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ABSTRACT:

There are many variations in the design and use of curtain wall, storefront and window systems. This Tech Tip will explain the differences.

FILING:

UniFormat™
B2020 Exterior Windows
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08 41 13 Aluminum-Framed Entrances and Storefronts.
08 44 13 Glazed Aluminum Curtain Wall.
08 51 13 Aluminum Windows.

KEYWORDS:

Curtain Wall, Storefront, Windows, Exterior Wall Cladding, Fenestration, Performance Criteria.

REFERENCES:

AAMA/WDMA/GSA 101/I.S.2/A440 - North American Fenestration Standard/ Specification for Windows, Doors, and Skylights.
AAMA 501.1 - Standard Test Method for Exterior Windows, Curtain Walls and Doors for Water Penetration Using Dynamic Pressure.
ASTM E283 – Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls and Doors Under Specified Pressure Differences Across the Specimen.
ASTM E330 - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference.
ASTM E331 - Standard Test Method for Water Penetration of Exterior Windows, Curtain Walls and Doors by Uniform Static Air Pressure Difference.
ASTM E547 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Cyclic Static Air Pressure Difference.
NFRC 100 - Procedure for Determining Fenestration Product U-Factors.

Curtain Walls, Storefronts, and Windows - What are the Differences?

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What to Choose?

Knowing the difference between curtain walls, storefronts and windows and when each should be used will allow the products to meet project needs. This article will describe differences among the systems and provide performance, installation, and other information to help you select the appropriate system for your next project.

Defining Differences

Curtain walls are exterior wall systems consisting of vertical and horizontal metal framing members, glass, and other infill materials. They are designed to span multiple floors with unlimited heights and widths. Vertical and horizontal mullions are joined to form expansion joints to accommodate thermal movement.

Curtain walls are anchored at the top, bottom, and each floor to transfer the wind and system gravity loads to the building structure. The anchors accommodate the movements caused by thermal stresses; building sway, and structure creep and deflection.

Of all the systems, curtain wall has the largest, strongest framing sections that resist the greatest loads. Manufacturers offer standard curtain wall systems, but these can be designed and engineered to suit custom applications. Curtain walls can be reinforced by adding steel sections inside the tubular aluminum framing. This allows curtain walls to maximize the

vision area by supporting large individual glass lights.

Curtain wall systems provide the best performance for wind loads, air infiltration, and water resistance. The framing is designed with efficient thermal breaks giving good thermal and condensation resistance.

Storefronts consist of perimeter and intermediate framing and fixed glazing field assembled in a building façade opening. The openings can be a punched or strip type within a single floor.

Storefront is typically used in one and two story buildings because of the wind load resistance limitations. Mid rise and high rise buildings require greater design loads than storefront is capable of providing.

Storefront consists of single piece vertical mullions anchored at the top and bottom of the opening. Unlike curtain wall, storefront allows for thermal expansion and contraction at vertical mullions, only.

Windows are factory assembled and glazed units consisting of a perimeter frame, sash frame, and glass. Windows are anchored to the perimeter of punched wall openings. Windows are available in a variety of performance grades. The grade can be selected to match the project design load.

Windows can be fixed or operable with hung, awning, casement, pivot and other operations. The face width or sight line depends on the window operation.

Costs

As with most construction products, the product with the best performance is the most costly. Installed costs for aluminum framed curtain wall can be twice the cost of aluminum storefront, or more depending on project specific conditions.

The installed cost of fixed aluminum windows can be 1.5 times the cost of storefront.

Conclusion

Select curtain walls, storefronts, or windows for your project based on the performance that is required. Be sure to label each system correctly on the drawings and to specify the system to match what is shown to avoid increasing costs, unnecessarily.

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Summarizing the Differences – Design and Performance

Properties	Curtain Walls	Storefronts	*Windows
Framing			
Maximum Height (feet)	Unlimited	12	Varies
Face Width (inches):	2-1/4 to 2-1/2	1-3/4 to 2	Varies
Depth (inches):	6 and greater	4-1/2	2 to 4-1/2
Air Infiltration			
Test Method:	ASTM E283	ASTM E283	**ASTM E283
Test Pressure (psf):	6.24	6.24	6.2
Max. Infiltration (cfm/sf):	0.06	0.06	0.1
Water Penetration			
Test Method:	ASTM E331 static AAMA 501.1 dynamic	ASTM E331 static AAMA 501.1 dynamic	**ASTM E331 static ASTM E547 dynamic
Test Pressure (psf):	20% of positive wind-load design pressure 6.24 minimum 15.0 maximum	20% of positive wind-load design pressure 6.24 minimum 12.0 maximum	20% of positive wind-load design pressure 12.0 maximum
Test Result:	No uncontrolled water penetrating assemblies	No uncontrolled water penetrating assemblies	No uncontrolled water penetrating assemblies
Design Pressure			
Test Method	ASTM E330	ASTM E330	**ASTM E330
Test Pressure (psf)	Engineered in accordance with codes and ASCE 7	40 maximum Engineered in accordance with codes and ASCE 7	40 minimum No maximum limit
***Thermal Performance			
Test Method:	NFRC 100	NFRC 100	NFRC 100
Typical U-Factor Range:	0.45 to 0.69	0.57 to 0.69	0.35 to 0.60
Notes			
*Performance values are based on AAMA 101 Class AW windows that are commonly used in high-rise and mid-rise buildings. Minimum gateway test size is 60" x 99". Other lighter duty window Classes are available. Optional performance grades are available for higher design pressures and water penetration resistance.			
**AMMA 101 references the ASTM standards shown for the test methods.			
***Thermal performance is dependent on the efficiency of the thermal break, insulating glass construction including glass tinting, coatings, gas fill, and edge spacer, and the ratio of glass area to framing area.			