

GOLD PLUS

Gold Recovery Granular Activated Carbon

Description

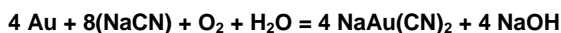
Calgon Carbon Corporation's Gold Plus product is a coconut-shell-based granular activated carbon designed and optimized for gold recovery operations. Gold Plus was developed to be a consistent, cost effective activated carbon that delivers the maximum performance required for gold recovery operations. The use of Gold Plus enables gold processors to maximize profitability because of the activated carbon's ability to deliver the highest possible yields at a lower carbon price than traditionally available.

For gold recovery circuits, it is essential that the activated carbon employed provides excellent process performance, minimal attrition loss and minimal maintenance problems. Through the years, Calgon Carbon Corporation has continually improved its manufacturing process to ensure that high quality products are provided. By screening and de-dusting during the manufacturing process to eliminate platelets (flatter granules which are relatively long and wide while not particularly thick), Gold Plus has been engineered to exhibit superior abrasion resistance and better flow characteristics. The enhanced kinetics of Gold Plus allow for the extraction of trace amounts of gold from every ton of ore, even when processing average or low-grade ores.

Gold Plus is manufactured specifically for gold adsorption. As a result, the quality of the carbon is extremely consistent and tailored to gold recovery applications. Beyond the product advantages, Calgon Carbon Corporation's expertise in activated carbon application technology is a valuable resource for designing and optimizing your entire gold recovery process.

Applications

Gold is not always able to be directly recovered. Often, the ore is crushed to release the gold which is then recovered using cyanidation. The process is characterized by the following chemical reaction:



Activated carbon such as Gold Plus will adsorb the gold cyanide complex from the gold bearing stream (pregnant liquor). Gold Plus is selective to gold versus silver, copper, nickel and similar metals, so it can be used to process ores that contain high quantities of base metals.

Activated carbon is generally applied to extract gold from ores or tailings, including carbonaceous ores which are not recoverable via conventional cyanidation techniques. Among the process applications where Gold Plus has demonstrated its adsorption effectiveness are:

- Carbon In Pulp (CIP)
- Carbon In Leach (CIL)
- Carbon In Column (CIC)
- Heap Leaching

Specifications

GOLD PLUS 6x12

CTC*	50 (min)
Ash by Weight	5 % (max)
Moisture by Weight (As packaged)	5 % (max)
Hardness Number	98 (min)
Platelets by Weight	3 % (max)

*CTC value may be based upon the ASTM D5742 correlation, CTC = 2.55 x Butane Activity.



Carbon In Pulp (CIP) – Activated carbon is added directly to the pulp (cyanated ore slurry). Crushed, ground and leached pulp is mixed with activated carbon which flows countercurrent to the pulp in a series of semi-batch adsorbers. Because of the product's superior hardness, Gold Plus exhibits low attrition during movement, agitation, and activation. The high adsorption rate and capacity of Gold Plus permit gold recoveries as high as 98%.

Carbon In Leach (CIL) – Activated carbon is added directly to the vessels in which the cyanidation process is taking place. Adsorption with Gold Plus can result in recoveries of 97-98% of the gold compared to a 50% recovery rate with conventional cyanidation techniques. Naturally present carbon competes with the activated carbon for the gold. Therefore, after oxygenation, the cyanidation process is carried out simultaneously as activated carbon is brought into contact with ore in the mixers. The superior initial adsorption rate of the Gold Plus minimizes interference with gold recovery associated with "preg robbers" in the ore and thereby results in improved leaching efficiency.

Carbon In Column (CIC) – Appropriate for cases where gold is already in solution (such as with runoff, soluble gold in a water source, overflow, return water from a tailings dam, etc.), activated carbon columns in series or parallel flow mode are used to collect gold using packed beds or a fluidized bed (if there is excessive Total Suspended Solids). Packed beds can achieve gold recovery efficiencies greater than 95%; efficiencies of 50-70% per stage are noted with fluidized beds.

Heap Leaching – Low grade surface deposits and waste rock are candidates for heap leaching. Recoveries of up to 85% can be achieved using Gold Plus.

Features

When Gold Plus is utilized, the features shown below provide individual and combined associated benefits for operating plants:

High Adsorption Rate – Reduces soluble gold losses, adjusts ore tonnage and grade. Gold Plus allows a shorter contact time and a faster processing rate for the same activated carbon bed volume.

Tight Undersize and Screen Distribution Specification – Very low carbon fines and, therefore, minimized gold losses due to undersized carbon particles escaping from the circuit.

High Hardness Specifications – Lower carbon losses resulting in lower gold losses.

Easily Regenerated – Low operating cost, low carbon makeup, capability to return product near virgin activity.

Coconut Shell Based Material – High resistance to fracture due to structural stability inherited from the shells.

Low Concentration Adsorption – Ability to achieve high gold loadings from pulps/solutions containing extremely low concentrations of gold.

De-Dusted – This extra manufacturing step results in lower carbon losses in circuit.

Easy to Strip - Because Gold Plus does not hold the gold complex too strongly, lower soluble tail losses and the maximum efficiency through each stage of the recovery process can be observed.

Uniform Gold Capacity – Consistent performance means that the circuit parameters don't need to be adjusted as often.

Bulk Bags or Super Sacks – Easy to handle and store, even outdoors.



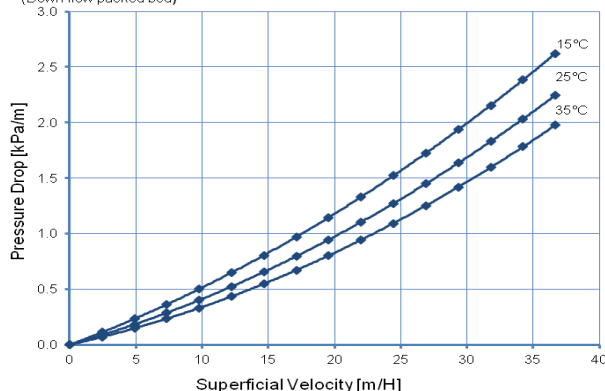
Design Considerations

Certain points should be considered when designing a gold recovery operation with granular activated carbon.

- Carbon's Adsorption Equilibrium
- Gold Concentration
- Hardness and Attrition Resistance
- Other Metals – Ag, Cu, & Ni
- Temperature
- pH (Adsorption / Displacement)
- Free Cyanide Concentration
- The Rate of Adsorption
- Regenerability of the Carbon
- Stripping Efficiency
- Particle Size
- Seasonal and Ore Variability

Typical Pressure Drop

Figure 1: CIC Pressure Drop Curves
Gold Plus 6 x 12
(Down flow packed bed)



Packaging

1,100 lb. (500 kg) super sack

Safety Message

Wet activated carbon preferentially removes oxygen from air. In closed or partially closed containers and vessels, oxygen depletion may reach hazardous levels. If workers are to enter a vessel containing carbon, appropriate sampling and work procedures for potentially low oxygen spaces should be followed, including all applicable federal and state requirements. Please refer to the MSDS for all up to date product safety information.

Making Water and Air Safer and Cleaner



Corporate Headquarters

Calgon Carbon Corporation
500 Calgon Carbon Drive
Pittsburgh, PA USA 15205
800.422.7266
412.787.6700
412.787.6713 Fax

www.calgoncarbon.com

European Operations

Chemviron Carbon Corporation
Zoning Industriel C de Feluy
B-7181 Feluy, Belgium
+ 32 (0) 64 51 18 11
+ 32 (0) 64 54 15 91 Fax

Asia Operations

Calgon Carbon Asia Pte Ltd.
9 Temasek Boulevard
#26-02 Suntec Tower Two
Singapore 038989
+65 6221 3500
+65 6221 3554 Fax

www.calgoncarbon.com

Your local representative