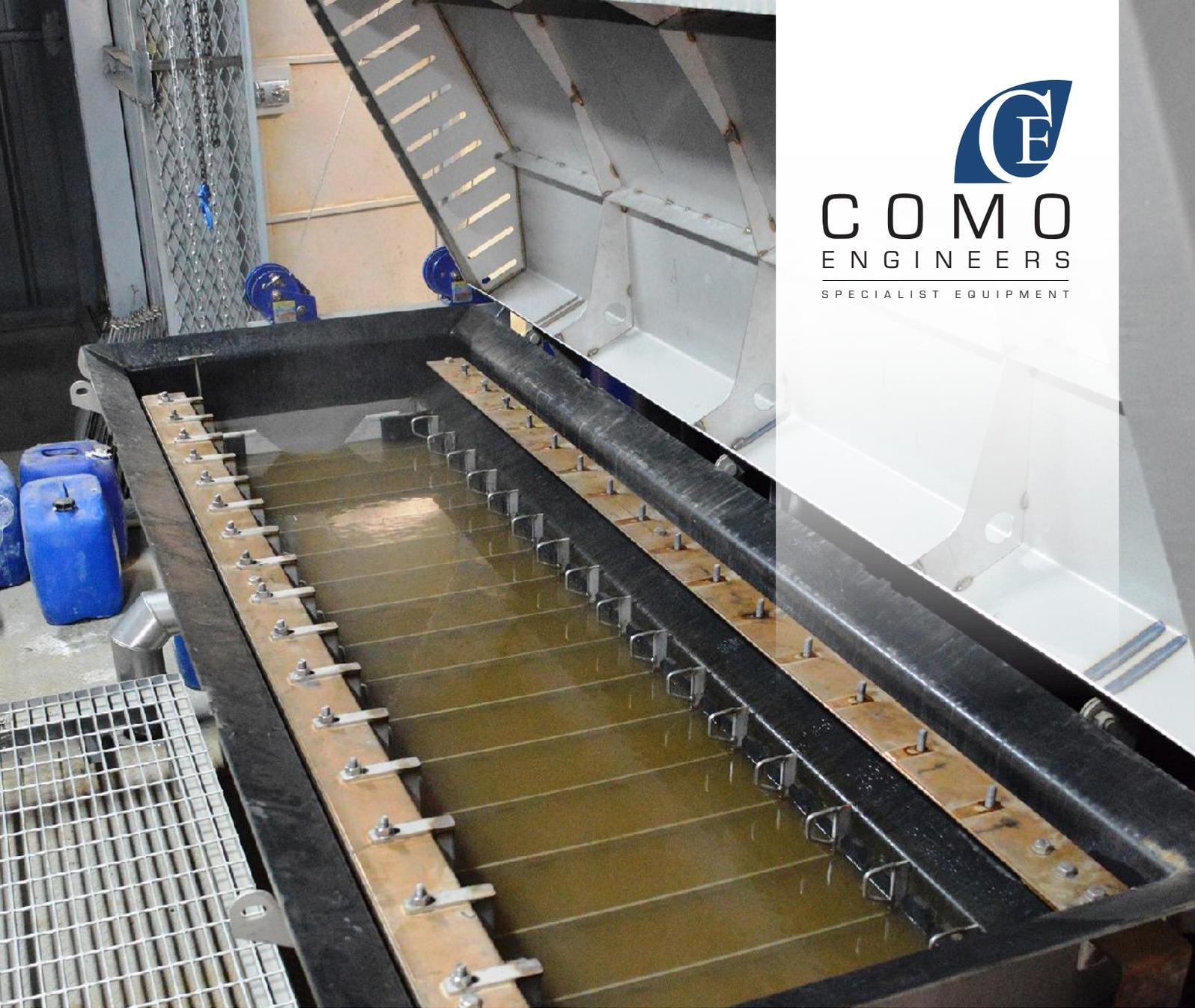




COMO
ENGINEERS
SPECIALIST EQUIPMENT



ELECTROWINNING CELLS

'CLIENT SATISFACTION IS OUR SUCCESS'



ELECTROWINNING CELLS

Como Engineers Pty Ltd are designers and manufacturers of high quality, robust SS304 stainless steel constructed electrowinning cells for the recovery of a range of precious metals from solution.

Como manufactures a wide range of cells suited to multiple applications, such as Pressure and Atmospheric Zadra, AARL, Como's proprietary Integral Pressure Strip (IPS) Elution, as well as Gravity Electrowinning such as the proven Gekko Systems ILR.

Designs range from the entry level E series through to the higher security non-drip ES series and a range of variant designs, which provide added flexibility in cathode and anode management.

Proven, standard designs are available for the following cathode sizes: 600 x 600mm; 800 x 800mm; 900mm x 900mm; 1000 x 1000mm; 1250 x 1250mm, with custom sizes also available on request.

Standard designs are based multiple of three cathodes, commencing at the smallest cell with 9 cathodes all the way up to 25 cathodes per cell. Cells are also available in Como's 'Split' Dual compartment design which facilitates reduction in the required floor space for the cell installation. Free standing or mezzanine mounted styles are available.

The advantages of Como's stainless steel cells over other cells include:

- Long life and robustness: unlike plastics such as polypropylene, stainless steel does not become brittle
- High security: Como's integral lids are available in high security 'lockable' versions on the E, ES and ESF series cells
- Ease of repair: repairable at mine site with rubber re-liners
- Lightweight: due to the strength of steel, the actual weight of stainless steel cells (due to wall thickness) is comparable with plastic cells and much lighter than concrete units
- Ease of use: Como can provide the right ancillary equipment to manage your precious metal recovery
- Fire resistant: a common occurrence at Australian gold mines has been for plastic cells to burn and melt due to hot connections or interrupted solution flow. Stainless steel does not burn
- Integral fume extraction port: Como's cells come complete with a lockable hinged stainless steel lid which serves both as a fume hood and to prevent unauthorised access to the cathodes. Alternatively fixed extraction ducting is available on the ES, ESL and ESF series cells
- A wide variety of lid lifting mechanisms are available to facilitate the lid opening including:
 - Winch Pulley Systems (all series)
 - Counterweights Systems (all series)
 - Como's Proprietary 'Near-Neutral Spring Assist' Compact Lid Lifting Mechanism
 - Electromechanical Systems

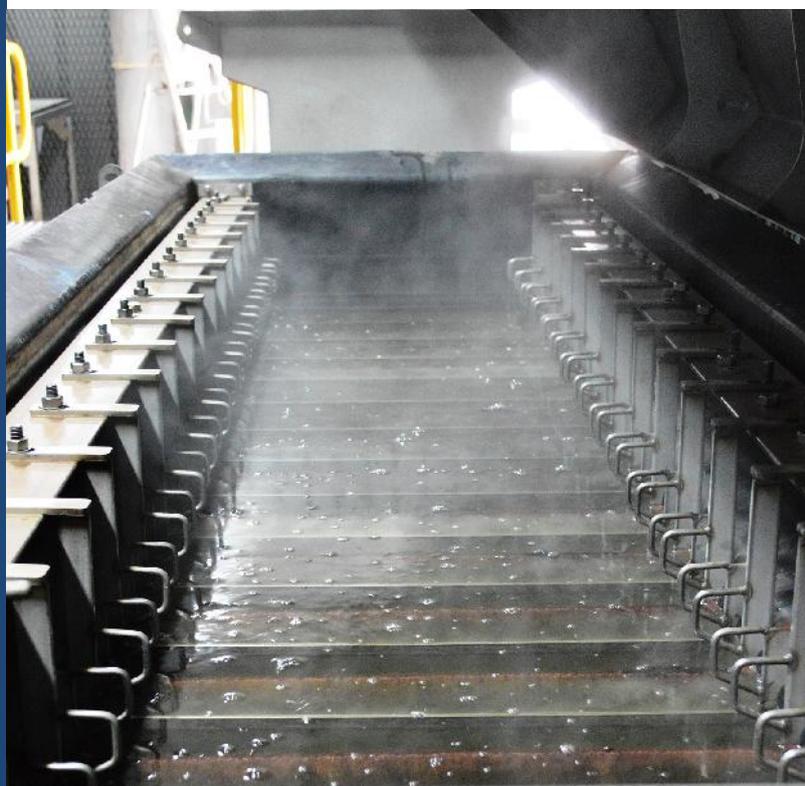
TO SLUDGE OR NOT TO SLUDGE...

Como Engineers offer two types of cathode systems; STAINLESS SS316 woven wire for precious metal sludging and wound MILD STEEL wool for plating and subsequent calcining of the wool. Mesh is simply wrapped around a serrated cathode frame, with no requirement for basket type systems as in poly cells.

Cathodes and anodes can be designed to connect either at the front or rear busbars for the E, ES and ESL series cells (these cells are only recommended for cell sizes 800mm and below) depending on the clients preferred electrode management in the goldroom. For the premier ESF series, both anode and cathode busbar connections are accessible at the front of the cell closest to the operator.

A range of lifting devices are available to assist with cathode or anode removal, including lifting devices that can remove either all of the electrode set at once (cathodes or anodes) or every second in the set to allow easy washing. Busbar connections remain highly conductive bolted connections to avoid the common problem of voltage drop (up to 2V) across the busbar-electrode connections which are common place with 'quick release' connections. Como is also currently developing a hydraulic bolt type connector to facilitate quick release with low impedance contact at the busbar connection.

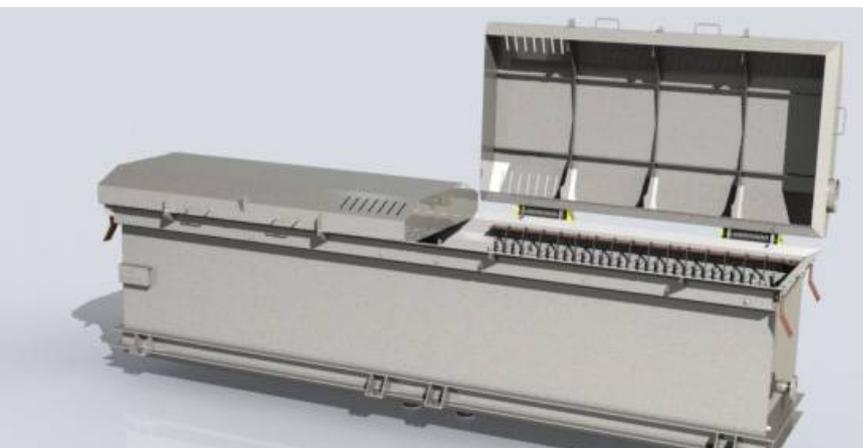
A range of cathode/anode storage bays, sludge settling tanks, sludge recovery filters and washing equipment is also available to assist with your precious metal recovery and post electrowinning processing.



For more detailed information and technical specifications please contact:
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E SERIES CELL

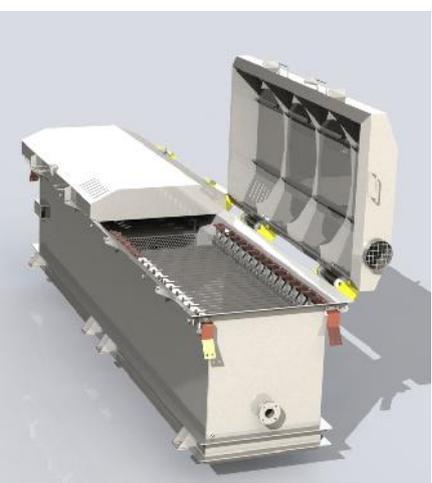
- These are Como's traditional, entry level cells, consisting of a SS304 constructed 'shell' with EPDM rubber lining with a overhanging secure pad-lockable lid
- Lowest cost, simple design with extraction port (250mm dia.) integral in the lid
- Bolted low impedance busbar connections
- Traditionally used for low cost MILD STEEL plating operations or gravity gold where there is minimal chance of condensation
- Rear bolted anode busbars and front mounted cathode busbars
- Anodes or cathodes are removed individually



ES SERIES CELL

High Temperature, Non Drip Design, High Security

- Designed for higher temperature applications, particularly Pressure Zadra where operating cell temperatures can be 95°C, the cell body incorporates side protruding busbars and a non-drip lid design which feeds any lid condensate back into the cell body
- Minimises dripping of condensate products and emissions such as ammonia
- Highly rigid, heavy (120-150 kg), high security lids
- Proprietary 'Near-Neutral Spring Assist' compact lid lifters available. Or lid can be opened with winching or electromechanical lifters
- Available with anode or cathode lifting devices (full sets can be removed of each using the optional tool)
- Anodes or cathodes are rear and front bolted to busbars respectively
- Fume extraction is either incorporated into lid (250mm diameter flexible duct connection), or a fixed rectangular exhaust duct can be designed into the cell body above the eluate line



NOTE: ES series shown in split cell configuration.

ESL SERIES CELL

High Temperature, Non Drip Design, Low Security, Lightweight Lid Design

- Based on the ES series
- Low security, ergonomic, lightweight bi-fold lid design
- Last opening stage is assisted with gas struts
- Lid is readily removable by operators if necessary
- Non-drip lid is suitable for condensate generating electrowinning operations
- Designed for fixed extraction ducting
- Busbars front and rear mounted



ESF SERIES CELL

High Temperature, Non Drip Design, High Security, Front Mounted Busbars

- Como's PREMIER electrowinning cell design
- Readily accessible design
- Anodes and cathodes are dual hanger designs and supported on both front and rear supporting benches, as opposed to being cantilever design
- An isolation switch can be integrated into the lid as an interlock to isolate the rectifier power when the lid is opened
- Busbar connections in the ESF series is copper/copper versus copper/stainless with the E, ES and ESL series. This design is optimised for ensuring intimate electrical contact and low resistivity at the busbar connections
- ESF series is also available with a dual purpose anode/cathode puller which enables every second anode/cathode or all of a set to be removed at once from the cell. This enables cathode washing either in-situ within the cell or allows removal of every second one to a dedicated wash bay, allowing for easier washing



OPTIONS FOR ES SERIES CELLS

- Split cell configuration:
Essentially two cells within one body. Each cell is fed from the side of the body with a common launder for return eluate to the tank. Each cell compartment has its own busbar lids/extraction. Saves up to 1.5m of space between adjacent cells
- 'Near-Neutral' Spring-Assist Lid Lifting Mechanism:
With all ES series lids other than the ESL, Como recommend the heavy duty lids to be opened either with a winch or counterweight system to balance the lid load. Alternatively we can offer a compact proprietary 'Near-Neutral Spring Assist' Compact Lid Lifting Mechanism which allows the lids to be conveniently opened by a single operator by hand to any position manually with 'Near-Neutral' lid balancing
- Choice of cell sludging design:
Sludge can be removed from the cell in a number of options, such as centre V bottom, left or right or rear sludge draining

OPTIONS FOR ALL CELLS

- Crating
- Cathode Winders
- Cathode or Anode Pullers or all in one
- Stainless Steel 316 Woven Wire Mesh or Grade '000' Mild Steel Wool
- Anode or Cathode Storage/Washing Bays
- SCR or Compact Switch Mode Rectifiers
- Sludge Settling Cones
- Sludge Recovery Filters
- Sludge Transfer Pumps
- Calcine Ovens
- Barring Furnaces
- Integral Pressure Strip (IPS) Pressurised Electrowinning Cell
- Workstation Crane





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