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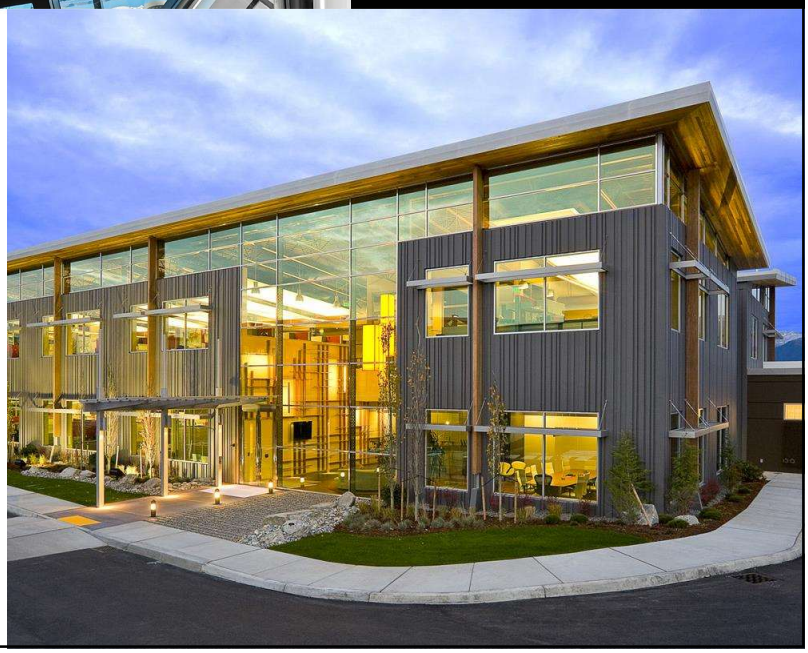
Overview

- ✓ Fire-Rated Glazing Basics
- ✓ Fire-Rated Glazing Tests
- ✓ Fire-Rated Glazing Trends
- ✓ Fire-Rated Glazing Benefits
- ✓ Multifunctional Products



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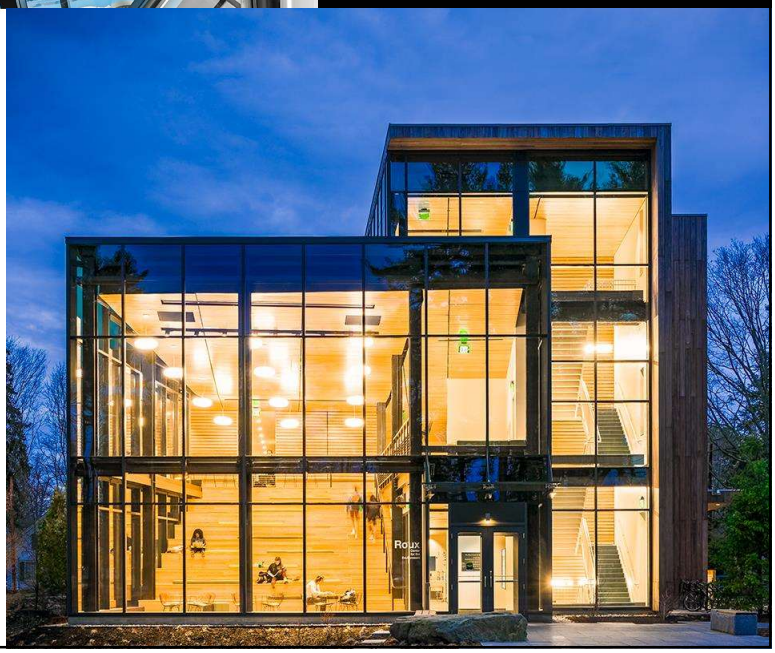
Fire-Rated Glazing Basics

Fire-Rated Glazing Definition

- Specialized glass designed to prevent the spread of flames and smoke
- Glass earns fire ratings through rigorous testing processes at independent laboratories such as Underwriters Laboratories, Inc.® (UL)
- Fire-rated glazing for door and window assemblies are rated from 20 minutes to 3 hours
- The rating reflects the amount of time the material has been tested to remain in place to help stop the spread of fire and smoke: "**Compartmentation**"



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Fire-Protective

Fire-Protective / Opening Protective

- Glazing defends against flames and smoke ***only*** for its designated rating
- Specifiers are subject to area and size limitations
  - May not exceed 25% of the aggregate length of the wall may not exceed 156 sq. ft.
- Design professionals can typically use where building codes allow "opening-protective" assemblies
- Glazing is "thin"
- Examples: Traditional wired glass, glass ceramics and specially tempered glass
- Does **not** meet ASTM E119

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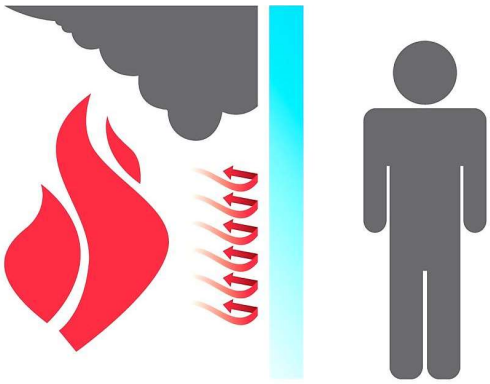
Fire-Resistive

Fire-Resistive / Transparent Wall Assembly

- Defends against flames, smoke ***and*** radiant and conductive heat
- Tested to stringent fire-resistance test standards for walls versus openings
- Can typically be used where building codes require a “fire resistant” assembly to enclose a space
- Glazing is “thick”
- Example: Wall applications requiring a 60-minute or greater fire rating that must meet temperature-rise criteria (i.e. stairwells)



FIRE RESISTIVE GLASS

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Fire Test

To receive a fire rating, modern assemblies must pass a fire test at independent laboratories such as Underwriters Laboratories, Inc.® (UL).

- A large furnace heats window frames or doors holding the glass sample to simulate the high temperatures and extreme exposure of a building fire
- The laboratory then assigns hourly ratings ranging from 20 minutes to 3 hours depending on how long the product withstands the test fire
- The assembly must remain intact for the duration of the test
- There can be no flaming on the exposed surface of the assembly or openings

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Hose Stream Test

Immediately, following the fire test, a mandatory hose stream test determines whether or not a system can achieve a rating of 45 minutes and greater in the U.S.

- The testing agency sprays the heated glass and frames with water from a two-man fire hose
- Importantly, this simulates how the product holds up to the stress and thermal shock of a fire sprinkler system
- If the assembly fails, flames and smoke may spread throughout a building
- To earn a hose stream designation, the glass and framing can't break

In Canada, all fire-rated glass products must pass this test.

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Key Fire Test Standards

Here's a look at the notable standards to keep in mind when verifying fire ratings:

NFPA 252
The fire-rated test applies to fire door systems.

NFPA 80
The installation and maintenance standard regulates the assemblies used to protect fire doors and openings against the spread of flames and smoke.

NFPA 257
The fire-rated test evaluates windows, glass block and other light-transmitting assemblies.

ASTM E119
The fire-resistance test determines how long the product can contain a fire and/or retain structural integrity.

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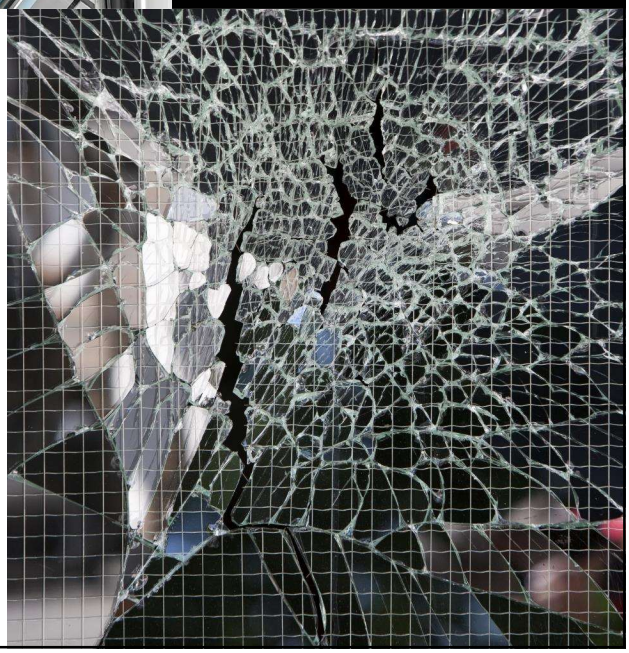
Wired Glass

What ever happened to traditional wired glass?

- For decades, wired glass was the most common fire-rated glass product specified
- Couldn't tolerate much impact
- When broken, the wires could form snags and inflict serious injury
- With the advent of wireless fire-rated glazing, the International Building Code (IBC) restricted traditional wired glass from hazardous locations in 2003
- Simply applying safety film to wired glass is not an option, as the film can be damaged, impairing performance ability and invalidating fire ratings



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Fire-Rated Glazing Trends

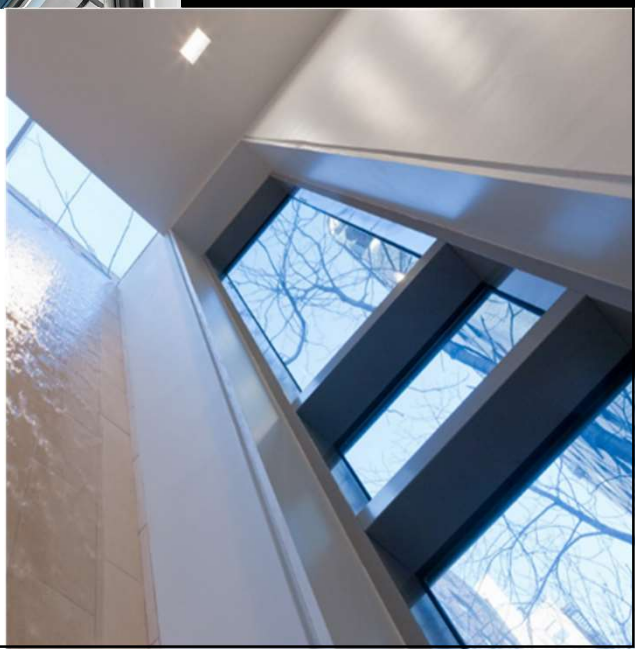
Challenge: Congestion/Urbanization

With buildings that are closer together and taller, lot line protection is a concern

(NYC Department of Building implemented stricter lot line fire-protection standards in 2015)

Solution:

- TGP offers fire-rated glazing systems that fulfill lot line protection requirements with narrow profiles that can compliment overall design schemes



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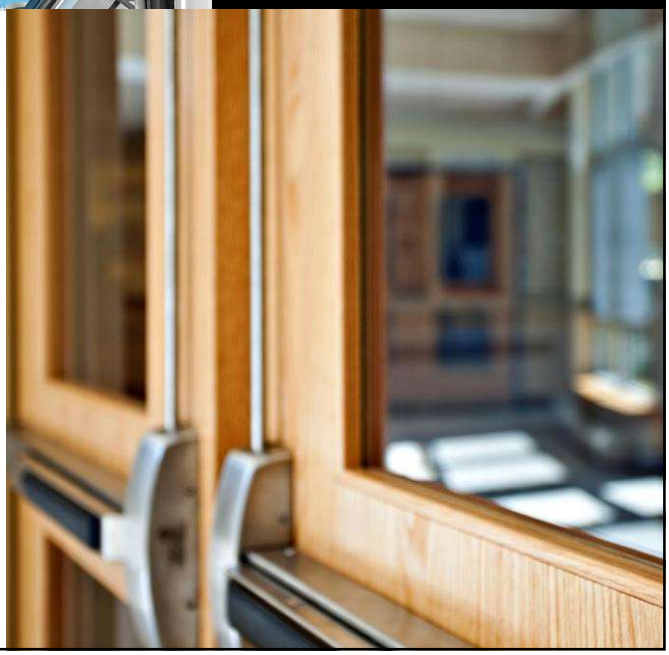
Fire-Rated Glazing Trends

Challenge: Complicated Hardware

Projects that include complicated hardware such as access control products may negate the fire rating of some fire-rated systems

Solution:

- Rely on TGP's expertise in specifying fire-rated door hardware for your next fire-rated project. TGP offers fire-rated glazing systems that can integrate with complicated hardware and a full service team of experts to ensure fire-rated glazing and hardware needs are met



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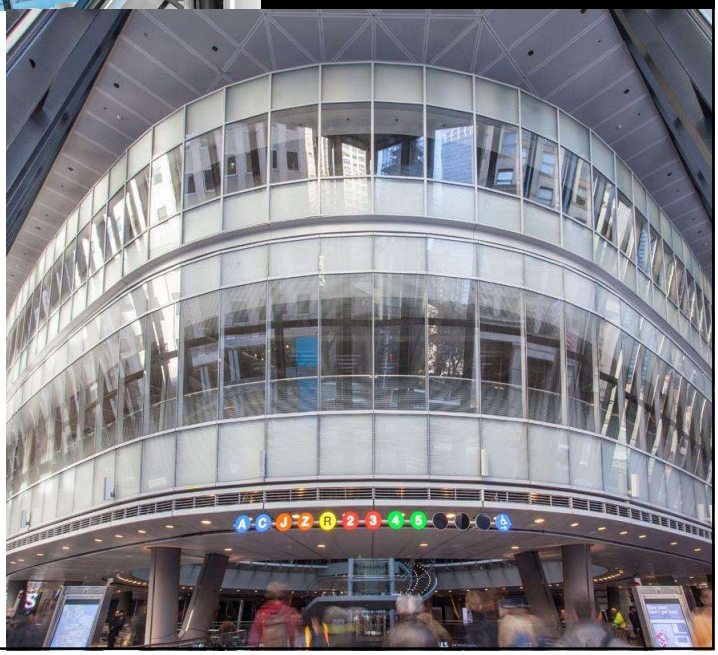
Fire-Rated Glazing Trends

Challenge: Matched Systems – Fire-Rated + Non-Rated

Traditional fire-rated framing systems can be bulky and cause aesthetic discrepancies, impeded sightlines and limited transparency

Solution:

- TGP's innovative line of narrow profile fire-rated framing systems can incorporate custom cover caps and surface finishes to match surrounding curtain wall and door applications to ensure a smooth visual integration with non-rated assemblies



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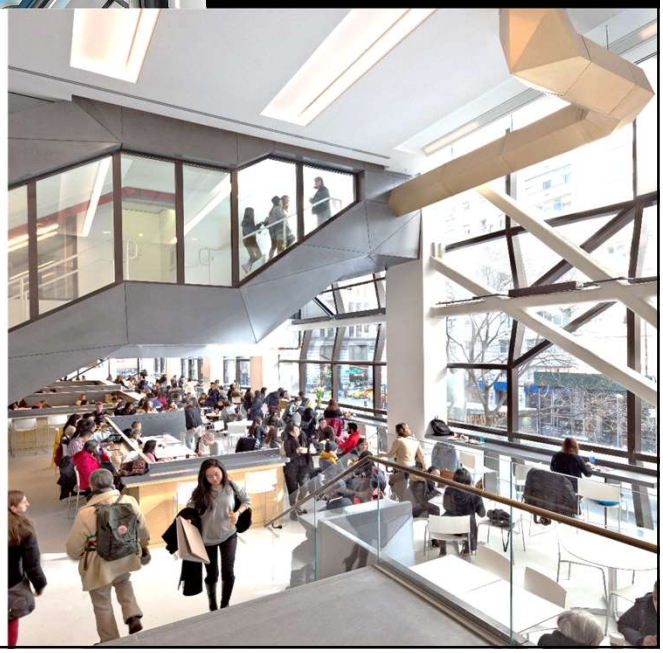
Fire-Rated Glazing Benefits - Transparency

Fire-rated glass provides the benefit of transparency while meeting fire- and life-safety requirements.

Specifically, glass helps:

- Elevate design with a modern look and feel
- Provide clear, unobstructed views, crucial for wayfinding during active shooter events and other security threats
- Enhance daylight transfer and visibility, making for healthy environments thanks to direct exposure to vitamin D



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Fire-Rated Glazing Benefits - Daylighting

The following studies show how daylight, in particular, benefits students:

- The ***Policy Insights from the Behavioral and Brain Sciences*** found that daylight can help create environments in which students learn better over the course of an academic year.
- According to the ***U.S. Department of Education***, "A 2003 study found that classrooms with the most daylighting had a 20 percent better learning rate in math, and a 26 percent improved rate in reading, compared to classrooms with little or no daylighting."
- ***National University of Malaysia***, "Students who attend schools with good daylighting exhibited enhanced health, well-being, and student performance based on the result of test scores."

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Multifunctional Products

Fire-rated glazing can be combined with many types of additional protection including:

- Smoke
- Heat transfer
- Forced-entry
- Ballistics
- Hurricane
- Acoustic

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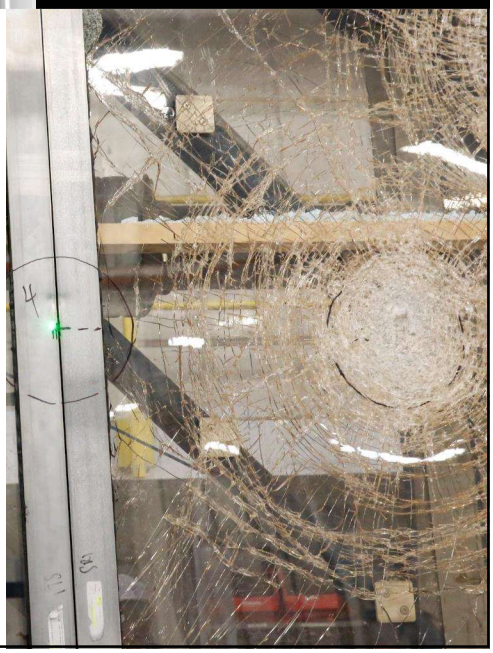
Multifunctional Products

While building codes require the use of fire-rated glazing in specific applications, they **do not** currently mandate the use of security glazing.

Security Glazing

- Protection against forced entry
- Protection against ballistics
- Protection against blast

However, the industry is working to tighten regulations and manufacturers are working to develop **multifunctional** products to meet these needs.



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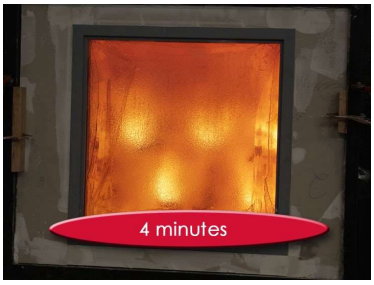
Glass Test

When multifunctional products are created, it is important that the characteristics of one product does not negate the performance of the other.

- **Example:** Glass Clad Polycarbonate combined with fire-rated glazing



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- GANA formed a committee to publish a Glass Information Bulletin (GIB) for Security Glazing for Schools.
  - **<u>Multifunctional Glazing Considerations (Proposed Language)</u>**
  - *This document does not purport to address all code requirements such as fire, hurricane and other life-safety requirements. It is the responsibility of the user of this document to determine all applicable regulatory requirements. When selecting products, multifunctional glazing may be needed to fulfil the applicable codes. The glazing should be tested for all required functions, such as fire resistance, hurricane impact and cycling, and forced entry, by a certified laboratory.*

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Forced Entry Standards

- Forced entry (FE) resistant laminated glazing can be used in detention facilities or other installations with high risk of attack and may also resist penetration from hand-held or hand-thrown objects such as hammers, crowbars, bats, knives, bricks, and rocks. Laminated glass, or glass clad polycarbonate makeups, can be tested according to ASTM F 1233 *Standard Test Method for Security Glazing Materials and Systems*; ASTM F 1915 *Standard Test Method for Glazing for Detention Facilities;* ASTM E 2395 *Standard Specification for Voluntary Security Performance of Window and Door Assemblies with Glazing Impact; and* HP White HPW-TP-0500 *Test Procedure Transparent Materials for use in Forced Entry or Containment Barriers.*

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- **System vs. Component based approvals are more becoming more prevalent.**
  - Ballistic and Fire-rated solutions are required to be tested as a "system". Large-missile impact solutions are now require system based approvals.
  - Forced-entry solutions are viewed as needing a "system" approach.
    - Testing protocols and standards are being recommended - F12/E54 ASTM Standard for Armed Aggressors in Educational Institutions.

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State Funding

- **New Legislation**
  - **Alabama:** House Bill 179 ($17M for higher ed) & Senate Bill 323 ($58M for public schools)
  - **Florida:** Senate Bill 7026 ($98M for schools)
  - **Indiana:** House Bill 1230 ($5M for public schools)
  - **Maryland:** Senate Bill 186 ($13.5M in capital bonds) & House Bill 1783 ($10M for schools)
  - **Maine:** LD 1858 (revolving renovation fund)
  - **New Mexico:** Senate Bill 239 ($10M in capital outlays)
  - **Wisconsin:** Act 143 (Grand amount TBD)

Established Programs

- **Connecticut:** School Security Infrastructure Competitive Grant Program
- **Indiana:** Secured School Safety Grant Program
- **Mississippi:** MS Community Oriented Policing (MCOPS)
- **New Hampshire:** One-time grant program ($19M in FY2018)
- **New York:** NYSAFE
- **Virginia:** School Security Equipment Grant

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PASS Guidelines

Partner Alliance for Safer School (PASS) Guidelines were developed by the Security Industry Association and the National Systems Contractors Association to answer questions from the education community about what can be done to better secure K-12 schools and how these security projects can be funded.

- These guidelines are designed to allow the end user to migrate up the security pyramid as their needs and budgets change.
- The first step is to address the backbone of security and address the procedural layers, building a solid foundation on which to grow.

Learn more at **http://passk12.org/**

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Barricades

- **Security Industry Association**
  - Position Statement on Classroom Barricade Devices

Fig. 1: Exit doors in a school, chained to provide security. This locking method does not meet IBC, IFC, or NFPA 101 requirements for free egress. Photo: Wayne Ficklin, Architect

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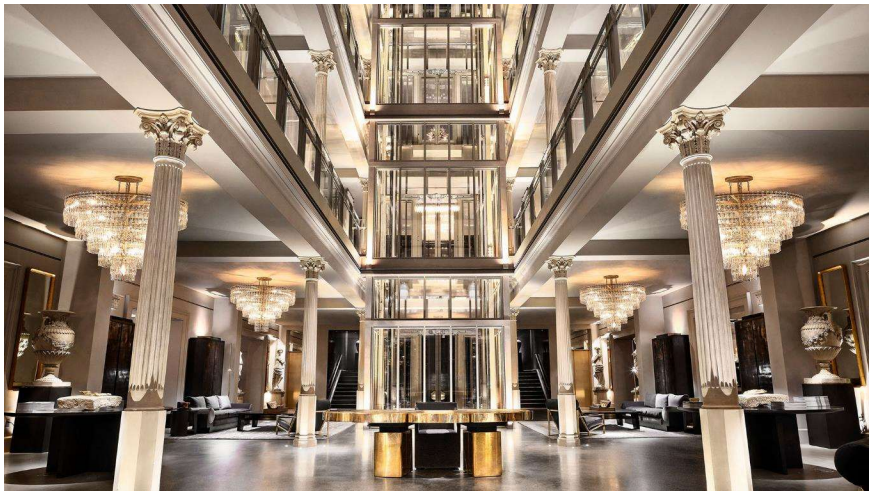
Thank You

QUESTIONS?



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