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T E C H T A L K

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Q U E N C H P A T T E R N C H A R A C T E R I S T I C S

# QUENCH PATTERNS

This Tech Talk provides you with strain pattern information for heat-processed glass. For more information on this subject, contact Viracon's Technical Services Department at 800-533-2080.

## Introduction

### CAUSES OF QUENCH PATTERNS

During the production of tempered and heat-strengthened glass, the glass is heated close to its softening point. Then, it's quenched, or cooled, with high velocity blasts of air.

This process results in compression at the glass surface and edges, and compensating tension in the glass thickness center. What occurs is a slightly higher level of surface compression directly opposite the air nozzles or slots. Consequently, this produces a slightly more dense glass at these locations.

In addition to this, a complex light interference phenomenon can cause areas to exhibit a darker appearance under various viewing conditions. These conditions include polarized light, particularly near the horizon, and viewing at oblique angles to the glass surface.

## Characteristics

### QUENCH PATTERN CHARACTERISTICS

The perceived dark areas are visual effects of the strain pattern. A reflective coating accentuates the intensity of these dark areas. The intensity is less for thinner and uncoated glass, all else being equal. The pattern of the strain may vary from one manufacturer to another. However, the effect cannot be eliminated in heat-treated glass.

This strain pattern is recognized by the American Society for Testing and Materials (ASTM). ASTM C1048 Heat-Treated Flat Glass—Kind HS, Kind FT Coated and Uncoated reports the following:

*"7.5 Strain Pattern—In heat-strengthened and fully-tempered glass, a strain pattern, which is not normally visible, may become visible under certain light conditions. It is characteristic of these kinds of glasses and should not be mistaken as discoloration or nonuniform tint or color."*

Often, the intensity of the glass strain pattern of one building is compared to another. These comparisons may involve two different types of glass and two different viewing conditions, such as highly polarized daylight vs. moderately polarized daylight, sunlit exposure vs. shaded exposure or daylight as background vs. the surface of an adjacent building.

Any conclusions may be misleading, since the factors that influence the intensity of the strain pattern vary widely between cases.

For valid comparisons, the two glasses must be exactly the same and be viewed in transmission with daylight as the light source. Also, the degree of polarization and other daylighting characteristics must be approximately the same.

## Glass Solutions

### THE LEADER IN GLASS FABRICATION

As an international company, Viracon offers the most complete range of high-performance architectural glass products available worldwide. However, we're not just another company that fabricates glass. Rather, we're a company that delivers design, aesthetic, budget and performance solutions for each of your projects. Glass solutions that meet your needs—giving you peace of mind.

Since 1970, Viracon has expanded its facilities to perform more glass fabricating processes at a single site than any other fabricator in the world. Our state-of-the-art tempered, laminated, insulating, security, silk-screened and high-performance coated products give you the choices you need from one single source. This single-source responsibility is evident in our complete line of product offerings, technical expertise, design assistance and responsive customer support.



1812 NORTH MOORE

LOCATION: ARLINGTON, VIRGINIA // GLASS TYPE: VRE1-54, VNE15-63, VRE1-38

PHOTOGRAPHER: COURTESY MONDAY PROPERTIES



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