir bottles are NOT sold with the package. Please buy locally.

Tubing Complete Set (Connection Set)

Connects the media reservoir bottle to the BelloCell® bottle.

BelloStage™ Machine

Stainless steel 304 L Carcass that can hold up to 4 BelloCell® bottles.

Place inside a 240 L or 8.5 ft³ CO₂ incubator

Disposable Tubing Set and Pump Head

Replacement tubings and pump head for tubing complete set (connection set).

Culture Medium Sampling Port

Needleless closed sampling for cell culture growth monitoring.

BelloFeeder™ Pump

Enables four-pump operation with individual programming setting.

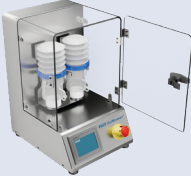
Pump Head

Calibration-free single-use pump head for up to three times to support consistent feeding rate.

Dimension	264 (W) × 359 (L) × 170 (H) mm (10.4 × 14 × 6.7 inches)
Weight	7.0 kg (15.4 lbs)
Power	100~230 VOLTS AC, 50/60 Hz (Input); 12 VOLTZ DC (Output)
Up-Down Rate	0.25 to 2.0 mm/sec. Step of 1.0 sec or 1.0 min.
Delay Time	0 to 99 min 59 sec Step of 1.0 sec or 1.0 min.
Driver Motor	DC stepping-motor
Environment	20~42 °C, 0~90% relative humidity (in a CO ₂ incubator)
Mechanical Protection	Hi-Low Optical Sensor
Transmission	Gear set (ratio 1:1.2) and belt
Materials	Aluminum alloy, chromic steel
Recommended CO ₂ incubator dimension	CCL-170 L model: 505 × 535 × 633 mm (19.9" × 21.1" × 24.9") and CCL-240 L model: 595 × 640 × 633 mm (23.4" × 25.2" × 24.9")

A Comprehensive, Cost-Effective Bioprocess Workflow

Eliminate the complexity of multi-vendor integration. Esco provides a totally unified solution designed to maximize yield and minimize capital expenditure. By bridging the gap between cultivation, detachment, and final fill-finish, we help you achieve a robust, efficient, and reproducible process from bench to bedside.

Equipment	Esco BelloStage™ <i>(requiring placement inside a CO2 incubator for operation)</i>	Esco CelShaker™	Esco ACC Automatic Cell Counting Analyzer	Esco Versati™ Centrifuge	Esco Pipette Loadcell
					
Consumables	BelloCell®	Non-vented Cap	Sheath liquid and Wash buffer	PuriCradle™	COC/COP Cryovials
					
Function	Standardized adherent cell culture optimized for consistent cell growth and high-density expansion.	Efficient detachment and harvesting of adherent cells while maintaining high viability and recovery rates	Precise cell counting and viability analysis to monitor cell culture and assess harvest quality and concentration.	Efficient cell washing and concentration to target densities for final formulation.	Filling of harvested cells into standard cryovials, with compatibility for both press-on caps and screw-top tubes.

Standard Operating Procedure: Cell Harvesting Using the Esco CelShaker™

Pre-Harvest Preparation (Inside BSC)

1. Uninstall the Vessel: Disconnect the tubing set from the BelloCell®/CelCradle® bottle. Immediately interconnect the vessel's inlet (female luer) and outlet (male luer) tubings to form a secure, closed loop.
2. Cap Exchange: Switch to a non-vented white cap to prevent leakage during shaking: For BelloCell®: Replace the vented blue cap with the non-vented white cap. For CelCradle®: Replace the tubing-integrated cap with the non-vented white cap.
3. Pre-Wash & Digestion: Remove the medium, add the appropriate rinsing reagent to the vessel, discard it, and then add the enzyme/dissociating reagent.
4. Seal and Invert: Tighten the non-vented cap securely and invert the bottle(s) to ensure the reagent covers the matrix.

Agitation & Dissociation (Outside BSC)

5. Mount to CelShaker™: Transfer the closed bottle(s) from the Biological Safety Cabinet (BSC) and securely mount them onto the CelShaker™ system.
6. Execute Shaking: Set the CelShaker™ speed between 100–300 rpm (or according to your specific process requirements). Preset the timer and start the agitation cycle.

Cell Harvest (Inside BSC)

7. Return to BSC: Once the shaking cycle is complete, transfer the bottle(s) back into the BSC.
8. Add Harvest Reagent: Manually add the harvesting/neutralization reagent to the vessel.
9. Swirl & Collect: Gently swirl the bottle to suspend the dissociated cells, then manually collect the cell-containing harvest reagent into a sterile collection tube.
10. Repeat Cycle: Repeat Steps 4 through 9 sequentially until the desired cell yield is achieved and the matrix is thoroughly cleared.

 Critical Control Point: Steps 1–4 and 7–10 must be performed strictly inside the Biological Safety Cabinet (BSC) to maintain sterility.

Esco Class II Biological Safety Cabinet



LA2-S G4

Labculture® G4 Class II Type A2 Biological Safety Cabinet

- Available in three sash opening models: 8", 10", and 12"
- Dimmable LED lighting system
- Centurion touchscreen controller
- Standby height that activates standby mode sustaining ISO Class 3 work zone as the fan runs at half speed
- USB port to relay operational parameters to Building Management System (BMS)
- Remote Modbus
- Default cable port
- Optional 21 CFR Compliance
- Stainless steel interior
- Single-piece work tray
- Equipped with DC ECM blower for up to 70% energy savings
- Low power consumption
- Available width sizes: 3 ft, 4 ft, 5 ft, and 6 ft



LA2-S-EU G4

Labculture® Plus (S-series) G4 Class II Biological Safety Cabinet

- 200 mm (8") sash opening
- Dimmable LED lighting system
- Centurion touchscreen controller
- Tilttable sash for easy glass cleaning
- Standby height that activates standby mode sustaining ISO Class 3 work zone as the fan runs at half speed
- USB port to relay operational parameters to Building Management System (BMS)
- Remote Modbus
- Default cable port
- Optional 21 CFR Compliance
- S-Series: Single-piece work tray, stainless steel sidewalls
- Motorized window
- Equipped with DC ECM blower for up to 70% energy savings
- Low power consumption
- Available width sizes: 3 ft, 4 ft, 5 ft, and 6 ft



LA2-E-EU G4

Labculture® Plus (E-Series) G4 Class II Biological Safety Cabinet

- 200 mm (8") sash opening
- Dimmable LED lighting system
- Centurion touchscreen controller
- Tilttable sash for easy glass cleaning
- Standby height that activates standby mode sustaining ISO Class 3 work zone as the fan runs at half speed
- USB port to relay operational parameters to Building Management System (BMS)
- Remote Modbus
- Default cable port
- Optional 21 CFR Compliance
- E-Series: Multi-piece work tray, glass sidewalls
- Motorized window
- Equipped with DC ECM blower for up to 70% energy savings
- Low power consumption
- Available width sizes: 3 ft, 4 ft, 5 ft, and 6 ft



LA2-G G4

Labculture® (G-series) G4 Class II Biological Safety Cabinet

- 200 mm sash opening
- Dimmable LED lighting system
- Centurion touchscreen controller
- Tilttable sash for easy glass cleaning
- Standby height that activates standby mode sustaining ISO Class 3 work zone as the fan runs at half speed
- USB port to relay operational parameters to Building Management System (BMS)
- Remote Modbus
- Default cable port
- 21 CFR part 11 as standard feature
- Full SS316L working area, with single piece work tray
- Single sheet internal walls with smooth edges for easy cleaning
- Motorized window
- Equipped with dual DC ECM blower for up to 70% energy savings
- Low power consumption
- Available width sizes: 1.2m (4 ft) and 1.8m (6 ft)
- Available for customization of Stainless Steel 304/316L exterior cabinet material

CelCulture® CO₂ Incubator

CelCulture® CO₂ Incubator with Copper Interior Chamber*

- 5°C above ambient to 60°C
- 90°C moist heat decontamination cycle
- Pure solid copper interior
- Available in 50L, 170L, and 240L models



CCL-170--CU

CelCulture® CO₂ Incubator with Integrated Cooling System*

- 8°C below ambient to 60°C
- 90°C moist heat decontamination cycle
- Highly efficient peltier cooling system
- Available in 170L and 240L models



CCL-170--P

CelCulture® CO₂ Incubator with Stainless Steel Exterior Cabinet*

- 5°C above ambient to 60°C
- 90°C moist heat decontamination cycle
- Corrosion-resistant surface
- Available in 50L, 170L, and 240L models



CCL-170--SS

CelCulture® CO₂ Incubator with High-Temperature CO₂ Sensor

- 5°C above ambient to 60°C
- 90°C moist heat decontamination cycle
- High-temperature CO₂ sensor
- Available in 50L, 170L, and 240L models



CCL-170--HITEMP

CelCulture® CO₂ Incubator with Stainless Steel Exterior Cabinet*

- 5°C above ambient to 60°C
- 180°C high heat sterilization cycle
- Heat-resistant sensors
- Available in 170L and 240L models



CCL-170--HHS

CelCulture® CO₂ Incubator with Stainless Steel Exterior Cabinet*

- 5°C above ambient to 60°C
- 90°C moist heat decontamination cycle
- Available in 50L, 170L, and 240L models



CLM-170B--

*Available with UV Lamp models

Order information

Item Code	Product Name	Description
AR3000070	CelShaker™	Programmable Closed Cell Harvesting Device (with TPC4013Ei Touchscreen)
2370003	Esco ACC Automatic Cell Counting Analyzer ACC-300	Fully Automated Counter Features Coulter Method, Bright-field Imaging, Automated Staining, and 21 CFR Part 11 readiness.
2370005	Sheath Liquid	Sheath Liquid 500 mL, Applicable to ACC-100, ACC-200, ACC-300
2370006	Wash Buffer	Wash Buffer 500 mL, Applicable to ACC-100, ACC-200, ACC-300
2370007	Trypan Blue	Trypan Blue 150 mL, Applicable to, ACC-300
2370008	QC Microspheres	QC Microspheres, 7 µm, 1 mL, Applicable to ACC-100, ACC-200, ACC-300
23700013	Liquid Bottle Tray	Liquid Bottle Tray, Applicable to ACC-100, ACC-200, ACC-300
23700014	21 CFR Software	21 CFR Software of Cell Counter, Applicable to ACC-100, ACC-200, ACC-300
2220014T	Esco Versati™ TCR-3000	Large-Capacity, High-Speed Refrigerated Centrifuge
5220007	PuriCradle™ Separation Cup	PuriCradle™ Separation Cup
5220008	PuriCradle™ Washing Cup	PuriCradle™ Washing Cup
1710008	Single Channel Electronic Pipette 0.1-5 ml	Electronic Pipette, Single Channel, 5 ml, 0.1-5 ml, increment 25 µl
1710009	Single Channel Electronic Pipette 1-10 ml	Electronic Pipette, Single Channel, 10 ml, 1-10 ml, increment 100 µl
2230006 (BCS04000)	BelloCell® System Complete	System Inclusive of: 1× BelloStage™ Machine 1× Control Box 1× Power Adapter (100–240V) 1× Signal Cable 2× Forceps 1× CVD (Crystal Violet Dye) kit (50 mL) 1× GlucCell™ Glucose Monitoring System
2230007 (BCS07000)	BelloCell® Continuous System Complete	System Inclusive of: 1× BelloStage™ Machine 1× Control Box 1× Power Adapter (100–240V) 1× Signal Cable 2× Forceps 1× CVD (Crystal Violet Dye) kit (50 mL) 1× GlucCell™ Glucose Monitoring System 1× BelloFeeder™ Pump 2× Tubing Complete Set (1 Bottle – 1 Set, autoclavable)
2230005 (BCS03000)	BelloStage™ Machine	1× BelloStage™ Machine 1× Control Box 1× 100–240 V Power Adapter 1× Signal Cable 2× Forceps 1× Crystal Violet Dye Nucleus Count Kit
1400067 (BCA01500)	BelloFeeder™ Pump	1× BelloFeeder™ Pump
1400003 (BCA00500)	BelloCell®-500A BioNOC II®	1× BelloCell®-500A prefilled with 0.1 L BioNOC II® (pack of 4)
1400297 (BCAH0500)	BelloCell®-500AH BioNOC II®	1× BelloCell®-500A prefilled with 0.05 L BioNOC II® (pack of 4)
1400298 (BCAQ0500)	BelloCell®-500AQ BioNOC II®	1× BelloCell®-500A prefilled with 0.025 L BioNOC II® (pack of 4)
1400295 (BMA00500)	BelloCell®-500A BioMESH®	1× BelloCell®-500A prefilled with 0.1 L BioMESH® (pack of 4)
1400004 (BCA01000)	BelloCell®-500AP BioNOC II®	1× BelloCell®-500AP prefilled with 0.1 L BioNOC II® (pack of 4)
1400301 (AR2000063)	BelloCell®-500APH BioNOC II®	1× BelloCell®-500APH prefilled with 0.05 L BioNOC II® (pack of 4)
1400302 (AR2000064)	BelloCell®-500APQ BioNOC II®	1× BelloCell®-500APQ prefilled with 0.025 L BioNOC II® (pack of 4)
1400303 (BCMAP100)	BelloCell®-500AP BioMESH®	1× BelloCell®-500AP prefilled with 0.1 L BioMESH® (pack of 4)

ESCO LIFESCIENCES GROUP NETWORK

42 Locations in 24 Countries All Over the World



- 📍 Global Offices
- 🏢 Distributors
- 🏭 Manufacturing Plants
- 🔬 R&D Centres
- 🏠 Regional Distribution Centres



Air Showers
BioBooth
BioPass Pass Through
Blood Cell Labeling
Isolators
Cell Processing Isolator
Compounding Isolator
Containment Barrier
Isolator
Cytotoxic Safety
Cabinet
Downflow Booth
Filling Line Isolator
General Processing
Platform Isolator

Glassware Hoods
Healthcare Platform
Isolator
Laminar Airflow Units
Operational Excellence
Aseptic Platform
Pass Boxes
Radioisotope
Dispensing Isolator
Restricted Access
Barrier System
Shielded Isolators
Turbulent Flow Aseptic
Isolator
Ventilated Balance

Enclosure
Weighing and
Dispensing
Containment Isolator
Wireless Glove Tester
MiniTide® and
MiniTide® C
CelCradle X®
TideXCell®
CelCradleX® -
Automated Cell
Harvesting System
TideXCell® - Harvesting
System

Since 1978, Esco has emerged as a leader in the development of controlled environment, laboratory and pharmaceutical equipment solutions. Products sold in more than 100 countries include biological safety cabinets, fume hoods, ductless fume hoods, laminar flow clean benches, animal containment workstations, cytotoxic cabinets, hospital pharmacy isolators, and PCR cabinets and instrumentation. With the most extensive product line in the industry, Esco has passed more tests, in more languages, for more certifications, throughout more countries than any biosafety cabinet manufacturer in the world. Esco remains dedicated to delivering innovative solutions for the clinical, life science, research and industrial laboratory community.

ESCO

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