



COMO  
ENGINEERS  
SPECIALIST EQUIPMENT



## COMO ENGINEERS GOLD EQUIPMENT

*'CLIENT SATISFACTION IS OUR SUCCESS'*





# DESIGNED GOLD EQUIPMENT

Como Engineers is a recognised specialist supplier of processing equipment to the mining industry, with specific expertise on the design and manufacture of gold processing equipment.

We also provide all our specialist equipment as separate items for integration into your own greenfields or brownfields projects.

Como can make recommendations on the sizing and selection of your equipment, assist with the integration of the equipment into your plant and provide assistance in installing and commissioning the equipment with you on site.

We can supply all your spares covered for your operating life of your equipment.

- Electrowinning Cells
- Switch Mode Rectifiers
- Direct Eluate Heating Systems
- Carbon Transfer / Quench Vessels
- Elution and Acid Wash Columns
- Carbon Conditioning Tanks
- Fine Carbon Transfer Water Tanks
- Plate and Frame Filters
- Sludge Settling Cones
- Cathode Wash Bays
- Gold Barring Furnaces
- Calcine Ovens
- Modular Switch Rooms
- Spares Sales



For more detailed information and technical specifications please contact:  
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## Switch Mode or SCR Rectifiers

Como Engineers can supply high quality DC rectifiers for your electrowinning operation to couple with our range of electrowinning cells. Two types are available – the traditional SCR thyristor controlled diode rectification or the new generation of compact, high efficiency-high power factor - low ripple Switch Mode rectifiers.

All rectifiers are designed for ambient temperatures of up to 50°C operation and utilise IP54 cabinets for air cooling. A wide range of site voltages can be accommodated from 380 to 600 VAC 50/60Hz, with DC output voltages typically of 0 - 8V for gold electrowinning applications and 600 - 4000A DC currents. All rectifiers are supplied with remote current and voltage IO and fault signalling.

SCR rectifiers are thyristor controlled with proven OzTherm™ Power Controllers and custom wound transformers, with less than 10% ripple at full output current.

The Switch Mode rectifiers are German built high efficiency (> 85%) with outstanding power factor of 0.95 and minimal ripple of < 2%. With inbuilt over temperature protection, the rectifiers will adjust their output rather than faulting if the system temperature rises too high. Multiple rectifiers can be installed within a space saving cabinet.



## Carbon Transfer / Quench Vessels

Como Engineers are specialists designers of coded pressure vessels designed to Australian and many International Standards. Available primarily in AS1210, ASME VIII Div I, or EU Directive CE marked guise, Como produces a range of either dual dished end or conical bottom pressure vessels which can be used for receiving and then hydraulic transferring a range of granulated materials.

Como produces a range of pressure vessels specifically for the gold processing industry for receiving Loaded Carbon for intermediate storage from the CIL/CIP loaded carbon screen, or as Quench Tanks located on the discharge end of the carbon regeneration kilns. By delivering into a sealed vessel, exposure of hot carbon to oxygen can be minimised ensuring optimum product activity from your regeneration kiln, when compared to open top carbon quench vessels used on many mine sites.

Vessels are manufactured from thick AS1548-470 grade boiler plate with seamless schedule 80 nozzles and a range of flange connection options. Finished in a two pack epoxy coating externally and internally can be either native steel finish or a 1000µm Interzone™ rubber replacement finish.



# Carbon Conditioning Tanks

Fine carbon circulating your gold circuit is not only a tails management issue, it potentially costs your site thousands in lost gold recoveries. Careful management of carbon means minimising introduction of carbon fines into your CIL/CIP circuit from the start.

Rather than introducing fresh bulk bags of activated granular carbon into your tanks directly, Como has developed a slow agitation carbon conditioning tank with feed chute which allows gentle agitation of your carbon to thoroughly wet the carbon and release much of the fines before you transfer it across your barren carbon screen and deposit the carbon into your adsorption circuit.

Available as a 4.3 m<sup>3</sup> conical bottom tank as standard, this tank accepts two bulk bags of carbon at a time. The internals are baffled and rubber lined. Supplied with a carbon feed chute and stainless agitator.



## Transfer Water Tanks

Water can be one of the most valuable resources on an isolated mine site and elution systems are demanding when it comes to utilisation of water.

Como Engineers has developed a Transfer Water System incorporating a large capacity Transfer Water Tank designed around solids settling principles. Used when hydraulic carbon transfer methods are implemented, this system allows water recovered from across dewatering screens or sump waters to be returned to the Transfer Tank.

Supplied with a horizontal axial flow pump or optionally a twin VSD controlled vertical multistage pump, the system is designed to start supply of water when it detects a drop in the system backpressure after an isolating transfer valve is opened downstream. Heavy or flocculating solids are collected at the base of the tank after impacting a solids separating 'spider' which is internal to the tank.

## Sludge Settling Cones

Where electrowinning cells are wound with Stainless Steel mesh, higher current densities can be applied to the cathodes, resulting in loosely attached dendritic deposits of precious metals. These can be detached through pressure washing and the resulting sludge can be recovered from the cells. Recovery of this gold sludge and post recovery heat treatment is made far simpler with the application of a sludge settling cone when used in conjunction with a specially selected plate and frame filter, when compared with either decant or pressure pot filter methods.

Manufactured from SS304 steel, the sludge settling tank is designed to receive sludge waters directly from your cell or cathode washing bay and through a downcomer and solids trap design, it captures the majority of the solids at the conical base of the tank. With recirculation through an appropriately selected filter, the gold sludge can be separated with the permeate returning to the tank. This can be supplied with or without an access platform.



## Plate and Frame Filters

Como can supply a range of high quality plate and frame filters for your plant, including sludge collection filters for recovery of dendritic sludge from your 'sludging' electrowinning process, or as an optional addition for collection of fine carbon from a Transfer Water Tank.

In Fine Carbon Recovery Systems, highly loaded carbon fines that report from the CIL to the elution circuits can be collected and recovered for either high temperature burning or multi-layered packed bed stripping. In existing installations at Lapa and Laronde mine sites, the recoveries are of the order of 40 kgs fine carbon per week for every tonne of carbon stripped.

Filters are available in standard sizes of 470x470mm, 600x600mm or 800x800mm with your choice of chambers, cake thicknesses and manual or automatic plate withdrawal.



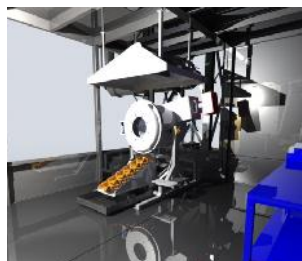
## Cathode Wash Bays

Como's range of Cathode Wash & Storage Bays will have you covered for your preferred goldroom method of handling cathodes and anodes. No matter whether you opt to clean in-situ within your cell, remove individual cathodes at a time, remove your full set to a cleaning bay or just intend to store your anodes, Como can provide your storage and cleaning solution.

Manufactured from SS304, our range of Cathode Wash & Storage Bays can accommodate as little as one cathode for individual cleaning or can accommodate the full set of anodes and cathodes.

Sludge pumps and high pressure spraying lances can be provided to complete your package.

We can additionally offer access platforms for installation of your cells and wash bays where floor mounted installations are selected.



## Gold Barring Furnaces

Being a MODULAR Elution and Goldroom specialists, no Como goldroom is complete without one of our centre tilt electric gearbox drive Gold Barring Furnaces. Designed to be easy on maintenance, the furnace is driven by a high-low packaged burner (or optionally a AFR type burner) and can be supplied in either Natural Gas, LPG or Diesel fired configuration.

Remotely tilted with a pendant control to enhance operator safety, the tilting can be slowed or sped up on the run due to incorporation of a variable speed drive with potentiometer control. This ensures stable pouring of your melt. Limits are set by proximity sensors and the use of an electric driven gearbox arrangement ensures you won't have issues with hydraulics overheating.

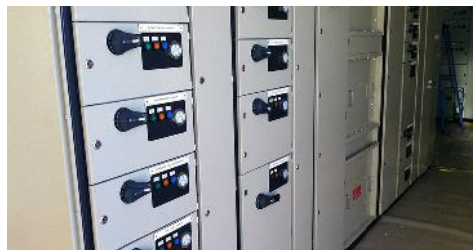
Ingot moulds are arranged in a overflow configuration with an integral self levelling cascade table built into the design over which refractory sand can be poured before casting. Moulds are available as 400oz, 500oz or 800oz with 4-6 moulds in the cascade series standard.

Available in A150, A200, A300 or A400 configuration with options of top pivoting designs for larger custom requirements.

## Calcine Ovens / Cupellation Furnaces

Como can provide a range of high quality electrically heated or AFR fired Calcine Ovens for calcining of mild steel wool or Cupellation Furnaces for treatment of lead and arsenic containing dores.

Manufactured from stainless steel 2mm plate, lined with insulating fire bricks and Superwool insulation, the equipment is finished in a hammer tone enamel finish. Standard capacities are 290L and 950L internally and these are supplied with SS304 trays and rack as standard.



## Modular Switch Rooms

With remote site access in some parts of the world being constrained by geography, access roads provide limitations to equipment sizes and shipping considerations start to have a real impact on achieving a successful project delivery. In response, Como Engineers has developed a MODULAR Switch Room design which can be flat packed into containers and reassembled quickly and easily on site.

Built to 2 hour fire ratings as standard with the option of other certification, the systems are pre-assembled for quality checking and can be installed with a range of equipment, including fire retarding systems & monitoring alarms, air-conditioning units, a range of lighting and we can even deliver the motor control centres (MCC's). Walls can be specified as urethane insulated or a combination of compressed fibreboard/rockwool. Cladding is standard powder coated steel or stainless can be supplied. Delivered in 40' or 20' open top containers.





## Elution and Acid Wash Columns

Elution and Acid Wash Columns can be supplied as separate pieces of equipment to either integrate into your own system design or as replacement items for an existing installation.

Designed and manufactured to AS1210, ASME VIII Div I (U & non-U coded) and EU Directives (CE marked), these pressure vessels are designed for 150°C and 6.5 bar maximum operating conditions. Manufactured from AS1548-PT-460NR or SA516-70 boiler plate as standard, they are finished with a two pack epoxy paint. Elution vessels are clad in 50mm Rockwool with stainless cladding while Acid Wash columns are internally lined with 6mm Bromo Butyl rubber for acid resistance. Alternatively, Como Engineers can supply vessels as SAF 2205 stainless steel.

Vessels are supplied with Manufacturers Data Report (MDR) and insertion stainless steel wedge wire carbon retaining filters.



## Elution Heating Systems

Como's Direct Heating System technology was first introduced back in the late 1980's while traditionally elution heating systems were based on indirect thermal oil designs. Recognising the inherent problems with this design for heating of eluate solutions above 120°C – such as thermal cracking of the oil due to caustic migration across the heat exchanger gaskets – Como developed the direct eluate heating system for all its MODULAR elution plants.

In the past decade Como has fine tuned the technology to utilise stainless steel coil heating designs with its boiler designs providing outstanding longevity and low maintenance for its boilers. And as the coil heater is not a pressure vessel, it provides increase safety for your operators.

Como can supply you either a stand alone eluate heater or a heating system complete with regenerative heat exchanger and instrumentation as a package.

## Rotary Kilns

Como Engineers is the proud Australasian distributor for the class leading Custom Furnaces range of rotary fuel fired and electric kilns. Available in ranges from 50 – 1400 kg/hr, the kilns can be customised to suit a range of thermal heat treatment processes of a range of products from uranium drying and roasting to carbon regeneration and reactivation.

Renowned for delivering high regeneration activities of carbon in gold processing industries, the Custom Furnace kilns are designed around sound processing principles and pay intimate attention to ensuring that thermal transfer is effected and sufficient residence times are achieved. Designed with a three zone heating system with independent process and over-temperature monitoring, unique lifter designs and co-current movement of pyrolysis products in mind.



## Dewatering and Sizing Screens

Como Engineers can provide you a range of sizing linear vibrating screens with a combination of either wedgewire or polydeck screens to suite either a sizing and classification application or simple dewatering applications.

Screens are supplied with Uras™ brand exciters and can be engineered with feed boxes, oversize and undersize chutes and structural support packages to suite your installation.

Our proprietary designed Static DSM style de-watering screens come in a range of sizes and builds and are ideal for low level dewatering applications such as the carbon regeneration feed. Styles vary from low cost lightweight stainless steel units to heavy duty larger units with adjustable apertures feeding the static sieve bend screen.

Screens are designed specifically to feed correctly into the feed distributor box, ensuring the carbon does not lose velocity when impacting the impingement plate and cause blockages in the transfer lines and are low on maintenance.



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