

Within all the metal, only gold poured in human economic life and it has such a significant influence to the human society. In the thousands of years of human civilization history, through the years, the up and downs, honor or disgrace, lift uncertain, the social status of gold have never changed and it still the wealth that pursued by all the people. We will give you the key to concentrate the gold from the mineral ore.

Gold ore means the mineral ore which is with sufficient Au elements and it is with industrial exploitation value. Here is the several common gold ore for your reference as below:

Name	Content	Au Grade	Ag Grade	Name	Content	Au Grade	Ag Grade
Native gold	Au	Au>80%	Ag<20%	Electrum	Au & Ag	Au80-50%	Ag20-50%
Küstelite	Au & Ag	Au50-20%	Ag50-80%	Au; Pt;Pb ore	Au; Pt; Pb	84.6-95.55%	
Intermetallic compound	(Au, Ag)3Hg	--	--	Intermetallic compound	CuAu	--	--
Calaverite	AuTe2	--	--	Black gold	Au2Bi	--	--
Se-type gold ore	Ag3AuSe2	--	--	Sulfide gold and silver	(Ag3Au)4S2	--	--

## The processing technology for the gold ore:

### Coarse gold ore:

- a. Gravity Separation+flotation
- b. Gravity Separation+ CIL processing technology

### Fine Gold ore or the gold ore with high flotability ( like Sulfide gold and silver, the gold is associated with quartz)

- a. Flotation processing
- b. Flotation+ CIL processing
- c. CIL processing

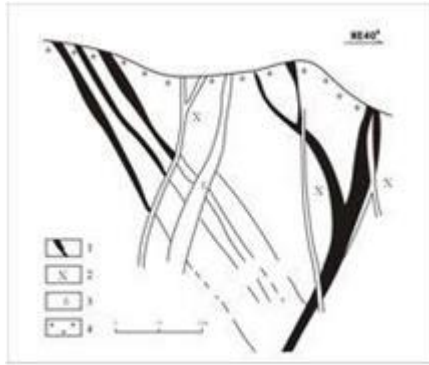
**Gold is in fine-grained or the microgranular is decentralized in quartz vein ore or the gold ore is with very high oxidation degree, not including Cu, As, Sb, Bi and carbon.**

- a. Cyanidation

b. Or Cyanidation leaching processing (CIL processing or dump leaching)

## How to setup the gold ore processing plant?

**Frist**, doing the geological prospecting to know the deposit, position and the trend of your mine and make sure it is with the the feasibility of developing or not.



Gold ore veins figure

**Second**, doing the dressing test is for choosing the suitable and economical mineral processing technology and recovering the Au element inside the raw ore after detailed experimental study. The research report will be as the basis of the project feasibility study.

a. Spectral analysis & elements chemical analysis to fix the chemical composition of Au ore. And the grade of the Au elements like in the below table is 3.14 g per ton.

Elements	Au (g/t)	Ag (g/t)	Cu	Pb	Zn	Ni	As
Cotent %	3.14	1	0.003	0.001	0.011	0.005	0.3
Elements	Mo	Mn	S	TFe	TC	SiO <sub>2</sub>	Al <sub>2</sub> O <sub>3</sub>
Cotent %	0.06	0.23	0.29	5.17	2.39	61.24	10
Elements	TiO <sub>2</sub>						
Cotent %	0.45						

b. Glod ore phase analysis to fix the type of your gold ore and the gangue name.

Item	Quartz	In Sulfide	In Carbonate	In Silicate	In Iron oxide	Total
Content (g/t)	2.4	0.07	0.1	0.03	0.2	2.8
Distribution Rate %	85.72	2.50	3.57	1.07	7.14	100.00

c. The texture and structure and mineral composition of the ore; To know the valuable mineral of your gold ore like the tetralite, manganocalcite, rhodochrosite, capillite and the gangue which is associated with the manganese ore like, clay, pyrite, quartz, calcite etc.

Item	Quartz	illite	Kaolin	Calcite	Limonite	Other
Content %	26	25	23	18	5	3

d. The major metal mineral's embedded features; The Major element mineral's dissociation. To fix the suitable particle size to separate the valuable mineral and gangue.

Particle Size	Yield Rate (%)		Au Grade (g/t)		Au Distribution Rate (%)	
	Individual	Sum	Individual	Sum	Individual	Sum
+0.074	29.02	29.02	1.82	1.82	17.91	17.91
-0.074+0.056	13.39	42.41	2.21	1.94	10.04	27.95
-0.056+0.038	9.15	51.56	1.77	1.91	5.49	33.44
-0.038+0.025	9.38	60.94	1.88	1.91	5.98	39.42
-0.025+0.010	33.03	93.97	4.62	2.86	51.75	91.17
-0.010	6.03	100	4.32	2.95	8.86	100
Total	10	/	2.95	/	100	/

e. Condition test; Base on the research, we will doing the condition test include grinding solution; grinding fineness CIL concentration solution; collector type and dosage; depressant type and dosage; activator type and dosage; modifier type and dosage; PH value; processing time; pulp density, etc for fixing the technological parameter of beneficiation flowsheet and the result is as below:

## Gold ore Carbon-In-Leaching (CIL) processing technology index

Crushing and Grinding Sections	Feeding size	<200 mm	Remark	Pickling	Total pickling time	6 h	
	Particle Size	75 $\mu$ (D80)			Desorption temperature	150 °C	
	Feeding Concentraion of Thickner	16-17%			Desorption Pressure	0.03-0.35MPa	
Thickner	Flocculant	0.30%	Prepared Concentration	Electrolyte System	Stripping liquid	1%	NaOH
		0.03%	Fortified Concentration			0.50%	NaCN

	Bottom flow concentration	55%			Desorption Time	9.5h	
CIL System	Pulp Density	40-45%	adsorption time	24h%	Electrowinning System	Voltage	2.5V
	Cyanide concentration	0.05-0.12%	pH	10.5		Current	50A/p
	Leaching Time	24h	Carbon intensity	10g/l		Cathode bristles	450g/p

f. Completely open closed-circuit test: Base on the above test, choose the beneficiation technology process and the process parameters. The test index should be with repeatability, stability and facticity.

g. Product check: Make multi-element analysis for the concentrate and tailing; Make sedimentation performance test for the concentrate and tailing.

h. Designing the beneficiation flow-sheet:Base on the above test, designing the most suitable beneficiation flow-sheet, technological parameter and reagent system.

i. Issuing Report Issuing report base on the above tests.

**Third**, choosing the suitable equipments base on the above test result.

**Forth**, build the foundation and doing the installation with our engineer. After receiving the deposit, we will send the technical drawing to you and send our engineer to supervise the foundation building and guide your staff to do the installation, then have a commissioning running. Meanwhile, they can train your staff at your site also.

## Here is one project of Gold ore Processing plant as below

a. In the crushing section, crush the raw gold ore into size 0-10mm. It is prepared for the beneficiation process.

b. In the grinding system use the ball mill to grinded the crushed gold ore from 0-10mm to 75 microns with passing rate like 80%. ( This particle size should be fixed by the dressing test.)

c. Then use the hydrocyclone to classify the gold ore with the suitable size and then send to the thickner to dewater. The over size gold ore will be returned to the ball mill to grind it again.

d. The gold slurry from the thickener will be sent to the agitation tank to mix together with the cyanide and slaked lime. Then the slurry will be sent to the CIL system for cocentrating process. The active carbon will collect the Au ion.

e. The carbon loaded with gold will be collect and send to the pickling tank to adjust the PH and remove the heavy metals elements and the carbonate in the pickling tank.

f. The carbon after the pickling elution will send to the electrolyte tank to desorb the carbon and gold elements. The liquid which is rich in Au will be sent to the lectrowinning tank. The carbon will send to the carbon storage tank.

g. The Au ion liquid will be collected by the cathodes and then use the smelting oven to get the coarse gold. ( If the coarse gold contain Hg, it should be processed by the evaporate mercury device to remove the hg.)

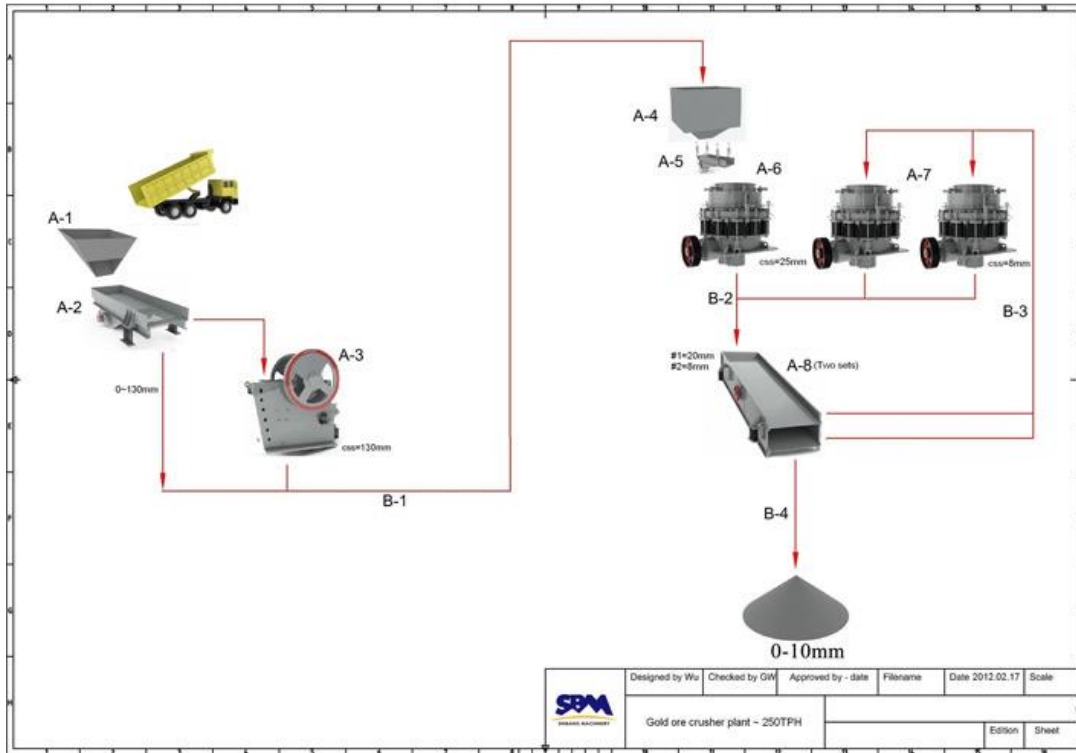
h. The carbon after the electrolyte process will be stocked into the carbon storage tank, then use the screen to do the dewatering. The dewatered carbon will send to the rotary kiln to do the carbon regeneration. The regenrated carbon will be classified by the screen, the suitable carbon will be sent to the CIL system for cyclic utilization, the fine carbon will be dropped.

i. All the waste liquid with cyanide should doing the cyanide destruction and the sewage treatment in the waste pound. The water can be cyclic utilization and the talings will be send to the tailings lake. ( You can also choose to use the technology of pressure filtration and dry heaping of tails.)

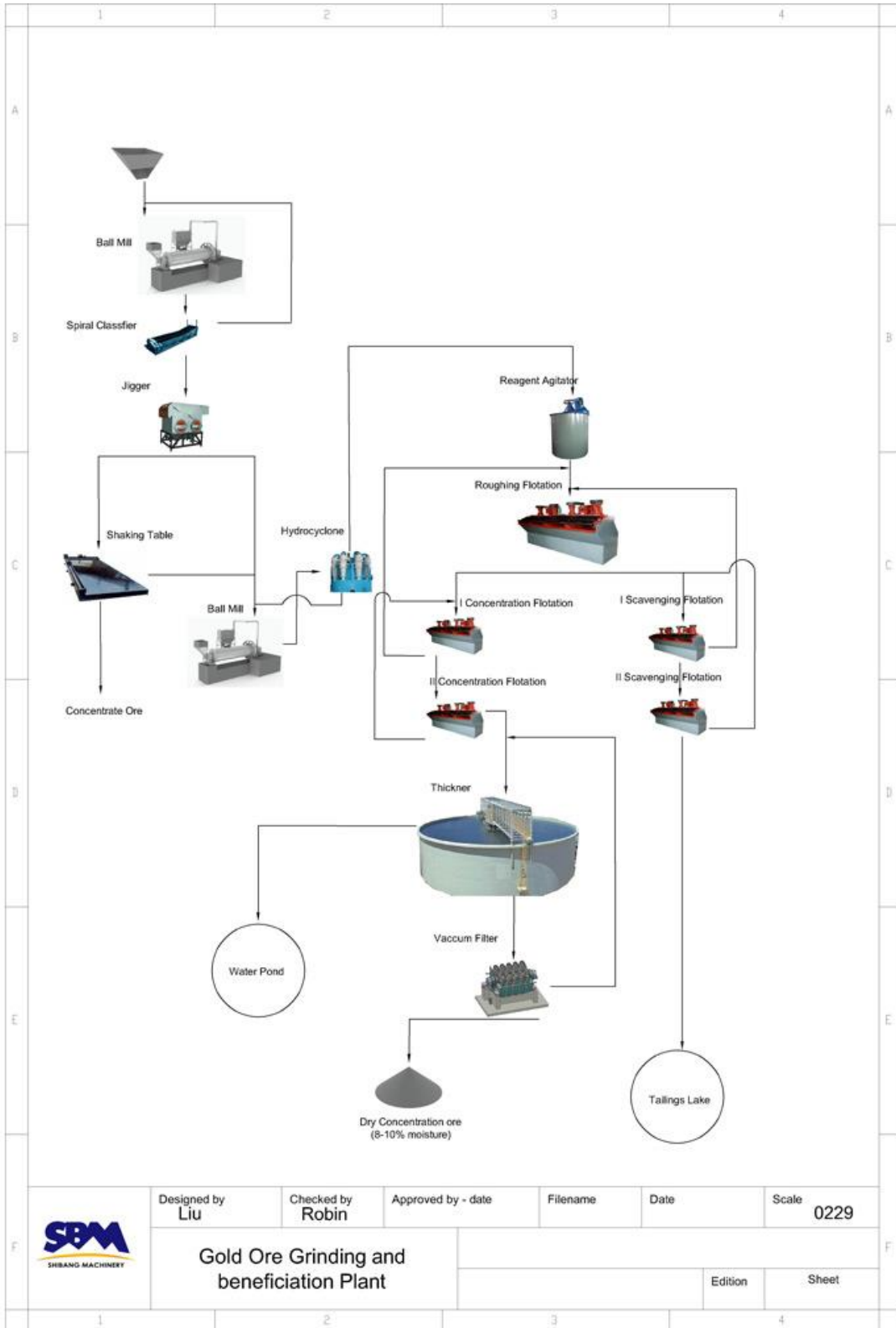
This design is just for your reference. The precise design for your plant should be done base on the dressing test of your raw mineral ore. Because this customer just want to improve the grade and selling the mineral ore directly.

## **Appendix:**

Appendix I. The flow chart of the crushing section for gold ore.



AppendixII. The flow chart of the grinding section and the CIL processing section



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**Gold Ore Grinding and  
beneficiation Plant**

Edition

Sheet