



GLAZING THE SKYLINE: Unitized curtain wall systems for high-rise

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Photos courtesy Binyan Studios

WHEN DESIGNING AND BUILDING HIGH-PROFILE HIGH-RISES, A UNITIZED CURTAIN WALL SYSTEM IS OFTEN THE FAVORED FACADE SOLUTION, FOR MORE REASONS THAN JUST HIGHLIGHTING THE SKYLINE.

THE BENEFITS OF THIS APPROACH RANGE FROM MANUFACTURING, QUALITY CONTROL, ONSITE INSTALLATION SPEED, AND ENHANCED WATER RESISTANCE.

When the colonial-style Singaporean brand, selected a prominent corner site in Boston as the location for its first North American mixed-use property, it was no surprise the project team chose a unitized curtain wall facade system for the building. Raffles Boston Back Bay Hotel & Residences, which is well under construction and slated to be open in 2023, will be a 35-story tower, set to hold 147 guestrooms, and 146 residential units.

With a complex set of environmental and contextual conditions, the project's specification and design approach offers valuable takeaways for building teams engaged in urban high-rise design and construction with curtain wall systems. The case history also sheds light on key considerations and best practices in such applications.

One immediate challenge for the project team was site context: the building lot is set just 20 m (65 ft) from the largest all-glass building in Boston. 200 Clarendon is an iconic structure, colloquially known as the John Hancock Tower, or simply the Hancock. Designing in proximity to a local landmark is always complex. A primary design goal for the Raffles tower—which includes many elements of glass specification—was how to create a new skyline statement of subordinate scale and make it visually stand apart from the taller Hancock, while respecting the tower's importance to

the city's urban fabric. How the team resolved this is explored further in this article as well.

Initial considerations

Initially, the project team explored several potential materials and dozens of design iterations. For instance, they investigated combinations of glass areas, mixed with opaque materials, such as precast concrete and composite aluminum panels.

The owner-developer group preferred a primarily glass facade, and the building team, along with structural engineers, focused on a unitized system for its benefits, which allowed for a faster construction process and earlier occupation.

The glass selection process then began with the client making an informed decision based on their aesthetic and performance goals for the structure. For the Raffles tower, the project team shared several precedents, and referenced high-rise buildings around the world to consider many options. Questions began with aesthetic and visual performance parameters. For example, is this building's facade too reflective or not enough? Is this color in line with the vision for how the tower will look on the skyline? Will the tinted glass be clear enough when viewed from inside? These questions set basic expectations to help drive downstream the selection criteria.

Subsequently, the project team approached manufacturers to request glass panel samples used in the specific buildings, which were seen as benchmarks. From there, discussions refined the list to four or five specific glass assemblies. Then, they provided samples from other buildings, manufacturers, and fabricators to their chosen manufacturer in Colombia. This helped establish what the manufacturer could deliver based on the provided precedents, performance, and aesthetics, such as specific percentages of reflectivity and translucence.

Building program and glass specification

The Raffles planned program is a mix of residential and hospitality uses, alongside significant amenity spaces. Each of these three spaces are typically served with a different type of vision glass. Residential glass tends to be clear to render exterior colors as true as possible; whereas in a hotel or in public areas, there is a higher tolerance and even a demand for tinting or other glass treatment. To combine these different properties into a single building, it is best to avoid a facade which looks striated because of glass panels with different levels of reflectivity or transparency on a portion of the building.



The construction process involved the simultaneous use of both creeper cranes and a tower crane, allowing the building team to enclose the tower on lower levels while forming and laying concrete slabs on upper levels.

Photos courtesy The Architectural Team Inc. (TAT)

In addition to the tower's vision glass, the size of the building called for a significant amount of spandrel glass, and the opaque glazing covering the edges of the floor decks and components such as building columns, heat pumps, and other elements had to be obscured from the view. To make the spandrel glass fully opaque, the inside surface was back painted, which creates a perceptible clash with the appearance of the vision glass, particularly if the contrast is not intended as a deliberate design feature.

When designing a visually coherent glass facade for a mixed-use building, the structure itself can be an obstacle. Columns on the Raffles tower's hotel level are at a different location than those on the residential levels or in some of the larger public areas. Even within residential units, varying layouts dictate the location of heat pumps and other elements along the building perimeter. All these considerations meant the pattern of opaque spandrel glass would vary from on every floor. Selecting the right glass, for any project, becomes a crucial design choice for the resulting patterns to not appear as checkerboards across the building's facade.