

Silvertech LED

Highly reflective silver surfaces



Electronics

Functional electronic coatings

atotech.com

Low-to-zero free cyanide silver processes for highest brightness

GAM
> 2.0

Atotech's silver processes achieve GAM values higher than 2.0

LED technology

Due to the global environmental protection and energy-saving concepts, LED (light emitting diodes) as replacement of the traditional lighting has become an irreversible trend. To achieve best efficiency highest reflectivity is a must for the final silver coating.

Highest reflectivity for best LED efficiency

For new generations of high performance LED, functional silver coatings with highest reflectivity are required. The reflectivity is often determined by a densimeter and quantified in so-called GAM values. Targeted GAM values for the above mentioned LEDs are 2.0 or higher.

Fulfilling highest requirements

In order to fulfill these requirements, new high performance silver processes have been developed. These electrolytes can be operated up to a current density of 150 A/dm², while achieving GAM values higher than 2.0.

Low-to-zero free cyanide silver processes provide mirror-built deposits for medium speed (Silvertech MS LED, 5 - 20 A/dm²) and high speed (Silvertech HS LED, 40 - 160 A/dm²) applications.

Features and benefits

- Low-to-zero free cyanide
- GAM 2.0 with wide process window
- Hardness between 70 - 120 HV
- Selective high speed (HS LED) and full area medium speed plating (MS LED)
- Maximum lifetime formulation

Highly reflective silver coatings

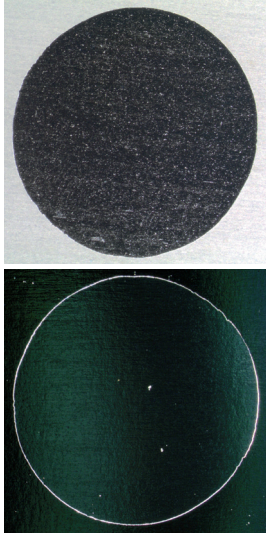


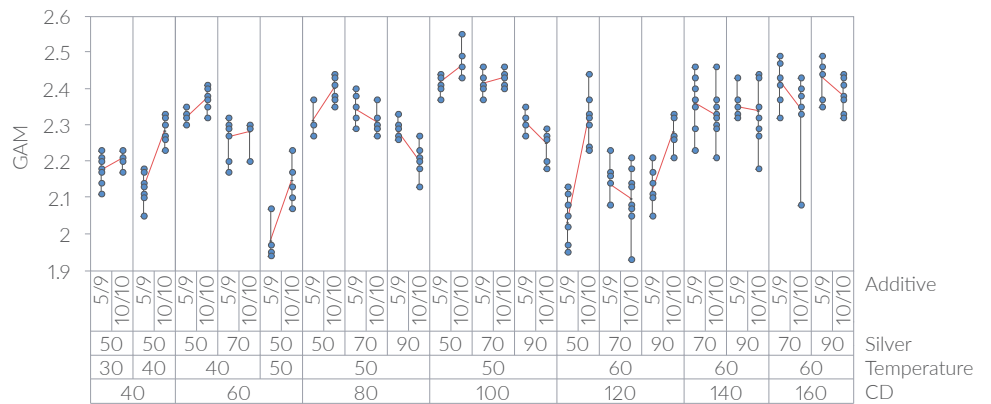
Figure 1:
Bright silver GAM 2.03
over matt Ni GAM 0.40

Figure 2:
Bright silver GAM 2.05
over bright Ni GAM 2.34

GAM test results

Extended GAM investigations have been carried out under variation of current density, temperature, silver and brightener concentrations. Average GAM values of 2.0 were observed for all selected parameters. Reflectivity results are independent of Ni interlayer brightness.

GAM test results under parameter variation



Retained reflectivity after heat treatment

Silver surfaces are sensitive to heat treatment and prone to show discoloration / tarnishing causing significant losses in reflectivity and GAM reading. New post-treatments have been developed to prevent reflectivity loss after heat treatment.

