

# Protective Glazing Manual

## 2010 Edition



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## Glass Association of North America

Founded in 1994, the Glass Association of North America (GANA) originated as an amalgamation of the Flat Glass Marketing Association (FGMA – founded in 1949), Glass Tempering Association (GTA - founded in 1958) and the Laminators Safety Glass Association (LSGA – founded in 1977). The three associations had a history of cooperation, having first worked together in 1976 to form Centric Management and Consulting, Inc., a multiple association management company, as a means of providing more efficient and less costly administrative services to their respective associations and other interested associations. Later, they aggressively pursued the formation of the Glazing Industry Code Committee as a means of dealing more effectively with the model building codes. More recently, member concern regarding the number of industry meetings each year and the quality of the programs led to their bringing together the primary glass and metal companies to initiate Glass Week™, the annual glass industry convention. The amalgamation was the logical next step in their organizational evolution.

The original structure of GANA consisted of three Divisions – Distribution/Installation, Laminating and Tempering with each Division having equal representation on the Association's Board of Directors.

In 1997 the Distribution/Installation Division split into two Divisions: Distribution and Building Envelope Contractors (BEC). The BEC Division diversified to focus on the specific needs of the building envelope suppliers and erectors. In 2000, the North American Association of Mirror Manufacturers (NAAMM) joined GANA and formed the Mirror Division. Following that merger, the Primary Glass Manufacturers Council (PGMC) followed suit and in 2002, became the Flat Glass Manufacturing Division. Also in 2002, in response to request from member companies, the GANA Board of Directors voted to transform the Distribution Division into the Insulating Division to serve the manufacturers and suppliers of the insulating glass industry. In 2007 the newest GANA Division was created to serve the decorative glass industry: the Decorative Division. This Division was created based upon a need from GANA's membership base to serve this newly expanding glass and glazing subset. Currently, the Association strives to serve the needs of the glass and glazing industry with seven Divisions: Building Envelope Contractors, Decorative, Flat Glass Manufacturing, Insulating, Laminating, Mirror and Tempering.

GANA members also conduct business under non-Division Committees that are focused to broad topics that cover membership interest in various Divisions: Energy Committee, Fire-Rated Glazing Council, Glazing Industry Code Committee, Marketing Committee and Protective Glazing Committee. All of these Committees have specific projects conducted that benefit not only the singular group, but the glass and glazing industry as a whole.

Meetings are an important resource for GANA members. They provide regular opportunities for members to share information, ideas and experiences with peers, customers and suppliers. GANA conducts numerous industry meetings and educational seminars each year. Industry executive management and technical leaders gather in the first quarter of the year for the annual Glass Week™ meeting. Glass Week™ features committee meetings, industry topic forums as well as networking and social opportunities. The BEC Division hosts the annual Building Envelope Contractors (BEC) Conference™, the industry's leading opportunity for suppliers and window and curtain wall erectors to gather and address industry issues in the Spring of each year. Spring brings the annual Glass Fabrication & Glazing Educational Conference™ with in-depth training on glass decorative, insulating, laminating and tempering fabrication procedures as well as technical presentations and forum discussions for glazing contractors. The annual GANA Fall Conference provides a second gathering for committee meetings, industry presentations and networking.

While each Division has a number of committees that address subjects of specific concern to its members, their Technical Committees are responsible for the Association's major publications. GANA publishes a number of technical manuals and informational bulletins, but the *Glazing Manual*, *Sealant Manual*, *Engineering Standards Manual* and the *Laminated Glazing Reference Manual* are the most referenced and extensively used by industry, government, architects and specification writers. The Technical Committees make a concerted effort to see that Association technical manuals and information reflect the current state of the industry.

GANAs staff actively represents the industry in the development of industry codes and standards, and serves as a liaison to other fenestration related organizations such as the American Architectural Manufacturers Association (AAMA), American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE), ASTM (American Society of Testing and Materials) International, Insulating Glass Manufacturers Alliance (IGMA), National Glass Association (NGA), and Protective Glazing Council (PGC) International.

GANAs General Counsel monitors the activities of Congress and those federal regulatory agencies that impact the Association's members or the industry. In addition to advising the officers, directors and staff, the Counsel regularly attends Association meetings and monitors its activities and publications to ensure strict compliance with current laws and regulations, particularly anti-trust.

Timely communication is essential in today's business environment. The association's website, [www.glasswebsite.com](http://www.glasswebsite.com), along with the GANA members' only section which features Committee, Subcommittee and Task Group agendas, minutes and working documents, *Glass Reflections*, GANA's electronic newsletter, Special Bulletins (issued on an as needed basis), monthly Safety Bulletins, USGlass Magazine (official monthly magazine publication of GANA) and Human Resource Reports as needed all serve to keep members informed regarding those technical, employee, energy and environmental issues that are a part of the day-to-day operation of a glass business.

GANAs is committed to continuing its efforts to help members develop the management skills needed to remain competitive in a continually changing business environment, while maintaining the flexibility to respond promptly to matters of importance to members and the industry.

## Protective Glazing Council International

Incorporated in 1998, the Protective Glazing Council (PGC) International originated from the formation of the Technical Advisory Committee on Blast Resistant Glazing Systems (TACBRGS) a year prior. TACBRGS was formed to facilitate dialogue between government agencies and the protective glazing industry. Its specific mission was to supply technical support to government and commerce on the development and adoption of blast resistant and hazard mitigation glazing systems. Members present throughout the activities of TACBRGS decided the purpose of the committee was not temporary, but held continual importance and evolution. With that in mind, the Protective Glazing Council was formed. Ten years later, in 2008, the organization added the term “International” to its name to better represent the use of protective glazing products and systems around the world.

PGC International is a trade organization that specializes in protective glazing products, technologies, and services. It is a unique organization that is able to bring both glass and film manufacturers together within one organization, resulting in a well-rounded membership base that is able to work jointly for the betterment of the industry. PGC International members come from various segments of the industry including: glass fabricators, suppliers of materials and accessories, window film manufacturers, curtain wall and window manufacturers, sealant suppliers, test laboratories and consultants, and the fenestration industry. Currently the association strives to serve the needs of six different areas within the protective glazing realm: ballistics, blast, fire, forced entry, hurricane and seismic.

Many of PGC International’s activities are generated through one of its two committees. The Marketing Communications Committee handles the promotion related to PGC International initiatives and programs; it also acts as the planning committee for all events hosted by the Association. The Technical Resources Committee is responsible for developing educational resources and voluntary guidelines for the protective glazing industry. Technical Committee members are aware of existing needs in the industry and make efforts to create references that will accommodate them.

PGC International staff represents the Association alongside its members, acting as liaisons to other industry-related organizations such as the American Architectural Manufacturers Association (AAMA), the Building Owners and Managers Association (BOMA), the Glass Association of North America (GANA), the National Institute of Building Sciences (NIBS), and the Sealant, Waterproofing and Restoration (SWR) Institute; as well as governmental agencies including the Bureau of Alcohol, Tobacco, Firearms, and Explosives (ATF), the General Services Administration (GSA), and the Interagency Security Committee (ISC).

PGC International’s General Counsel monitors the activities of federal regulatory agencies that impact the Association’s members or the industry. The Counsel regularly attends Association meetings, tracks its involvements, and reviews documents to be published to ensure compliance with current laws and regulations, particularly anti-trust. The Counsel also acts as an advisor to the officers, directors and staff as needed.

Members are kept informed about what is occurring in their Association and industry through PGC International’s website, [www.protectiveglazing.org](http://www.protectiveglazing.org), and through quarterly E-News bulletins.

PGC International is committed to identifying programs that encourage the use of protective glazing products and technologies, and promote the growth of the protective glazing market.

## Disclaimer

The Glass Association of North America (GANA) and the Protective Glazing Council (PGC) International have produced this *Protective Glazing Manual* solely to provide general descriptions and information concerning the basics of protective glazing materials and systems. It is the responsibility of the user of this Manual to ensure that protective glazing is selected and installed by competent professionals in compliance with all relevant laws, rules, regulations, standards and other requirements.

GANA and PGC International disclaim any liability for any loss or damage of any kind arising out of the use of this Manual and all those using it agree, as a condition of its use, to release GANA, PGC International, their members, officers, directors, employees and agents from any and all liability, loss or damage of any kind or nature arising out of or related in any way to its use. Users of this Manual understand that GANA and PGC International are not responsible for any errors or omissions of any kind contained in this Manual and that GANA and PGC International do not design, develop, manufacture, or guarantee any glazing materials or any other products described in this Manual and do not make any express or implied representations or warranties as to fitness, merchantability, patent infringements or any other matter respecting any products, processes or equipment referred to in this Manual. GANA and PGC International do not guarantee any results of any kind relating to the use of this Manual. GANA and PGC International expressly reserve the right, in their sole discretion, to revise, amend, or otherwise modify the Manual from time to time as they see fit and to do so without notice to prior recipients of the Manual.

The standards referenced in the GANA/PGC International *Protective Glazing Manual* are under the jurisdiction of a number of organizations and agencies and are continuously being revised. The documents referenced in this Manual were those in effect as of May 2010. The most recent standards should be referenced. Full names of reference standards and publishing entities are listed in the appendices.

Drawings contained herein are not to scale.

## Introduction to Protective Glazing

Protective glazing has various definitions depending upon the context in which it is used. It can mean glazing that has been designed to minimize injury and property damage from bullets, blast waves and/or physical attack. It can also mean glazing that has been designed to protect people and property from windborne debris associated with hurricanes.

Depending on the product make-up, protective glazing can also fulfill a range of other performance criteria, such as blocking the spread of smoke and flames, reducing unwanted noise, and insulating against heat gain and loss for improved building energy efficiency.

In short, protective glazing is a versatile medium that has the unique ability to enhance daylighting and allow the picturesque beauty of nature to shine through while providing a virtually transparent shield of protection against many unwanted assaults.

This Manual describes the types of protective glazing available, as well as the U.S. and international standards and levels of protection they provide, although the primary focus of this Manual is upon U.S. standards and protection levels.