MARK YOUR CALENDAR FOR THESE OTHER UPCOMING EVENTS

BEC Presents...
episodes dropping March 22 on glass.org

Thirsty Thursday - EPDs for Glazing Products
April 15, 2021, 1:00 pm ET

Thirsty Thursday – Anisotropy Standard
May 20, 2021, 1:00 pm ET

Thirsty Thursday – Designing for School Security
June 17, 2021, 1:00 pm ET

NGA Glass Conference: Chicago
July 27-29, 2021

Stay Tuned!
Episodes dropping 3.22 on glass.org

Understanding the Tech Tables:
NGA's Engineering Standards Manual & Heavy Glass Door Design Guide

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Understanding the Tech Tables

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Overview

This session will discuss two recently updated NGA documents, the Engineering Standards Manual and the Heavy Glass Door Design Guide. The primary focus of this session will be on the updated tables for minimum thickness guidelines for interior walls and heavy glass doors.

Learning Objectives

- Summarize the documents’ contents
- Discover some of the more significant changes with respect to interior applications
- Describe the historical use of the documents and reasons for changes
- Explore examples of common applications

Engineering Standards Manual

“The purpose of the Engineering Standards Manual is to clarify the proper selection and use of heat-strengthened and fully tempered glass.”

- Previously published in sections, most recent compiled version 2008
- Updated 2019

Available for Purchase:

https://members.glass.org/cvweb/cgi-bin/msascartdll.dll/ProductInfo?productcd=ENGINEERINGSTANDARD
### Contents - Engineering Standards Manual

#### Section 01
- Fully Tempered Glass and Heat-Strengthened Glass Applications

#### Section 02
- Specification No. 66-9-20 REV. #8
  - Specification for Heat-Strengthened or Fully Tempered Ceramic Enamed Ceramic Enameled Spandrel Glass for Use in Building Window/Curtain Walls or Other Architectural Applications

#### Section 02.1
- Specification No. 89-1-69 REV. #2
  - Specification for Environment Durability of Heat-Treated Spandrel Glass with Applied Opacifiers

#### Section 03
- Specification No. 76-12-10a REV. #3
  - Specification for Fully Tempered Glass for Uses Requiring Strength and Resistance to Temperature

#### Section 04
- Specification No. 95-1-31 Rev#2
  - Specification for Screen Printed Ceramic Enamed Ceramic Enameled Architectural Flat Glass

#### Section 05
- Specification No. 65-5-13 REV. #5
  - Specification for Fully Tempered Glass for Use in Appliances

#### Section 06
- Specification No. 64-3-16a rev. #7

#### Section 06.1
- Specification No. 64-3-16b Rev. #5

#### Section 06.2
- Specification No. 86-8-11 Rev#2
  - Specification for Fully Tempered Safety Glass for Overhead and Slop Glazed Locations

#### Section 07
- Specification No. 76-12-10b Rev. #3
  - Specification for Tempered Safety Glass for Use in Motor Vehicles and Motor Vehicle Equipment Operating On and Off Land Highways

#### Section 07.1
- Specification No. 76-12-10b Rev. #3
  - Specification for Tempered Safety Glass for Use in Marine Craft and Marine Craft Equipment

#### Section 08
- Tempered Glass for Fireplace Screens (Precautions)

#### Section 09
- Guidelines for Fully Tempered Interior Butt Glazed Fixed Glass Panels

#### Minimum Thickness Guidelines for Fully Tempered Glass
- Specification for use in two-side simply supported interior panels and mounted or restrained at top and bottom only

#### Section 10
  - The Importance of Fabrication Prior to Heat-Treatment

#### Appendix 1 thru Appendix 8
- Specification for Edge Stress Estimation Using Polarized Light (Strain Viewer)
- Thermal Endurance Curves, Time vs. Temperature
- Glossary of Terms Related to Heat-Treated Glass
- Specification References
- Edge Finish
- Proper Procedures for Cleaning Architectural Glass Products
- Units of Measure
Heavy Glass Door Design Guide

“The purpose of this Design Guide is to provide authoritative technical information to designers and to offer some suggestions as to the proper applications of HG used in doors and entrances.”

- Previously published in 1999
- **Updated 2019**

**Available for Purchase:**

[https://members.glass.org/cvweb/cgi-bin/msascartdll.dll/ProductInfo?productcd=HEAVYGLASSDOOR](https://members.glass.org/cvweb/cgi-bin/msascartdll.dll/ProductInfo?productcd=HEAVYGLASSDOOR)

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### Contents - Heavy Glass Door Design Guide

I. General Information
   - Design Considerations
   - Interior Applications
   - Door Size Limitations

II. Types of Entrances

III. Types of Doors

IV. Types of Glass

V. Types of Hardware
   - Rail Types
   - Patches

VI. Swinging Door Systems

VII. Sliding Doors, Walls and Fronts

VIII. Entrance Components
   - Locks
   - Handles

IX. Metal Finishes

X. Sidelites with Rails

XI. Guidelines for Interior Swinging Door Sizes

XII. Glass Transoms

XIII. Glass Stabilizer Fins

XIV. Structural Design of Interior Glass Entrance Systems

XV. Structural Design of Exterior Glass Entrance Systems

XVI. Application Guidelines for Fully Tempered and Tempered Laminated Glass Entrance Systems

XVII. Protection and Cleaning

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Appendix I: Recommendations for Fully Tempered Interior Butt Glazed Fixed Glass Panels

Appendix II: Glossary of Terms
What Changed?

**Engineering Standards Manual (ESM)**

Section 9 (used to be 11): Table 12
- Tables 1 and 2 were combined into one table - Table 12
- Deflection criteria for glass linked with permanent clips or silicone in joints was updated and explicitly defined

**Heavy Glass Door Design Guide (HGDDG)**

Section XI: Table 4
- Laminated glass with patch fittings was allowed
- 5/8” glass was added

Why Were They changed?

**Engineering Standards Manual (ESM)**

Section 9: Table 12
- Define applicable code considerations
- Provide clarification regarding calculations related to tabulated recommendations
- Reduce risk of mis-use of tables by combining into one table

**Heavy Glass Door Design Guide (HGDDG)**

Section XI: Table 4
- Provide guidance regarding acceptability of laminated glass
- Address limitations for use of 5/8” glass
What Has Not Changed?

Intent of Recommendations (ESM)

- Joints linked with permanent clips or silicone
- IBC 1607
- Open Joints
  - IBC 2403 (previous edition referenced BOCA)

Basis of Hardware Recommendations (HGDDG)

Tech Tables – Engineering Standards Manual
Tech Tables – Heavy Glass Door Design Guide

Table 4. Guidelines for Interior Swinging Door Sizes

<table>
<thead>
<tr>
<th>Glass Thickness</th>
<th>R/R (Full Rails)</th>
<th>P/P (Patch Fittings) and/or P/F (Rail Combinations)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>10 mm (0.4 in.)</th>
<th>12 mm (0.47 in.)</th>
<th>14 mm (0.55 in.)</th>
<th>16 mm (0.63 in.)</th>
<th>18 mm (0.71 in.)</th>
<th>20 mm (0.79 in.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(2.6 kN/m²)</td>
<td>(2.8 kN/m²)</td>
<td>(3.1 kN/m²)</td>
<td>(3.5 kN/m²)</td>
<td>(3.9 kN/m²)</td>
<td>(4.4 kN/m²)</td>
</tr>
</tbody>
</table>

1 Consult specified closer hardware manufacturers for their size and weight capabilities
2 Based on results from collaborative testing performed on patch fittings with laminate glass, patch fittings can be used with laminate glass in interior applications with controlled temperatures below 75 degrees F. Note that testing was performed on panels with 0.500 in. standard Per and lexan. Prior to specifying other laminate thickness or material for use in these applications, consult the hardware manufacturer for approval.

Examples – Understanding the Tech Tables

Considerations

Door Height, Width and Weight for Rails and Floor Closer or COC - Table 4, HGDDG

Between Door and Sidelite:

- Open Joints - Table 12, ESM, 1st and 3rd Columns

Between Panels of Adjacent Sidelites:

- Open Joints or Linked Joints?
  - Table 12, ESM, 1st and 3rd Columns for Open
  - Table 12, ESM, 2nd and 4th Columns for Linked

Review Table 4 for Hardware Based on Selected Glass Thickness

P-Style Door (Rails Top and Bottom) with Sidelites in Rails
Examples – Understanding the Tech Tables

A-Style Door (patch fittings top and bottom) with full height sidelites in top and bottom channels and a transom over the door

Considerations

Door Height, Width and Weight for Patch Fittings and Floor Closer

Between Door and Sidelite:
- Open Joints – Sidelite Height

Between Panels of Adjacent Sidelites:
- Open Joints or Linked Joints?

Review for Hardware Based on Selected Glass Thickness

Examples – Understanding the Tech Tables

Wall With Top Channel and Bottom Rail

Considerations

Between Panels of Adjacent Sidelites:
- Open Joints or Linked Joints?
Tech Tables

NGA’s Engineering Standards Manual & Heavy Glass Door Design Guide

Engineering Standards Manual – Section 9, Table 12

Available for Purchase:
https://members.glass.org/cvweb/cgi-bin/msascartdll.dll/ProductInfo?productcd=ENGINEERINGSTANDARD

Heavy Glass Door Design Guide – Table 4

Available for Purchase:
https://members.glass.org/cvweb/cgi-bin/msascartdll.dll/ProductInfo?productcd=HEAVYGLASSDOOR

QUESTIONS?

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