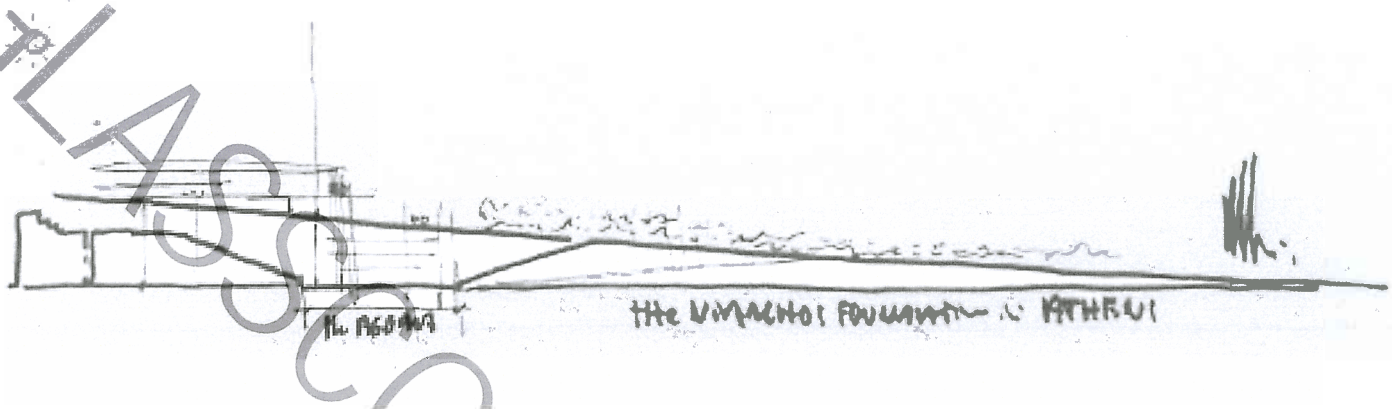
GLASSCON
PREMIUM ARCHITECTURAL BUILDING SKINS



PROJECT: STAVROS NIARCHOS FOUNDATION CULTURAL CENTER

"FT-03 CUSTOM MADE FAÇADE SYSTEM"

Operation & Maintenance Manual

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1. GENERAL INFORMATION

The "custom made façade system FT-03" is designed for minimum maintenance requirements once properly installed. All moving contacts on the operable windows are aluminum against nylon, so no lubrication is required. However, guide tracks should be cleared of dirt and debris periodically.
The following sheets describe parts for the GLASSCON products supplied for typical projects. Occasionally, a part will break and need replacing. The materials in this packet are based on typical window types and job conditions.

2. GLASS CARE MAINTENANCE AND CLEANING

2.1 GENERAL CLEANING

Wash, rinse, and dry the glass at frequent intervals particularly during construction. For all glass surfaces, except coated glass use soft, clean, grit-free cloths, to apply a solution of a mild soap or detergent in water with a maximum of 2% concentration, or use a slightly acidic cleaning solution. Do not allow the soap or cleaning solution to dry on the surface. Follow this immediately with a high volume of clean water, and prompt removal of excess rinse water with a clean squeegee. ***Ensure that not only the glass, but also the surrounding surfaces are rinsed well.***

Some important Cautions

1. Do not mark or coat glass partially or completely with "x's" or other symbols with any material whatsoever. If paper or adhesive is alkaline in character, the contact area may be attacked directly. If paper or adhesive is neutral or slightly acid in character, it may "protect" the contact area and permit adjacent exposed surfaces to weather or age. Although subtle, such conditions are sometimes sufficiently evident to be annoying.
2. Splatter from welding may cause permanent surface damage, reduce strength, and lead to breakage.

2.2 CLEANING OF COATED OR REFLECTIVE SURFACES

Clean coated glasses with a solution of mild soap or other mild detergent in water with a maximum concentration of 2%. Apply this with grit free clothes or sponges, followed immediately by rinsing the glass and surrounding areas with a high volume of clear water and removal of excess rinse water with a squeegee. Do not allow the soap solution to dry on the surface. Remove grease and glazing materials with commercial solvents such as xylene, toluene, mineral spirits or naphtha and follow with normal wash and rinse. Be careful not to damage glazing or insulating unit seals by over generous applications of strong solvents. Comply with solvent manufactures directions on label for toxicity and flammability warnings.
Because fingerprints, grease stains, smears, dirt, scum, sealant residue, scratches, and abrasions (on either surface) are more noticeable on reflective glasses than on non-reflective glass. Take extra care in cleaning to be sure that gritty dirt particles picked up by the cloths do not scratch the glass. Coated glasses should be cleaned at least 3-4 times per year so that materials such as metal irons, alkali rundown from concrete, stucco, etc. are not permitted a long residence time on the coated glass surfaces. As residence time of the stain increases, there is an increasing probability that diffusion into the coating will occur. This results in a

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more difficult stain to remove and could damage the coating. Do not use harsh cleaners, abrasive cleaners, alkaline materials, fluoride salts, chlorine based cleaners or hydrogen producing compounds.

NOTE: All cleaning products must be completely rinsed from the glass and surrounding surfaces before the process is complete.

2.3 DEGLAZING AND REGLAZING FOR GLAZED APPLICATIONS

Deglazing of Broken or Defective Glass

1. Remove glazing beads by applying pressure to the inside lower edge of the bead to compress the glazing vinyl. While maintaining inward pressure give a slight upward movement. If the bead is tight it may be necessary to insert a putty knife in the crevice between the bead and the sash of the frame then give a slight twisting motion as pressure is applied to the bead.
2. Remove broken or defective glass—in some cases it may be necessary to cut the old sealant loose from the glass by running a utility knife between the glass and the glazing leg.
3. Remove all existing sealants and dirt from the glazing surface of the sash or frame. This is usually done by scraping with a putty knife or similar object.
4. Wipe down the sash or frame glazing surface with a solvent saturated oil-free cloth. Suitable solvents include xylol, toluol or methyl ethyl ketone. Always follow the manufactures' instructions for handling of solvents.

Glazing/Reglazing the Window

1. Apply a bead of silicone sealant to the glazing surface. Glazing surfaces should be prepared in accordance with the sealant manufactures' instructions to assure good adhesion. Surrounding temperatures must be within the sealant manufactures' specified range during application and curing. Special attention must be given to condensed moisture or frost on cold metal surfaces with can occur if glazing when temperature in below 40 F.
2. Install setting blocks and edge blocks—glass should always be set on two identical rubber setting blocks of an acceptable rubber material having a shore a durometer hardness of 85+/-5. The setting blocks should be the proper size and design to assure full bearing surface of both lites of glass in an insulated unit.
3. After inserting the glass, reinstall horizontal glazing beads and then the vertical beads by applying an inward pressure on the inside bottom of the bead with a slight downward pressure. Some types of glazing may require a slight tap from a rubber hammer/mallet to get the bead started.
4. Clean off excess sealant with a clean cloth or paper towel.
5. Allow sealant to cure a minimum of 24 hours before operating the window, see sealant manufacturers' instructions for actual cure time.

NOTE: GLASSCON assumes no responsibility for failure of insulated glass units due to faulty installation.

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3. FINISH CARE MAINTENANCE AND CLEANING

3.1 PAINTED ALUMINUM CARE AND CLEANING

General Cleaning Procedure:

Start cleaning at the top of the window(s) at the highest part of the building, rinse the area moving downward with moderate water pressure to dislodge the soil. If rinsing with moderate water pressure does not remove soil then low pressure scrubbing with a soft bristle brush or sponge may be employed. The washing should be accomplished with uniform pressure, cleaning first with a horizontal motion and then with a vertical motion. Care should be taken to not mar or scratch the surface. Thoroughly rinse the surface after scrubbing.

Removal of light surface soil:

If soil remains after the above procedure has been attempted, a solution of mild soap in water with a maximum concentration of 2% may be applied with a soft bristle brush, sponge or soft cloth. The washing should be accomplished with uniform pressure, cleaning first with a horizontal motion and then with a vertical motion. Care should be taken to not mar or scratch the surface. ***The surfaces must be thoroughly rinsed by spraying a large volume of clean water*** and thoroughly dried with a clean cloth. Do not allow soap solution to dry on the painted surface or surrounding surfaces. To minimize rundown of cleaning products over the lower portions of the building rinse such areas as soon as possible. ***When rinsing pay special attention to joints and crevices.***

Removal of heavy surface soil:

If surface soil still adheres after using the above procedures spot cleaning with some type of mild solvent such as mineral spirits, or isopropyl alcohol may be used to remove grease, sealant or caulking compounds. Use extra caution to avoid allowing these solvents to contact any gaskets or other rubber or plastic parts. Strong solvents or cleaners containing solvents may have a deleterious or softening effect on paints and should be avoided. To prevent harm to the finish, these types of solvent or emulsion cleaners should be spot tested and the coating manufacturer should be consulted. Care should be taken to not mar or scratch the surface, since this could give an undesirable appearance if viewed from certain angles. Cleaners of this type are usually applied with a clean cloth and removed with a clean cloth. ***Remaining residue should be washed with the above mild soap solution and rinsed with a high volume clean of water***. Use solvent cleaners sparingly, remove promptly and rinse thoroughly. Always follow manufactures instructions for handling of solvents.

Some important Do's & Don'ts:

- DON'T use paint removers, aggressive alkaline, acid or abrasive cleaners.
- DON'T use cleaners containing trisodium phosphate, or highly alkaline, highly acidic, fluoride or chlorine based cleaners.
- DON'T mix different cleaners.
- DON'T attempt to clean hot, sun-heated surfaces since possible chemical reactions on hot metal surfaces will be highly accelerated, and cleaning no uniformity can occur. Surfaces cleaned under

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these adverse conditions can become streaked or stained so that they cannot be restored to their original appearance.

- DON'T use strong cleaners on other building accessories where it is possible for the cleaner to come in contact with the painted surface. If an aggressive cleaner is required for some other component of the building, extreme care must be taken to prevent the cleaner from contacting the aluminum finish.
- DON'T allow any cleaning products to dry on the painted surface or surrounding surface.
- DO follow the manufacturer's recommendations for mixing and diluting cleaners.
- DO test clean a small area first.
- DO protect the aluminum from building fallout such as wet plaster, mortar, dust, paint, welding splatter and the like, during installation.
- DO remove alkaline building materials such as wet plaster and wet mortar immediately and washed the soiled area with clean water.
- ***DO thoroughly rinse away all cleaning products with a high volume of clean water.***

NOTE: GLASSCON will not be responsible for defects caused by exposure to corrosive chemicals.

3.2 ANODIZED ALUMINUM CARE AND CLEANING

General Cleaning Procedure:

Start cleaning at the top of the window(s) at the highest part of the building, rinse the area moving downward with moderate water pressure to dislodge the soil. If rinsing with moderate water pressure does not remove soil then low pressure scrubbing with a soft bristle brush or sponge may be employed. The washing should be accomplished with uniform pressure, cleaning first with a horizontal motion and then with a vertical motion. Care should be taken to not mar or scratch the surface. Thoroughly rinse the surface after scrubbing.

Removal of light surface soil:

If soil remains after the above procedure has been attempted, a solution of mild soap in water with a maximum concentration of 2% may be applied with a soft bristle brush, sponge or soft cloth. The washing should be accomplished with uniform pressure, cleaning first with a horizontal motion and then with a vertical motion. Care should be taken to not mar or scratch the surface. ***The surfaces must be thoroughly rinsed by spraying a large volume of clean water*** and thoroughly dried with a clean cloth. Do not allow soap solution to dry on the painted surface or surrounding surfaces. To minimize rundown of cleaning products over the lower portions of the building rinse such areas as soon as possible. ***When rinsing pay special attention to joints and crevices.***

Removal of heavy surface soil:

If surface soil cannot be removed by the above noted procedures, cleaning with the assistance of an abrasive pad can be employed. CAUTION: Abrasive pads should not be used on surfaces with a factory applied clear organic protective coating (lacquer) unless the clear coating has deteriorated and must be removed. Thoroughly wet with clean water or the mild soap solution mentioned above. Hand scrub the surface using a nylon abrasive cleaning pad such as Norton Bear-Tex No. 668 or 3M Scotch Brite No. 7447. Begin at the top and work down, rubbing with uniform pressure across the surface in the direction of the metal grain. After

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scrubbing, the metal surface should be thoroughly rinsed with clean water or wiped with solvents to remove all residues. ***Thorough rinsing is required and cleaning products should not be permitted to dry on the surface***. Wipe dry with a clean cloth. Do not use excessive abrasive scrubbing even on stubborn stains. This can adversely affect the finish and may result in an appearance that is even more undesirable than the stain. This also could void the warranty.

Removal of non-water soluable deposits:

If it is necessary to remove oils, wax, polish, or other materials, MEK, Xylene, Acetone or Toluene solvent is recommended. CAUTION: MEK and similar solvents may damage organic sealants, gaskets, or glazing materials, and should be used with extreme care in order to not come in contact with these materials. Solvents should be avoided on anodic finishes protected by clear organic coatings. Always follow the manufacturer's instructions regarding handling of solvents.

Some important Do's & Don'ts:

- DON'T use aggressive alkaline or acid cleaners on aluminum finishes.
- DON'T use cleaners containing trisodium phosphate, phosphoric acid, hydrochloric acid, hydrofluoric acid, fluorides, chlorine based cleaners or similar compounds on anodized aluminum surfaces.
- DON'T mix different types of cleaners.
- DON'T attempt to clean hot, sun-heated surfaces since possible chemical reactions on hot metal surfaces will be highly accelerated, and cleaning no uniformity can occur. Surfaces cleaned under these adverse conditions can become streaked or stained so that they cannot be restored to their original appearance.
- DON'T use strong cleaners on other building accessories where it is possible for the cleaner to come in contact with the painted surface. If an aggressive cleaner is required for some other component of the building, extreme care must be taken to prevent the cleaner from contacting the aluminum finish.
- DON'T allow muriatic acid (hydrochloric) used for cleaning brick to drip on the aluminum. If this should occur, the acid should be immediately washed off with clean water.
- DON'T allow cleaning products to dry on the anodized surface or the surrounding surfaces.
- DO follow the manufacturers recommendations for proper mixing and diluting of cleaners.
- DO test clean a small area first.
- DO protect the aluminum from building fallout such as wet plaster, mortar, dust, paint, welding splatter and the like, during installation.
- DO remove alkaline building materials such as wet plaster and wet mortar immediately and washed the soiled area with clean water. If these materials are allowed to remain in contact with the anodized surface for an extended period of time, staining will occur.
- ***DO rinse off all cleaning products with a high volume of clean water.***

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4. RECOMMENDED MAINTENANCE FOR WINDOWS IN A COASTAL ENVIRONMENT

4.1 PERIODICALLY

- Blow or vacuum all sand and salt residue from all sill tracks and/or weeps.
- Wash the exterior of the system, both glass and frame, with the same mild soap solution mentioned previously in these instructions. Thoroughly spray rinse with a high volume of fresh water. When cleaning, the use of foam sponges and soft bristle brushes are acceptable. (Reference previous sections.)
- Care of Steel hardware. Steel is rust resistant due to the hot deep galvanize treatment. However regular care and maintenance is still required to ensure the longevity and maintain the appearance of this material. Since the base material is a form of steel, surface staining can occur in aggressive environmental condition.
- Wash surface regularly with warm, clean water and the same mild soap solution previously mentioned. Follow this with a thorough rinse with a high volume of clean water. The soap solution should only be used if surface deposits are visible.
- If any surface staining does occur, use only a stainless steel cleaner to remove the staining per the manufacturer's instructions.
- DO NOT use household cleansers, abrasive cleansers, or steel wool at any time to clean the surface.

4.2 QUARTERLY

- Clean all sand from both the window latch mechanisms.
- Clean sand from moving parts. Avoid using spray lubricants as they will promote adherence of outside elements.

4.3 ANNUALLY

- Check all exterior caulk and seals, recaulk where necessary.

NOTE: The performance and record keeping of this preventive maintenance is required per EFCO's warranty terms and conditions and will help to ensure that your EFCO products continue to function as they were designed and will help to extend the life of the product.

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5. MAINTENANCE INTERVAL OF TOP HUNG OUTWARD PROJECTING WINDOW

5.1 GENERAL MAINTENANCE

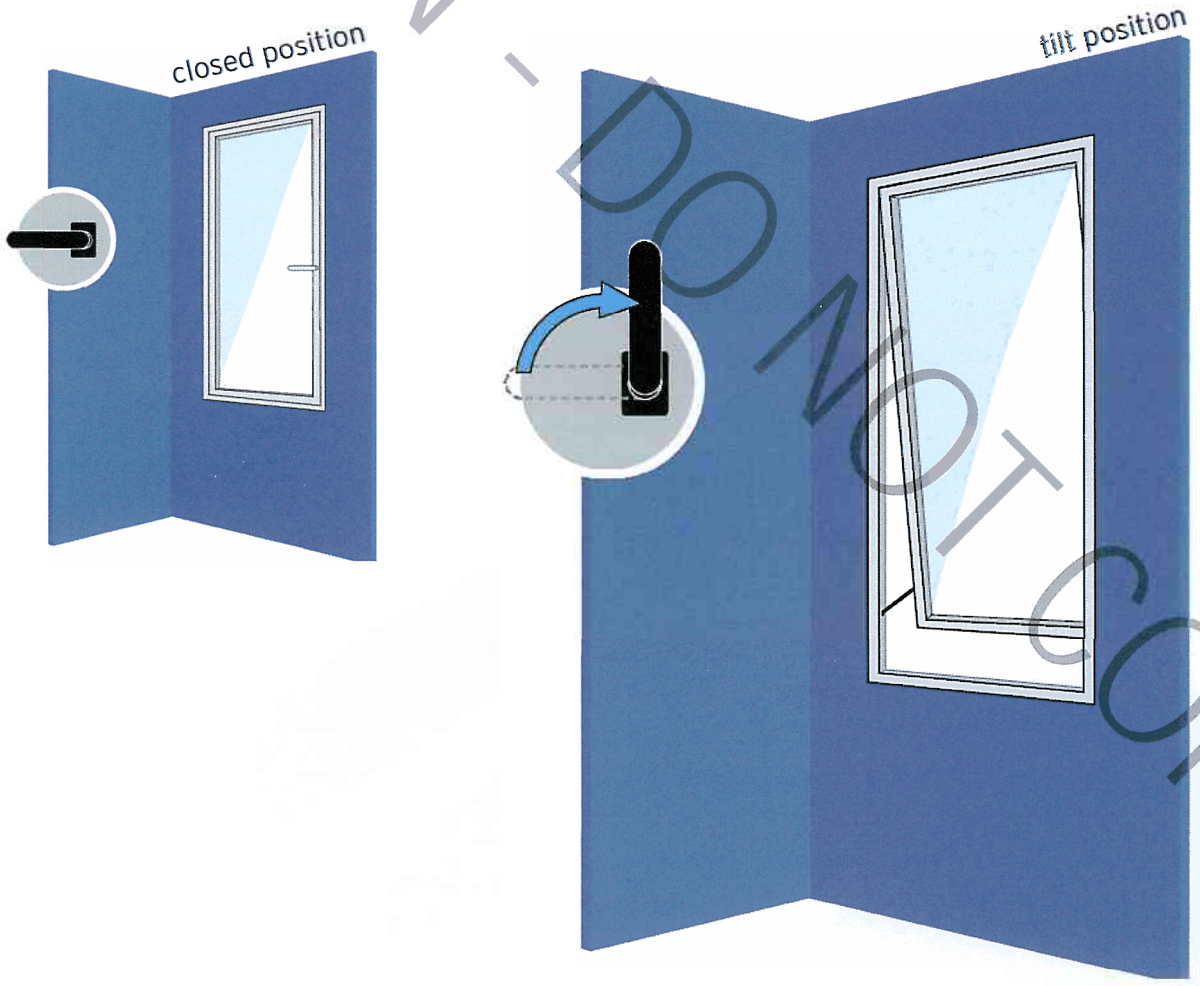
Regular supervision of the elements is of major importance. The timeframe interval between these check-ups depends on the installation situation and the amount of window or door movements. This is defined in the contract with your fabricator.

Any possible irregularities in the operation (slowness, unusual sounds, etc.) which might occur during maintenance must be reported immediately to the concerned specialist. Windows and sliding doors should undergo regular maintenance to prolong their service life and to ensure their functionality and the conservation of value.

Frequency of maintenance for profiles and hardware in non-corrosive atmospheres and provided that the aluminum constructions are exposed to rain: twice a year. In all other cases: minimum 4 times a year.

Some corrosive atmospheres or other risk factors (e.g. limited rain) may however require even more frequent cleaning to be observed by the end-user.

- By operating the handle, the window sash is projected towards the outside, with limited opening angles. A position with the handle pointing downwards is not possible.



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5.2 MAINTENANCE OF DRAINAGE SLOTS

Clean the chamber between the moving and the fixed part every 6 months. If necessary, clear the drainage slots of any blockings.

5.3 MAINTENANCE OF GASKETS

Once a year, apply normal domestic talc to the gaskets (in EPDM) between the moving and the fixed part of the element, or apply liquid silicone (by means of a cloth), to avoid cracks and deposits.

6. GENERAL INSPECTION AND PRECAUTIONS

It is suggested that the building owner provide a qualified inspector who will see that the desired effect is being obtained with the use of sound procedures. Inspection should commence early in the cleaning procedure. Consideration must be given to possible effects of run-down on shrubbery, personnel, equipment, etc., located below. These factors may require considerations toward methods of timing.

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