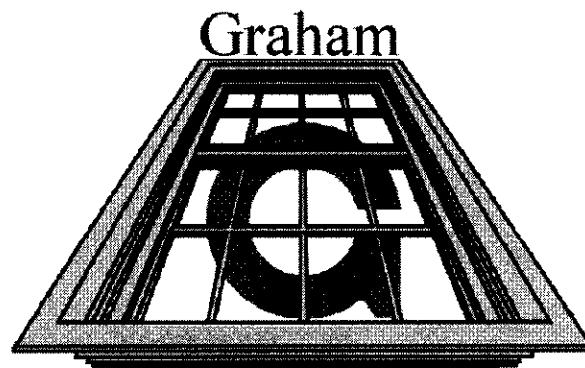


MAINTENANCE MANUAL

GRAHAM ARCHITECTURAL PRODUCTS
1551 MT. ROSE AVENUE
YORK PA 17403-2909

(717) 849-8100



Architectural Products

Model 6800

WINDOW SYSTEM

GENERAL CONSTRUCTION NOTES

The following practices are recommended for all installations:

1. Check shop drawings to become thoroughly familiar with the job.
2. Check all material on arrival for quantity and condition.
3. Be sure you have all the materials needed to begin the installation:

A. Approved shop drawings	D. Mastic
B. Fasteners	E. Sealant
C. Perimeters and Accessories	F. Glazing Material
4. Become thoroughly familiar with total system so you can use the appropriate parts. Instructions are of a general nature and cover most common conditions.
5. Make certain that construction, which will receive your materials, is in accordance with the contract documents. If not, notify the general contractor and your Graham representative in writing before proceeding with your work. Commencing work without written notification constitutes acceptance of work by other trades. Note: if construction is according to construction documents, but does not seem adequate to support the window, etc., the general contractor should be notified in writing before starting installation.
6. All work should start from established bench marks and column centerlines established by the architectural drawings and the general contractor.
7. All materials are to be installed plumb, level, and true.
8. Isolate all aluminum to be placed directly in contact with the masonry or incompatible material with a heavy coat of zinc chromate or bituminous paint.
9. If Vaseline or any petroleum products are used for protection or cleaning, do not allow material to come in contact with glazing materials, sealant, mastics, or weather-stripping.
10. When using sealant or mastic, surface must be cleaned with MEK (Methyl Ethyl Ketone) or other suitable/compatible non-petroleum cleaning solvent.
11. When ordering replacement glass, hardware, etc., please refer to the window mark (W-1, W-2, etc.) on the shop drawings.
12. Graham window units are finished products and should be treated as such. Therefore, they should not be used as scaffolding, ladders, passageways, or work surfaces.

HANDLING, STORAGE AND PROTECTION OF ALUMINUM

All material must be protected against damage. The following are recommendations to insure acceptance of your products and workmanship.

1. Handle carefully – do not drop windows. Stack with adequate separation, so material will not rub together. Store off ground. Protect against the elements and other construction trades. Store right side up.
2. Keep material away from water, mud, and spray – prevent cement, plaster, or other materials from damaging the finish. If these elements do get on the finish, clean as soon as possible.
3. Protect the materials after erection – cement, plaster, terrazzo, and other alkaline solutions are very harmful to the finish and should be removed with water and mild soap immediately. Acidic solutions are also harmful to the finish and should be removed immediately.

BASIC DESCRIPTION OF 6800 SERIES WINDOW SYSTEM

The 6800 Series Window family is comprised of a 3 1/2" deep frame that incorporates a total system of operable, fixed and spandrel units.

The design of the basic frame section allows for multiple run combinations of the above window types.

Highlights of this System Include:

1. 2" and 3-5/16 exterior perimeter siteline
2. 3-1/2" deep frame
3. Chemically welded and crimped corner construction
4. Accepts 3/16" to 1" glass thickness in conjunction with interior access panel
5. Silicone glazing with Dow 1199 or Dow 9-1350
6. 1/4" polyurethane thermal break
7. Anodized or painted surface
8. Guardian options

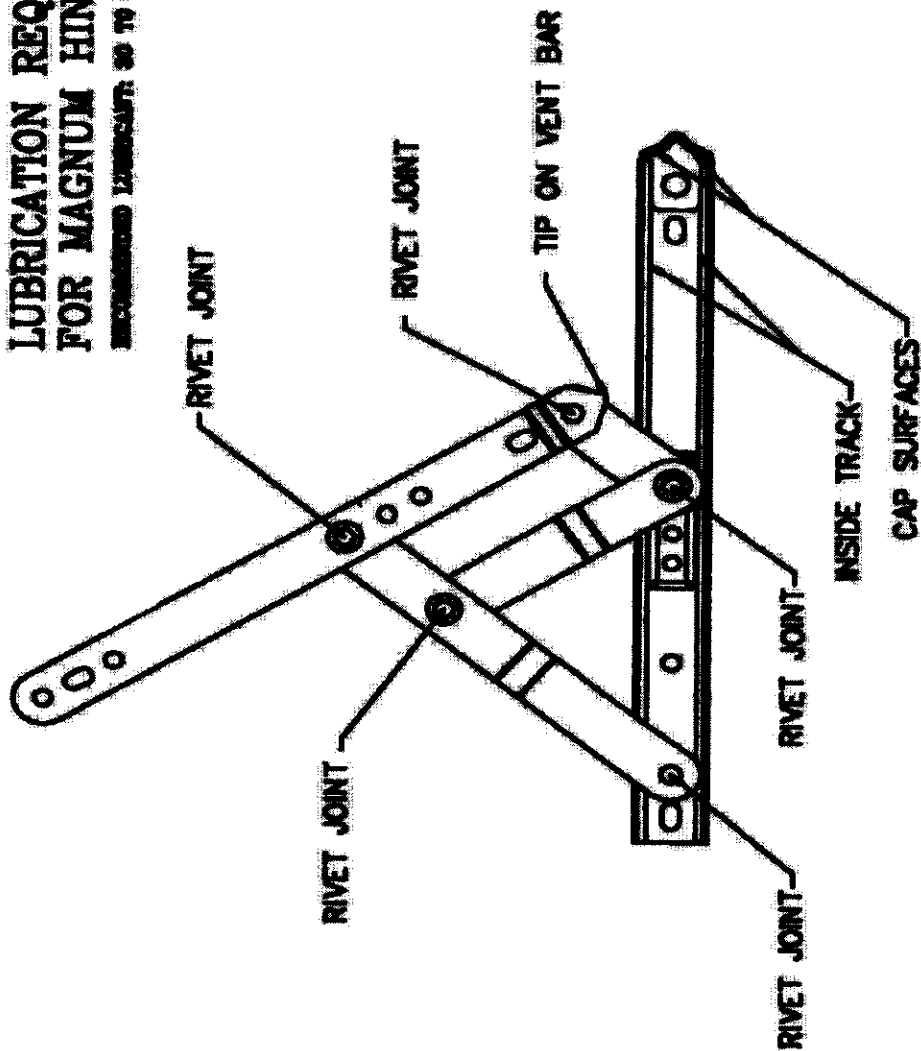
HARDWARE ADJUSTMENT 6800

- I. Locking Handles
 - A. The first step is to tighten the nut and star washer behind the cam handle to ensure that it is tight and secure.
 - B. Make sure that the gasket between the locking handle and the sash or frame is in place (project-in-windows).
 - C. Perform a paper test to ensure the sash and frame are weathering properly. (See Annex # 1)
 - D. Check to ensure the locking pawl hits the keeper and compresses the sash and frame properly.
- II. Hinges, Magnum Hinge (slide arms)
 - A. Make sure the track of the hinge is clean of construction dirt and debris.
 - B. These hinges are equipped with friction screws that allow the vent to be held in whatever position you open it to.
 - C. Hinges are attached with three screws to the frame and three to the sash. Contact the factory prior to removing any of these screws.
 - D. Hinges have stops that allow the window to open between 85° and 95°. We can also provide limit devices at 45°. If you have a situation that exists that you need a different limiting other than 45° or 90°, please contact the factory.
 - E. Lubricate hinges per Attachment 1 at every 1200 cycles or once per year.
- III. Butt Hinges
 - A. Graham Architectural Products provides a five-knuckle butt hinge with a stainless steel pin. These hinges, depending upon the environment should be lubricated with light oil every 4 – 6 months. This is basically the only maintenance that is required for this hinge. This hinge is typically used for escape windows and larger casement windows.

ATTACHMENT #1

LUBRICATION REQUIREMENTS FOR MAGNUM HINGES

RECOMMENDED LUBRICANT: 30 TO 50 WT. OIL



AMC

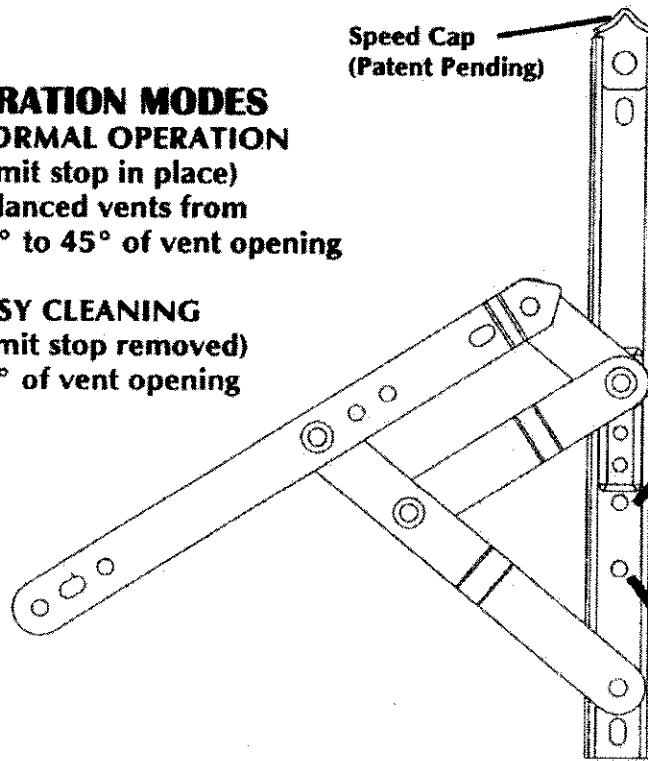
ADVANTAGE MANUFACTURING CORP.
716-548-1870 08/08/99

MAGNUM HINGE

HEAVY-DUTY STAINLESS STEEL
4 BAR HINGE - 16"
FOR NEW YORK CITY SCHOOLS

OPERATION MODES

1. **NORMAL OPERATION**
(Limit stop in place)
Balanced vents from
10° to 45° of vent opening
2. **EASY CLEANING**
(Limit stop removed)
77° of vent opening



NEW!

Metal Limit Stop
Field adjustable
for vent opening and
removable for cleaning

Slide stop
up or down
to desired
vent opening

Secured
with two
tamper-proof
screws

FEATURES

- ◆ Designed to meet the "upper vent" specifications under ventilation hardware.
- ◆ Fully adjustable limit stop with preset adjustable opening settings for custodial use.
- ◆ Limit stop field removable for vent cleaning.
- ◆ 4 Bar Hinge and limit stop secured with two tamper-proof screws.
- ◆ Solid brass shoe with 2 adjustment screws per hinge for fine tuning.

ADVANTAGE MANUFACTURING CORP.
788 Old Dutch Road
Victor, New York 14564

Phone: 716-742-1570
FAX: 716-742-1559
E-Mail: AMC@RPA.NET

ANNEX #1

The Paper Test

1. The purpose of this test is to check the compression on the weather-stripping between the sash and the frame of a projected window.
2. The compression on the inside seal is critical to pressure equalization in window performance.

STEPS IN A PAPER TEST

1. Open the vent.
2. Find a piece of paper or a dollar bill.
3. Place the paper on the interior vent weather-stripping.
4. Close and lock the vent.
5. Resistance should be felt on the paper while trying to pull it back into the room. The weather-stripping contact between the sash and the frame should provide this resistance.

GLAZING INSTRUCTIONS

1. Casement vents should be blocked out of square to allow for sag. (High on lock side. See page 9.)
2. Clean the area the silicone is to be applied to with isopropyl alcohol or other approved material.
3. Install a ¼" diameter bead of silicone around the perimeter of the glazing leg.
4. Install the setting blocks at ¼ points for projected and reference Figure #3 on page 9 for casement block locations.
5. Check to ensure the glazing weeps in the sash and the frame are open if present.
6. Clean the edges of the glass with isopropyl alcohol or other approved material, then install the glass, making sure that it is sitting on the setting blocks and glazing leg properly.
7. Check all glazing beads for nicks or dents that might interfere with their installation. Horizontal beads are to be installed first, then the vertical ones.

**Wet Glazing Procedure
6800 Series Dual Glazed**

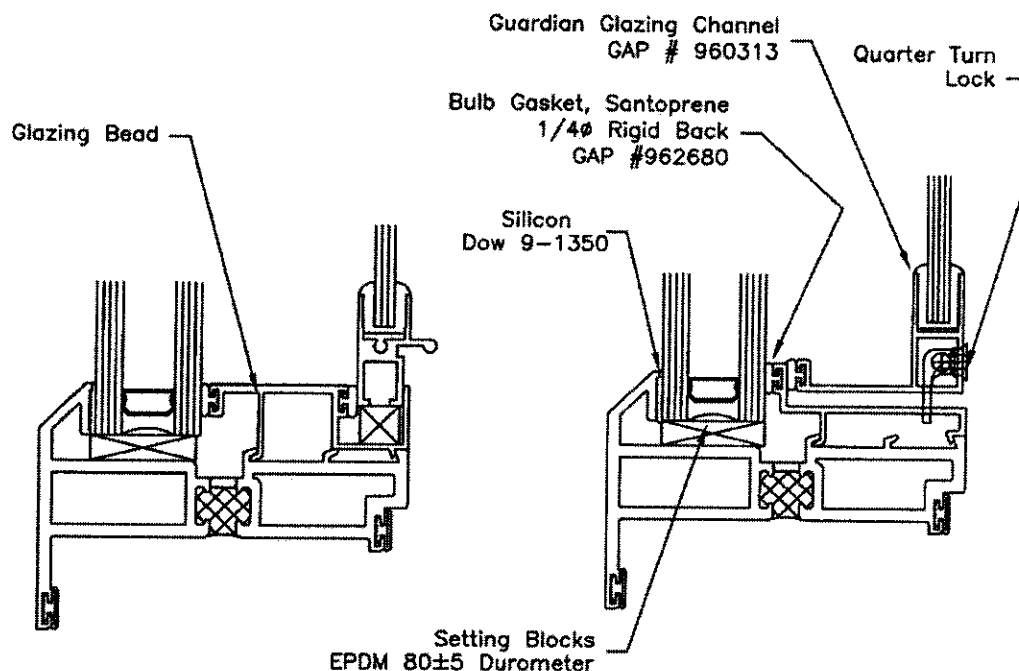


Figure #1
IG with Lift Out Guardian

Figure #2
IG with Hinged Guardian

Glazing Procedure:

Primary Glass;

1. Clean Perimeter Of Sash Glazing Leg And Wipe With A 50/50 Mix Of Isopropyl Alcohol And Water Followed By A Clean Rag Wipe.
2. Clean Perimeter Of Glass With A 50/50 Mix Of Isopropyl Alcohol And Water Followed By A Clean Rag Wipe.
3. Apply Glass Shims To Glazing Leg Side Of Glass At All Four Corners And 18" Max. On Centers Between Corners.
4. Apply A Continuous Bead Of Dow 9-1350 Silicon Around the Perimeter Of The Glazing Leg.
5. Set Glass Into Silicon With Glass Shims To Glazing Leg Of Sash. Be Cautious Not To Touch The Glass In The Areas Where It Will Be Set In The Silicon.
6. Insert Setting Blocks Between Glass And Sash Frame Centering The Glass In The Frame.
7. Replace Glazing Bead Bulb Gasket If Required. Apply Glazing Bead To Sash Compressing Glass Into Silicon.
8. Allow Silicon To Cure (24 Hours) Then Carefully Remove Excess From Exterior Of Glass.

Guardian Glass;

1. Disassemble Guardian Sash By Removing Corner Screws. Clean Channels Of Any Debris.
2. Apply Glazing Channel To Glass By Starting At The Midpoint Top Of The Glass And Wrapping The Glazing Channel Around The Full Perimeter.
3. Apply Butyl Tape Seal To The Glazing Channel At The Joint Created At Midpoint Top.
4. Press Guardian Sash Rails Onto Glazing Channel And Reassemble By Installing The Corner Screws Removed In Step 1.

CASEMENT CROSS BLOCKING CHART

6100/6500/6600/6800/6900

WINDOW WIDTH

WINDOW HEIGHT

	2'-0"	2'-6"	3'-0"	3'-6"	4'-0"	4'-6"	5'-0"	5'-6"	6'-0"
2'-0"	0"	0"	1/16"						
2'-6"	0"	0"	1/16"	1/16"					
3'-0"	0"	0"	0" 1/16"	1/16"	1/16"				
3'-6"	0"	0"	0" 1/16"	1/16"	1/16"	1/8"			
4'-0"	0"	0"	0" 1/16"	1/16"	1/16"	1/8"	1/8"		
4'-6"	0"	0"	1/16"	1/16"	1/16" 1/8"	1/8"	1/8"	1/8" 3/16"	
5'-0"	0" 1/16"	0" 1/16"	1/16"	1/16"	1/16" 1/8"	1/8"	1/8" 3/16"	1/8" 3/16"	1/8" 3/16"
5'-6"	0" 1/16"	0" 1/16"	1/16"	1/16"	1/16" 1/8"	1/8"	1/8" 3/16"	1/8" 3/16"	3/16"
6'-0"	0" 1/16"	0" 1/16"	1/16"	1/16" 1/8"	1/16" 1/8"	1/8"	1/8" 3/16"	1/8" 3/16"	3/16"
6'-6"	0" 1/16"	0" 1/16"	1/16"	1/16" 1/8"	1/16" 1/8"	1/8"	1/8" 3/16"	1/8" 3/16"	3/16"
7'-0"	1/16"	1/16"	1/16" 1/8"	1/16" 1/8"	1/8"	1/8"	1/8" 3/16"	1/8" 3/16"	3/16"
7'-6"	1/16"	1/16"	1/16" 1/8"	1/16" 1/8"	1/8"	1/8"	1/8" 3/16"	1/8" 3/16"	3/16"
8'-0"	1/16"	1/16"	1/16" 1/8"	1/16" 1/8"	1/8"	1/8"	1/8" 3/16"	1/8" 3/16"	3/16"
8'-6"	1/16"	1/16"	1/16" 1/8"	1/16" 1/8"	1/8"	1/8"	1/8" 3/16"	1/8" 3/16"	3/16"
9'-0"	1/16"	1/16"	1/16" 1/8"	1/16" 1/8"	1/8"	1/8"	1/8" 3/16"	1/8" 3/16"	3/16"

OPTIONAL GUARDIAN GLAZING SYSTEM – 600 SERIES

(Lift and Tuck System)

If sash are supplied with a Guardian Insert sash within the primary vent, the following directions will apply in addition to those previously mentioned.

Removing of Guardian Insert Sash:

1. Insert a 9/64" Allen key into each guardian lock and turn 90°, to the open position.
2. The Guardian Insert is now free to remove by lifting upward until bottom is free to pull outward.

Installing of Guardian Insert Sash:

1. Install the Guardian Insert into primary sash frame by inserting top rail of guardian into pocket at top of glazing area.
2. Once top rail is fully inserted, swing the bottom of the guardian insert into the glazing area and lower into bottom pocket.
3. Insert a 9/64" Allen key into each guardian lock and turn 90°, to the locked position.

Reglazing of Guardian Insert Sash:

1. Remove the Guardian Insert as described above.
2. Remove the assembly screws from each corner.
3. Gently drive the top rail and bottom rail off the glass with a mallet and block of wood. Remove the two (2) side rails and the bottom rail, being careful not to damage the reusable vinyl glazing channel.
4. Discard the removed glazing after stripping the vinyl glazing channel. Check the channel for adhered particles of glass or other foreign substances.
5. Wrap the glazing channel around the new glazing material. The corner cuts should match the corners and the splice will occur at the top center of the glazing. Apply butyl tape to this seam.
6. Drive the bottom rail on first, making sure that it is properly centered, then install the top rail. Next insert the corner keys into the side rails and align each with corresponding hole at top & bottom rails and install.
7. Secure all four corners with the secondary sash assembly screws.
8. If you have properly seated the rails to the glass and the glass is square, the complete assembly should be square.

**OPTIONAL GUARDIAN GLAZING SYSTEM -
(Pivot Hinged System)**

If sash are supplied with a Guardian Insert sash within the primary vent, the following directions will apply in addition to those previously mentioned.

Opening of Guardian Insert Sash:

1. Insert a 9/64" Allen key into each guardian lock and turn 90 degrees, to the open position.
2. The Guardian Insert is now free to open like a door.

Closing of Guardian Insert Sash:

1. Swing the Guardian Insert into primary sash frame.
2. Insert a 9/64" Allen key into each guardian lock and turn 90 degrees, to the locked position.

Reglazing of Guardian Insert Sash:

1. Open the Guardian Insert as described above.
2. Remove the Guardian Insert sash from primary vent by retracting the pivot pins located at the upper & lower corners of the Guardian Insert. This is done by opening the Guardian Insert and locating the release pins at the inside upper & lower corners of the Guardian Insert. Simply slide the lower release pin upward and gently remove the Insert sash from the primary vent. Place Guardian Insert sash on a flat, suitable work surface.
3. Gently drive the top rail and bottom rail off the glass with a mallet and block of wood. Remove the two (2) side rails and the bottom rail, being careful not to damage the reusable vinyl glazing channel.
4. Discard the removed glazing after stripping the vinyl glazing channel. Check the channel for adhered particles of glass or other foreign matter.
5. Wrap the glazing channel around the new glazing material. The corner cuts should match the corners and the splice will occur at the top center of the glazing.
6. Drive the bottom rail on first, making sure that it is properly centered, then install the top rail. Next insert the corner keys into the side rails and align each with corresponding hole at top & bottom rails and install.

Maintenance Manual
Model 6800

7. Secure all four corners with the secondary sash assembly screws.
8. If you have properly seated the rails to the glass and the glass is square, the complete assembly should be square.
10. To install the Guardian Insert sash into the primary vent, insert the lower pivot pin into the corresponding hole in the primary vent. Retract the upper pivot pin by lowering the release pin and align the pivot pin with the corresponding hole at the top of the primary vent, then release the pin. Each pivot pin is now secured into the primary vent.
11. Swing the Guardian Insert into closed position inside the primary vent and insert a 9/64" Allen key into each guardian lock and turn 90 degrees, to the locked position.

Protecting Flat Glass Surfaces

Flat glass must be protected during shipment and storage. Only by proper handling and storage techniques can the integrity and clarity of the glass be assured before installation. After installation, appropriate precautions and proper maintenance are needed for long and trouble-free service. In this section, we will explore the various causes of glass surface damage, means of prevention, and methods of identification and removal of stains.

The specific cause of glass surface damage is difficult to diagnose, and stain removal is usually costly. Therefore, prevention of such damage is better than any "cure". To prevent glass surface damage, follow the procedures for storage, installation, and maintenance that are recommended.

Causes of Glass Surface Damage

Once installed, glass can withstand large amounts of water without significant surface damage. However, water can accumulate when there is inadequate separation between lights in storage. Even small amounts of water trapped in this way can cause surface deterioration. Glass in contact with water enters into a series of complex chemical reactions that result in alkaline solutions. The trapped water reacts slowly initially, but in time the reaction accelerates, resulting in a rapidly increasing alkali concentration. The alkaline solution attacks the glass surface by dissolving away surface ingredients (sodium) which results in hazing and roughness. Initial attack may cause only faint whitening of the glass surface due to the change from a glassy silicate structure to a crystalline silicate structure.

At this stage, a light polishing or special chemical treatment would probably restore the glass surface. However, the condition worsens in time and the final stages of attack result in decomposition and deterioration of the appearance of the glass surface.

Chemical Air Pollutants

Certain chemicals can also deteriorate glass surfaces. While glass is resistant to most acids, even dilute forms of hydrofluoric and phosphoric acids quickly react with silica in glass. A variety of other chemicals can also attack glass surfaces. These substances are transmitted in airborne sprays and mists. They can be carried for some distances, not only in industrial, but also in rural and residential areas. Even solid particulates can break down into destructive compounds when held against glass surfaces by water condensation. Even water alone can be a surface damaging agent of glass. Certain types of hard water, for instance, may leave harmful deposits if allowed to dry on glass surfaces. These deposits can be formed in washing or rinsing the glass, or accidentally by the evaporation of water from such sources as lawn sprinklers. It is difficult or impossible to remove such residue without excessive polishing.

Alkali Attack

Building materials and construction methods can cause surface damage to glass. A very common cause of such problems is alkalis being leached from pre-cast concrete panels by rain, or fluorides in the washoff from concrete floors that have been treated for hardening. These materials will stain or etch the glass if allowed to remain for a few days. When this occurs, there is no practical method of restoring the glass surface.

Other sources of damaging alkalis are some lubricants used during installation of neoprene structural gaskets and locking strips. When using lubricants for such installations, avoid those containing high levels of alkaline ingredients. The gasket manufacturer should recommend a suitable lubricant.

Potentially harmful alkalis are also sometimes present in marking materials used on glass installations during construction. Such markings are, of course, useful in making the glass more visible, thus reducing accidental breakage. However, the marking materials may stain the glass if they contain alkalis, or if water vapor is allowed to condense on them.

Physical Damage

Glass surfaces can be altered by physical abrasions such as scratches, rub marks, and many different types of deposits. These can come during handling, installation and storage. Such damage may be similar in appearance to chemical deterioration. However, the difference can be determined under microscopic examination and various stain removal tests. Further surface damage is accelerated by abraded glass because a moisture present produces strongly alkaline solutions which attack the glass.

On the job site, the welding of metal close to window areas is often necessary and results in sparks, which can damage unprotected glass surfaces. The welding sparks which come in contact with the glass surface cause a thermal shock, which results in a pitting of the surface of the glass. As well as detracting from the appearance of the glass, this pitting may reduce the strength. Reduction of strength may have little relationship to the size of the pits since a smaller pit may have vents originating from it, which are not visible to the naked eye. In comparison, a much larger pit may only be harmless smooth spall. A microscopic examination of each pit would be necessary to determine the effect on the glass. Even with such a precise unrealistic examination, such a judgment would only be speculative.

Metals that oxidize (weathering steel for example) can leave a stain on the glass, which is difficult to remove. This oxidation of the steel stabilizes over a period of time, depending on the frequency of rainfall and other climatic conditions. However, the washoff from the steel during the initial oxidation can leave a residue of rust (iron oxide) on adjacent materials including glass. It may be difficult to remove this residue from the glass if it is allowed to acculate.

Hard setting adhesives including many epoxies and hide glue may cause damage to the surface of the glass. This is especially true in exterior applications where low temperatures may be encountered. The hard setting epoxies will contract the glass surface at low temperatures which can cause spalling, a harmful chipping of the surface. Hard setting epoxies may be used as a joint material for applications of glass on the building interior with little chance of this type of damage. Some types of resilient materials, which remain soft at low temperatures, may perform satisfactorily when used in exterior installations. The sealant manufacturer should be consulted when glazing sealants are to be used on the exterior of a building.

Protection of Glass Surfaces

Storage

Every practical attempt should be made to preserve the surface quality of glass. To prevent glass surface deterioration, water and chemicals should not be allowed to dry on the glass. Even chemically inert substances, which adhere to glass, should not be allowed to harden on glass surfaces. This is especially important in storage. Storage areas for glass should be maintained at a temperature and humidity that will prevent water vapor condensation on the glass. Glass should be stored at a nearly constant temperature above the dew point. The relative humidity should always be held less than 80%.

To unventilated areas, changes in temperature and humidity from night to day may produce conditions, which cause condensation. This is because the glass warms up at a much slower rate than the surrounding air. The air, as it gets warmer, may become more humid. With this condition, the glass may be below the dew point of the air. The result is condensation on the glass. Glass should not be stored under leaky pipes, roofs, skylights, or under cold water pipes, which may collect condensation in warm, humid weather.

On a jobsite, glass should be stored inside the building and should be protected from driving rain. Outdoor storage is always risky because of the strong chance of moisture condensation. Periods of outdoor storage should be kept to a minimum. Glass subjected to cyclic wetting and drying during storage can become stained or etched. This condition can occur during storage at a jobsite, warehouse, or a customer's cutting area, even while the glass is still in the shipping case. Glass stored out of the case should always be stored with interleaving or spacing between individual lites of glass.

Also, it is a good practice for the glazing contractor to caution the general contractor concerning glass surface damage from welding sparks. The general contractor should make sure that subcontractors follow all the necessary precautions.

Proper Cleaning of Glass

Often the first step of the identification of the stain on the glass is to determine how difficult it is to remove. Either Bon Ami cleaning powder, 5% solution of hydrofluoric acid, or cerium oxide can be used.

An area of the affected glass is masked off and subjected to a timed cleaning with one of these substances. If the deposit is not quickly and cleanly removed, some permanent attack of the glass or good adhesion by some other material is evident. When cleaning stained glass, especially with a buffered acid solution, care should be taken to protect surrounding building materials, such as painted or anodized metals.

In such cases, a sample of the damaged glass may be sent to the Architectural Service Department of (Supplier of Glass). As a service to glass customers and to the users of these glass products, we analyze such samples and subject them to a number of removal processes. Their technicians will determine:

1. If the stain can be removed.
2. Which stain removal process is most effective.

When required, their technical personnel can make a jobsite inspection and attempt to remove the stain. They advise the glass user about the best techniques to remove the stain from the remainder of the product.

Stain removal is time consuming and costly. Again, we stress that the original integrity and surface quality of glass products is best maintained by proper storage, handling, installation, and maintenance before damage occurs. If you have problems, however, we are at your service.

Protection and Maintenance of Monolithic Glass with Reflective Coating

Monolithic reflective glass with reflective coated surface is glazed to the building interior. To properly protect and clean monolithic reflective coated glass, the same general guidelines apply as for any other flat glass product. However, greater care must be exercised to prevent damage to the filmed surface.

Monolithic reflective coated glass can be maintained by ordinary window washing techniques using non-abrasive cleaners. For routine cleaning use a conventional window washing solution. Ammonia and water, mild household detergents or cleansing agents such as Windex are all suitable. Uniformly spray or apply the solution with a clean soft cloth, sponge or pad, rinse thoroughly and wipe or squeegee dry. Make sure no metal parts of the cleaning equipment touch the coated glass surface and that no abrasive particles are entrapped between the glass and the cleansing materials. The general contractor and other building trades should be alerted that room-side glazed surfaces are coated, and that care must be taken to protect them against damage during construction activities. When necessary during construction, the glass should be protected with a clear plastic material or similar screening device. The protective material should not touch the glass surface, and the air space between the temporary screening and the glass space between the temporary screening and the glass should be vented to reduce the possibility of moisture staining or thermal breakage. As soon as possible following completion of construction activities in the glazing area, the protective materials should be removed and the glass properly washed.

Protection of glass against damage on the jobsite is usually the responsibility of the general contractor. Therefore it is a good practice for the glazing contractor to advise him that the glass should be washed during and after construction, or until alkalis are no longer leached from other building materials.

Actually, the glass should be washed at frequent intervals during construction. Soft, clean, grit-free cloths and a mild, non-abrasive, non-alkaline cleaning solution should be used. The glass should be rinsed immediately with clean rinse water, and excess rinse water should be removed promptly with a squeegee. Grease and glazing materials should be removed with xylene or toluene, followed by normal washing and rinsing.