



32: BUTT-GLAZED, FIRE-RATED SOLUTIONS

edited by: Amanda Gibney Weko
information provided by McGrory Glass



DEVIL'S DETAIL

INTRODUCTION

In *Devil's Detail 29: Fire-Rated Glass*, AGI described the earliest and most recognized fire-rated glazing as wired glass. Ubiquitous in building codes and areas that necessitated fire-protective glazing, wired glass nevertheless did not provide impact resistance or offer the aesthetic and visibility benefits of clear glass.

As such, many designers held the opinion that fire-rated solutions and expansive clear glazing were mutually exclusive. According to the *Building Safety Journal*, in a 2019 article on fire-rated glazing systems in modern design, "Today's fire-rated glazing systems are challenging this notion. Developed and tested to work together as part of a comprehensive unit instead of only as individual components, these simple, yet elegant solutions are proving they can satisfy some of the most rigorous building code requirements while advancing modern design."



Manufacturers with advanced technology have developed new products that meet fire and life safety criteria while also offering a seamless glass aesthetic – enter butt-glazed, fire-rated solutions.

WHAT ARE BUTT-GLAZED, FIRE-RATED SOLUTIONS?

Butt-glazed, fire-rated glass systems combine fire-rated glass wall panels aligned end-to-end and connected with silicone sealant within a fire-rated perimeter frame. The solutions combine visual continuity and customizable frames, often with slim profiles, for a clean, modern aesthetic.

According to Technical Director Richard Whitcombe of McGrory Glass Fire-Rated Glass & Glazing Division, "On the technical side, these solutions existed for a number of years. But initial offerings had a big joint reveal that didn't take off because most designers and customers prefer a narrower reveal." He elaborated that the new systems offer thin joints, as small as 4 mm, that maximize vision area. Glass panels can be multi-layer, colorless, and low-iron laminated glass. Perimeter framing options can also incorporate minimalist angles or custom frames. McGrory's solutions feature multi-layer, colorless, low-iron laminated glass panels.

PROTECTIVE VS. RESISTIVE

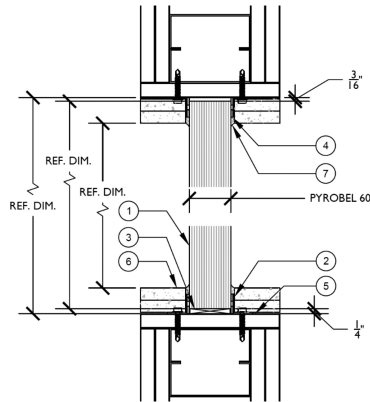
Devil's Detail 29 offers a more thorough overview of the differences between fire-protective and fire-resistive glazing. In simplest terms, fire-protective systems limit the transfer of flame, smoke, and gases from a fire. Fire-resistive systems also protect from a fire's radiant heat. Burn tests assess the qualities of fire-resistive systems. In these tests, temperature sensors are affixed to the glass in multiple areas to ensure an average temperature over the duration of the test does not exceed 250 degrees above ambient temperature. Tests are monitored closely by industry professionals to avoid ambiguity and ensure fire-rated systems are assessed on a level playing field.



AGC Vision Line 60 by McGrory | Butt-Glazed Wall System
One Hour Fire-Resistive Frameless Assembly

GLAZING DETAIL

Butt-Glazed Non-Bearing Wall – 60 Minute Rating



1. FIRE RESISTANT GLAZING MATERIAL - Pyrobel 60-25 or Pyrobel 60-25EG by McGrory Glass. Multi-ply, low-iron laminated glass totaling a thickness of 27 – 30mm (+/- 3mm), glazed into non-load bearing fire-rated wall construction.

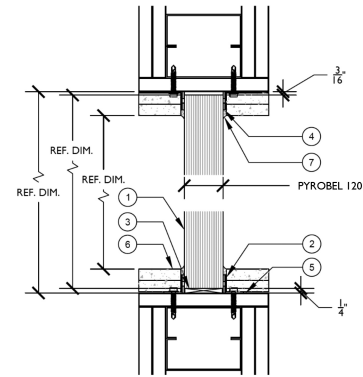
2. GLAZING STOPS – Steel L-Angle Perimeter Channel. Minimum 1" wide x 1" tall x 1/8" thick steel angle, anchored with minimum #6 x 1" fasteners spaced 8" on center, starting 2" from each end. Stops may be discontinuous/spliced; butt-joints of stops must be offset from the butt-joints of the glazing panels by minimum of 6".

3. SETTING BLOCKS – Calcium Silicate. Minimum of (2) 1" wide x 1/4" tall x 3" long setting blocks per glazing panel; each located at the quarter point.

AGC Vision Line 120 by McGrory | Butt-Glazed Wall System
Two Hour Fire-Resistive Frameless Assembly

GLAZING DETAIL

Butt-Glazed Non-Bearing Wall – 120 Minute Rating



1. FIRE RESISTANT GLAZING MATERIAL - Pyrobel 120-53N or 120-53NEG by McGrory Glass. Multi-ply, low-iron laminated glass totaling a thickness of 53 – 57mm (+/- 3mm), glazed into non-load bearing fire-rated wall construction.

2. GLAZING STOPS – Steel L-Angle Perimeter Channel. Minimum 1" wide x 1" tall x 1/8" thick steel angle, anchored with minimum #6 x 1" fasteners spaced 8" on center, starting 2" from each end. Stops may be discontinuous/spliced; butt-joints of stops must be offset from the butt-joints of the glazing panels by minimum of 6".

3. SETTING BLOCKS – Calcium Silicate. Minimum of (2) 1" wide x 1/4" tall x 3" long setting blocks per glazing panel; each located at the quarter point.

LOCAL RESOURCE: MCGRORY GLASS

AGC Pyrobel® fire-resistive safety glass by McGrory is a barrier-to-heat product that protects against radiant and conductive heat transfer. These products meet ASTM E119 and UL263 heat barrier performance criteria and are impact safety rated for ANSI Z97.1 and CPSC 16CFR1201 (Categories I and/or II), and are Cradle to Cradle Certified™ with stable, non-insulated construction for maximum performance. The products are listed for use in doors, side lites, transoms, borrowed lites, and wall applications. Pyrobel glazing options satisfy requirements for large-format, unbroken glass, and are compatible with customizable acid-etched surfaces and decorative films via McGrory's in-house print division and other life-safety options.

AGC Vision Line 60 is a butt-glazed, fire-rated system for interior, 1-hour transparent walls utilizing Pyrobel® 60, a low-iron and impact-safety fire-resistant glass.

- 60-minute, 250°F temperature rise transparent wall system
- Continuous installation with unlimited number of panels of glass sizes up to 48" x 96"
- Narrow 4mm vertical joints for maximum transparency
- Low-iron, multi-ply laminated glazing with 88% visible light transmission

AGC Vision Line 120 is a butt-glazed, fire-rated system for interior, 2-hour transparent walls utilizing Pyrobel® 120, a low-iron and impact-safety fire-resistant glass.

- 120-minute, 250°F temperature rise transparent wall system
- Continuous installation with unlimited number of panels of block glass sizes up to 40" x 114"
- Narrow 4mm vertical joints for maximum transparency
- Low-iron, multi-ply laminated glazing with 84% visible light transmission and 48 STC

Both systems are tested and rated without the requirement of bulky or expensive framing, and can be rapidly deployed while meeting aesthetic and budgetary requirements.

An established national manufacturer and direct distributor, McGrory Glass is based in Paulsboro, N.J. McGrory stocks most fire-rated glass for immediate shipment. All glass is cut to order and shipped directly from the warehouse, allowing for quick turnaround and custom sizing at competitive prices. The company's fire-rated glazing solutions include environmentally friendly and sustainable options.



Left: Richard Whitcombe participating in a fire rating test, demonstrating the ability to touch the glazed surface even when subject to intense heat; right: click to watch a demonstration of how the butt-glazed AGC Vision Line glass partitions go together at the DHI Connexions Conference in October.

CLEAR WALLS

Butt-glazed, fire-rated solutions are essentially clear wall systems. Designers can replace traditional masonry and studs with these transparent, floor-to-ceiling systems. And, due to the glass thickness (1 inch or more), the system offers fire-resistance. The thicker product not only provides a barrier to heat but an ability to affix finish materials to it or hang decorative items on it. By contrast, fire-protective products have a limited application because they do not offer protection from heat; code limits the amount of wall area that can be covered, often as little as 25 percent of a corridor. This is to minimize potential overwhelming heat loads from a fire. The thicker and fire-resistive butt-glazed solutions can be used anywhere, from long corridors to large conference rooms.

As McGroby Glass Director of Performance Products Ben Haigh explained, "The beauty is that the heat doesn't transfer through [butt-glazed, fire-rated systems]. Think about a school application, like a classroom; a teacher can still hang pictures on the glass wall. Something as simple as a poster hanging on a non-resistive wall might cause a code official to flag it because of the potential to ignite."

This versatility also means the edges can be covered with whatever decorative trim material a designer conceives, from woodwork to aluminum, as long as the flash point is higher than 400 degrees.

UNLIMITED POSSIBILITIES

Historically, designers had to choose between fire-rated and decorative products. With newer systems, that choice has been eliminated. Decorative films, applied color, laminated finishes, and security products such as ballistic glass can all be incorporated into butt-glazed, fire-rated solutions.

LONG LEAD TIMES

Long lead times have become the norm for construction materials, including glazing products. An October 2021 article in Building Design + Construction described a "grim market outlook" outlined in general contractor Consigli's Market Outlook for October. "The Outlook reports a 12 percent average price escalation for the 15 building materials tracked and anticipates another 3 percent bump through the final quarter of this year." Glass was included among products with price escalation, with a material lead time of 10 weeks for fabrication after release.

Selecting butt-glazed, fire-rated solutions from McGroby Glass may mitigate the problem of long lead times. Haigh asserts that McGroby can provide its 1- and 2-hour rated Vision Line glass systems with faster lead times than traditionally framed glass for several reasons. First, the product is fabricated locally, at McGroby's facility in Paulsboro, N.J., which is 85 percent dedicated to producing these systems. Early in the pandemic, concerned about supply chain slowdowns, McGroby proactively

inventoried extra raw materials. In addition, the company serves as a single source for many products that accompany fire-rated solutions, including decorative films and security features.

“Customer feedback has told us that we offer a lead time savings of 40 to 50 percent compared to competitor systems,” said Haigh. Where other products might have lead times of 18-22 weeks, McGrory can produce smaller quantities in as quick as a week.

Consider the importance of lead times not only before, but also during, construction. If a piece of glass breaks during installation or a field condition requires a change, a lead time of another 18-22 weeks might cause significant project delays or economic impact to a glazier waiting on payment.

VALUE ENGINEERING

Butt-glazed, fire-rated solutions may be a surprisingly viable choice for value engineering. Despite the sleek appearance, the systems reduce a fair amount of material costs associated with traditional framing. Single-source producers such as McGrory can provide all components, leading to better pricing, especially for volume orders. All glazing industry professionals agree, regardless of product choice, engage a manufacturer and glazing contractor early to understand available options, configurations, and design potential.

MARKETING ISSUE

Why haven't architects and designers heard more about butt-glazed, fire-rated solutions? Despite products being available on the market, producers have mostly been a combination of glass and metal companies working together. A producer needs the correct equipment to fabricate the glass edges for proper butt-glazing. A producer also needs the metal capabilities to create the framing. Few companies had in-house capabilities to fabricate – or market – the solutions as branded products. That has changed in recent years.

MARKET ALTERNATIVE

Technical Glass Products (TGP) is another key player in the butt-glazed, fire-rated solutions market. TGP offers the Fireframes ClearView® System, made of butt-glazed Pilkington Pyrostop® low-iron, fire-rated, and impact safety-rated glass with a heat resistive perimeter frame. The solutions offer fire ratings for up to 60 and 120 minutes, protection against radiant and conductive heat transfer, and 5 mm vertical butt joints. For additional details, visit <https://www.fireglass.com/resources/product-downloads/fact-sheets/doc/fireframes-clearview-fact-sheet.pdf>

REFERENCES

AGI Devil's Detail 29: Fire-Rated Glass: <https://www.theagi.net/pdf/devilsdetails202010.pdf>

Building Safety Journal article: <https://www.iccsafe.org/building-safety-journal/bsj-technical/the-system-solution-fire-rated-glazing-systems-in-modern-design/>

Building Design + Construction article: https://www.bdcnetwork.com/grim-market-outlook-foresees-more-shortages-impede-construction?oly_enc_id=7809B1450478A7Q

Consigli Market Outlook: <https://www.consigli.com/market-outlook-october-2021/>

Butt-glazing demonstration: https://www.linkedin.com/posts/dhi-connexions_mcgrory-glass-agc-partitions-activity-6858779280738963456-NPHv/

ABOUT

McGrory Glass has a dedicated team of fire-rated specialists with decades of experience in fire-rated glass and framing systems ready to help you navigate the complicated world of life-safety glazing options, including a series of lunch-and-learn presentations offering AIA HSW learning units. For more details, visit <https://mcgrory.com/glass/fire-rated-glass/>

McGRORYGLASS



All images and graphics used in this article © McGrory Glass 2021.

About the Devil's Details

The AGI educational series illustrates and describes common glazing challenges as a means to communicate best practices for the design and construction industry, not as a sole source for design guidance. AGI recommends design professionals consult with an AGI contractor regarding specific project challenges. AGI contractor profiles may be accessed at www.theagi.org. To suggest a devilish detail of your own, contact info@theagi.org.