



Quality Document 1010.01 – 1010.06
Revised 10/26/03

Quality Procedure Outline for Monolithic & Insulated Glass “As Is” Compositions

1010.01 Dimensional Tolerance, Length, Width and Overall Bow and Warp Tolerances, Maximum.

ASTM C 1048, Standard Specification for Heat-Treated Flat Glass- Kind HS, Kind FT Coated and Uncoated Glass is the industry standard for heat strengthened, fully tempered and ceramic-coated spandrel glass. The standard provides dimensional tolerances for heat-treated glass, as well as overall bow and warp tolerances (reference ASTM C 1048).

A tempered lite with dimensions of 84” x 130” x 6mm thick is allowed a warp and bow tolerance of 0.47” across the 84” dimension, and 0.83” across the 130” dimension. Consider the variation is two fold when two lites of glass are adjoined as and insulated unit. Assembly of two lites encompassing dimensional variations as indicated would exemplify distortion potentially in an outward/inward combination of either deflection, which may appear objectionable.

The length and width requirements under C1048 8.2 for a 6mm lite are plus or minus 1/16”, 10.0mm is 3/32” & 12.0mm is 1/8”.

1010.02 Distortion Considerations within a heat processed glass-insulated unit.

The air sealed within an insulated glass unit will respond to the gas laws of physics the moment the unit is sealed. These laws govern the volume of gas as it relates to changes in temperature and pressure. As the sealed-in air is heated or cooled, it expands or contracts in volume. As the barometric pressure falls and rises, it likewise expands and contracts. This causes the two lites of glass to bow away from, and toward each other. As a result, objects viewed in reflection will be distorted. The amount of distortion depends upon the amount of deviation from flatness and the pattern of movement of the objects viewed. There is no known method by which the identical internal volume, air temperature and pressure can be achieved in each and every insulated unit for a specific project and still have the advantages of a sealed unit. Distortion will also be evident in the units with heat-treated glass and from unequal glazing pressures around the perimeter (reference GANA glazing manual-11 design considerations).

Glass that has been heat processed has an additional attribute monolithically and is compounded or enhanced as an insulated unit. Heat processed glass may contain within the shape of the heat processed lite a by-product of ceramic conveyor roller variation. The variation may be minimal or objectionable based on several heat-processing by-products. Roller distortion levels vary based on ceramic roller condition, glass residence time within the heat-process that may be longer than the required term to accomplish heat strengthening or tempered glass. A dimensionally large lite of glass; as an 84” x 130” x 6mm potentially will contain higher levels of roller distortion as a result of longer heat-processing residence time related to obtaining a center temperature equal to the rapidly heated edge temperature. Ideally, the edge and center of the lite temperatures will be comparable.

A secondary aspect of the distortion potential is enhanced on larger lites of glass due to the edges of the glass being more rapidly cooler on the edges than the center. Additionally the upper surface of the lite potentially could be cooled more rapidly or slowly than the bottom surface as the glass substrate proceeds through a rapidly cooled air quench, causing bow or warp. Cooling the edges more rapidly than the center and or the top surfaces, more rapidly or slowly than the bottom may cause the edges of the lite to bow/warp and allow the center bottom glass surface of the lite to potentially obtain enhanced roller distortion as the lite of glass travels over the primary quench conveyor rolls. Larger lites of glass such as a 84” 130” x 6mm may appear flat in relationship to bow and warp initially but once the lite reaches ambient temperature the bow/warp potentially may change.

Heat processing glass with like dimension i.e.: 84” x 84”. Glass heat processed near or at similar like, dimensions will be more prone to exhibit a concave or convex appearance.

1010.03 Roller Wave Distortion in Heat Processes Glass.

The glass industry now has an internal quantitative specification pertaining to the level of roller wave/distortion that can term the distortion either acceptable or unacceptable on 5mm thickness types or greater on clear glass. Roller wave distortions are measured optically or physically with peak-to-peak and peak to valley considerations. The value of the Peak to Valley is measured in thousands of an inch and converted to a milidiaoptor.

1010.04 Aesthetic Appearance.

A tempered insulated glass unit that has a vacuum sputter coating or pyrolithic coating applied will in most cases enhances the glass substrate surface to accentuate levels of bow or warp and roller distortion that in non-coated products may not be considered objectionable.

1010.05 The “As Is” Disclaimer.

Consideration for the term “AS IS” is partially derived from the multitude of variations that potentially may be enhance or be exaggerated by the processing of product that is not the normally processed (not normally processed does not mean a discard of standard high quality practices and procedures). Heat processing equipment is design and built to facilitate the “normal” or “average” typical glass dimensions. Heat processing equipment in some cases may be capable of providing “larger than normal” dimensional glass sizes with the unfortunate by-product of sacrifices in other attributes and overall surface quality. The objective is to give the customer the quality they anticipate and desire, the capability of the equipment original design parameters may be exceeded or at their upper limits to obtain the dimension the customer may require specific to bow and warp. A customer-purchasing product under the criteria of “AS IS” must be informed of the potential ramifications of the products visual and or mechanical performance being potentially diminished.

1010.06 Insulted Glass Unit Composition Quality.

The “AS IS” label does not diminish the responsible application or processing of; primary or secondary sealant application, spacer or spacer corner key size or spacer positioning with in the confines of standard Arch Aluminum & GLASS standard sight lines of 1/2” or 7/16”, unit glass thickness, unit glass dimensional tolerances, or overall cleanliness of the interior glass surfaces.

Dependant upon the overall insulted unit square feet, a deeper inset of the insulated glass spacer may be required. When this situation arises, the customer must be fully apprised and the consistence of spacer placement within the perimeter of the insulated unit must be consistent.