

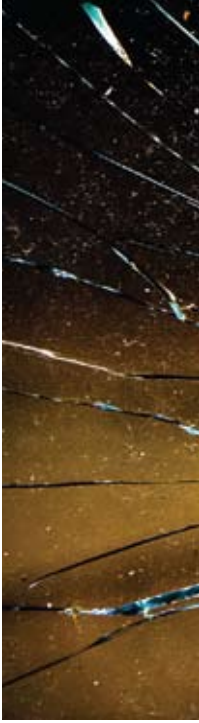
# Safety Glazing

Photo: Jerry Bezdikian  
(www.stellarindigo.com).



## Origins and Benefits of Certification

Richard A. Paschel  
on behalf of the Safety Glazing  
Certification Council (SGCC)

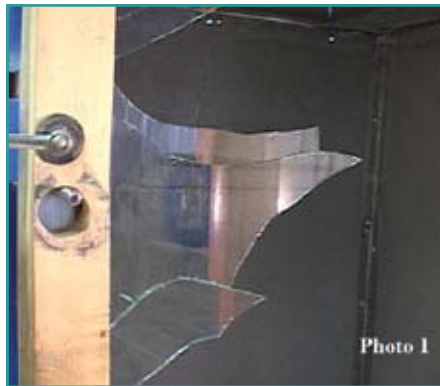


Glass is a very ancient, yet very modern material. Archaeological evidence indicates that the origins of glass manufacturing go back as far as the Late Bronze Age, circa 1600 BC, when glass for beads was being manufactured in and around Mesopotamia, while the workings of natural, volcanically-created glass go back even further to around 3,000 BC.

Although today we have literally hundreds of different types (formulae) of glass for specialized requirements, with more being regularly created for new applications, the formula for ancient glass - soda, lime & silica - is essentially the same as today's ordinary float glass.

The initial application of glass for glazing purposes using small pieces of cast glass dates to the height of the Roman Empire and was limited to only the most luxurious villas. After the fall of the Roman Empire, the use of glass for glazing virtually disappeared and did not resume until the Early Middle Ages utilizing an adaptation of glass blowing techniques that first evolved around the 1st Century AD.

All of these early windows utilized very small pieces of glass that were usually held together with strips of metal, which remained the norm for several hundred years. By the 17th Century, on the eve of the onset of the Industrial Revolution, the technology to make larger pieces of annealed cast glass had been



developed, resulting in windows with larger-sized panes of annealed glass, and with it the increased risk of serious injury from bodily impact breakage.

Photo No. 1 illustrates the results of a test-breakage of a large piece of ordinary non-safety annealed glass, with the resulting razor-sharp edges and dagger points that are highly likely to cause very serious injury.

Safety glass, however, is fabricated so that should it break, the potential for serious injury is minimized. The first true modern safety glass to be developed (i.e., laminated glass) is generally associated with the Automotive Industry in the early part of the 20th Century.

The first automobiles were fully open and had no windscreen or any kind of glazing, with

the driver and/or passengers simply wearing goggles. As autos developed and gained sophistication, a front windscreen of ordinary annealed glass was incorporated into the design, which turned out to be a dangerous development.

The first safety (i.e., laminated glass) glass resulted from the concern about the effects of broken annealed glass from early auto accidents.

In 1903, a Parisian scientist named Edouard Benedictis was becoming quite alarmed about the rise of glass-related injuries resulting from the increasing number of automobile accidents, which were regularly reported in the newspapers.

As he was a scientist, his normal daily activities involved working with a variety of substances. One day while at work, he inadvertently knocked off of a shelf an empty glass bottle that had previously contained cellulose nitrate solution (a type of early plastic), which fell to the floor and broke.

In cleaning things up, he noticed that though the bottle had broken, where a "film" of the evaporated solution had adhered to the inside face of the glass bottle, virtually all of the pieces held together. He instantly realized that this could be developed into a type of glass that,



if broken, would minimize, if not prevent, the glass related injuries that were being regularly reported in the press.

From this fortuitous discovery, laminated safety glass was developed. Its initial application was in lenses for gas masks during the First World War, eventually becoming standard for automotive windshields in the 1920's, and subsequently for use in many other glazing applications.

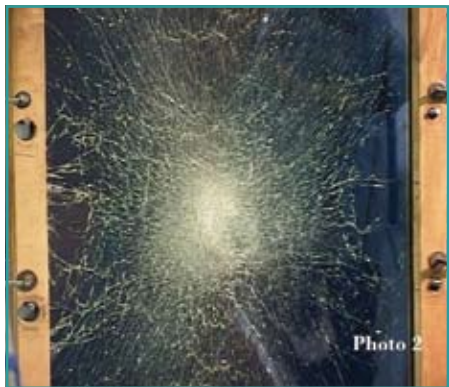


Photo No. 2 illustrates the results of test breakage of a piece of laminated glass. Though it has shattered from the impact, the interlayer has held the broken pieces together so that any potential resulting injuries would most likely be very minor.

Since there is a range of glazing applications for

which laminated glass may not be particularly suitable, it became apparent that another type of safety glazing would be needed.

Thermally tempered safety glass was initially developed in France by the ST. GOBAIN research laboratories in the early 1920's, also initially intended for automotive applications. In 1929, ST. GOBAIN commenced production of this early thermally tempered glass on somewhat inefficient semi-industrial production lines, which were originally limited in both size and thickness to just flat glass, though expanded to fabricate bent tempered glass in 1933.

The development of the commercially viable production processes for fabricating a wider range of sizes and thicknesses in both flat, as well as bent, was the work of the inventive genius Harold McMaster of Perrysburg, Ohio, in the late 1940's.

The Company he founded in 1948, PERMAGLASS, almost immediately commenced production of tempered flat glass for household domestic appliances, TV sets, and display applications, eventually extending to a range of other applications for which safety glazing was not previously available. By 1958, this included thermally tempered bent safety glass primarily for, but not limited to, automotive applications.



Photo No. 3 illustrates a test piece of fully thermally tempered glass shattering under impact into the "safety dicing fragmentation pattern", with Photo No. 4 showing the inspection and evaluation of some of the small somewhat rounded pieces resulting from the fragmentation that would be very unlikely to cause any serious injury.

It is frequently impossible from simple visual inspection of a piece of glass to determine if it is in fact a safety glazing that conforms to the various codes applicable to the particular application at hand.

For this, some kind of certification and labeling identification process is required. In many countries, such processes are conducted under the auspices of National Governmental Authorities, but in the United States, it is left



to the private sector to “police” itself, though frequently with at least some Governmental direction and oversight.

In the U.S., some codes, specifications, and applications allow for the “self-certification” process wherein a manufacturer or fabricator can conduct their own in-house tests and issue their own certification stating that their production is a compliant safety glazing.

Other companies, however, base their statement of compliance on testing conducted by well-established, highly qualified and respected testing organizations to test-verify that their glazing is in compliance with the various applicable codes.



However, since the manufacturer or fabricator is paying the testing facility for their services, there sometimes can be a question of the actual “independence” of the testing process.

To resolve any such questions, an independent neutral organization, the SAFETY GLASS CERTIFICATION COUNCIL (SGCC) was formed in 1971 thru the collaboration of several Industry and Public Interest Organizations, including the Glass Tempering Association, now known as GANA (GLASS ASSOCIATION OF NORTH AMERICA). The structure of this new organization included “Public Interest” member-directors totally independent of Industry who have an equal voice in the functioning of the SGCC.

Under the SGCC’s Certification Program which validates compliance to AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI) Specification Z97.1, 2004 and the U.S. CONSUMER PRODUCT SAFETY COMMISSION (CPSC) Specification 16CFR1201,CII, participating manufacturers and fabricators have their glass products tested semi-annually by various approved

independent testing entities under the auspices of the SGCC, which then reviews and certifies the results.

These certified products are then permanently labeled with a unique identifying number so that it is clear to any and all that these products are true, easily verifiable safety glazings as listed in the SGCC’s CERTIFIED PRODUCTS DIRECTORY (CPD) which is updated every six months.

For the 35+ years subsequent to its founding, the SGCC has been a leading force in the promotion of safety glazing, and advocating for “Third-Party” certification for all applicable glazing products. This philosophy is equally beneficial to both Industry and the Public alike:

- First, it helps to assure the general public that only the safest glazing products are used in the marketplace.
- Second, it helps to ensure that all Industry producers are competing on a level playing field with safety glazing products that are equally compliant with the established codes and specifications.
- And third, it helps protect companies in the event of litigation as they can legally demonstrate due-diligence that their products were produced to the current state-of-the-art and certified for code compliance thru a fully recognized independent agency.

The SGCC’s success has been the result of the collaboration of the Glass Industry and Public Interest working together to achieve a viable consensus for the benefit of all.

Richard A. Paschel is a current member of the Board of Directors and a past President of the SGCC.

He has been active in the Glass Industry for the past 25 years, with a focus on tempered bent glass. He is considered the person responsible for introducing the “Eurostyle” display case concept into North America and promoting its acceptance, as well as the development of Anti-Reflective coated glass for display applications.

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