Glazed aluminum curtain walls are engineered and tested more than any other type of building enclosure system. Unlike most fenestration and cladding assemblies, curtain walls are an assembly of parts designed and detailed to achieve project specific performance and design requirements. Since they are performance driven, the designer needs to define performance criteria as it relates to evaluating, engineering, testing, production, construction, and commissioning of the curtain wall. There are a number of environmental, maintenance, performance, and security/safety factors that need to be considered when selecting a system. These factors include, but are not limited to, determining structural loads/movements resulting from wind and seismic forces, maintenance access equipment and operations, temperature change, and external/external loads imposed on the supporting building structure. Performance considerations include thermal value, air and water infiltration, condensation resistance, and acoustic separation. Based on the building location and usage, safety considerations may include fire resistance, airborne missile protection, blast protection, and falling ice protection.

There are several types of curtain walls available from which the designer can choose among. Most systems fall into two classifications: stick frame and unitized. Stick frame systems are usually delivered to the site in parts and built in place. Some systems can be partially built off site and delivered to the site. These “ladder frames” are typically spliced together, leaving a joint in the interior face of the mullion. On the other hand, a unitized system is completely assembled in a factory, delivered to the site, and hung on the building. A unitized system can speed installation and avoid problems associated with field installation and weather but can come at a higher cost and need specific attention to air and water-tight integrity at panel to panel connections. In order to select a system, the designer must also identify if it is inside or outside glazed and the thickness of the glazing, as each system will have different limitations. This selection must consider the building as a whole. For instance, you would not want to select an interior glazed system if there were structural connections. In order to select a system, the designer must also identify if it is inside or outside glazed and the thickness of the glazing, as each system will have different limitations.

Once a system is selected, the designer must also specify an assortment of add-ons and custom components. Glazing can be specified as captured or with butt joints utilizing structural sealant. Captured glazing systems use a pressure plate to hold the glass in place. These plates come with standard flat snap-on covers but a projecting or shaped cover can be used. Gaskets can be dry or wet sealed, and may consist of silicone, silicone rubber, EPDM, or neoprene. Setting blocks and anti-walk inserts should also be considered depending on the application. Another important accessory is the transition flashing that connects the curtain wall to the adjacent wall construction. While there are several options, the preferred option is a pre-cured silicone transition membrane that can be set into the glazing pocket and span the rough opening gap to the air barrier. Since this membrane can be installed by the waterproofing sub-contractor or curtain wall installer, coordination of the products for compatibility and sequencing is important.

The project specifications should clearly identify each of these accessories and each project performance requirement. Relying on manufacturers’ recommendations, which are often price driven, may not provide real world performance values. Most manufacturer data is based on standard unit sizes and glass types, and does not take into account actual job specific materials and layout. Project specific modeling and testing is recommended to confirm anticipated performances.

For this reason, it is recommended that owners and design professionals use a building enclosure professional with curtain wall experience to assist the team through the labyrinth of curtain wall specifying.

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