

CORROSION-RESISTANT NEW GENERATION MIRRORS



MIROX
NEW GENERATION ECOLOGICAL



Manufacturing process

Mirox New Generation Ecological (MNGE) – superior quality plus environmental protection

Mirox New Generation Ecological mirrors reflect AGC's ongoing quest for innovation and the constant improvement of our range.

These products, available exclusively from AGC, stand out for:

- their copper-free metal coating;
- the very low lead paints;
- their ability to resist chemical damage.

AGC manufactures its New Generation Ecological mirrors at most of its production sites, guaranteeing the same optimum levels of quality and service.

Elimination of toxic products

The elimination of the amounts cited below¹ shows just how environmentally-friendly Mirox New Generation Ecological mirrors really are.

Cu Copper (7 tonnes/year)

NH₃ Ammonia (84 tonnes/year)

Pb Lead (248 tonnes/year)

Furthermore, AGC puts great effort in developing products that preserve our indoor air quality. MNGE products show close to zero indoor emissions of Volatile Organic Compounds (A+, according to French Décret No. 2011-321), including very low levels of formaldehyde. Since 2012, Mirox New Generation Ecological mirrors are Cradle to Cradle Certified^{CM} Silver.



Mirox New Generation Ecological – product identification

As a hallmark certifying MNGE's high quality standards, AGC paints the back of each mirror stock sheet green and prints it with the "ECOLOGICAL" logo.

The green paint used is itself environment-friendly and does not affect the MNGE quality in any way. Moreover, its higher hardness index makes the product easier to shape.

The advantages of Mirox New Generation Ecological

- Unrivalled anti-corrosion properties and protection against ageing and aggressive agents such as the ammonia and acetic acid found in certain cleaning products;
- Compatible with a wide range of adhesives for ease of handling by the customer or installer;
- No pitting or clouding with age;
- Unbeatable value for money.

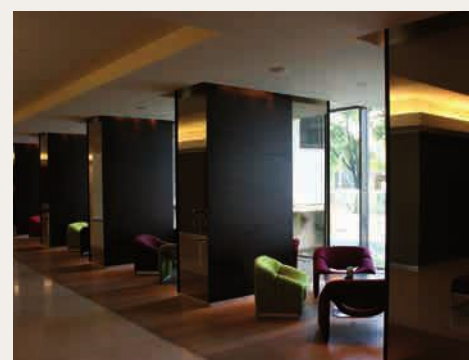
¹ estimate based on an output of 20,000,000 m²/year

| Old Generation mirror | Mirox New Generation Ecological (MNGE) |
|--|--|
| Polishing | Polishing |
| Sensitization | Sensitization |
| | *Activation |
| Silvering | Silvering |
| | *Passivation |
| Coppering | |
| | Paint adhesion treatment |
| Annealing of metal coatings | Annealing of metal coatings |
| First coat of paint applied (chemical protection) | First coat of very low lead paint applied (chemical protection) |
| First coat baked | First coat of very low lead paint baked |
| Second coat of paint applied (physical protection) | Second coat of no-added lead paint applied (physical protection) |
| Second coat baked | Second coat of no-added lead paint baked |

*Activation: treatment to affix the silver coating to the glass

*Passivation: protects the silver coating against oxidation

To ensure greater respect of the environment, AGC only manufactures ecological mirrors that are 100% copper-free and with very low lead (0,16% or 1.600ppm).



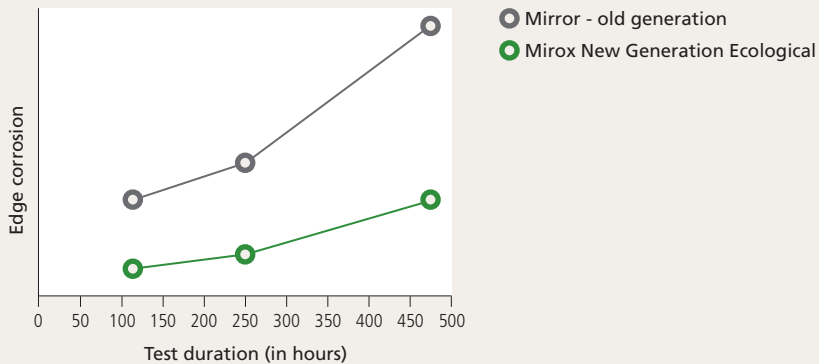
Performance of Mirox New Generation Ecological

BEHAVIOUR IN STANDARD ACCELERATED AGEING TESTS

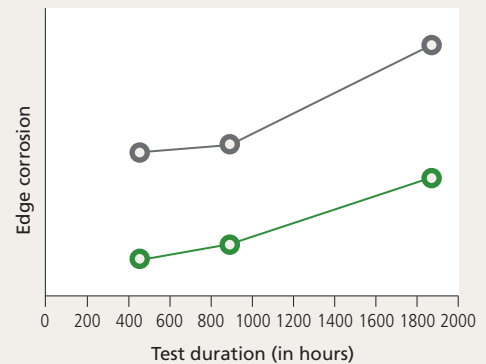
| Property or test | European Standard EN 1036 | Mirror – old generation | Mirox New Generation Ecological |
|--|---|---|---|
| Maximum corrosion (μm) of edges after Cass Test EN ISO 9227 | 1500 | 500 | 250 |
| Pitting after Cass Test (number / dm^2) EN ISO 9227 | 2 of 0,2 mm < diameter \leq 3 mm accepted provided < 0,2 mm | 1 of 0,2 mm < diameter \leq 3 mm accepted provided < 0,2 mm | 1 of 0,2 mm < diameter \leq 3 mm accepted provided < 0,2 mm |
| Maximum corrosion (μm) of edges after the neutral salt spray test EN ISO 9227 | 1000 | 200 | 50 |
| Pitting after the neutral salt spray test (number / dm^2) EN ISO 9227 | 2 of 0,2 mm < diameter \leq 3 mm accepted provided < 0,2 mm | 1 of 0,2 mm < diameter \leq 3 mm accepted provided < 0,2 mm | 1 of 0,2 mm < diameter \leq 3 mm accepted provided < 0,2 mm |
| Maximum corrosion (μm) of edges after the condensation water test acc EN 1036 (Normative annex A) | 200 | 50 | 50 |
| Pitting after the condensation water test (number / dm^2) acc EN 1036 (Normative annex A) | 1 of diameter \leq 0,3 mm | 1 of diameter \leq 0,3 mm | 1 of diameter \leq 0,3 mm |

BEHAVIOUR IN EXTENDED ACCELERATED AGEING TESTS

Extended ageing in the Cass Test (standard duration: 120 hours)



Extended ageing in Salt Spray (standard duration: 4800 hours)



RESISTANCE TO AGGRESSIVE AGENTS

| | | Cleaning products | |
|---|-------------------------|-------------------------|---------------------------------|
| Ammonia resistant | Mirror – old generation | 1 day | Mirox New Generation Ecological |
| | | | <7days |
| | | Adhesives* for mounting | |
| Compatibility with oxime- or alkoxy-based silicones | Mirror – old generation | NO | Mirox New Generation Ecological |
| | | | YES |

Please consult the processing and installation guidelines available from our subsidiaries and agents for advice on storage, mounting, positioning, cutting and shaping.

*AGC advises to use only recommended or compatible brands of silicone as set out in its installation guidelines that can be found on www.yourglass.com

No “cloud”

The defect known as “cloud”, which appears on most conventional mirrors, results from the oxidation of the copper or silver coating brought on by reagents passing through the paint (especially polymerization agents in the adhesives used to fix the mirrors in place). Once the copper or silver coating is completely oxidized, brownish or greyish stains appear.

This defect, known as “cloud”, is simply not possible with our Mirox New Generation Ecological mirrors, if compatible adhesives are used.

Environmental protection

- Generally speaking, mirror production results in a high concentration of ammonia in the effluent from the silvering line. Some 90% of this ammonia comes from the coppering process.
- Copper-free mirrors help processors to respect the environment too, since the effluent from shaping operations is totally free of copper.

- Given the increased stringency of both national and international environmental standards, Mirox New Generation Ecological mirrors are definitely a safe investment.

A product rewarded for its excellence

The ecological excellence of Mirox New Generation Ecological has been rewarded with a number of awards bestowed by glass production experts and industrial troubleshooters. These awards reflect the efforts that AGC has made to help protect the environment. They include:

- The “British Industry Award” for environmental initiative: an award given by Glassex (the UK specialist glass fair).
- The “Prix de l’Environnement” awarded by the FEB (the Federation of Belgian Companies).
- The special commendation made in the “Eco-design” category at the European Better Environment Awards for Industry (sponsored by the European Commission).

THE MIROX NEW GENERATION ECOLOGICAL RANGE

| | Thicknesses (mm) | | | | | Max sizes (cm) ¹ | Available in Mirox Safe/ Safe+ safety version ² | Available on request with white paint ³ | Installation, bonding |
|------------------|------------------|---|---|---|---|-----------------------------|---|---|--|
| | 3 | 4 | 5 | 6 | 8 | | | | |
| Clear | x | x | x | x | x | 600 x 321 | x | x | alkoxy- or oxime-based silicones |
| Bronze | x | x | x | x | | 600 x 321 | x | x | |
| Grey | x | x | x | x | | 600 x 321 | x | x | |
| Green | | x | | x | | 225 x 321 | x | x | |
| Clearvision | x | x | x | x | | 600 x 321 | x | x | |
| Black Mirox | | | | x | | 225 x 321 | x | x | |
| PrivaBlue | | | | x | | 225 x 321 | x | x | |
| Miroid Morena | | x | | x | | 225 x 321 | x | x | |

¹ Other sizes: please refer to the Product Catalogue available on www.yourglass.com;

² Maximum size: 255 x 321cm;

³ White paint advised in applications where the back of the mirror is visible (e.g. bathroom cabins).

Applications

Mirox New Generation Ecological mirrors are a source of inspiration for furniture professionals, interior architects, decorators and designers. The possibilities are endless, but a few examples are given below.

GLAZING USED AS A COVERING*

| Mirox New Generation Ecological | Partitions, walls, colonnades, pillars | Sliding doors (for cupboards, wardrobes, contemporary furniture) | Contemporary furniture | Display case stands |
|---|--|--|------------------------|---------------------|
| Clear, Bronze, Grey, Green, Black, Clearvision, Priva-Blue, Miroid Morena | x | x | x | x |

*Always consult the safety and security standards for the market in which the application will be used.

In addition to Mirox New Generation Ecological mirrors, AGC offers a full range of decorative glass products. For further information, contact your local AGC representative or consult www.yourglass.com.

