



.1 General Design Requirements

- .1 Window assemblies shall be designed using rainscreen principles; pressure equalized, with internal drainage and ventilation capabilities. Storefront glazing assemblies are not acceptable products for exterior exposure.
- .2 Glazing shall be designed to limit unwanted solar heat gain into occupied spaces, and shall manage visible light transmittance in coordination with mechanical and electrical systems.
- .3 Specify at a minimum, the following performance criteria for all window and curtainwall assemblies :
 - .1 Energy Performance: (maximum assembly U-Value)
 - .2 Solar Heat Gain Coefficient: (NFRC assembly rating)
 - .3 Visible Light Transmittance: (NFRC rating)
 - .4 Air Tightness Rating: Fixed
 - .5 Air Tightness Rating: Operable (A)
 - .6 Water Tightness Rating: (B)
 - .7 Wind Load Resistance Rating: (C)
 - .8 Forced Entry Resistance: (F)
 - .9 Sound Attenuation:
- .4 Minimum Energy Performance:
 - .1 Low-Rise Residential Buildings:
 - .1 Exceed by 10% the performance standards specified by the Energy Star Qualifying Criteria for Windows Sold in Canada.
 - .2 Mid & High-Rise Residential, and Commercial Buildings (minimum code compliance with ASHRAE 90.1 – 2004)
 - .1 Comply with BSR/ASHRAE/USGBC/IESNA Standard 189.1 – Standard for the Design of High Performance Green Buildings Except Low Rise Residential Buildings. A general summary of the required performance is as follows:
 - .1 Maximum Assembly U-Value:
 - .1 Non-metal framing: U- 1.42 W/m² °K
 - .2 Metal frame curtainwall / storefront: U- 2.00 W/m² °K
 - .3 Metal framing: all other: U- 2.57 W/m² °K
 - .2 U-Values to be published values provided by manufacturer based upon the NFRC ratings which consider all components within the fenestration area as defined by ASHRAE.
 - .3 Maximum Assembly Solar Heat Gain Coefficient (SHGC)
 - .1 Nonresidential: 0.35 (all exposures)
 - .2 Residential: 0.40 (all exposures)
 - .4 SHGC values to be published values provided by manufacturer based upon the NFRC ratings which consider all components within the fenestration area as defined by ASHRAE. ASHRAE alternative compliance of compliance using C.O.G. SHGC values are acceptable.



.2 Finish

- .1 Aluminum:
 - .1 Clear Anodized typical for new construction
 - .2 Bronze Anodized or other finish to match existing where necessary.
 - .3 Provide physical samples to FMGT for approval during design stage.
- .2 Composite: Light Colors Only

.3 Hardware

- .1 Hardware: Premium hardware as recommended by manufacturer for compatibility.
- .2 Latching/locking devices shall be cam handle type (rotor operators, push bars are not acceptable).
- .3 Hardware finish: To complement frames or match/complement existing in-situ products. Provide samples to FMGT for approval during design stage.
- .4 Opening restrictors shall be installed to limit window *opening* as follows:
 - .1 Typical: 150mm
 - .2 Residential Units: 100mm.
- .5 Opening operation
 - .1 Residential units in dorms: awning or casement opening, unless approved otherwise.
- .6 Screens shall not be provided, except some ground floor rooms, reviewed on a case by case basis.
- .7 Operable windows in laboratories and other specialty spaces are to be installed with specialized hardware to suit opening only during a mechanical system failure or shutdown.

.4 Approved Products:

- .1 Curtain Wall: Kawneer 1600 system with AA900 IsoWeb Rainscreen Vent Operables (casement or awning only)
- .2 Punched Windows: Kawneer 5500 or 5525 IsoWeb Rainscreen windows with AA900 IsoWeb Rainscreen Vent Operables (casement or awning only)

.5 Quality Assurance

- .1 Testing and Verification of Performance: In accordance with Section 1.2 – Quality Assurance & Quality Control:
 - .1 In-Plant Testing
 - .1 Manufacturer to test minimum 5% of windows (minimum 2) prior to shipments to site. Verification letter shall accompany shipments.
 - .2 Field Testing – Water Penetration
 - .1 Preferred: ASTM E1105 by using AAMA 502-02 Test Method B.
 - .2 Contractor to provide full wall assembly detailing in area of all tests (for a minimum distance of 600mm beyond rough opening). Where stucco is the exterior finish, plywood may be used as a temporary cladding for the test, otherwise the specified cladding is to be in place at the time of testing.



- .3 Test a minimum of 5% (minimum 2) of the total quantity of windows. One of the 5% shall be a mock-up test completed prior to installation of additional windows on site.
- .4 For each testing failure, the original specimen plus an additional shall be re-tested at no cost to the Owner. The costs to repair, replace, or adjust the assemblies prior to re-testing shall be at no cost to the Owner.
- .5 All modifications required to pass field tests must be performed on all other affected or similar assemblies.