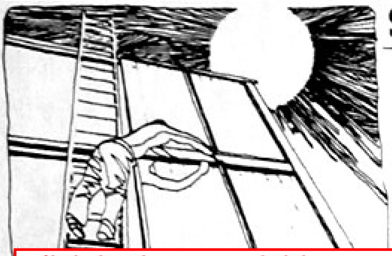

Click in the top of this page for an updated version of this article online at InspectAPedia.co

Sloped Glazing:

Careful and informed design can bring success to these popular but problematic building details.

A glazing system must perform many functions. It has to shed and drain water, support and cushion the glass to avoid mechanical pressure points, and seal against air and water leakage. It should be attractive and must be economical. Yet many subtle and pervasive forces are working against you: thermal and structural movement, high UV radiation, wind and weather. A pretty redwood cross-batten is no match for sliding sheets of ice.

The problems inherent in vertical glazing systems are multiplied in sloped glazing: higher levels of UV, water damming, and structural loading. Professionals in the large-scale curtain wall industries, as well as residential contractors, have encountered problems in this area. Fortunately, many new products and systems are being developed to beat the elements.

System design

The three types of glazing systems are wet, dry, and combination wet/dry glazing. Wet systems use gunned-in-place sealants. Dry systems use pre-formed gasket materials. The choice depends largely on labor and material costs and the appearance desired. Generally, dry systems require less labor time and less demanding workmanship, but more expensive materials. For residential work, combination systems are often the best choice.

There are general considerations for any system. It is essential that proper allowances be made for contraction and expansion of materials over the expected temperature range. This is particularly important when using materials with high coefficients of expansion such as metals and plastics. (See the adjoining chart.) To keep thermal movement to a minimum, use shorter lengths of material, joining them with expansion joints.

Equally important is water management to prevent water damming at sill or mullion. If battens are used over purlins, keep them shallow and tool the sealant to shed water. Slope sills (better if flashed) inside and out for good drainage. Where feasible, overhang glass to provide a mechanical drip edge. The connection of horizontal and vertical glazing caps form a prime candidate for leaks. The joints of glazing tape to tape, or silicone to tape are the worst offenders. Pack these joints well and don't rely on joints between two sealants.

Voids under glazing bars should be weeped to the outside. In addition to getting rid of trapped water, this will help to equalize atmospheric pressure across the glazing seal—minimizing moisture driving pressures.

Steve Bliss is an associate editor at Solar Age.

COMPARISON OF COEFFICIENTS OF THERMAL EXPANSION OF SOME BUILDING MATERIALS

	Inches/inch/°F.
Polycarbonates	.0000440
Acrylics	.0000410
Aluminum	.0000129
Steel	.0000063
Plate Glass	.0000050

Sealants and gaskets

The critical issues with sealants are joint size and shape, compatibility with other materials, and type and preparation of the surface to be bonded.

With a product having a ±25 percent movement capability, such as some silicones, a ¼-inch-wide joint can safely handle 1/16-inch movement in either direction. If the sealant is installed with the materials at one end of the temperature range (very hot or cold) then all movement of the joint will be in one direction, requiring a wider joint. Up to a point, the wider the joint, the better. Joint depth also effects the performance of the sealant. Deeper joints create greater stresses at the bond line. The recommended depth for silicone is from 1/8-inch to 3/8-inch.

A sealant can fail in either adhesion to the substrate or cohesion to itself. Bonding of the bead on three sides of the recommended rectangular joint can cause either type of failure. Bond-breaking tapes or rods (backer rods)