



Glass Informational Bulletin

GANA TD-03-1003

## Construction Site Protection of Architectural Glass

### Steps Must Be Taken to Avoid Permanent Damage to Glass

Architectural glass products used in windows, doors and skylights for today's residential and commercial building projects are more sophisticated than those used in earlier fenestration applications. Performance requirements call for glass to be coated and insulating in order to be more energy efficient; and often heat-treated and laminated to provide greater strength, safety, and security. As a result of increased performance capabilities, more glass is being used in both residential and commercial construction. The higher valued products have increased the importance of proper site storage, handling, installation and protection throughout the construction process.

During glass manufacturing, fabrication and installation, products are carefully handled to prevent surface and edge damage. Materials are packaged to provide protection during shipment and delivery. Once finished materials are placed on a construction site, they become exposed to a variety of conditions and influences that can adversely affect product aesthetics and functionality. Irreparable glass damage can occur from improper storage and handling, exposure to chemicals and leaching agents, prolonged exposure to moisture, mechanical attack and breakage, damage related to adjacent construction activities and improper cleaning methods.

#### Site Delivery and Storage

Windows, doors and skylights for residential construction typically arrive on construction sites preglazed, while commercial construction applications often require that individual lites of glass be delivered to the site and glazed at a later date. In both types of construction, it is vital that materials be properly stored. The complex nature of construction projects and site management require well-planned and executed material delivery and storage. The following is a list of recommended practices for site delivery and storage of fenestration materials:

- Glass and glazing system suppliers should be consulted for specific recommendations on the site storage, handling, installation, and protection of their materials before any work is started.
- To the extent practical, glass deliveries should be coordinated to minimize on-site storage durations.

- Subcontractors should work with the general contractor or builder to select on-site under roof storage locations that avoid direct rain and water runoff; work areas of other trades; areas of high traffic; and to minimize material movement and handling.
- Individual cases of glass and preglazed materials should be secured, blocked, and braced to prevent falls.
- Blocks or supports should ensure that the bottom edge of materials will be kept well above potential puddles of rainwater.
- Provide secure, temporary covering that prevents direct water flow but ensures ventilation and combats condensation buildup on the glass.
- Clearly mark protected areas of glass cases and preglazed materials using colored ribbons or tape.
- Ensure that stored materials are not subjected to corrosive agents, such as concrete and masonry runoff.
- Ensure that stored materials are not exposed to activities of other trades such as welding, painting, insulating, and fireproofing.
- Establish a program for daily inspection of stored glass and glazing systems to monitor conditions and ensure prompt corrective action when needed.

### **Trade Awareness**

As fenestration materials are delivered to a residential or commercial construction site, it is recommended that all construction trades be made aware of the potential for permanent damage and their level of responsibility in the event materials are subjected to harmful conditions. Site supervision must ensure that, in the event of damage, prompt attention is called to the conditions and a trained professional properly cleans the fenestration materials.

### **Site Handling and Installation**

Trade professionals should execute site material handling and installation of fenestration materials. Residential and light commercial windows, doors, and skylights should be installed in accordance with ASTM International document E 2112 – *Standard Practice for Installation of Exterior Windows, Doors and Skylights*. Glass for commercial glazing applications should be handled and installed in accordance with guidelines set forth in the Glass Association of North America (GANA) *Glazing Manual*.

## Post Installation Inspection and Protection

After installation, special attention should be given to construction activities in order to prevent exposure of glass in windows, doors and skylights to welding, paint, plaster, sealants, fireproofing, and alkali and chemical attack. The subcontractor and general contractor or builder should inspect and document the condition of the glazed materials on a daily basis. At this stage of construction, the general contractor or builder is encouraged to remind other construction trades of the potential for damage to the glazed materials and to implement systems for protection. The following is a list of common conditions and causes that damage glass after installation:

**Condition:** Wet glass – resulting in permanent surface corrosion/staining

**Cause:** Outside, uncovered or extended storage; inadequate ventilation; improper glass separation

**Condition:** Glass surface or edge damage

**Cause:** Inadequate on-site protection; storage locations; exposure to other trades

**Condition:** Chemical attack and surface corrosion

**Cause:** Overspray and runoff of chemicals from sealing/cleaning of concrete, masonry, roofing, etc; inadequate protection and/or poor storage location

**Condition:** Weld-splatter surface damage and reduction in strength

**Cause:** Location of glass near welding; inadequate protection of stored or installed glass

**Condition:** Surface corrosion and stain from concrete and masonry runoff

**Cause:** Poor storage and/or protection of uninstalled glass; absence of prompt, interim cleaning of installed glass during construction

## Construction Clean-Up

If glass is exposed to harmful materials or conditions during construction, the general contractor or builder and all trades should be immediately advised of the potential damage. The glazing contractor and glass fabricator/supplier should be consulted for damage assessment and corrective actions.

Deep surface scratches, contact by hot weld-splatter and edge damage threaten the structural integrity of glass and may require glass replacement. Surface contact with harmful materials will require prompt cleaning by a trained professional window cleaner. Glass should be cleaned in strict accordance with the Glass Informational Bulletin - *Proper Procedures for Cleaning Architectural Glass Products*. General contractors, builders, owners, and window cleaners should also consult the Glass Informational Bulletin – *Heat-Treated Glass Surfaces are Different* for additional considerations when cleaning heat-strengthened and tempered glass products. Both documents are published by the Glass Association of North America and are available for free download from the GANA website: [www.glasswebsite.com](http://www.glasswebsite.com) or by contacting the association headquarters at (785)-271-0208.

If harmful exposure results in conditions that cannot be cleaned using the industry guidelines, the glass fabricator/supplier should be consulted for recommendations on more aggressive glass polishing and chemical cleaning procedures. The use of a more aggressive procedure may itself damage the glass. Careful thought and discussion must precede the use of aggressive cleaning procedures.

The general contractor or builder may need to schedule regular cleaning during the construction process. Extended construction schedules and site conditions often result in dirt and debris build-up. Professional cleaning at the initial signs of build-up can decrease the potential for glass damage.

### **Long-Term Building Maintenance & Performance**

Following the completion of the construction project and throughout the life of the building, windows, doors, and skylights should be properly cleaned. Building facades may be exposed to sealant rundown, pollutants, dirt and debris, which can attack and damage glass surfaces over time. Building maintenance schedules should include frequent cleaning to ensure long-term glass aesthetics and performance.

Building owners should ensure that individuals cleaning fenestration materials are well aware of the products in the building and are knowledgeable of cleaning procedures and practices recommended by the manufacturer and the glass industry.

Proper protection of glass in windows, doors, and skylights throughout the construction process and the life of a building is essential. Planning and execution of the practices offered in this bulletin will enable the glass to meet the aesthetic and performance expectations, and the needs of the building occupants.

*This bulletin was developed by the GANA Tempering Division - Construction Subcommittee and approved by the Tempering Division - Standards & Engineering Committee and GANA Board of Directors. This is the original version of the document as approved and published in October 2003.*