



CIRGOLD 965

Immersion Gold

INTRODUCTION

Cirgold 965 Immersion Gold has been formulated to non-electrolytically deposit a dense, even coating of pure gold on electroless nickel substrates. The process has been specially developed as the final stage of PMD Chemicals Limited's Cirgold SMD electroless nickel and gold solderable finish for printed circuit boards.

When used in conjunction with Procirc 964 Electroless Nickel a flat, even, solderable finish is produced which is ideal for surface mount devices.

A deposit thickness of up to 0.15 microns can be obtained depending upon operating conditions.

BENEFITS

- Ease of use.
- Replenishable system - economical.
- Low concentration of gold - reduced drag out losses.
- Flat finish for surface mount devices.
- Excellent solderable finish.

SOLUTION MAKE -UP

Cirgold 965 Immersion Gold is supplied either ready for use at a gold concentration of 2.0 g/l or as a base solution to which gold is added at 2g/l (2.94g/l potassium gold cyanide).

OPERATING DATA

Temperature	85 – 95°C (optimum 90°C)
pH	5.0 – 6.0
Time	5 – 15 minutes
Gold Concentration	1.5 – 2.5 g/l

EQUIPMENT

Tanks	Polypropylene, polyethylene
Heaters	PTFE or silica immersion heaters with thermostatic control.
Extraction	Mechanical fume extraction recommended

If in any doubt as to the compatibility of equipment consult PMD Technical Department.



INSTALLATION

It is essential that the tanks to be used for Cirgold 965 Immersion Gold are thoroughly cleaned and leached before any product is added.

The final leach should be performed using a 5% w/v aqueous citric acid solution at 60-70°C for a minimum of 12 hours.

If in any doubt as to the appropriate cleaning procedure contact PMD Technical Department.

PROCESS SEQUENCE

1. Procirc 9027 Acid Cleaner.
2. Rinse.
3. Rinse.
4. Procirc 921 Microetch.
5. Rinse.
6. Rinse.
7. 10% v/v sulphuric acid.
8. Rinse.
9. Rinse.
10. Procirc 963 Activator.
11. Rinse.
12. Rinse.
13. Procirc 964 Electroless Nickel.
14. Rinse.
15. Rinse.
16. Cirgold 965 Immersion Gold
17. Drag out.
18. Rinse.
19. Dry.

MAINTENANCE AND CONTROL

The gold concentration should be replenished when it reaches 1.5 g/l. Under optimum conditions for every 10 sq.dm. (approximately 1ft²) of plated area processed 0.19 g of gold will be consumed.

e.g.

Cirgold 965 Immersion Gold contains 2.0 g/l of gold.

Therefore, for 100 l tank:-

Initial gold content = 200 g

Gold content when replenishment due = 150 g

From above consumption figures replenishment is due after approximately 2,600 sq.dm. (approximately 260 ft²) of plated area has been processed.



However, the above figures do not take into account drag out losses which will vary according to the type of work being processed. It is therefore recommended that regular analysis of the solution for gold concentration is carried out.

For every 1 g of gold added (1.47 g as potassium gold cyanide), 10 ml Cirgold 965 Base Replenisher should be added. This addition will compensate for drag out losses and keep the bath composition in balance.

If the specific gravity of the solution falls below 1.040, additions of Cirgold 965 Base Replenisher should be made. A 40 ml/l addition will increase the S.G. by 0.01.

After 10 g/l gold has been deposited (1000 g gold from a 100 l bath) the solution should not be replenished further. The gold concentration should be run down to 1.5 g/l and then the residual gold reclaimed.

All gold containing materials can be returned to PMD for reclamation.

ANALYSIS METHOD

Gold

Atomic Absorption Spectrophotometry. Consult PMD Technical Department for details.

Gravimetric Analysis

Reagents

- a) Conc. Sulphuric acid
- b) Hydrogen peroxide (100 vol)

Method

1. Pipette duplicate 25.0 ml samples of the solution into 500 ml glass beakers and add 25 ml of conc. sulphuric acid.
2. In a fume cupboard, boil the solution to decompose the gold cyanide, continue to boil until white fumes of sulphur trioxide are formed.
3. Allow the solution to cool.
4. Slowly add 20 ml of 100 volume hydrogen peroxide to destroy the charred organics present in the solution. (The dark brown solution should turn clear when no nickel present, or green when nickel has accumulated in the 965 solution).
5. Return the beakers to the hotplate and re-fume.
6. If solution is not clear, repeat steps 4 and 5.
7. Allow the solution to cool and dilute to approximately 100 ml with deionised water.
8. Heat to boiling to ensure all salts are re-dissolved.
9. Filter through a 9cm Whatman No. 40 filter paper, and wash free of acid with hot deionised water.
10. Ignite the filter paper and gold sponge at 600-800°C in a previously ignited and weighted crucible.
11. Cool and re-weigh. The difference between the two weights is equal to the weight of gold (A).

Calculation - $A \times 40 = \text{g/l gold in solution}$



NOTES ON THE USE OF CIRGOLD 965 IMMERSION GOLD

Deposition Rate

The main factor effecting deposition rate is temperature, i.e. higher temperature will give increased deposition.

pH variation within the specified range does not affect deposition rate.

Gold concentration within the specified range does not affect deposition rate.

Time increases deposition rate as follows:-

5 min @ 90 deg C - 0.05 microns

10 min @ 90 deg C - 0.10 microns

15 min @ 90 deg C - 0.12 microns

Should the pH rise above the specified maximum of 6.0 it can be adjusted. Contact PMD Technical Department for procedure.

DISPOSAL

Dispose of in accordance with local authority requirements.

PRODUCT FAMILIES

The following products are referred to in this data sheet.

PRODUCT NAME	PRODUCT NUMBER
Cirgold 965 Immersion Gold RTU	965004
Cirgold 965 Immersion Gold Base Solution	965001
Potassium Gold Cyanide 100 g Gold	029003
Potassium Gold Cyanide 50 g Gold	029004
Cirgold 965 Base Replenisher	965003
Procirc 9027 Acid Cleaner	905003
Procirc 921 Microetch	923001
Procirc 963 Activator	967001
Procirc 964 Electroless Nickel MU	967002

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