Overview

The last 40 years have seen major changes in the science and technology of glazing systems. Prior to this time, joints between glass and supporting frame were sealed with oil based putty and glazing compounds. Some were more elastic than others but most had little or no resiliency and, with time, became hard and brittle. Cracking of the joint material resulted in leakage and lack of resiliency often caused glass breakage. Glazing compounds in steel sash joints were particularly vulnerable to cracking since leakage caused expansive corrosion of the frame against glass edges and resulted in breakage. Painting of the frame included painting of the joint seal, up to and including contact with the glass, to help protect against water penetration. The advent of new elastomeric materials in the form of sealants, tapes, and gaskets was most welcome and opened the door to innovative, technically superior and esthetically pleasing glazing concepts.

Among the new glazing concepts developed within the last 40 years are lock-strip gasket glazing, compression seal gasket glazing, preformed tape sealant glazing, structural sealant glazing, suspended glazing, and multiple elastomeric sealant and gasket glazing combinations.

Lock-strip gasket glazing was first used extensively on the General Motors Technical Research Center in Warren, Michigan on lights of glass in areas approximately 25 square feet. The preformed glazing gaskets were used structurally, as well as for weatherseals, and were esthetically pleasing and relatively maintenance-free. Their success on this project resulted in widespread popularity of the system. Larger and larger lights of glass were subsequently used with the system and it was eventually discovered that it was necessary to supplement the gaskets with metal clips where the structural capacity of the gasket was exceeded.

With limited structural capacity and the requirement for supplementary structural clips on relatively large lights of glass, popularity of this glazing system started to wane, particularly with the advent of structural sealant glazing which featured shear walls of glass without visible metal supports when viewed from the exterior.

Of the more conventional systems using metal glazing stops to retain the glass structurally, preformed glazing tapes or compression seal gasket glazing systems were and still are extensively used. Some of these systems are supplemented with a field-applied elastomeric cap bead sealant. With the exception of the exterior cap bead, the entire system can be installed from the interior with resultant cost savings.
The most rapid advance has been with the increasingly popular structural sealant glazing system. Today, this concept is used on approximately one third of all glazing systems. It offers unique design opportunities but is technically sophisticated and requires precise engineering, meticulous, workmanship, and reliable quality control. The state of the art is not yet perfected and intensive efforts are being made by ASTM Committee C-24 on building seals and sealants to develop standards for the use of the industry.

With the many new materials and systems available, ASTM Committee C-24 saw fit to sponsor a symposium in 1976 entitled “Sealant Technology in Glazing Systems” which resulted in *ASTM Special Technical Publication (STP) 638* of the same title, published in 1977. The purpose of the symposium was promulgation of the latest available information on glazing materials and systems for use of the industry.

Since 1976, further developments have taken place in the materials and methods used in glazing systems and again ASTM C-24 felt the need to inform the industry of the latest advances. A symposium was held in February 1988 and has resulted in this STP which updates and expands on the glazing systems described in STP 638.

Five timely papers are presented on structural sealant glazing which cover important fundamentals of this increasingly popular system:

One paper is presented on preformed tape sealant glazing. This paper is an update on the concept which has been widely used for some time and discusses the parameters which constitute a quality tape.

In the category of laboratory testing of sealants, one paper is presented which provides research data indicating that the typical small laboratory specimen provides an accurate measure of the mechanical properties of full length joints.

In the final category on insulating glass, which is a major component in glazing systems, two papers are presented. One discusses the merits of using a silicone sealant as a component of the edge seal and the other discusses potential breakage problems when using relatively small lights of glass.

As the papers indicate, the quest for knowledge is never ending. It is intended that this publication helps to fulfill some of the need for information on glazing systems.

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