Mirror Ink M2

Mirror Ink M2 – Silver
Mirror Ink M2 Color Shades and Colorants

Mirror Ink M2 is a solvent-based metallic screen printing ink for creating mirror-like or SLC (surface like chrome) effects on various clear transparent plastic films or glass, when printed on the reverse side of the materials (back printing).

Mirror Ink M2 is obtainable in colored versions as well. In addition, for customized mixtures, Colorants (liquid pigment dispersions) are available. Please see page 6.

Features / Benefits

- press ready
- good adhesion to PC, PET films and glass
- good printing properties and easy processing
- **scratch resistance directly after jet drying**
- improved humidity stability compared to Mirror Ink M1
- high gloss

Auxiliaries

Mirror Ink M2 is press ready.
If thinning is necessary, **Thinner 6401** can be added.

**For printing on glass:**
Glass Hardener GC (0.5 – 1 %)

**To increase print viscosity:**
Mirror Ink Additive L 56605 (0.5 – 2 %)

Mirror Ink Additive L 56605 can improve adhesion to certain substrates (e.g. Autotype EBG 180L).

_mesh_

Depending on the graphics to be printed, the printing sequence, and the percentage of thinning, a mesh count ranging from 77 to 150 threads/cm (195 to 380 threads/inch) is recommended.
**Printing Usage**

**Stir well before each use!**

**Caution!!**

Even minimal residues of silicone oils (components of defoamers and screen inks) will cause fish-eyes and pinholes. Take care to use absolutely clean equipment for preparation of the printing mixtures along with well degreased fabrics for the printing process.

**Squeegee**

65° - 75° Shore A

**Drying**

The gloss level of Mirror Ink M2 depends on drying conditions as well as on the substrate and its surface quality.

To achieve a high quality mirror reflection, it is necessary to remove virtually all solvents and use an optimized drying process. Scratch resistance is achieved directly after jet-drying at 80 °C (176 °F).

Jet drying of PC and PET films (EBG 180L):

1st section 50 °C (122 °F), 2nd section 80 °C (176 °F), 3rd section fresh air.

To improve the stabilization of the printed ink film, further drying at 80 °C (176 °F) for 30 min. is strongly recommended.

Jet drying of PMMA film 99524 Röhm Evonik (printing side = side with blue protective film) and transparent rigid PVC:

1st section 50 °C (122 °F), 2nd section 50 °C (122 °F), 3rd section fresh air.

Subsequent drying in a well ventilated oven at 50 °C (122 °F) for 60 min. is necessary to further stabilize the printed ink layers. Prints on PMMA or rigid PVC do not pass the tape test.

Jet drying of glass:

1st section 50 °C (122 °F), 2nd section 80 °C (176 °F), 3rd section fresh air.

Subsequent baking for 20 to 30 min. at 120 to 160 °C (248 to 320 °F) is necessary.

**Cleaning**

Thinner 6401

**Overprinting of Mirror Ink M2**

For protection against mechanical or chemical damage (scratches or corrosion) it is recommended to overprint the Mirror Ink M2 layer. Residues of finger prints will considerably reduce the resistance of the mirror layer to climatic influences considerably.
Further reasons for overprinting:
- Improved formability of the mirror layer (see section “Forming”).
- Increased adhesion to the backmolded resin.

Depending on the substrate, the following overprinting inks (adhesion promoters, screen printing inks) can be used:
- **PC and PMMA films (solvent sensitive substrates):**
  - **no further processing steps of the printed films:**
    - on PMMA: Norifin® PP N
    - on PC: NORIPHAN® XWR
  - **further IMD processing, forming and backmolding:**
    - on PMMA or PC: AquaPress® ME or AquaPress® M1 White

Provided that the mirror ink layer, printed on PC, is optimally dried, the IMD ink systems NORIPHAN® N2K or NORIPHAN® XWR are suitable for backprinting as well. In this case, immediate drying is mandatory.

**Note:**
NORIPHAN® N2K and NORIPHAN® XWR are not suitable for PMMA!
If ventilation is not adequate, NORIPHAN® N2K or NORIPHAN® XWR will dry too slowly and the mirror may become dull.

- **PET films (substrates not sensitive to solvents):**
  - NoriPET®, NORIPHAN® N2K, NORIPHAN® XWR
- **Glass:**
  - Noritemp GC

For further information on the ink systems mentioned, please see the respective Technical Information Sheets, which can be downloaded from www.proell.de.

**Note:**
The mirror effect will be impaired if unsuitable solvent-based inks and thinners are used or drying conditions are unfavorable. Pre-tests are necessary!

The user is responsible for climate tests which are required when using Mirror Ink M2 for middle or long-term exterior applications.

**Pröll climatic test:**
12 h / 60 °C (140 °F) / 95 % rel. humidity: only minor damage to mirror finish.

**Printing conditions (without Stabilizer Mirror Ink):**
- **Mesh:** 100-40 Y
- **Film:** Makrofol® DE 1-1, 250 μm
- **Drying:** 30 min at 80 °C (176 °F)
Hints for Processing
AquaPress® for Overprinting Mirror Ink M2

AquaPress® ME or AquaPress® M1 White:
See corresponding Technical Information.

Addition of 2% AquaPress® Hardener L49858 is necessary!

Drying of AquaPress® layers:
3 h at 90 °C (194 °F) to prevent AquaPress® from sticking to forming tool.

Recommended forming tool temperatures:
AquaPress® ME: 100 °C (212 °F) maximum
AquaPress® M1: 110 °C (230 °F) maximum

Recommendation:
Mesh 77 threads per cm (195 threads per inch) –
two print runs

Mirror Ink M2 layers thin out during forming process in 3D areas.
Overprinting of such areas with AquaPress® M1 White before forming is necessary.

Forming and Injection Molding

Mirror-like effects created by Mirror Ink M2 can be formed only to a certain extent.

Under optimal conditions, mirror ink overprinted with AquaPress® can be backmolded with resin.

Use resins with lower viscosity and melting temperatures below 260 °C (500 °F) and ensure good heat dissipation on the film side.

In every case, however, peel results of combinations with Mirror Ink M2 are very low. This is a property of the metal layer.

Note:
To avoid removal of mirror layer, the AquaPress® overprint should overlap mirror ink edges by 2 mm minimum. Additionally, this measure protects from corrosion and cloudiness.

The suitability of Mirror Ink M2 for a given project must be checked individually by extensive pre-tests.

Shelf Life

If Mirror Ink M2 has cooled or warmed during transportation or storage, please allow the product to adjust to room temperature to avoid unwanted humidity and/or condensation, which could contaminate the ink. This advice also applies to the auxiliaries added to Mirror Ink M2.

The shelf life stated on the label assures the ink’s quality and refers to unopened original cans stored in a dry place at temperatures between 5 °C (40 °F) and 25 °C (75 °F).

Optimal shelf life of open cans can only be achieved if the can is tightly closed immediately after each use.

Substrates

Printing results, to a large extent, depend on the substrate as well as the printing and application conditions. We recommend checking your printing materials under your conditions of use before performing any production runs. Materials that are supposed to be identical may vary from manufacturer to manufacturer and even from batch to batch. Some substrates may have been treated with or contain sliding agents, antistatics or other additives which may impair the adhesion of the inks.

In general please refer to our technical leaflet “General Information on Screen Printing Inks” which may be downloaded from our website www.proell.de, click Download ⇒ Screen Printing Inks ⇒ General information on screen printing inks.
Mirror Ink M2 Color Shades

For creating mirror color effects, the following shades in the Mirror Ink M2 range are available:

Mirror Ink M2 Gold 195
Mirror Ink M2 Pink 395
Mirror Ink M2 Violet 495
Mirror Ink M2 Blue 595
Mirror Ink M2 Green 695
Mirror Ink M2 Copper 895
Mirror Ink M2 Black 995

Colorants (liquid pigment dispersions) for stirring in Mirror Ink M2 to create mirror color shades

Additionally, to the color shades mentioned above, further effects can be produced by mixing Mirror Ink M2 with Colorants.

Range of Colorants:

C101 Gold   C501 Blue
C301 Red    C601 Green
C401 Pink   C801 Copper
C402 Violet C901 Black

Drying:
Mirror Ink M2 colors have to be dried at 50 °C on any substrate.
Drying at higher temperatures decreases the intensity of the effect and the degree of gloss can vary from print to print.
To achieve good scratch resistance, post curing at 80 °C for 30 min is recommended.

Note: Colorant C801 Copper
Color shades of Mirror Ink M2 containing Colorant C801 Copper, are prone to jell. Those inks should be mixed just before printing.
Jelling can be decelerated by replacing a small amount of Mirror Ink M2 by Thinner 6401.

Example:
Mirror ink color shade
80 % Mirror Ink M2 + 20 % Colorant C801 Copper
can be matched as follows as well:
64 % Mirror Ink M2 + 16 % Colorant C801 Copper + 20 % Thinner 6401

When adding higher quantities of Thinner 6401, pre-test are necessary.
For intensive color effects, proportions of Colorants in the formulation can be increased up to 60 %.
This is a test product which is still in development. For this reason, no assurances are currently given as to type conformity, processability or long-term performance characteristics. Therefore, the customer uses the product entirely at their own risk with no guarantee.

Before starting a production run, it is necessary to test samples of each newly designed part systematically with regard to the specifications for the intended use (e.g. climatic chamber, resistance, etc.).