

# Mirrors: *Handle With Extreme Care*



**GLASS**

ASSOCIATION OF NORTH AMERICA

**Mirror Division**



# Mirrors: Handle with Extreme Care

## Tips for the professional on the care and handling of mirrors

The purpose of this publication is to provide the latest available information to glass dealers, distributors and installers on the procedures recommended by the Mirror Division of the Glass Association of North America (GANA) for the proper storage, handling, fabrication, shipping, installation, and cleaning of high quality mirror products.

The Mirror Division of GANA has undertaken this project with the objective of helping preserve the integrity and prolonging the life of mirrors.

Publication of this booklet, however, does not promise an end to all mirror problems. Edge deterioration (black edge) has been reduced due to improvements in mirror coatings. Most occurrences are a result of the use of improper cleaning agents. Research into more durable backing materials, consumer education, and improved mirror manufacturing processes is ongoing in a continuing effort to provide a durable, trouble-free, and environmentally safe product.

However, a mirror - because it is a combination of many delicate materials and processes - will never be indestructible. Proper storage, handling, fabrication and good installation practices go a long way in reducing potential failures or damage. Educating consumers in the proper care and cleaning of mirrors requires a continual effort on the part of the entire industry to ensure that the mirrors will be properly maintained after they have been installed.

This publication contains the best information currently available from material suppliers, experienced dealer-installers, and major mirror manufacturers on the care and handling of today's quality mirrors.

**Disclaimer.** This document is prepared by the Mirror Division of GANA solely to provide guidance regarding the proper installation and care of mirrors. It represents the collective experience of those in the mirror manufacturing industry; however, this document does not constitute a standard or specification, either mandatory or voluntary, for the installation and care of mirrors. Conditions and circumstances will vary from installation to installation. It is the responsibility of the mirror installer to ensure that the installation and care of the mirrors comply with all relevant rules, laws, regulations, applicable standards, and other requirements. GANA disclaims any liability for any loss or damage of any kind arising out of the use of this publication, and all those using it agree, as a condition of use, to release GANA from any and all liability, loss, or damage of any kind or nature arising out of or relating in any way to its use. Users of this publication understand that GANA is not responsible for any errors or omissions of any kind contained in the publication and that GANA does not design, develop, manufacture, install, guarantee, or make any express or implied representations or warranties as to fitness, merchantability, patent infringement, or other matters respecting products, processes, and equipment referred to in this publication. GANA does not guarantee any results of any kind relating to the use of this publication.

GANA expressly reserves the right, in its sole discretion, to revise, amend, or otherwise modify the publication from time to time as it sees fit and to do so without notice to prior recipients of the publication.



## A Mirror – More than Just Glass

A mirror is a delicate and beautiful thing. Even though it is a combination of hard and durable components, the very nature of this blending creates a number of frailties that can ultimately lead to problems for both buyer and seller absent proper planning and care in handling.

Today's mirrors - made from the highest quality glass produced by the float process - are better in every way from those made just a decade ago. Surfaces are flatter and there are fewer surface and internal imperfections. Better edges are possible and closer tolerances can be maintained. State-of-the-art technology is employed to assure a better sheet of glass for silvering. Silvering methods have improved to provide maximum depth and reflectivity. Better copper solutions, the advent of copper replacement technology, and thermosetting mirror backing paint products, have offered improved protection to the silver layer for long-lived performance. A second method is to apply a copper-free protective film, which also offers environmental advantages. The copper layer has been eliminated and the silver coating has been stabilized with other chemicals.

But each of the five components which make up the mirror, glass; sensitizing solution; silver; copper "copper-free" chemicals, copper replacement coatings; and finish coatings, if improperly handled anywhere along the way from manufacture to final installation can lead to a failure of the mirror. Opportunities for mishandling are many. Each mirror must be shipped, stored, removed from storage, cut, perhaps beveled or drilled, finished, packed and shipped again, installed and cleaned. Because each mirror is indeed more than "just glass," an array of proper handling techniques described in this publication should lead to a durable installation.

Two positive benefits will result from employing these procedures: a handsome, trouble-free mirror installation and a satisfied customer.

### Receiving, Storage and Transportation

Every time a mirror crate or an open mirror is moved, there is potential for damage. Therefore, the key to successful handling is to keep these movements to a minimum. Plan your storage in an efficient manner. Use proper handling techniques and equipment. Ship wisely. Review the suggestions below and compare them to your present practices.

- The very first - and important - step in maintaining mirror integrity is to *check your shipments on arrival*. If there appears to be moisture present, the mirrors should be unpacked and allowed to dry using a separating technique. Moisture can attack the backing or stain the face of a mirror over a period of time.
- Be sure that your mirror storage areas are in dry, adequately ventilated spaces. Don't store mirrors in areas of high humidity, where exposed to chemical fumes, or near high heat such as steam or water pipes. These conditions can cause deterioration of the mirror edges, backing, or surface staining.
- Mirrors should be unpacked as soon as possible to allow moisture caused by condensation to dissipate, especially if the mirrors have been subject to temperature changes during shipment.
- Store mirrors vertically, but *do not* pull mirrors from the ends of the case. Do not lay mirrors flat. Glass exhibits more strength, fewer strains when stored vertically.
- Don't store mirrors outdoors or in unheated areas. The mirror can be affected not only by the moisture prevalent under these conditions, but also by excessive expansion and contraction caused by cyclic temperatures.



- Block mirror cases up off floors and away from walls. This will assist in proper ventilation of the storage area and prevent any water damage to the bottom of the cases. Also, do not store crates or mirrors on uneven surfaces. This can lead to stresses and strains on the glass, which can lead to cracks and breakage.
- Mirrors should not be placed touching cinder block wall or other concrete material.
- Protect cases and mirrors from falling objects. Even a small impact could cause cracks and ruin a mirror.
- Be certain to rotate your mirror stocks. Consume older stocks first. Many experts believe that “aging” helps in the curing of the paint backing and thus results in a more durable installation. This aging process takes about a week and is the result of the purging of all solvents in the paint coating. Organize storage areas so that faster moving items are more readily accessible. This will reduce traffic and handling and make damage less likely.
- Be certain that handling equipment is strong enough to handle the weight of the mirror. A dropped mirror is usually a ruined mirror.
- Do not ship partially unpacked mirror cases without proper repacking. Movement within the case can cause damage or breakage.

If mirrors are transported in an open or exposed condition and become spattered or come in contact with foreign elements such as road salt, they should be washed with warm water and dried with a soft rag.

## **Fabrication**

It is important to emphasize that care be taken during every step of fabrication to maintain the integrity of the back and edges of a mirror. Any major damage to these two areas will result in a useless product. Equally important, however, is cleanliness in the fabrication shop. *Dirt, grit, solvents, and other contaminants can lead to damage not only to the surface but also to the backing.*

- Always use gloves when handling mirrors. This protection works two ways. Hands are protected from sharp edges, and the edges and backing of the mirror from body salts and chemicals.
- Vacuum or sweep the cutting tables with a stiff brush regularly to keep dust down and to eliminate glass grit and particles which could scratch mirrors.
- Do as much fabrication in the shop as possible. This will reduce the possibility of on-site damage where conditions are usually less than perfect.
- Locate fabrication areas away from parts of the shop where mirrors could be exposed to solvents, heavy-duty cleaners, etc. which could affect the backing.
- Be sure that mirrors - especially backs and edges - are thoroughly washed after fabrication. Use only clean water for washing. If a glass washing machine is used, a recommended mild detergent may be used. No commercial glass cleaner can be recommended. Most contain ammonia or other strong chemicals which can damage the edge of the mirror.
- Depending on the geographical location, the glass shop may apply an approved sealant to all edges after fabrication and thorough edge cleaning with diluted rubbing alcohol. This will provide additional protection against moisture or other degrading chemical or atmospheric penetration of the backing.
- When grinding and polishing edges, remember that a wet belt sander is the recommended tool. If you are using dry belts, a recommended belt lubricant can be used, but some lubricants contain chloride contaminants. The best recommendation is the use of clean, fresh water. Also remember to keep the heat generated by sanding or swiping to a



minimum to prevent damage to the mirror backing. Never allow a belt to “fire”. The direction of rotation of the sanding belt must be toward the edge (thickness) of the mirror to prevent pushing contaminants into the paint backing. For example, when the mirror is positioned horizontally with the paint side down, the belt direction must be “up” from below the mirror and “down” from above the mirror.

- Diamond wheels should always be dressed and maintained in good cutting condition. Set wheels so as not to grind excessively on the paint side and edge grind in only one direction. Diamond wheels should also be used with clean water as a lubricant. If coolant is used, it should be clean, pure and have a pH of close to 7.
- Try to retain at least one factory edge when trimming, preferably at the bottom where mirror is subject to puddling.
- Don't slide mirror lites one over another. Scratching of the surfaces will result.
- Be sure mirrors are inspected before and after fabrication and that adequate light is provided in the inspection areas.
- If questions arise concerning approved coolants, cutting oils, sanding belts or cutting tools, contact the mirror manufacturer or other suppliers for specific instructions.

## **Installation**

The best mirror job is one that is not only striking in appearance, but one that was trouble-free during installation. Proper techniques, carefully and professionally employed, can virtually guarantee this kind of result.

- As with fabrication, always use gloves when handling any mirror on the job site to prevent damage to the face or backing from skin-borne salts or chemicals.
- Where possible, lay out a mirror installation in your shop before taking it to the job site. Any errors in cutting or sizing can be caught and remedied immediately and no excessive handling will occur.
- Never install mirrors on new plaster, new or old masonry or on a freshly painted wall without proper sealing. Also, do not install in any new construction area where airborne solvents and heavy-duty cleaners are in the air. This is especially true in the case of new bathroom construction, where acid fumes from tile grout cleaners can severely damage mirror products.
- In humid climates, wait until the air conditioning is operating before installing mirrors.
- In newly constructed buildings that include concrete floors or cinder block walls, do not install mirror until floor or wall have been covered or sealed.
- Never install mirrors outdoors without additional engineered protection for the backing of the mirror.
- Set mirrors off the wall with an air space behind to provide ventilation for the backing whenever possible.
- If mastic must be used, be sure it is approved for mirror use. Mechanical fastening devices should always be used in conjunction with the mastic. This can help prevent possible personal injury or damage from the mirror in the event of future failure of the mastic.
- Be certain that the room or space in which the mirror is to be installed is properly ventilated during and after installation. Good ventilation will keep mirrors from “sweating” and creating condensing liquids which could be corrosive and damaging to mirrors.
- Never permit edges of the mirror to be exposed to “puddling” conditions such as on back splashes. Instead, raise the mirror up off the bottom with an angle clip which will not catch and retain water in contact with the mirror.
- Be sure that there are adequate tolerances between installed mirrors to avoid later problems as the building settles.



- Mirrors should be one of the last items installed in new construction after final cleanup. To insure the best mirror protection, installation should occur after air temperature control equipment (air conditioning or heating equipment) has been turned on.
- Consult with mirror manufacturers or other suppliers for recommendations on mastics, silicones (for trim out), belt lubricants, and other installation materials and tools.
- A light seam of clear (not acid based) silicone could be placed across the face of the mirror between the glass face surface and splash or J molding. This should be along the bottom of the mirror only and the other three sides open for ventilation. Care should be taken to ensure excessive material is not pushed to the paint edge of the mirror when applied.

## Cleaning

The “final touch” on any outstanding mirror installation is proper cleaning. The techniques described here are good practices for you and should be passed on to your customers so they can maintain the mirror for the life of the job.

- The safest cleaner for a mirror is clean, warm water used with a soft cloth. An approved glass cleaner such as Windex or similar products may be used. Be careful not to allow the edges of the mirror to get or remain wet over a period of time.
- Do not use any acid or alkali cleaners for mirror cleanup after installation. They can attack both the surface and edges as well as the backing of the mirror. And never use an abrasive cleaner on any mirror surface.
- Do not use cleaners with heavy ammonia bases. These too can damage the mirror edges and backing and result in a ruined mirror.
- **Never spray *any* cleaner directly on to a mirror. Instead, apply the cleaner to a soft cloth and then wipe the mirror. This will also prevent “puddling” at the mirror edge where the cleaner could attack the backing.**
- Always use soft, grit-free cloths when cleaning a mirror to reduce chances of scratching the surface.
- Be sure to dry all joints and edges thoroughly to be certain no cleaner comes in contact with the edge and backing.
- Be sure to let your customers know that routine cleaning maintenance can be accomplished simply and effectively by washing, rinsing and drying the mirror.

Members of the mirror industry also encourage awareness of the industry consensus document ASTM C 1503 – *Standard Specification for Silvered Flat Glass Mirror*. The ASTM International standard addresses the requirements for silvered flat glass mirrors of rectangular shape supplied as cut sizes, stock sheets or as lehr ends; quality requirements of silvered annealed monolithic clear and tinted flat glass mirrors up to 6 mm (1/4 in.) thick; and mirrors intended to be used indoors for mirror glazing, for components of decorative accessories or similar use. The standard may be purchased by visiting the ASTM International website: [www.astm.org](http://www.astm.org).

For additional information on mirrors and the Mirror Division of the Glass Association of North America, visit the Division website: [www.mirrorlink.org](http://www.mirrorlink.org) and the Association website: [www.glasswebsite.com](http://www.glasswebsite.com).

*We are hopeful that you have found the suggestions contained in this publication, on the care and handling of mirror products, informative. If one or more of them are new to you and can improve your operations, this booklet has served its purpose. If you have been employing other techniques which you think would benefit other distributors, dealers and installers, please pass them on to us, and we will consider them for inclusion in future revisions of this publication.*

## MIRROR DIVISION MEMBER FIRMS

The following is an alphabetical list by company name; an asterisk is used to identify the Divisional Representatives.

### **AFG, INDUSTRIES**

1400 Lincoln Street  
P.O. Box 929  
Kingsport, Tennessee 37662  
Tel: (423) 229-7251  
Fax: (423) 229-7211  
www.afgglass.com

### **AKZO NOBEL COATINGS, INC.**

1313 Windsor Avenue  
Columbus, Ohio 43211  
Tel: (614) 294-3361 (main)  
Fax: (614) 421-4367  
www.akzonobel.com

### **ALBAR PRECIOUS METAL REFINING**

740 Waukegan Road  
Deerfield, Illinois 60015  
Tel: (800) 241-1811  
Fax: (847) 317-1759  
www.albarmetals.com

### **ARCH ALUMINUM & GLASS COMPANY, INC.**

10200 NW 67<sup>th</sup> Street  
Tamarac, Florida 33321-6404  
P.O. Box 25127  
Fort Lauderdale, Florida 33320  
Tel: (954) 724-1775  
Fax: (954) 724-2083  
www.archaluminum.net

#### **Arch Aluminum & Glass Company, Inc.**

7413 Commercial Circle  
Fort Pierce, FL 34951  
Tel: (772) 468-8500  
Fax: (772) 467-9333

#### **Arch Aluminum & Glass Company, Inc.**

124 Old Suffolk Drive  
Monroeville, PA 15146  
Tel: (412) 979-0827

### **BOTTERO FLAT GLASS, INC.**

200 Airport Executive Park, Suite 211  
Nanuet, New York 10954  
Tel: (845) 371-6181  
Fax: (845) 371-6182  
www.bottero.com

### **DONISI MIRROR COMPANY**

507 Loveland – Madeira Road  
P.O. Box 368  
Loveland, Ohio 45140-0368  
Tel: (513) 683-3110  
Fax: (513) 683-3225  
www.donisimirror.com

### **FENZI SPA**

Via Trieste 13/15  
20067 Tribiano  
Milano, Italy  
Tel: 39 02 906221  
Fax: 30 -2 90631216  
www.fenzigroup.com

### **GARDNER GLASS PRODUCTS, INC.**

600 Elkin Highway  
P.O. Box 1570  
North Wilkesboro, North Carolina 28659  
Tel: (336) 651-9300  
Fax: (336) 667-0185

### **GUARDIAN INDUSTRIES CORP**

2300 Harmon Road  
Auburn Hills, Michigan  
Tel: (248) 340-2235  
Fax: (248) 340-2239  
www.guardian.com

### **GUARDIAN INDUSTRIES CORP.**

**Consolidated Glass & Mirror Corp.**  
110 Jack Guynn Drive  
Galax, Virginia 24333  
Tel: (540) 236-5196  
Fax: (540) 236-0570

### **HILEMN CORPORATION**

3125 Spring Garden Street  
Greensboro, North Carolina 27407

### **Spraylat, Gmbh**

Am Silberberg 2  
D-96346 Wallenfels, Germany  
Tel: 49 9262 974 651  
Fax: 49 9262 974 653

**INDEPENDENT MIRROR INDUSTRIES, INC.**

250 Brockport Drive  
Rexdale, Ontario M9W 5S1  
Canada  
Tel: (416) 798-0440  
Fax: (416) 798-0434

**ITW REDDI-PAC**

595 Telsler Road Suite 100  
Lake Zurich IL 60047  
Tel: (847) 719-9200  
Fax: (847) 719-9201  
www.itwreddipac.com

**LAURIER GLASS, LTD.**

153 Laurier Blvd., #300  
Laurier-Station, Quebec G0S 1N0  
Canada  
Tel: (418) 728-2023  
Fax: (418) 728-2961  
www.laurierglass.com

**LENOIR MIRROR COMPANY**

401 Kincaid Street SW  
P.O. Box 1650  
Lenoir, North Carolina 28645  
Tel: (828) 728-3271 x221  
Fax: (828) 728-5010  
www.LenoirMirror.com

**MESSER INDUSTRIES, INC.**

208 School Street  
P.O. Box 648  
Greer, South Carolina 29652-0648  
Tel: (864) 877-0703  
Fax: (864) 877-5816

**PEACOCK LABORATORIES, INC.**

1901 S 54th Street  
Philadelphia, Pennsylvania 19143  
Tel: (215) 729-4400  
Fax: (215) 729-1380  
www.peacocklabs.com

**PILKINGTON NORTH AMERICA, INC.**

**Building Products**

8 Waxwind Cove  
Greensboro, North Carolina 27455-1373  
Tel: (336) 286-8569  
Fax: (771) 871-3942  
www.pilkington.com

**Pilkington North America, Inc.**

**Building Products**

6050 Peachtree Pkwy., Ste 240 #406  
Norcross, GA 30092  
Tel: (800) 221-0444  
Fax: (770) 662-5127

**PMC SOFTWARE INC.**

8 Bartles Corner Road, Suite 11  
Flemington, New Jersey 08822  
Tel: (908) 806-4231  
Fax (908) 806-3951  
www.pmcsoftware.com

**PPG INDUSTRIES, INC.**

Guys Run Road  
P.O. Box 38361  
Pittsburgh, Pennsylvania 15238-8361  
Tel: (412) 820-8001  
Fax: (412) 826-2299  
www.ppg.com

**SAINT-GOBAIN GLASS MEXICO SA de C.V.**

Nicolas Bravo 5, Parque Industrial Cuautla  
Cuautla, MOR 62741  
Tel: 52 735-354-8113  
Fax: 52 735-354-8112  
www.saint-gobain.com.mx

**SPRAYLAT, GMBH**

(See Hilemn Corporation)

**SUNSHINE MIRROR**

7337 Commercial Circle  
Fort Pierce, Florida 34951  
P.O. Box 15216  
Tampa, Florida 33684-5216  
Tel: (561) 465-6569  
Fax: (561) 465-7734

**VALSPAR CORPORATION**

2350 – 114th Street  
Grand Prairie, Texas 75050  
Tel: (800) 454-2003  
Fax: (800) 606-0098  
http://www.valspar.com

**Valspar Corporation**

1 Evergreen Avenue, Ste LL1  
Hamden, Connecticut 06518  
Tel: (203) 248-2649  
Fax: (972) 248-4543

**Valspar Corporation**

2710-A Bluff View Drive  
Greenville, NC 27834  
Tel: (252) 551-9935  
Fax: (252) 551-9936

**Valspar Corporation**

403 Crescent Park  
Warren, PA 16365  
Tel: (814) 726-9849  
Fax: (814) 726-9850

**VIRGINIA MIRROR COMPANY, INC.**

300 South Moss Street (24112)

P.O. Box 5431

Martinsville, Virginia 24115-5431

Tel: (276) 632-9816

Fax: (276) 632-2488

www.va-mirror.com

**VITRO AMERICA, INC./ACI Distribution**

**South**

965 Ridge Lake Blvd, Memphis, TN 38187-1173

P.O. Box 171173

Memphis, Tennessee 38120

Tel: (800) 238-6057 x331

Fax: (901) 682-3062

**Vitro America, Inc./Binswanger Mirror**

Highway 8 East, Grenada, Mississippi  
38901

P.O. Box 1400

Grenada, Mississippi 38902-1400

Tel: (662) 226-5551

Fax: (662) 226-9787

**Vitro America, Inc.**

9010 S Norwalk Blvd.

Santa Fe Springs, California 90670

Tel: (562) 345-1227

Fax: (562) 699-5797

**WALKER GLASS CO., LTD.**

9551 Ray Lawson Blvd.

Montreal, Quebec, H1J 1L5

Canada

Tel: (514) 352-3030

Fax: (514) 351-3010



**ASSOCIATION OF NORTH AMERICA**

**2945 SW Wanamaker Drive, Suite A  
Topeka, KS 66614-5321  
(785) 271-0208  
(785) 271-0166 Fax**

**[www.glasswebsite.com](http://www.glasswebsite.com)**