

General Specification Notes: References in blue are general indicators to the specifier. References in red relate to fire-rated assemblies and/or code related issues, if not applicable, delete.

08 45 13 Translucent Glazed Curtain Wall

PART 1 – GENERAL

1.1 SUMMARY

- A. Section includes requirements for translucent curtain wall system as shown and specified herein.

1.2 WORK INCLUDED

- A. Design, engineer, manufacture and installation of unitized double glazed insulated translucent curtain wall system.
- B. All anchors, brackets, and hardware attachments necessary to complete the specified structural assembly, weatherability, and water-tightness performance requirements. All flashing up to but not penetrating adjoining work are also required as part of the system and shall be included.
- C. Trained and factory authorized labor and supervision to complete the entire panel installation.

1.3 RELATED WORK ELSEWHERE

- A. Structural Steel/Wood Framing/Concrete, Section _____
- B. Curbs and supporting members, Section _____
- C. Roofing, Section _____
- D. Sheet Metal and Flashing, Section _____
- E. Sealant, Section _____

1.4 QUALITY ASSURANCE

- A. The glazing panels must be evaluated and listed by recognized building code evaluation organization: International Council Evaluation Service Inc (ICC-ES).
- B. Materials and products shall be manufactured by a company continuously and regularly employed in the manufacturing, engineering, and designing, stocking and building of unitized translucent curtain walls for a period of at least ten (10) years.
- C. Erection shall be by a factory-approved installer who has been in the business of erecting similar material for at least five (5) consecutive years and can show evidence of satisfactory completion of projects of similar size, scope, and type.
- D. The manufacturer shall be responsible for the configuration and fabrication of the complete panel system, in accordance with the requirements of this specification.

1.5 SUBMITTALS

- A. Submit Shop drawings and color samples in accordance with Section _____.

- B. Manufacturer shall submit written guarantee accompanied by substantiating data, stating that the products to be furnished are in accordance with or exceed these specifications.
- C. Manufacturer shall submit full warranty terms and conditions for verification of compliance with the requirements of this specification.
- D. Submittal: For glazing assemblies indicated to comply with performance requirements and design criteria. [OPTIONAL] Include analysis data signed and sealed by a professional engineer licensed in the state of the project's location
- E. The manufacturer shall submit certified test reports made by an independent organization. Reports shall verify that the material will meet all performance requirements of this specification. Previously completed reports will be acceptable if they are indicative of the products used on this project. Test reports required are:
 - 1. Self-Ignition Temperature (ASTM 1929-3).
 - 2. Burning Extent (ASTM D-635).
 - 3. Smoke Density (ASTM E-84).
 - 4. Interior Flame Spread (ASTM E-84).
 - 5. Color Difference (ASTM D-2244-85).
 - 6. Tests on a weathered system after approximately 10 years of actual exposure in Florida field conditions. Test shall include:
 - a. Uniform Static Air Pressure (ASTM E-330).
 - b. Impact Loading (ASTM E-695).
 - c. Cyclic Static Air Pressure and Missile Impact Level D (ASTM 1886 & E-1996).
 - 7. Weather evaluation before and after exposure to 300°F for 25 minutes. Include light transmission and color change (ASTM E-1175 and ASTM D-2244, respectively).
 - 8. Large missile Test – Impact resistance (SFBC PA 201-94).
 - 9. Impact Loading (ASTM E-695).
 - 10. Insulation U-Value for Center of Glazing (NFRC 100).
 - 11. Insulation U-Value for System, glazing and aluminum framing (NFRC 100 and 700 Certification).
 - 12. Visible Light Transmission (VT) (ASTM E-972 and E-1084).
 - 13. Solar Heat Gain Coefficient (SHGC) based on tests or calculations which are based on tests per methodology and procedure given in the NFRC/Calorimeter Standard.
 - 14. Maximum Air Infiltration Rate for fenestration assemblies of curtain walls, (NFRC 400 or ASTM E-283).
 - 15. Water Penetration (ASTM E-331).
 - 16. Load Bearing Ability (ASTM E-330-97).
 - 17. Cyclic static air pressure and Missile Impact Level D for exterior windows and curtain walls (ASTM 1886 & E-1996).
 - 18. Haze for glare measurement (ASTM D-1003).
 - 19. ICC Evaluation Service Report (ICC-ESR) for compliance with IBC Building Code.
 - 20. Sound Transmission Loss (STC) per ASTM E413

21. Environmental Product Declaration (EPD) for submitted product with Life Cycle Assessment (LCA), Product Category Rule ISO 21930, Independent verification (external) ISO 14025

1.6 MAINTENANCE DATA

- A. The manufacturer shall provide recommended maintenance procedures, schedule of maintenance and materials required or recommended for maintenance.
- B. Submit installer certificate signed by installer, certifying compliance with project qualification requirements.

1.7 WARRANTY

- A. Provide a single source curtain wall system manufacturer warranty against defective materials and fabrication. Submit manufacturer's written warranty agreeing to repair failures in materials within one (1) year from date of delivery. [Optional]: Provide extended warranty for [2] [3] years from date of delivery.]
- B. Provide the following single source curtain wall manufacturer glazing warranties. Third party warranties shall not be acceptable. All warranties shall be maintained without the requirement for periodic re-application of a UV-stabilizing exterior coat. The expected humidity of the enclosed space shall not affect warranty length or limitations.
 - 1. Provide a lifetime warranty for both interior and exterior glazing covering:
 - a. Delamination of the glazing from the internal structure.
 - b. Fiberbloom; development of a rough exterior surface.
 - 2. Provide a ten (10) warranty on the interior and exterior glazing panels covering:
 - a. Change in light transmission of no more than 6% per ASTM D-1003.
 - b. Color stability: interior glazing shall not change color more than 6 CIE Units DELTA E by ASTM D-2244.
 - c. Blue light spectrum (400-470nm) measured in accordance with ASTM E-1175 shall not decrease by no more than 6% after ten years in comparison with the original value.
- C. In addition, submit installer's written warranty agreeing to repair installation workmanship, defects and leaks within one year from date of delivery. [Optional]: provide extended warranty for [2] [3] years from date of delivery.

PART 2 – PRODUCTS

2.1 MANUFACTURER

- A. Basis of design
 - 1. The design and performance criteria of this job are based on the UniQuad – Curtain Wall System - as manufactured by Kingspan Light + Air | Architectural Daylighting
 - a. Phone: (800) 759-6965; Website: www.kingspanlightandair.us
- B. Approved Manufacturers
 - 1. Other manufacturers may bid this project provided they comply with all requirements of the specification and submit evidence of compliance with all

performance criteria specified herein. This evidence must include proof of conformance and test reports per section 1.5. Any exceptions taken from this specification must be noted on the approval request. If no exceptions are noted and approval is given, product performance will be as specified.

2. Listing manufacturers names in this specification does not constitute approval of their products or relieve them of compliance with all the performance requirements contained herein.

2.2 TRANSLUCENT CURTAIN WALL PERFORMANCE AND APPEARANCE

A. Glazing construction for weatherability and resistance to buckling and pressure

1. Translucent glazing must be constructed of polycarbonate with tight cell sizes not exceeding 0.18". Wide cells of size greater than 0.18" shall not be acceptable.
 2. Glazing shall be factory sealed to restrict dirt ingress.
 3. Glazing must be manufactured with a permanent, co-extruded ultra-violet protective layer. Post-applied coatings or films of dissimilar materials that need to be maintained are unacceptable.
 4. The light transmission shall not decrease more than 6% as measured by ASTM D-1003 over 10 years, or after exposure to temperature of 300° for 25 minutes (thermal aging performance standard).
 5. Blue light spectrum (400-470nm) measured in accordance with ASTM E-1175 shall not decrease by no more than 6% after ten years in comparison with the original value.
 6. The weathering performance should be justified by successful testing of the glazing's performance after exposure to actual Florida weather conditions for approximately 10 years in comparison to a new glazing assembly. This performance must be demonstrated by providing independent lab test reports for the exposed and a new panel assembly for the following tests; test results must show that there is no deterioration in performance for the 10 year's exposed panels versus new:
 - a. Uniform static air pressure per ASTM E-330 at negative load of -105 PSF and positive load of 130 PSF.
 - b. Impact loading of 500 ft lbs. per ASTM E-695.
 - c. Cyclic static air pressure at 65 PSF and impact lever D per ASTM 1886 and ASTM E-1996.
 7. Glazing shall not become readily detached when exposed to temperatures of 300°F and 0°F for 25 minutes.
 8. Thermal aging – the interior and exterior glazing shall not change color in excess of 0.75 Delta E per ASTM D-2244 and shall not darken more than 0.3 units Delta L per ASTM D-2244 and shall allow no cracking or crazing when exposed to 300°F for 25 minutes.
- ### B. Translucent glazing assemblies – Unitized Double Glazed
1. Design, engineer, manufacture, and installation of unitized double-glazed translucent curtain wall system. An assembly of two independent insulated glazing panes in one integrated assembly, incorporated into a complete

aluminum frame system that has been tested and warranted by the manufacturer as a single source system. Design shall provide for the replacement of the exterior glazing, independently of the interior glazing without exposing the building's interior or compromising the weather tightness or interfering with the normal working functions of the building. Single pane glazing systems are not acceptable.

2. Overall glazing assembly thickness shall be a minimum 2.75", with two glazing panes and concealed interlocking connector. Thickness of the exterior and interior glazing shall be minimum 8mm thick each.

C. Thermal and Solar Performance

1. To ensure Energy Code compliance, product U-Values must be listed in the NFRC Product Directory and have a NFRC Certified Product Directory (CPD) number.
 - a. Basis of Design CPD Number: CPI-M-3 / CPI-M-5
2. Center of glazing U-Value per NFRC 100: Maximum .23.
 - a. [OPTIONAL Center of Glass U-Value: [.13] [.07]
3. System U-Value per NFRC 100 and 700 with a Mill finish: Maximum .28.
 - a. [OPTIONAL System U-Value: [.17] [.11]
4. Each unitized glazing assembly shall be thermally broken.
5. Visible Light Transmission – Center of Glass (VT%) _____ Per ASTM E-972 and E-1084.
6. Solar Heat Gain Coefficient (SHGC) _____ per NFRC Calorimeter.
7. Haze measurement minimum of 90% per ASTM D-1003.
8. Standard exterior glazing color: [Clear Matte] [Ice White Matte] [White Matte] [Green Matte] [Blue Matte] [OPTIONAL: CUSTOM]
9. Standard interior glazing color: [Clear Matte] [Ice White Matte] [White Matte] [Green Matte] [Blue Matte] [OPTIONAL: CUSTOM]

D. Translucent Glazing Joint System

1. Water penetration: no water penetration of the glazing joint connection length at test pressure of 6.24 PSF per ASTM E-331.
2. Air Infiltration: pass requirements of NFRC 400 at 1.57 PSF and 6.24 PSF.
3. Free movement of the glazing shall be allowed to occur without damage to the weather tightness of the completed system.
4. The glazing joint shall comply with the deflection limitation of IBC Table 1604.3 for exterior walls with flexible finishes – L/120 per ASTM E-330.

E. Flammability

1. Exterior Glazing
 - a. Class CC1 fire rating classification per ASTM D-635. Square foot and separation limitations provided in IBC Table 2607.4, any light transmitting plastic of a CC2 fire classification rating is specifically dis-allowed.
 - b. Class A interior flame spread per ASTM E-84
 - c. Flame spread no greater than zero (0) and smoke density no greater than 110 per ASTM E-84.
 - d. Minimum self-ignition temperature of 1120° per ASTM 1929.
2. Interior Glazing

a. Class CC1 fire rating classification per ASTM D-635. Square foot and separation limitations provided in IBC Table 2607.4, any light transmitting plastic of a CC2 fire classification rating is specifically dis-allowed.

b. Class A interior flame spread per ASTM E-84

c. Flame spread no greater than zero (0) and smoke density no greater than 110 per ASTM E-84.

d. Minimum self-ignition temperature of 1120° per ASTM 1929.

F. Impact Resistance

1. Minimum Impact resistance of 350 ft. lbs. per SFBC – PA 201-94.

2. Minimum Impact loading of 500 ft. lbs. per ASTM E-695.

3. Must comply with standard specification for performance of exterior windows or curtain walls when impacted by windborne debris at level D and after cyclic wind loading at the specified design load (ASTM E1996-02).

G. Sound Transmission Class (STC) Rating, provide materials and construction identical to those tested in assembly indicated according to ASTM E-90 and classified according to ASTM E 413 by an independent agency.

1. Sound Transmission Class (STC): Paired-panel assemblies shall have a minimum overall acoustic value of the following STC:

a. Paired-Panel Assembly; 3 Inches (76mm) Thick: STC [23] [26]

b. Paired-Panel Assembly; 4 Inches (101mm) Thick: STC 26 [Optional [27] [32] [34] [35] [38] [39] [43]]

2.3 METAL FRAME STRUCTURE

A. Design criteria shall be per [structural notes page] [ASCE-7 requirements]

B. The translucent wall light framing is designed to be self-supporting between the support constructions. The deflection of the glazing panel joint and system framing members in a direction normal to the plane of the glazing, when subjected to a uniform load deflection, shall not exceed $L/120$ for the unsupported span per IBC Table 1604.3. All adjacent and support construction must support the transfer of all loads included horizontal and vertical, exerted by the system. Design or structural engineering services for the supporting structure or building components in not included in the curtain wall scope of this section

C. All system aluminum framing exposed to the exterior shall be thermally broken.

D. Water penetration: the curtain wall system shall allow no water penetration at a minimum differential static pressure of 6.24 PSF per AAMA 501 pressure difference recommendations and as demonstrated by prior testing of typical framing sample per ASTM E-331

E. Water test of metal frame structure shall be conducted according to procedures in AAMA 501.2.

F. Maximum air infiltration rate for fenestration of the two glazing assemblies of curtain wall system shall be per NFRC 400.

2.4 METAL MATERIALS

- A. Extruded aluminum shall be ANSI/ASTM B-221; 6063-T6 or 6005-T5.
- B. Flashing:
 - 1. 5005 H34 Aluminum .040" thick
 - 2. Sheet metal sill flashings are to be furnished shop formed to profile - when lengths exceed 10ft, provide in nominal 10ft lengths. Field trimming of the flashing and field forming the ends is necessary to suit as-built conditions. Sheet metal ends are to overlap at least 6in to 8in, set in a full bed of sealant and riveted if required.
- C. All fasteners for aluminum framing to be stainless steel or cadmium plated steel, excluding the final fasteners to the building.
- D. All exposed Aluminum shall be finished:
 - 1. [Optional] Painted finish as per performance requirement [AAMA 2603 with a 1yr warranty] [AAMA 2604 with a 10yr warranty] [2 coat AAMA 2605 with a 10yr warranty] [3 coat AAMA 2605 with a 10yr warranty] [3 coat EXOTIC/METALLIC AAMA 2605 with 10yr warranty].
 - a. Paint color to be [selected from Manufacture's standards] [custom to match Architect's sample].
 - 2. [Optional] Anodized finish as per performance requirement [204 Class II Clear Anodized with 1yr warranty] [215 Class I Clear Anodized with 1yr warranty] [Class I Bronze Anodized with 1yr warranty].
 - 3. [Optional] Mill aluminum with no applied finish.

PART 3 – EXECUTION

3.1 EXAMINATION

- A. General contractor to verify when structural support is ready to receive all work in the section and to convene a pre-installation conference at least one week prior to commencing work of this section. Attendance required of the general contractor, curtain wall installer and all parties affecting and effected by the work of this section.
- B. All submitted opening sizes, dimensions and tolerances are to be field verified by the general contractor unless otherwise stipulated.
- C. Installer shall examine area of installation to verify readiness of site conditions. Notify the general contractor about any defects requiring correction. Do not work until conditions are satisfactory.

3.2 INSTALLATION

- A. Install components in strict accordance with manufacturer's instructions and approved shop drawings. Use proper fasteners, caulking and hardware for material attachments as specified.
- B. Use methods of attachment to structure allowing sufficient adjustment to accommodate tolerances.
- C. Remove all protective coverings on panels immediately after installation.

3.3 CLEANING

- A. Follow manufacturer's instructions when washing down exposed panel surfaces using a solution of mild detergent in warm water that is applied with soft, cleaning wiping cloths. Always test a small area before applying to an entire area.
- B. Follow strict panel manufacturer guidelines when removing foreign substances from panel surfaces requiring mineral spirits or any solvents that are acceptable for use.

- Always test a small sample to validate compliance before applying to the entire glazing surface.
- C. Installer shall leave glazing system clean at completion of installation. Final cleaning is by others upon completion of project, following manufacturer's cleaning instructions.

END OF SECTION

General Specification Notes: References in blue are general indicators to the specifier. References in red relate to fire-rated assemblies and/or code related issues, if not applicable, delete.

08 45 13 Translucent Wall Assemblies – Forced Entry

PART 1 – GENERAL

1.1 SUMMARY

- A. Section includes requirements for translucent wall system as shown and specified herein.

1.2 WORK INCLUDED

- A. Design, engineer, manufacture and installation of unitized double glazed insulated translucent curtain wall system.
- B. All anchors, brackets, and hardware attachments necessary to complete the specified structural assembly, weatherability, and water-tightness performance requirements. All flashing up to but not penetrating adjoining work are also required as part of the system and shall be included.
- C. Trained and factory authorized labor and supervision to complete the entire panel installation.

1.3 RELATED WORK ELSEWHERE

- A. Structural Steel/Wood Framing/Concrete, Section _____
- B. Curbs and supporting members, Section _____
- C. Roofing, Section _____
- D. Sheet Metal and Flashing, Section _____
- E. Sealant, Section _____

1.4 QUALITY ASSURANCE

- A. The glazing panels must be evaluated and listed by recognized building code evaluation organization: International Council Evaluation Service Inc (ICC-ES).
- B. Materials and products shall be manufactured by a company continuously and regularly employed in the manufacturing, engineering, and designing, stocking and building of unitized translucent curtain walls for a period of at least ten (10) years.
- C. Erection shall be by a factory-approved installer who has been in the business of erecting similar material for at least five (5) consecutive years and can show evidence of satisfactory completion of projects of similar size, scope, and type.
- D. The manufacturer shall be responsible for the configuration and fabrication of the complete panel system, in accordance with the requirements of this specification.

1.5 SUBMITTALS

- A. Submit Shop drawings and color samples in accordance with Section _____.

- B. Manufacturer shall submit written guarantee accompanied by substantiating data, stating that the products to be furnished are in accordance with or exceed these specifications.
- C. Manufacturer shall submit full warranty terms and conditions for verification of compliance with the requirements of this specification.
- D. Submittal: For glazing assemblies indicated to comply with performance requirements and design criteria. [OPTIONAL] Include analysis data signed and sealed by a professional engineer licensed in the state of the project's location
- E. The manufacturer shall submit certified test reports made by an independent organization. Reports shall verify that the material will meet all performance requirements of this specification. Previously completed reports will be acceptable if they are indicative of the products used on this project. Test reports required are:
 - 1. Self-Ignition Temperature (ASTM 1929).
 - 2. Burning Extent (ASTM D-635).
 - 3. Smoke Density (ASTM E-84).
 - 4. Interior Flame Spread (ASTM E-84).
 - 5. Color Difference (ASTM D-2244).
 - 6. Tests on a weathered system after approximately 10 years of actual exposure in Florida field conditions. Test shall include:
 - a. Uniform Static Air Pressure (ASTM E-330).
 - b. Impact Loading (ASTM E-695).
 - c. Cyclic Static Air Pressure and Missile Impact Level D (ASTM 1886 & E-1996).
 - 7. Weather evaluation before and after exposure to 300°F for 25 minutes. Include light transmission and color change (ASTM E-1175 and ASTM D-2244, respectively).
 - 8. Large missile Test – Impact resistance (SFBC PA 201-94).
 - 9. Impact Loading (ASTM E-695).
 - 10. Insulation U-Value for Center of Glazing (NFRC 100).
 - 11. Insulation U-Value for System, glazing and aluminum framing (NFRC 100 and 700 Certification).
 - 12. Visible Light Transmission (VT) (ASTM E-972 and E-1084).
 - 13. Solar Heat Gain Coefficient (SHGC) based on tests or calculations which are based on tests per methodology and procedure given in the NFRC/Calorimeter Standard.
 - 14. Maximum Air Infiltration Rate for fenestration assemblies of curtain walls, (NFRC 400 or ASTM E-283).
 - 15. Water Penetration (ASTM E-331).
 - 16. Load Bearing Ability (ASTM E-330).
 - 17. Cyclic static air pressure and Missile Impact Level D for exterior windows and curtain walls (ASTM 1886 & E-1996).
 - 18. Haze for glare measurement (ASTM D-1003).
 - 19. ICC Evaluation Service Report (ICC-ESR) for compliance with IBC Building Code.
 - 20. Sound Transmission Loss (STC) per ASTM E413

21. Environmental Product Declaration (EPD) for submitted product with Life Cycle Assessment (LCA), Product Category Rule ISO 21930, Independent verification (external) ISO 14025
22. 5 Minute Forced Entry certification per Department of State, SD-STD-01.01, Revision G (Amended), code 2114.
23. [Optional] DoD Antiterrorism Standard for Buildings per UFC 4-010-01.

1.6 MAINTENANCE DATA

- A. The manufacturer shall provide recommended maintenance procedures, schedule of maintenance and materials required or recommended for maintenance.
- B. Submit installer certificate signed by installer, certifying compliance with project qualification requirements.

1.7 WARRANTY

- A. Provide a single source translucent wall system manufacturer warranty against defective materials and fabrication. Submit manufacturer's written warranty agreeing to repair failures in materials within one (1) year from date of delivery. [Optional]: Provide extended warranty for [2] [3] years from date of delivery.
- B. Provide the following single source curtain wall manufacturer glazing warranties. Third party warranties shall not be acceptable. All warranties shall be maintained without the requirement for periodic re-application of a UV-stabilizing exterior coat. The expected humidity of the enclosed space shall not affect warranty length or limitations.
 1. Provide a lifetime warranty for both interior and exterior glazing covering:
 - a. Delamination of the glazing from the internal structure.
 - b. Fiberbloom; development of a rough exterior surface.
 2. Provide a ten (10) warranty on the interior and exterior glazing panels covering:
 - a. Change in light transmission of no more than 6% per ASTM D-1003.
 - b. Color stability: interior glazing shall not change color more than 6 CIE Units DELTA E by ASTM D-2244.
 - c. Blue light spectrum (400-470nm) measured in accordance with ASTM E-1175 shall not decrease by no more than 6% after ten years in comparison with the original value.
- C. In addition, submit installer's written warranty agreeing to repair installation workmanship, defects and leaks within one year from date of delivery. [Optional]: provide extended warranty for [2] [3] years from date of delivery.

PART 2 – PRODUCTS

2.1 MANUFACTURER

A. Basis of design

1. The design and performance criteria of this job are based on the UniQuad – Translucent Wall System - as manufactured by Kingspan Light + Air | Architectural Daylighting
 - a. Phone: (800) 759-6965; Website: www.kingspanlightandair.us

B. Approved Manufacturers

1. Other manufacturers may bid this project provided they comply with all requirements of the specification and submit evidence of compliance with all performance criteria specified herein. This evidence must include proof of conformance and test reports per section 1.5. Any exceptions taken from this specification must be noted on the approval request. If no exceptions are noted and approval is given, product performance will be as specified.
2. Listing manufacturers names in this specification does not constitute approval of their products or relieve them of compliance with all the performance requirements contained herein.

2.2 TRANSLUCENT CURTAIN WALL PERFORMANCE AND APPEARANCE

A. Glazing construction for weatherability and resistance to buckling and pressure

1. Translucent glazing must be constructed of polycarbonate with tight cell sizes not exceeding 0.18". Wide cells of size greater than 0.18" shall not be acceptable.
2. Glazing shall be factory sealed to restrict dirt ingress.
3. Glazing must be manufactured with a permanent, co-extruded ultra-violet protective layer. Post-applied coatings or films of dissimilar materials that need to be maintained are unacceptable.
4. The light transmission shall not decrease more than 6% as measured by ASTM D-1003 over 10 years, or after exposure to temperature of 300° for 25 minutes (thermal aging performance standard).
5. Blue light spectrum (400-470nm) measured in accordance with ASTM E-1175 shall not decrease by no more than 6% after ten years in comparison with the original value.
6. The weathering performance should be justified by successful testing of the glazing's performance after exposure to actual Florida weather conditions for approximately 10 years in comparison to a new glazing assembly. This performance must be demonstrated by providing independent lab test reports for the exposed and a new panel assembly for the following tests; test results must show that there is no deterioration in performance for the 10 year's exposed panels versus new:
 - a. Uniform static air pressure per ASTM E-330 at negative load of -105 PSF and positive load of 130 PSF.
 - b. Impact loading of 500 ft lbs. per ASTM E-695.
 - c. Cyclic static air pressure at 65 PSF and impact lever D per ASTM 1886 and ASTM E-1996.

7. Glazing shall not become readily detached when exposed to temperatures of 300°F and 0°F for 25 minutes.
 8. Thermal aging – the interior and exterior glazing shall not change color in excess of 0.75 Delta E per ASTM D-2244 and shall not darken more than 0.3 units Delta L per ASTM D-2244 and shall allow no cracking or crazing when exposed to 300°F for 25 minutes.
- B. Translucent glazing assemblies – Unitized Double Glazed
1. Design, engineer, manufacture, and installation of unitized double-glazed translucent wall system. An assembly of two independent insulated glazing panes in one integrated assembly, incorporated into a complete aluminum frame system that has been tested and warranted by the manufacturer as a single source system. Design shall provide for the replacement of the exterior glazing, independently of the interior glazing without exposing the building's interior or compromising the weather tightness or interfering with the normal working functions of the building. Single pane glazing systems are not acceptable.
 2. Overall glazing assembly thickness shall be a minimum 2.75", with two glazing panes and concealed interlocking connector. Thickness of the exterior and interior glazing shall be minimum 8mm thick each.
- C. Thermal and Solar Performance
1. To ensure Energy Code compliance, product U-Values must be listed in the NFRC Product Directory and have a NFRC Certified Product Directory (CPD) number.
 - a. Basis of Design CPD Number: CPI-M-3 / CPI-M-5
 2. Center of glazing U-Value per NFRC 100: Maximum .23.
 - a. [OPTIONAL Center of Glass U-Value: [.13] [.07]
 3. System U-Value per NFRC 100 and 700 with a Mill finish: Maximum .28.
 - a. [OPTIONAL System U-Value: [.17] [.11]
 4. Each unitized glazing assembly shall be thermally broken.
 5. Visible Light Transmission – Center of Glass (VT%) _____ Per ASTM E-972 and E-1084.
 6. Solar Heat Gain Coefficient (SHGC) _____ per NFRC Calorimeter.
 7. Haze measurement minimum of 90% per ASTM D-1003.
 8. Standard exterior glazing color: [Clear Matte] [Ice White Matte] [White Matte] [Green Matte] [Blue Matte] [OPTIONAL: CUSTOM]
 9. Standard interior glazing color: [Clear Matte] [Ice White Matte] [White Matte] [Green Matte] [Blue Matte] [OPTIONAL: CUSTOM]
- D. Translucent Glazing Joint System
1. Water penetration: no water penetration of the glazing joint connection length at test pressure of 6.24 PSF per ASTM E-331.
 2. Air Infiltration: pass requirements of NFRC 400 at 1.57 PSF and 6.24 PSF.
 3. Free movement of the glazing shall be allowed to occur without damage to the weather tightness of the completed system.
 4. The glazing joint shall comply with the deflection limitation of IBC Table 1604.3 for exterior walls with flexible finishes – L/120 per ASTM E-330.
- E. Flammability

1. Exterior Glazing

- a. Class CC1 fire rating classification per ASTM D-635. Square foot and separation limitations provided in IBC Table 2607.4, any light transmitting plastic of a CC2 fire classification rating is specifically dis-allowed.
- b. Class A interior flame spread per ASTM E-84
- c. Flame spread no greater than zero (0) and smoke density no greater than 110 per ASTM E-84.
- d. Minimum self-ignition temperature of 1120° per ASTM 1929.

2. Interior Glazing

- a. Class CC1 fire rating classification per ASTM D-635. Square foot and separation limitations provided in IBC Table 2607.4, any light transmitting plastic of a CC2 fire classification rating is specifically dis-allowed.
- b. Class A interior flame spread per ASTM E-84
- c. Flame spread no greater than zero (0) and smoke density no greater than 110 per ASTM E-84.
- d. Minimum self-ignition temperature of 1120° per ASTM 1929.

F. Impact Resistance

- 1. Minimum Impact resistance of 350 ft. lbs. per SFBC – PA 201-94.
- 2. Minimum Impact loading of 500 ft. lbs. per ASTM E-695.
- 3. Must comply with standard specification for performance of exterior windows or curtain walls when impacted by windborne debris at level D and after cyclic wind loading at the specified design load (ASTM E1996-02).

2.3 METAL FRAME STRUCTURE

- A. Design criteria shall be per [\[structural notes page\]](#) [\[ASCE-7 requirements\]](#)
- B. The translucent wall light framing is designed to be self-supporting between the support constructions. The deflection of the glazing panel joint and system framing members in a direction normal to the plane of the glazing, when subjected to a uniform load deflection, shall not exceed $L/120$ for the unsupported span per IBC Table 1604.3. All adjacent and support construction must support the transfer of all loads included horizontal and vertical, exerted by the system. Design or structural engineering services for the supporting structure or building components in not included in the curtain wall scope of this section
- C. All system aluminum framing exposed to the exterior shall be thermally broken.
- D. Water penetration: the curtain wall system shall allow no water penetration at a minimum differential static pressure of 6.24 PSF per AAMA 501 pressure difference recommendations and as demonstrated by prior testing of typical framing sample per ASTM E-331
- E. Water test of metal frame structure shall be conducted according to procedures in AAMA 501.2.
- F. Maximum air infiltration rate for fenestration of the two glazing assemblies of curtain wall system shall be per NFRC 400.

2.4 METAL MATERIALS

- A. Extruded aluminum shall be ANSI/ASTM B-221; 6063-T6 or 6005-T5.
- B. Flashing:

1. 5005 H34 Aluminum .040" thick
 2. Sheet metal sill flashings are to be furnished shop formed to profile - when lengths exceed 10ft, provide in nominal 10ft lengths. Field trimming of the flashing and field forming the ends is necessary to suit as-built conditions. Sheet metal ends are to overlap at least 6in to 8in, set in a full bed of sealant and riveted if required.
- C. All fasteners for aluminum framing to be stainless steel or cadmium plated steel, excluding the final fasteners to the building.
- D. All exposed Aluminum shall be finished:
1. [Optional] Painted finish as per performance requirement [AAMA 2603 with a 1yr warranty] [AAMA 2604 with a 10yr warranty] [2 coat AAMA 2605 with a 10yr warranty] [3 coat AAMA 2605 with a 10yr warranty] [3 coat EXOTIC/METALLIC AAMA 2605 with 10yr warranty].
 - a. Paint color to be [selected from Manufacture's standards] [custom to match Architect's sample].
 2. [Optional] Anodized finish as per performance requirement [204 Class II Clear Anodized with 1yr warranty] [215 Class I Clear Anodized with 1yr warranty] [Class I Bronze Anodized with 1yr warranty].
 3. [Optional] Mill aluminum with no applied finish.

PART 3 – EXECUTION

3.1 EXAMINATION

- A. General contractor to verify when structural support is ready to receive all work in the section and to convene a pre-installation conference at least one week prior to commencing work of this section. Attendance required of the general contractor, curtain wall installer and all parties affecting and effected by the work of this section.
- B. All submitted opening sizes, dimensions and tolerances are to be field verified by the general contractor unless otherwise stipulated.
- C. Installer shall examine area of installation to verify readiness of site conditions. Notify the general contractor about any defects requiring correction. Do not work until conditions are satisfactory.

3.2 INSTALLATION

- A. Install components in strict accordance with manufacturer's instructions and approved shop drawings. Use proper fasteners, caulking and hardware for material attachments as specified.
- B. Use methods of attachment to structure allowing sufficient adjustment to accommodate tolerances.
- C. Remove all protective coverings on panels immediately after installation.

3.3 CLEANING

- A. Follow manufacturer's instructions when washing down exposed panel surfaces using a solution of mild detergent in warm water that is applied with soft, cleaning wiping cloths. Always test a small area before applying to an entire area.
- B. Follow strict panel manufacturer guidelines when removing foreign substances from panel surfaces requiring mineral spirits or any solvents that are acceptable for use.

- Always test a small sample to validate compliance before applying to the entire glazing surface.
- C. Installer shall leave glazing system clean at completion of installation. Final cleaning is by others upon completion of project, following manufacturer's cleaning instructions.

END OF SECTION

General Specification Notes: References in blue are general indicators to the specifier. References in red relate to fire-rated assemblies and/or code related issues, if not applicable, delete.

08 45 13 Translucent Wall Assemblies – Human Impact

PART 1 – GENERAL

1.1 SUMMARY

- A. Section includes requirements for translucent wall system as shown and specified herein.

1.2 WORK INCLUDED

- A. Design, engineer, manufacture and installation of unitized double glazed insulated translucent curtain wall system.
- B. All anchors, brackets, and hardware attachments necessary to complete the specified structural assembly, weatherability, and water-tightness performance requirements. All flashing up to but not penetrating adjoining work are also required as part of the system and shall be included.
- C. Trained and factory authorized labor and supervision to complete the entire panel installation.

1.3 RELATED WORK ELSEWHERE

- A. Structural Steel/Wood Framing/Concrete, Section _____
- B. Curbs and supporting members, Section _____
- C. Roofing, Section _____
- D. Sheet Metal and Flashing, Section _____
- E. Sealant, Section _____

1.4 QUALITY ASSURANCE

- A. The glazing panels must be evaluated and listed by recognized building code evaluation organization: International Council Evaluation Service Inc (ICC-ES).
- B. Materials and products shall be manufactured by a company continuously and regularly employed in the manufacturing, engineering, and designing, stocking and building of unitized translucent curtain walls for a period of at least ten (10) years.
- C. Erection shall be by a factory-approved installer who has been in the business of erecting similar material for at least five (5) consecutive years and can show evidence of satisfactory completion of projects of similar size, scope, and type.
- D. The manufacturer shall be responsible for the configuration and fabrication of the complete panel system, in accordance with the requirements of this specification.

1.5 SUBMITTALS

- A. Submit Shop drawings and color samples in accordance with Section _____.

- B. Manufacturer shall submit written guarantee accompanied by substantiating data, stating that the products to be furnished are in accordance with or exceed these specifications.
- C. Manufacturer shall submit full warranty terms and conditions for verification of compliance with the requirements of this specification.
- D. Submittal: For glazing assemblies indicated to comply with performance requirements and design criteria. [OPTIONAL] Include analysis data signed and sealed by a professional engineer licensed in the state of the project's location
- E. The manufacturer shall submit certified test reports made by an independent organization. Reports shall verify that the material will meet all performance requirements of this specification. Previously completed reports will be acceptable if they are indicative of the products used on this project. Test reports required are:
 - 1. Self-Ignition Temperature (ASTM 1929).
 - 2. Burning Extent (ASTM D-635).
 - 3. Smoke Density (ASTM E-84).
 - 4. Interior Flame Spread (ASTM E-84).
 - 5. Color Difference (ASTM D-2244).
 - 6. Tests on a weathered system after approximately 10 years of actual exposure in Florida field conditions. Test shall include:
 - a. Uniform Static Air Pressure (ASTM E-330).
 - b. Impact Loading (ASTM E-695).
 - c. Cyclic Static Air Pressure and Missile Impact Level D (ASTM 1886 & E-1996).
 - 7. Weather evaluation before and after exposure to 300°F for 25 minutes. Include light transmission and color change (ASTM E-1175 and ASTM D-2244, respectively).
 - 8. Large missile Test – Impact resistance (SFBC PA 201-94).
 - 9. Impact Loading (ASTM E-695).
 - 10. Insulation U-Value for Center of Glazing (NFRC 100).
 - 11. Insulation U-Value for System, glazing and aluminum framing (NFRC 100 and 700 Certification).
 - 12. Visible Light Transmission (VT) (ASTM E-972 and E-1084).
 - 13. Solar Heat Gain Coefficient (SHGC) based on tests or calculations which are based on tests per methodology and procedure given in the NFRC/Calorimeter Standard.
 - 14. Maximum Air Infiltration Rate for fenestration assemblies of curtain walls, (NFRC 400 or ASTM E-283).
 - 15. Water Penetration (ASTM E-331).
 - 16. Load Bearing Ability (ASTM E-330).
 - 17. Cyclic static air pressure and Missile Impact Level D for exterior windows and curtain walls (ASTM 1886 & E-1996).
 - 18. Haze for glare measurement (ASTM D-1003).
 - 19. ICC Evaluation Service Report (ICC-ESR) for compliance with IBC Building Code.
 - 20. Sound Transmission Loss (STC) per ASTM E413

21. Environmental Product Declaration (EPD) for submitted product with Life Cycle Assessment (LCA), Product Category Rule ISO 21930, Independent verification (external) ISO 14025

22. Human impact resistance used at mental health hospital code per ASTM 695

1.6 MAINTENANCE DATA

- A. The manufacturer shall provide recommended maintenance procedures, schedule of maintenance and materials required or recommended for maintenance.
- B. Submit installer certificate signed by installer, certifying compliance with project qualification requirements.

1.7 WARRANTY

- A. Provide a single source translucent wall system manufacturer warranty against defective materials and fabrication. Submit manufacturer's written warranty agreeing to repair failures in materials within one (1) year from date of delivery. [Optional]: Provide extended warranty for [2] [3] years from date of delivery.
- B. Provide the following single source curtain wall manufacturer glazing warranties. Third party warranties shall not be acceptable. All warranties shall be maintained without the requirement for periodic re-application of a UV-stabilizing exterior coat. The expected humidity of the enclosed space shall not affect warranty length or limitations.
 - 1. Provide a lifetime warranty for both interior and exterior glazing covering:
 - a. Delamination of the glazing from the internal structure.
 - b. Fiberbloom; development of a rough exterior surface.
 - 2. Provide a ten (10) warranty on the interior and exterior glazing panels covering:
 - a. Change in light transmission of no more than 6% per ASTM D-1003.
 - b. Color stability: interior glazing shall not change color more than 6 CIE Units DELTA E by ASTM D-2244.
 - c. Blue light spectrum (400-470nm) measured in accordance with ASTM E-1175 shall not decrease by no more than 6% after ten years in comparison with the original value.
- C. In addition, submit installer's written warranty agreeing to repair installation workmanship, defects and leaks within one year from date of delivery. [Optional]: provide extended warranty for [2] [3] years from date of delivery.

PART 2 – PRODUCTS

2.1 MANUFACTURER

- A. Basis of design

1. The design and performance criteria of this job are based on the UniQuad – Translucent Wall System - as manufactured by Kingspan Light + Air | Architectural Daylighting

- a. Phone: (800) 759-6965; Website: www.kingspanlightandair.us

B. Approved Manufacturers

1. Other manufacturers may bid this project provided they comply with all requirements of the specification and submit evidence of compliance with all performance criteria specified herein. This evidence must include proof of conformance and test reports per section 1.5. Any exceptions taken from this specification must be noted on the approval request. If no exceptions are noted and approval is given, product performance will be as specified.
2. Listing manufacturers names in this specification does not constitute approval of their products or relieve them of compliance with all the performance requirements contained herein.

2.2 TRANSLUCENT CURTAIN WALL PERFORMANCE AND APPEARANCE

A. Glazing construction for weatherability and resistance to buckling and pressure

1. Translucent glazing must be constructed of polycarbonate with tight cell sizes not exceeding 0.18". Wide cells of size greater than 0.18" shall not be acceptable.
2. Glazing shall be factory sealed to restrict dirt ingress.
3. Glazing must be manufactured with a permanent, co-extruded ultra-violet protective layer. Post-applied coatings or films of dissimilar materials that need to be maintained are unacceptable.
4. The light transmission shall not decrease more than 6% as measured by ASTM D-1003 over 10 years, or after exposure to temperature of 300° for 25 minutes (thermal aging performance standard).
5. Blue light spectrum (400-470nm) measured in accordance with ASTM E-1175 shall not decrease by no more than 6% after ten years in comparison with the original value.
6. The weathering performance should be justified by successful testing of the glazing's performance after exposure to actual Florida weather conditions for approximately 10 years in comparison to a new glazing assembly. This performance must be demonstrated by providing independent lab test reports for the exposed and a new panel assembly for the following tests; test results must show that there is no deterioration in performance for the 10 year's exposed panels versus new:
 - a. Uniform static air pressure per ASTM E-330 at negative load of -105 PSF and positive load of 130 PSF.
 - b. Impact loading of 500 ft lbs. per ASTM E-695.
 - c. Cyclic static air pressure at 65 PSF and impact lever D per ASTM 1886 and ASTM E-1996.
7. Glazing shall not become readily detached when exposed to temperatures of 300°F and 0°F for 25 minutes.

8. Thermal aging – the interior and exterior glazing shall not change color in excess of 0.75 Delta E per ASTM D-2244 and shall not darken more than 0.3 units Delta L per ASTM D-2244 and shall allow no cracking or crazing when exposed to 300°F for 25 minutes.
- B. Translucent glazing assemblies – Unitized Double Glazed
1. Design, engineer, manufacture, and installation of unitized double-glazed translucent wall system. An assembly of two independent insulated glazing panes in one integrated assembly, incorporated into a complete aluminum frame system that has been tested and warranted by the manufacturer as a single source system. Design shall provide for the replacement of the exterior glazing, independently of the interior glazing without exposing the building's interior or compromising the weather tightness or interfering with the normal working functions of the building. Single pane glazing systems are not acceptable.
 2. Overall glazing assembly thickness shall be a minimum 2.75", with two glazing panes and concealed interlocking connector. Thickness of the exterior and interior glazing shall be minimum 8mm thick each.
- C. Thermal and Solar Performance
1. To ensure Energy Code compliance, product U-Values must be listed in the NFRC Product Directory and have a NFRC Certified Product Directory (CPD) number.
 - a. Basis of Design CPD Number: CPI-M-3 / CPI-M-5
 2. Center of glazing U-Value per NFRC 100: Maximum .23.
 - a. [OPTIONAL Center of Glass U-Value: [.13] [.07]
 3. System U-Value per NFRC 100 and 700 with a Mill finish: Maximum .28.
 - a. [OPTIONAL System U-Value: [.17] [.11]
 4. Each unitized glazing assembly shall be thermally broken.
 5. Visible Light Transmission – Center of Glass (VT%) _____ Per ASTM E-972 and E-1084.
 6. Solar Heat Gain Coefficient (SHGC) _____ per NFRC Calorimeter.
 7. Haze measurement minimum of 90% per ASTM D-1003.
 8. Standard exterior glazing color: [Clear Matte] [Ice White Matte] [White Matte] [Green Matte] [Blue Matte] [OPTIONAL: CUSTOM]
 9. Standard interior glazing color: [Clear Matte] [Ice White Matte] [White Matte] [Green Matte] [Blue Matte] [OPTIONAL: CUSTOM]
- D. Translucent Glazing Joint System
1. Water penetration: no water penetration of the glazing joint connection length at test pressure of 6.24 PSF per ASTM E-331.
 2. Air Infiltration: pass requirements of NFRC 400 at 1.57 PSF and 6.24 PSF.
 3. Free movement of the glazing shall be allowed to occur without damage to the weather tightness of the completed system.
 4. The glazing joint shall comply with the deflection limitation of IBC Table 1604.3 for exterior walls with flexible finishes – L/120 per ASTM E-330.
- E. Flammability
1. Exterior Glazing

- a. Class CC1 fire rating classification per ASTM D-635. Square foot and separation limitations provided in IBC Table 2607.4, any light transmitting plastic of a CC2 fire classification rating is specifically dis-allowed.
- b. Class A interior flame spread per ASTM E-84
- c. Flame spread no greater than zero (0) and smoke density no greater than 110 per ASTM E-84.
- d. Minimum self-ignition temperature of 1120° per ASTM 1929.

2. Interior Glazing

- a. Class CC1 fire rating classification per ASTM D-635. Square foot and separation limitations provided in IBC Table 2607.4, any light transmitting plastic of a CC2 fire classification rating is specifically dis-allowed.
- b. Class A interior flame spread per ASTM E-84
- c. Flame spread no greater than zero (0) and smoke density no greater than 110 per ASTM E-84.
- d. Minimum self-ignition temperature of 1120° per ASTM 1929.

F. Impact Resistance

- 1. Minimum Impact resistance of 350 ft. lbs. per SFBC – PA 201-94.
- 2. Minimum Impact loading of 500 ft. lbs. per ASTM E-695.
- 3. Must comply with standard specification for performance of exterior windows or curtain walls when impacted by windborne debris at level D and after cyclic wind loading at the specified design load (ASTM E1996-02).

2.3 METAL FRAME STRUCTURE

- A. Design criteria shall be per [\[structural notes page\]](#) [\[ASCE-7 requirements\]](#)
- B. The translucent wall light framing is designed to be self-supporting between the support constructions. The deflection of the glazing panel joint and system framing members in a direction normal to the plane of the glazing, when subjected to a uniform load deflection, shall not exceed $L/120$ for the unsupported span per IBC Table 1604.3. All adjacent and support construction must support the transfer of all loads included horizontal and vertical, exerted by the system. Design or structural engineering services for the supporting structure or building components in not included in the curtain wall scope of this section
- C. All system aluminum framing exposed to the exterior shall be thermally broken.
- D. Water penetration: the curtain wall system shall allow no water penetration at a minimum differential static pressure of 6.24 PSF per AAMA 501 pressure difference recommendations and as demonstrated by prior testing of typical framing sample per ASTM E-331
- E. Water test of meal frame structure shall be conducted according to procedures in AAMA 501.2.
- F. Maximum air infiltration rate for fenestration of the two glazing assemblies of curtain wall system shall be per NFRC 400.

2.4 METAL MATERIALS

- A. Extruded aluminum shall be ANSI/ASTM B-221; 6063-T6 or 6005-T5.
- B. Flashing:
 - 1. 5005 H34 Aluminum .040" thick

2. Sheet metal sill flashings are to be furnished shop formed to profile - when lengths exceed 10ft, provide in nominal 10ft lengths. Field trimming of the flashing and field forming the ends is necessary to suit as-built conditions. Sheet metal ends are to overlap at least 6in to 8in, set in a full bed of sealant and riveted if required.
- C. All fasteners for aluminum framing to be stainless steel or cadmium plated steel, excluding the final fasteners to the building.
- D. All exposed Aluminum shall be finished:
 1. [Optional] Painted finish as per performance requirement [AAMA 2603 with a 1yr warranty] [AAMA 2604 with a 10yr warranty] [2 coat AAMA 2605 with a 10yr warranty] [3 coat AAMA 2605 with a 10yr warranty] [3 coat EXOTIC/METALLIC AAMA 2605 with 10yr warranty].
 - a. Paint color to be [selected from Manufacture's standards] [custom to match Architect's sample].
 2. [Optional] Anodized finish as per performance requirement [204 Class II Clear Anodized with 1yr warranty] [215 Class I Clear Anodized with 1yr warranty] [Class I Bronze Anodized with 1yr warranty].
 3. [Optional] Mill aluminum with no applied finish.

PART 3 – EXECUTION

3.1 EXAMINATION

- A. General contractor to verify when structural support is ready to receive all work in the section and to convene a pre-installation conference at least one week prior to commencing work of this section. Attendance required of the general contractor, curtain wall installer and all parties affecting and effected by the work of this section.
- B. All submitted opening sizes, dimensions and tolerances are to be field verified by the general contractor unless otherwise stipulated.
- C. Installer shall examine area of installation to verify readiness of site conditions. Notify the general contractor about any defects requiring correction. Do not work until conditions are satisfactory.

3.2 INSTALLATION

- A. Install components in strict accordance with manufacturer's instructions and approved shop drawings. Use proper fasteners, caulking and hardware for material attachments as specified.
- B. Use methods of attachment to structure allowing sufficient adjustment to accommodate tolerances.
- C. Remove all protective coverings on panels immediately after installation.

3.3 CLEANING

- A. Follow manufacturer's instructions when washing down exposed panel surfaces using a solution of mild detergent in warm water that is applied with soft, cleaning wiping cloths. Always test a small area before applying to an entire area.
- B. Follow strict panel manufacturer guidelines when removing foreign substances from panel surfaces requiring mineral spirits or any solvents that are acceptable for use.

- Always test a small sample to validate compliance before applying to the entire glazing surface.
- C. Installer shall leave glazing system clean at completion of installation. Final cleaning is by others upon completion of project, following manufacturer's cleaning instructions.

END OF SECTION

General Specification Notes: References in blue are general indicators to the specifier. References in red relate to fire-rated assemblies and/or code related issues, if not applicable, delete.

08 45 13 Translucent Wall Assemblies - HVHZ

PART 1 – GENERAL

1.1 SUMMARY

- A. Section includes requirements for translucent wall system as shown and specified herein.

1.2 WORK INCLUDED

- A. Design, engineer, manufacture and installation of unitized double glazed insulated translucent curtain wall system.
- B. All anchors, brackets, and hardware attachments necessary to complete the specified structural assembly, weatherability, and water-tightness performance requirements. All flashing up to but not penetrating adjoining work are also required as part of the system and shall be included.
- C. Trained and factory authorized labor and supervision to complete the entire panel installation.

1.3 RELATED WORK ELSEWHERE

- A. Structural Steel/Wood Framing/Concrete, Section _____
- B. Curbs and supporting members, Section _____
- C. Roofing, Section _____
- D. Sheet Metal and Flashing, Section _____
- E. Sealant, Section _____

1.4 QUALITY ASSURANCE

- A. The glazing panels must be evaluated and listed by recognized building code evaluation organization: International Council Evaluation Service Inc (ICC-ES).
- B. Materials and products shall be manufactured by a company continuously and regularly employed in the manufacturing, engineering, and designing, stocking and building of unitized translucent curtain walls for a period of at least ten (10) years.
- C. Erection shall be by a factory-approved installer who has been in the business of erecting similar material for at least five (5) consecutive years and can show evidence of satisfactory completion of projects of similar size, scope, and type.
- D. The manufacturer shall be responsible for the configuration and fabrication of the complete panel system, in accordance with the requirements of this specification.

1.5 SUBMITTALS

- A. Submit Shop drawings and color samples in accordance with Section _____.

- B. Manufacturer shall submit written guarantee accompanied by substantiating data, stating that the products to be furnished are in accordance with or exceed these specifications.
- C. Manufacturer shall submit full warranty terms and conditions for verification of compliance with the requirements of this specification.
- D. Submittal: For glazing assemblies indicated to comply with performance requirements and design criteria. [OPTIONAL] Include analysis data signed and sealed by a professional engineer licensed in the state of the project's location
- E. The manufacturer shall submit certified test reports made by an independent organization. Reports shall verify that the material will meet all performance requirements of this specification. Previously completed reports will be acceptable if they are indicative of the products used on this project. Test reports required are:
 - 1. Self-Ignition Temperature (ASTM 1929).
 - 2. Burning Extent (ASTM D-635).
 - 3. Smoke Density (ASTM E-84).
 - 4. Interior Flame Spread (ASTM E-84).
 - 5. Color Difference (ASTM D-2244).
 - 6. Tests on a weathered system after approximately 10 years of actual exposure in Florida field conditions. Test shall include:
 - a. Uniform Static Air Pressure (ASTM E-330).
 - b. Impact Loading (ASTM E-695).
 - c. Cyclic Static Air Pressure and Missile Impact Level D (ASTM 1886 & E-1996).
 - 7. Weather evaluation before and after exposure to 300°F for 25 minutes. Include light transmission and color change (ASTM E-1175 and ASTM D-2244, respectively).
 - 8. Large missile Test – Impact resistance (SFBC PA 201-94).
 - 9. Impact Loading (ASTM E-695).
 - 10. Insulation U-Value for Center of Glazing (NFRC 100).
 - 11. Insulation U-Value for System, glazing and aluminum framing (NFRC 100 and 700 Certification).
 - 12. Visible Light Transmission (VT) (ASTM E-972 and E-1084).
 - 13. Solar Heat Gain Coefficient (SHGC) based on tests or calculations which are based on tests per methodology and procedure given in the NFRC/Calorimeter Standard.
 - 14. Maximum Air Infiltration Rate for fenestration assemblies of curtain walls, (NFRC 400 or ASTM E-283).
 - 15. Water Penetration (ASTM E-331).
 - 16. Load Bearing Ability (ASTM E-330).
 - 17. Cyclic static air pressure and Missile Impact Level D for exterior windows and curtain walls (ASTM 1886 & E-1996).
 - 18. Haze for glare measurement (ASTM D-1003).
 - 19. ICC Evaluation Service Report (ICC-ESR) for compliance with IBC Building Code.
 - 20. Sound Transmission Loss (STC) per ASTM E413

21. Environmental Product Declaration (EPD) for submitted product with Life Cycle Assessment (LCA), Product Category Rule ISO 21930, Independent verification (external) ISO 14025

22. Florida Product approval FL #17695 UniQuad- Unitized Wall System

1.6 MAINTENANCE DATA

- A. The manufacturer shall provide recommended maintenance procedures, schedule of maintenance and materials required or recommended for maintenance.
- B. Submit installer certificate signed by installer, certifying compliance with project qualification requirements.

1.7 WARRANTY

- A. Provide a single source translucent wall system manufacturer warranty against defective materials and fabrication. Submit manufacturer's written warranty agreeing to repair failures in materials within one (1) year from date of delivery. [Optional]: Provide extended warranty for [2] [3] years from date of delivery.
- B. Provide the following single source curtain wall manufacturer glazing warranties. Third party warranties shall not be acceptable. All warranties shall be maintained without the requirement for periodic re-application of a UV-stabilizing exterior coat. The expected humidity of the enclosed space shall not affect warranty length or limitations.
 - 1. Provide a lifetime warranty for both interior and exterior glazing covering:
 - a. Delamination of the glazing from the internal structure.
 - b. Fiberbloom; development of a rough exterior surface.
 - 2. Provide a ten (10) warranty on the interior and exterior glazing panels covering:
 - a. Change in light transmission of no more than 6% per ASTM D-1003.
 - b. Color stability: interior glazing shall not change color more than 6 CIE Units DELTA E by ASTM D-2244.
 - c. Blue light spectrum (400-470nm) measured in accordance with ASTM E-1175 shall not decrease by no more than 6% after ten years in comparison with the original value.
- C. In addition, submit installer's written warranty agreeing to repair installation workmanship, defects and leaks within one year from date of delivery. [Optional]: provide extended warranty for [2] [3] years from date of delivery.

PART 2 – PRODUCTS

2.1 MANUFACTURER

- A. Basis of design
 - 1. The design and performance criteria of this job are based on the UniQuad – Translucent Wall System - as manufactured by Kingspan Light + Air | Architectural Daylighting

a. Phone: (800) 759-6965; Website: www.kingspanlightandair.us

B. Approved Manufacturers

1. Other manufacturers may bid this project provided they comply with all requirements of the specification and submit evidence of compliance with all performance criteria specified herein. This evidence must include proof of conformance and test reports per section 1.5. Any exceptions taken from this specification must be noted on the approval request. If no exceptions are noted and approval is given, product performance will be as specified.
2. Listing manufacturers names in this specification does not constitute approval of their products or relieve them of compliance with all the performance requirements contained herein.

2.2 TRANSLUCENT CURTAIN WALL PERFORMANCE AND APPEARANCE

A. Glazing construction for weatherability and resistance to buckling and pressure

1. Translucent glazing must be constructed of polycarbonate with tight cell sizes not exceeding 0.18". Wide cells of size greater than 0.18" shall not be acceptable.
2. Glazing shall be factory sealed to restrict dirt ingress.
3. Glazing must be manufactured with a permanent, co-extruded ultra-violet protective layer. Post-applied coatings or films of dissimilar materials that need to be maintained are unacceptable.
4. The light transmission shall not decrease more than 6% as measured by ASTM D-1003 over 10 years, or after exposure to temperature of 300° for 25 minutes (thermal aging performance standard).
5. Blue light spectrum (400-470nm) measured in accordance with ASTM E-1175 shall not decrease by no more than 6% after ten years in comparison with the original value.
6. The weathering performance should be justified by successful testing of the glazing's performance after exposure to actual Florida weather conditions for approximately 10 years in comparison to a new glazing assembly. This performance must be demonstrated by providing independent lab test reports for the exposed and a new panel assembly for the following tests; test results must show that there is no deterioration in performance for the 10 year's exposed panels versus new:
 - a. Uniform static air pressure per ASTM E-330 at negative load of -105 PSF and positive load of 130 PSF.
 - b. Impact loading of 500 ft lbs. per ASTM E-695.
 - c. Cyclic static air pressure at 65 PSF and impact lever D per ASTM 1886 and ASTM E-1996.
7. Glazing shall not become readily detached when exposed to temperatures of 300°F and 0°F for 25 minutes.
8. Thermal aging – the interior and exterior glazing shall not change color in excess of 0.75 Delta E per ASTM D-2244 and shall not darken more than 0.3

units Delta L per ASTM D-2244 and shall allow no cracking or crazing when exposed to 300°F for 25 minutes.

B. Translucent glazing assemblies – Unitized Double Glazed

1. Design, engineer, manufacture, and installation of unitized double-glazed translucent wall system. An assembly of two independent insulated glazing panes in one integrated assembly, incorporated into a complete aluminum frame system that has been tested and warranted by the manufacturer as a single source system. Design shall provide for the replacement of the exterior glazing, independently of the interior glazing without exposing the building's interior or compromising the weather tightness or interfering with the normal working functions of the building. Single pane glazing systems are not acceptable.
2. Overall glazing assembly thickness shall be a minimum 2.75", with two glazing panes and concealed interlocking connector. Thickness of the exterior and interior glazing shall be minimum 8mm thick each.

C. Thermal and Solar Performance

1. To ensure Energy Code compliance, product U-Values must be listed in the NFRC Product Directory and have a NFRC Certified Product Directory (CPD) number.
 - a. Basis of Design CPD Number: CPI-M-3 / CPI-M-5
2. Center of glazing U-Value per NFRC 100: Maximum .23.
 - a. [OPTIONAL Center of Glass U-Value: [.13] [.07]
3. System U-Value per NFRC 100 and 700 with a Mill finish: Maximum .28.
 - a. [OPTIONAL System U-Value: [.17] [.11]
4. Each unitized glazing assembly shall be thermally broken.
5. Visible Light Transmission – Center of Glass (VT%) _____ Per ASTM E-972 and E-1084.
6. Solar Heat Gain Coefficient (SHGC) _____ per NFRC Calorimeter.
7. Haze measurement minimum of 90% per ASTM D-1003.
8. Standard exterior glazing color: [Clear Matte] [Ice White Matte] [White Matte] [Green Matte] [Blue Matte] [OPTIONAL: CUSTOM]
9. Standard interior glazing color: [Clear Matte] [Ice White Matte] [White Matte] [Green Matte] [Blue Matte] [OPTIONAL: CUSTOM]

D. Translucent Glazing Joint System

1. Water penetration: no water penetration of the glazing joint connection length at test pressure of 6.24 PSF per ASTM E-331.
2. Air Infiltration: pass requirements of NFRC 400 at 1.57 PSF and 6.24 PSF.
3. Free movement of the glazing shall be allowed to occur without damage to the weather tightness of the completed system.
4. The glazing joint shall comply with the deflection limitation of IBC Table 1604.3 for exterior walls with flexible finishes – L/120 per ASTM E-330.

E. Flammability

1. Exterior Glazing
 - a. Class CC1 fire rating classification per ASTM D-635. Square foot and separation limitations provided in IBC Table 2607.4, any light transmitting plastic of a CC2 fire classification rating is specifically dis-allowed.

- b. Class A interior flame spread per ASTM E-84
- c. Flame spread no greater than zero (0) and smoke density no greater than 110 per ASTM E-84.
- d. Minimum self-ignition temperature of 1120° per ASTM 1929.

2. Interior Glazing

- a. Class CC1 fire rating classification per ASTM D-635. Square foot and separation limitations provided in IBC Table 2607.4, any light transmitting plastic of a CC2 fire classification rating is specifically dis-allowed.
- b. Class A interior flame spread per ASTM E-84
- c. Flame spread no greater than zero (0) and smoke density no greater than 110 per ASTM E-84.
- d. Minimum self-ignition temperature of 1120° per ASTM 1929.

F. Impact Resistance

- 1. Minimum Impact resistance of 350 ft. lbs. per SFBC – PA 201-94.
- 2. Minimum Impact loading of 500 ft. lbs. per ASTM E-695.
- 3. Must comply with standard specification for performance of exterior windows or curtain walls when impacted by windborne debris at level D and after cyclic wind loading at the specified design load (ASTM E1996-02).

2.3 METAL FRAME STRUCTURE

- A. Design criteria shall be per [\[structural notes page\]](#) [\[ASCE-7 requirements\]](#)
- B. The translucent wall light framing is designed to be self-supporting between the support constructions. The deflection of the glazing panel joint and system framing members in a direction normal to the plane of the glazing, when subjected to a uniform load deflection, shall not exceed $L/120$ for the unsupported span per IBC Table 1604.3. All adjacent and support construction must support the transfer of all loads included horizontal and vertical, exerted by the system. Design or structural engineering services for the supporting structure or building components in not included in the curtain wall scope of this section
- C. All system aluminum framing exposed to the exterior shall be thermally broken.
- D. Water penetration: the curtain wall system shall allow no water penetration at a minimum differential static pressure of 6.24 PSF per AAMA 501 pressure difference recommendations and as demonstrated by prior testing of typical framing sample per ASTM E-331
- E. Water test of metal frame structure shall be conducted according to procedures in AAMA 501.2.
- F. Maximum air infiltration rate for fenestration of the two glazing assemblies of curtain wall system shall be per NFRC 400.

2.4 METAL MATERIALS

- A. Extruded aluminum shall be ANSI/ASTM B-221; 6063-T6 or 6005-T5.
- B. Flashing:
 - 1. 5005 H34 Aluminum .040" thick
 - 2. Sheet metal sill flashings are to be furnished shop formed to profile - when lengths exceed 10ft, provide in nominal 10ft lengths. Field trimming of the flashing and field forming the ends is necessary to suit as-built conditions. Sheet

metal ends are to overlap at least 6in to 8in, set in a full bed of sealant and riveted if required.

- C. All fasteners for aluminum framing to be stainless steel or cadmium plated steel, excluding the final fasteners to the building.
- D. All exposed Aluminum shall be finished:
 - 1. [Optional] Painted finish as per performance requirement [AAMA 2603 with a 1yr warranty] [AAMA 2604 with a 10yr warranty] [2 coat AAMA 2605 with a 10yr warranty] [3 coat AAMA 2605 with a 10yr warranty] [3 coat EXOTIC/METALLIC AAMA 2605 with 10yr warranty].
 - a. Paint color to be [selected from Manufacture's standards] [custom to match Architect's sample].
 - 2. [Optional] Anodized finish as per performance requirement [204 Class II Clear Anodized with 1yr warranty] [215 Class I Clear Anodized with 1yr warranty] [Class I Bronze Anodized with 1yr warranty].
 - 3. [Optional] Mill aluminum with no applied finish.

PART 3 – EXECUTION

3.1 EXAMINATION

- A. General contractor to verify when structural support is ready to receive all work in the section and to convene a pre-installation conference at least one week prior to commencing work of this section. Attendance required of the general contractor, curtain wall installer and all parties affecting and effected by the work of this section.
- B. All submitted opening sizes, dimensions and tolerances are to be field verified by the general contractor unless otherwise stipulated.
- C. Installer shall examine area of installation to verify readiness of site conditions. Notify the general contractor about any defects requiring correction. Do not work until conditions are satisfactory.

3.2 INSTALLATION

- A. Install components in strict accordance with manufacturer's instructions and approved shop drawings. Use proper fasteners, caulking and hardware for material attachments as specified.
- B. Use methods of attachment to structure allowing sufficient adjustment to accommodate tolerances.
- C. Remove all protective coverings on panels immediately after installation.

3.3 CLEANING

- A. Follow manufacturer's instructions when washing down exposed panel surfaces using a solution of mild detergent in warm water that is applied with soft, cleaning wiping cloths. Always test a small area before applying to an entire area.
- B. Follow strict panel manufacturer guidelines when removing foreign substances from panel surfaces requiring mineral spirits or any solvents that are acceptable for use. Always test a small sample to validate compliance before applying to the entire glazing surface.
- C. Installer shall leave glazing system clean at completion of installation. Final cleaning is by others upon completion of project, following manufacturer's cleaning instructions.

END OF SECTION

General Specification Notes: References in blue are general indicators to the specifier. References in red relate to fire-rated assemblies and/or code related issues, if not applicable, delete.

08 45 13 Translucent Wall Assemblies

PART 1 – GENERAL

1.1 SUMMARY

- A. Section includes requirements for translucent wall system as shown and specified herein.

1.2 WORK INCLUDED

- A. Design, engineer, manufacture and installation of unitized double glazed insulated translucent curtain wall system.
- B. All anchors, brackets, and hardware attachments necessary to complete the specified structural assembly, weatherability, and water-tightness performance requirements. All flashing up to but not penetrating adjoining work are also required as part of the system and shall be included.
- C. Trained and factory authorized labor and supervision to complete the entire panel installation.

1.3 RELATED WORK ELSEWHERE

- A. Structural Steel/Wood Framing/Concrete, Section _____
- B. Curbs and supporting members, Section _____
- C. Roofing, Section _____
- D. Sheet Metal and Flashing, Section _____
- E. Sealant, Section _____

1.4 QUALITY ASSURANCE

- A. The glazing panels must be evaluated and listed by recognized building code evaluation organization: International Council Evaluation Service Inc (ICC-ES).
- B. Materials and products shall be manufactured by a company continuously and regularly employed in the manufacturing, engineering, and designing, stocking and building of unitized translucent curtain walls for a period of at least ten (10) years.
- C. Erection shall be by a factory-approved installer who has been in the business of erecting similar material for at least five (5) consecutive years and can show evidence of satisfactory completion of projects of similar size, scope, and type.
- D. The manufacturer shall be responsible for the configuration and fabrication of the complete panel system, in accordance with the requirements of this specification.

1.5 SUBMITTALS

- A. Submit Shop drawings and color samples in accordance with Section _____.

- B. Manufacturer shall submit written guarantee accompanied by substantiating data, stating that the products to be furnished are in accordance with or exceed these specifications.
- C. Manufacturer shall submit full warranty terms and conditions for verification of compliance with the requirements of this specification.
- D. Submittal: For glazing assemblies indicated to comply with performance requirements and design criteria. [OPTIONAL] Include analysis data signed and sealed by a professional engineer licensed in the state of the project's location
- E. The manufacturer shall submit certified test reports made by an independent organization. Reports shall verify that the material will meet all performance requirements of this specification. Previously completed reports will be acceptable if they are indicative of the products used on this project. Test reports required are:
 - 1. Self-Ignition Temperature (ASTM 1929).
 - 2. Burning Extent (ASTM D-635).
 - 3. Smoke Density (ASTM E-84).
 - 4. Interior Flame Spread (ASTM E-84).
 - 5. Color Difference (ASTM D-2244).
 - 6. Tests on a weathered system after approximately 10 years of actual exposure in Florida field conditions. Test shall include:
 - a. Uniform Static Air Pressure (ASTM E-330).
 - b. Impact Loading (ASTM E-695).
 - c. Cyclic Static Air Pressure and Missile Impact Level D (ASTM 1886 & E-1996).
 - 7. Weather evaluation before and after exposure to 300°F for 25 minutes. Include light transmission and color change (ASTM E-1175 and ASTM D-2244, respectively).
 - 8. Large missile Test – Impact resistance (SFBC PA 201-94).
 - 9. Impact Loading (ASTM E-695).
 - 10. Insulation U-Value for Center of Glazing (NFRC 100).
 - 11. Insulation U-Value for System, glazing and aluminum framing (NFRC 100 and 700 Certification).
 - 12. Visible Light Transmission (VT) (ASTM E-972 and E-1084).
 - 13. Solar Heat Gain Coefficient (SHGC) based on tests or calculations which are based on tests per methodology and procedure given in the NFRC/Calorimeter Standard.
 - 14. Maximum Air Infiltration Rate for fenestration assemblies of curtain walls, (NFRC 400 or ASTM E-283).
 - 15. Water Penetration (ASTM E-331).
 - 16. Load Bearing Ability (ASTM E-330).
 - 17. Cyclic static air pressure and Missile Impact Level D for exterior windows and curtain walls (ASTM 1886 & E-1996).
 - 18. Haze for glare measurement (ASTM D-1003).
 - 19. ICC Evaluation Service Report (ICC-ESR) for compliance with IBC Building Code.
 - 20. Sound Transmission Loss (STC) per ASTM E413

21. Environmental Product Declaration (EPD) for submitted product with Life Cycle Assessment (LCA), Product Category Rule ISO 21930, Independent verification (external) ISO 14025

1.6 MAINTENANCE DATA

- A. The manufacturer shall provide recommended maintenance procedures, schedule of maintenance and materials required or recommended for maintenance.
- B. Submit installer certificate signed by installer, certifying compliance with project qualification requirements.

1.7 WARRANTY

- A. Provide a single source translucent wall system manufacturer warranty against defective materials and fabrication. Submit manufacturer's written warranty agreeing to repair failures in materials within one (1) year from date of delivery. [Optional]: Provide extended warranty for [2] [3] years from date of delivery.
- B. Provide the following single source curtain wall manufacturer glazing warranties. Third party warranties shall not be acceptable. All warranties shall be maintained without the requirement for periodic re-application of a UV-stabilizing exterior coat. The expected humidity of the enclosed space shall not affect warranty length or limitations.
 - 1. Provide a lifetime warranty for both interior and exterior glazing covering:
 - a. Delamination of the glazing from the internal structure.
 - b. Fiberbloom; development of a rough exterior surface.
 - 2. Provide a ten (10) warranty on the interior and exterior glazing panels covering:
 - a. Change in light transmission of no more than 6% per ASTM D-1003.
 - b. Color stability; interior glazing shall not change color more than 6 CIE Units DELTA E by ASTM D-2244.
 - c. Blue light spectrum (400-470nm) measured in accordance with ASTM E-1175 shall not decrease by no more than 6% after ten years in comparison with the original value.
- C. In addition, submit installer's written warranty agreeing to repair installation workmanship, defects and leaks within one year from date of delivery. [Optional]: provide extended warranty for [2] [3] years from date of delivery.

PART 2 – PRODUCTS

2.1 MANUFACTURER

- A. Basis of design
 - 1. The design and performance criteria of this job are based on the UniQuad – Translucent Wall System - as manufactured by Kingspan Light + Air | Architectural Daylighting
 - a. Phone: (800) 759-6965; Website: www.kingspanlightandair.us
- B. Approved Manufacturers

1. Other manufacturers may bid this project provided they comply with all requirements of the specification and submit evidence of compliance with all performance criteria specified herein. This evidence must include proof of conformance and test reports per section 1.5. Any exceptions taken from this specification must be noted on the approval request. If no exceptions are noted and approval is given, product performance will be as specified.
2. Listing manufacturers names in this specification does not constitute approval of their products or relieve them of compliance with all the performance requirements contained herein.

2.2 TRANSLUCENT CURTAIN WALL PERFORMANCE AND APPEARANCE

A. Glazing construction for weatherability and resistance to buckling and pressure

1. Translucent glazing must be constructed of polycarbonate with tight cell sizes not exceeding 0.18". Wide cells of size greater than 0.18" shall not be acceptable.
2. Glazing shall be factory sealed to restrict dirt ingress.
3. Glazing must be manufactured with a permanent, co-extruded ultra-violet protective layer. Post-applied coatings or films of dissimilar materials that need to be maintained are unacceptable.
4. The light transmission shall not decrease more than 6% as measured by ASTM D-1003 over 10 years, or after exposure to temperature of 300° for 25 minutes (thermal aging performance standard).
5. Blue light spectrum (400-470nm) measured in accordance with ASTM E-1175 shall not decrease by no more than 6% after ten years in comparison with the original value.
6. The weathering performance should be justified by successful testing of the glazing's performance after exposure to actual Florida weather conditions for approximately 10 years in comparison to a new glazing assembly. This performance must be demonstrated by providing independent lab test reports for the exposed and a new panel assembly for the following tests; test results must show that there is no deterioration in performance for the 10 year's exposed panels versus new:
 - a. Uniform static air pressure per ASTM E-330 at negative load of -105 PSF and positive load of 130 PSF.
 - b. Impact loading of 500 ft lbs. per ASTM E-695.
 - c. Cyclic static air pressure at 65 PSF and impact lever D per ASTM 1886 and ASTM E-1996.
7. Glazing shall not become readily detached when exposed to temperatures of 300°F and 0°F for 25 minutes.
8. Thermal aging – the interior and exterior glazing shall not change color in excess of 0.75 Delta E per ASTM D-2244 and shall not darken more than 0.3 units Delta L per ASTM D-2244 and shall allow no cracking or crazing when exposed to 300°F for 25 minutes.

B. Translucent glazing assemblies – Unitized Double Glazed

1. Design, engineer, manufacture, and installation of unitized double-glazed translucent wall system. An assembly of two independent insulated glazing panes in one integrated assembly, incorporated into a complete aluminum frame system that has been tested and warranted by the manufacturer as a single source system. Design shall provide for the replacement of the exterior glazing, independently of the interior glazing without exposing the building's interior or compromising the weather tightness or interfering with the normal working functions of the building. Single pane glazing systems are not acceptable.
2. Overall glazing assembly thickness shall be a minimum 2.75", with two glazing panes and concealed interlocking connector. Thickness of the exterior and interior glazing shall be minimum 8mm thick each.

C. Thermal and Solar Performance

1. To ensure Energy Code compliance, product U-Values must be listed in the NFRC Product Directory and have a NFRC Certified Product Directory (CPD) number.
 - a. Basis of Design CPD Number: CPI-M-3 / CPI-M-5
2. Center of glazing U-Value per NFRC 100: Maximum .23.
 - a. [OPTIONAL Center of Glass U-Value: [.13] [.07]
3. System U-Value per NFRC 100 and 700 with a Mill finish: Maximum .28.
 - a. [OPTIONAL System U-Value: [.17] [.11]
4. Each unitized glazing assembly shall be thermally broken.
5. Visible Light Transmission – Center of Glass (VT%) _____ Per ASTM E-972 and E-1084.
6. Solar Heat Gain Coefficient (SHGC) _____ per NFRC Calorimeter.
7. Haze measurement minimum of 90% per ASTM D-1003.
8. Standard exterior glazing color: [Clear Matte] [Ice White Matte] [White Matte] [Green Matte] [Blue Matte] [OPTIONAL: CUSTOM]
9. Standard interior glazing color: [Clear Matte] [Ice White Matte] [White Matte] [Green Matte] [Blue Matte] [OPTIONAL: CUSTOM]

D. Translucent Glazing Joint System

1. Water penetration: no water penetration of the glazing joint connection length at test pressure of 6.24 PSF per ASTM E-331.
2. Air Infiltration: pass requirements of NFRC 400 at 1.57 PSF and 6.24 PSF.
3. Free movement of the glazing shall be allowed to occur without damage to the weather tightness of the completed system.
4. The glazing joint shall comply with the deflection limitation of IBC Table 1604.3 for exterior walls with flexible finishes – L/120 per ASTM E-330.

E. Flammability

1. Exterior Glazing
 - a. Class CC1 fire rating classification per ASTM D-635. Square foot and separation limitations provided in IBC Table 2607.4, any light transmitting plastic of a CC2 fire classification rating is specifically dis-allowed.
 - b. Class A interior flame spread per ASTM E-84
 - c. Flame spread no greater than zero (0) and smoke density no greater than 110 per ASTM E-84.

d. Minimum self-ignition temperature of 1120° per ASTM 1929.

2. Interior Glazing

a. Class CC1 fire rating classification per ASTM D-635. Square foot and separation limitations provided in IBC Table 2607.4, any light transmitting plastic of a CC2 fire classification rating is specifically dis-allowed.

b. Class A interior flame spread per ASTM E-84

c. Flame spread no greater than zero (0) and smoke density no greater than 110 per ASTM E-84.

d. Minimum self-ignition temperature of 1120° per ASTM 1929.

F. Impact Resistance

1. Minimum Impact resistance of 350 ft. lbs. per SFBC – PA 201-94.

2. Minimum Impact loading of 500 ft. lbs. per ASTM E-695.

3. Must comply with standard specification for performance of exterior windows or curtain walls when impacted by windborne debris at level D and after cyclic wind loading at the specified design load (ASTM E1996-02).

2.3 METAL FRAME STRUCTURE

A. Design criteria shall be per [\[structural notes page\]](#) [\[ASCE-7 requirements\]](#)

B. The translucent wall light framing is designed to be self-supporting between the support constructions. The deflection of the glazing panel joint and system framing members in a direction normal to the plane of the glazing, when subjected to a uniform load deflection, shall not exceed **L/120 for the unsupported span per IBC Table 1604.3**. All adjacent and support construction must support the transfer of all loads included horizontal and vertical, exerted by the system. Design or structural engineering services for the supporting structure or building components in not included in the curtain wall scope of this section

C. All system aluminum framing exposed to the exterior shall be thermally broken.

D. Water penetration: the curtain wall system shall allow no water penetration at a minimum differential static pressure of 6.24 PSF per AAMA 501 pressure difference recommendations and as demonstrated by prior testing of typical framing sample per ASTM E-331

E. Water test of metal frame structure shall be conducted according to procedures in AAMA 501.2.

F. Maximum air infiltration rate for fenestration of the two glazing assemblies of curtain wall system shall be per NFRC 400.

2.4 METAL MATERIALS

A. Extruded aluminum shall be ANSI/ASTM B-221; 6063-T6 or 6005-T5.

B. Flashing:

1. 5005 H34 Aluminum .040" thick

2. Sheet metal sill flashings are to be furnished shop formed to profile - when lengths exceed 10ft, provide in nominal 10ft lengths. Field trimming of the flashing and field forming the ends is necessary to suit as-built conditions. Sheet

metal ends are to overlap at least 6in to 8in, set in a full bed of sealant and riveted if required.

- C. All fasteners for aluminum framing to be stainless steel or cadmium plated steel, excluding the final fasteners to the building.
- D. All exposed Aluminum shall be finished:
 - 1. [Optional] Painted finish as per performance requirement [AAMA 2603 with a 1yr warranty] [AAMA 2604 with a 10yr warranty] [2 coat AAMA 2605 with a 10yr warranty] [3 coat AAMA 2605 with a 10yr warranty] [3 coat EXOTIC/METALLIC AAMA 2605 with 10yr warranty].
 - a. Paint color to be [selected from Manufacture's standards] [custom to match Architect's sample].
 - 2. [Optional] Anodized finish as per performance requirement [204 Class II Clear Anodized with 1yr warranty] [215 Class I Clear Anodized with 1yr warranty] [Class I Bronze Anodized with 1yr warranty].
 - 3. [Optional] Mill aluminum with no applied finish.

PART 3 – EXECUTION

3.1 EXAMINATION

- A. General contractor to verify when structural support is ready to receive all work in the section and to convene a pre-installation conference at least one week prior to commencing work of this section. Attendance required of the general contractor, curtain wall installer and all parties affecting and effected by the work of this section.
- B. All submitted opening sizes, dimensions and tolerances are to be field verified by the general contractor unless otherwise stipulated.
- C. Installer shall examine area of installation to verify readiness of site conditions. Notify the general contractor about any defects requiring correction. Do not work until conditions are satisfactory.

3.2 INSTALLATION

- A. Install components in strict accordance with manufacturer's instructions and approved shop drawings. Use proper fasteners, caulking and hardware for material attachments as specified.
- B. Use methods of attachment to structure allowing sufficient adjustment to accommodate tolerances.
- C. Remove all protective coverings on panels immediately after installation.

3.3 CLEANING

- A. Follow manufacturer's instructions when washing down exposed panel surfaces using a solution of mild detergent in warm water that is applied with soft, cleaning wiping cloths. Always test a small area before applying to an entire area.
- B. Follow strict panel manufacturer guidelines when removing foreign substances from panel surfaces requiring mineral spirits or any solvents that are acceptable for use. Always test a small sample to validate compliance before applying to the entire glazing surface.
- C. Installer shall leave glazing system clean at completion of installation. Final cleaning is by others upon completion of project, following manufacturer's cleaning instructions.

END OF SECTION

General Specification Notes: References in blue are general indicators to the specifier. References in red relate to fire-rated assemblies and/or code related issues, if not applicable, delete.

08 45 13 Translucent Wall Assemblies – UFC Requirements

PART 1 – GENERAL

1.1 SUMMARY

- A. Section includes requirements for translucent wall system as shown and specified herein.

1.2 WORK INCLUDED

- A. Design, engineer, manufacture and installation of unitized double glazed insulated translucent curtain wall system.
- B. All anchors, brackets, and hardware attachments necessary to complete the specified structural assembly, weatherability, and water-tightness performance requirements. All flashing up to but not penetrating adjoining work are also required as part of the system and shall be included.
- C. Trained and factory authorized labor and supervision to complete the entire panel installation.

1.3 RELATED WORK ELSEWHERE

- A. Structural Steel/Wood Framing/Concrete, Section _____
- B. Curbs and supporting members, Section _____
- C. Roofing, Section _____
- D. Sheet Metal and Flashing, Section _____
- E. Sealant, Section _____

1.4 QUALITY ASSURANCE

- A. The glazing panels must be evaluated and listed by recognized building code evaluation organization: International Council Evaluation Service Inc (ICC-ES).
- B. Materials and products shall be manufactured by a company continuously and regularly employed in the manufacturing, engineering, and designing, stocking and building of unitized translucent curtain walls for a period of at least ten (10) years.
- C. Erection shall be by a factory-approved installer who has been in the business of erecting similar material for at least five (5) consecutive years and can show evidence of satisfactory completion of projects of similar size, scope, and type.
- D. The manufacturer shall be responsible for the configuration and fabrication of the complete panel system, in accordance with the requirements of this specification.

1.5 SUBMITTALS

- A. Submit Shop drawings and color samples in accordance with Section _____.

- B. Manufacturer shall submit written guarantee accompanied by substantiating data, stating that the products to be furnished are in accordance with or exceed these specifications.
- C. Manufacturer shall submit full warranty terms and conditions for verification of compliance with the requirements of this specification.
- D. Submittal: For glazing assemblies indicated to comply with performance requirements and design criteria. [OPTIONAL] Include analysis data signed and sealed by a professional engineer licensed in the state of the project's location
- E. The manufacturer shall submit certified test reports made by an independent organization. Reports shall verify that the material will meet all performance requirements of this specification. Previously completed reports will be acceptable if they are indicative of the products used on this project. Test reports required are:
 - 1. Self-Ignition Temperature (ASTM 1929).
 - 2. Burning Extent (ASTM D-635).
 - 3. Smoke Density (ASTM E-84).
 - 4. Interior Flame Spread (ASTM E-84).
 - 5. Color Difference (ASTM D-2244).
 - 6. Tests on a weathered system after approximately 10 years of actual exposure in Florida field conditions. Test shall include:
 - a. Uniform Static Air Pressure (ASTM E-330).
 - b. Impact Loading (ASTM E-695).
 - c. Cyclic Static Air Pressure and Missile Impact Level D (ASTM 1886 & E-1996).
 - 7. Weather evaluation before and after exposure to 300°F for 25 minutes. Include light transmission and color change (ASTM E-1175 and ASTM D-2244, respectively).
 - 8. Large missile Test – Impact resistance (SFBC PA 201-94).
 - 9. Impact Loading (ASTM E-695).
 - 10. Insulation U-Value for Center of Glazing (NFRC 100).
 - 11. Insulation U-Value for System, glazing and aluminum framing (NFRC 100 and 700 Certification).
 - 12. Visible Light Transmission (VT) (ASTM E-972 and E-1084).
 - 13. Solar Heat Gain Coefficient (SHGC) based on tests or calculations which are based on tests per methodology and procedure given in the NFRC/Calorimeter Standard.
 - 14. Maximum Air Infiltration Rate for fenestration assemblies of curtain walls, (NFRC 400 or ASTM E-283).
 - 15. Water Penetration (ASTM E-331).
 - 16. Load Bearing Ability (ASTM E-330).
 - 17. Cyclic static air pressure and Missile Impact Level D for exterior windows and curtain walls (ASTM 1886 & E-1996).
 - 18. Haze for glare measurement (ASTM D-1003).
 - 19. ICC Evaluation Service Report (ICC-ESR) for compliance with IBC Building Code.
 - 20. Sound Transmission Loss (STC) per ASTM E413

21. Environmental Product Declaration (EPD) for submitted product with Life Cycle Assessment (LCA), Product Category Rule ISO 21930, Independent verification (external) ISO 14025

22. DoD Antiterrorism Standard for Buildings per UFC 4-010-01.

1.6 MAINTENANCE DATA

- A. The manufacturer shall provide recommended maintenance procedures, schedule of maintenance and materials required or recommended for maintenance.
- B. Submit installer certificate signed by installer, certifying compliance with project qualification requirements.

1.7 WARRANTY

- A. Provide a single source translucent wall system manufacturer warranty against defective materials and fabrication. Submit manufacturer's written warranty agreeing to repair failures in materials within one (1) year from date of delivery. [Optional]: Provide extended warranty for [2] [3] years from date of delivery.
- B. Provide the following single source curtain wall manufacturer glazing warranties. Third party warranties shall not be acceptable. All warranties shall be maintained without the requirement for periodic re-application of a UV-stabilizing exterior coat. The expected humidity of the enclosed space shall not affect warranty length or limitations.
 - 1. Provide a lifetime warranty for both interior and exterior glazing covering:
 - a. Delamination of the glazing from the internal structure.
 - b. Fiberbloom; development of a rough exterior surface.
 - 2. Provide a ten (10) warranty on the interior and exterior glazing panels covering:
 - a. Change in light transmission of no more than 6% per ASTM D-1003.
 - b. Color stability: interior glazing shall not change color more than 6 CIE Units DELTA E by ASTM D-2244.
 - c. Blue light spectrum (400-470nm) measured in accordance with ASTM E-1175 shall not decrease by no more than 6% after ten years in comparison with the original value.
- C. In addition, submit installer's written warranty agreeing to repair installation workmanship, defects and leaks within one year from date of delivery. [Optional]: provide extended warranty for [2] [3] years from date of delivery.

PART 2 – PRODUCTS

2.1 MANUFACTURER

- A. Basis of design

1. The design and performance criteria of this job are based on the UniQuad – Translucent Wall System - as manufactured by Kingspan Light + Air | Architectural Daylighting

- a. Phone: (800) 759-6965; Website: www.kingspanlightandair.us

B. Approved Manufacturers

1. Other manufacturers may bid this project provided they comply with all requirements of the specification and submit evidence of compliance with all performance criteria specified herein. This evidence must include proof of conformance and test reports per section 1.5. Any exceptions taken from this specification must be noted on the approval request. If no exceptions are noted and approval is given, product performance will be as specified.
2. Listing manufacturers names in this specification does not constitute approval of their products or relieve them of compliance with all the performance requirements contained herein.

2.2 TRANSLUCENT CURTAIN WALL PERFORMANCE AND APPEARANCE

A. Glazing construction for weatherability and resistance to buckling and pressure

1. Translucent glazing must be constructed of polycarbonate with tight cell sizes not exceeding 0.18". Wide cells of size greater than 0.18" shall not be acceptable.
2. Glazing shall be factory sealed to restrict dirt ingress.
3. Glazing must be manufactured with a permanent, co-extruded ultra-violet protective layer. Post-applied coatings or films of dissimilar materials that need to be maintained are unacceptable.
4. The light transmission shall not decrease more than 6% as measured by ASTM D-1003 over 10 years, or after exposure to temperature of 300° for 25 minutes (thermal aging performance standard).
5. Blue light spectrum (400-470nm) measured in accordance with ASTM E-1175 shall not decrease by no more than 6% after ten years in comparison with the original value.
6. The weathering performance should be justified by successful testing of the glazing's performance after exposure to actual Florida weather conditions for approximately 10 years in comparison to a new glazing assembly. This performance must be demonstrated by providing independent lab test reports for the exposed and a new panel assembly for the following tests; test results must show that there is no deterioration in performance for the 10 year's exposed panels versus new:
 - a. Uniform static air pressure per ASTM E-330 at negative load of -105 PSF and positive load of 130 PSF.
 - b. Impact loading of 500 ft lbs. per ASTM E-695.
 - c. Cyclic static air pressure at 65 PSF and impact lever D per ASTM 1886 and ASTM E-1996.
7. Glazing shall not become readily detached when exposed to temperatures of 300°F and 0°F for 25 minutes.

8. Thermal aging – the interior and exterior glazing shall not change color in excess of 0.75 Delta E per ASTM D-2244 and shall not darken more than 0.3 units Delta L per ASTM D-2244 and shall allow no cracking or crazing when exposed to 300°F for 25 minutes.
- B. Translucent glazing assemblies – Unitized Double Glazed
1. Design, engineer, manufacture, and installation of unitized double-glazed translucent wall system. An assembly of two independent insulated glazing panes in one integrated assembly, incorporated into a complete aluminum frame system that has been tested and warranted by the manufacturer as a single source system. Design shall provide for the replacement of the exterior glazing, independently of the interior glazing without exposing the building's interior or compromising the weather tightness or interfering with the normal working functions of the building. Single pane glazing systems are not acceptable.
 2. Overall glazing assembly thickness shall be a minimum 2.75", with two glazing panes and concealed interlocking connector. Thickness of the exterior and interior glazing shall be minimum 8mm thick each.
- C. Thermal and Solar Performance
1. To ensure Energy Code compliance, product U-Values must be listed in the NFRC Product Directory and have a NFRC Certified Product Directory (CPD) number.
 - a. Basis of Design CPD Number: CPI-M-3 / CPI-M-5
 2. Center of glazing U-Value per NFRC 100: Maximum .23.
 - a. [OPTIONAL Center of Glass U-Value: [.13] [.07]
 3. System U-Value per NFRC 100 and 700 with a Mill finish: Maximum .28.
 - a. [OPTIONAL System U-Value: [.17] [.11]
 4. Each unitized glazing assembly shall be thermally broken.
 5. Visible Light Transmission – Center of Glass (VT%) _____ Per ASTM E-972 and E-1084.
 6. Solar Heat Gain Coefficient (SHGC) _____ per NFRC Calorimeter.
 7. Haze measurement minimum of 90% per ASTM D-1003.
 8. Standard exterior glazing color: [Clear Matte] [Ice White Matte] [White Matte] [Green Matte] [Blue Matte] [OPTIONAL: CUSTOM]
 9. Standard interior glazing color: [Clear Matte] [Ice White Matte] [White Matte] [Green Matte] [Blue Matte] [OPTIONAL: CUSTOM]
- D. Translucent Glazing Joint System
1. Water penetration: no water penetration of the glazing joint connection length at test pressure of 6.24 PSF per ASTM E-331.
 2. Air Infiltration: pass requirements of NFRC 400 at 1.57 PSF and 6.24 PSF.
 3. Free movement of the glazing shall be allowed to occur without damage to the weather tightness of the completed system.
 4. The glazing joint shall comply with the deflection limitation of IBC Table 1604.3 for exterior walls with flexible finishes – L/120 per ASTM E-330.
- E. Flammability
1. Exterior Glazing

- a. Class CC1 fire rating classification per ASTM D-635. Square foot and separation limitations provided in IBC Table 2607.4, any light transmitting plastic of a CC2 fire classification rating is specifically dis-allowed.
- b. Class A interior flame spread per ASTM E-84
- c. Flame spread no greater than zero (0) and smoke density no greater than 110 per ASTM E-84.
- d. Minimum self-ignition temperature of 1120° per ASTM 1929.

2. Interior Glazing

- a. Class CC1 fire rating classification per ASTM D-635. Square foot and separation limitations provided in IBC Table 2607.4, any light transmitting plastic of a CC2 fire classification rating is specifically dis-allowed.
- b. Class A interior flame spread per ASTM E-84
- c. Flame spread no greater than zero (0) and smoke density no greater than 110 per ASTM E-84.
- d. Minimum self-ignition temperature of 1120° per ASTM 1929.

F. Impact Resistance

- 1. Minimum Impact resistance of 350 ft. lbs. per SFBC – PA 201-94.
- 2. Minimum Impact loading of 500 ft. lbs. per ASTM E-695.
- 3. Must comply with standard specification for performance of exterior windows or curtain walls when impacted by windborne debris at level D and after cyclic wind loading at the specified design load (ASTM E1996-02).

2.3 METAL FRAME STRUCTURE

- A. Design criteria shall be per [\[structural notes page\]](#) [\[ASCE-7 requirements\]](#)
- B. The translucent wall light framing is designed to be self-supporting between the support constructions. The deflection of the glazing panel joint and system framing members in a direction normal to the plane of the glazing, when subjected to a uniform load deflection, shall not exceed $L/120$ for the unsupported span per IBC Table 1604.3. All adjacent and support construction must support the transfer of all loads included horizontal and vertical, exerted by the system. Design or structural engineering services for the supporting structure or building components in not included in the curtain wall scope of this section
- C. All system aluminum framing exposed to the exterior shall be thermally broken.
- D. Water penetration: the curtain wall system shall allow no water penetration at a minimum differential static pressure of 6.24 PSF per AAMA 501 pressure difference recommendations and as demonstrated by prior testing of typical framing sample per ASTM E-331
- E. Water test of meal frame structure shall be conducted according to procedures in AAMA 501.2.
- F. Maximum air infiltration rate for fenestration of the two glazing assemblies of curtain wall system shall be per NFRC 400.

2.4 METAL MATERIALS

- A. Extruded aluminum shall be ANSI/ASTM B-221; 6063-T6 or 6005-T5.
- B. Flashing:
 - 1. 5005 H34 Aluminum .040" thick

2. Sheet metal sill flashings are to be furnished shop formed to profile - when lengths exceed 10ft, provide in nominal 10ft lengths. Field trimming of the flashing and field forming the ends is necessary to suit as-built conditions. Sheet metal ends are to overlap at least 6in to 8in, set in a full bed of sealant and riveted if required.
- C. All fasteners for aluminum framing to be stainless steel or cadmium plated steel, excluding the final fasteners to the building.
- D. All exposed Aluminum shall be finished:
 1. [Optional] Painted finish as per performance requirement [AAMA 2603 with a 1yr warranty] [AAMA 2604 with a 10yr warranty] [2 coat AAMA 2605 with a 10yr warranty] [3 coat AAMA 2605 with a 10yr warranty] [3 coat EXOTIC/METALLIC AAMA 2605 with 10yr warranty].
 - a. Paint color to be [selected from Manufacture's standards] [custom to match Architect's sample].
 2. [Optional] Anodized finish as per performance requirement [204 Class II Clear Anodized with 1yr warranty] [215 Class I Clear Anodized with 1yr warranty] [Class I Bronze Anodized with 1yr warranty].
 3. [Optional] Mill aluminum with no applied finish.

PART 3 – EXECUTION

3.1 EXAMINATION

- A. General contractor to verify when structural support is ready to receive all work in the section and to convene a pre-installation conference at least one week prior to commencing work of this section. Attendance required of the general contractor, curtain wall installer and all parties affecting and effected by the work of this section.
- B. All submitted opening sizes, dimensions and tolerances are to be field verified by the general contractor unless otherwise stipulated.
- C. Installer shall examine area of installation to verify readiness of site conditions. Notify the general contractor about any defects requiring correction. Do not work until conditions are satisfactory.

3.2 INSTALLATION

- A. Install components in strict accordance with manufacturer's instructions an approved shop drawings. Use proper fasteners, caulking and hardware for material attachments as specified.
- B. Use methods of attachment to structure allowing sufficient adjustment to accommodate tolerances.
- C. Remove all protective coverings on panels immediately after installation.

3.3 CLEANING

- A. Follow manufacturer's instructions when washing down exposed panel surfaces using a solution of mild detergent in warm water that is applied with soft, cleaning wiping cloths. Always test a small area before applying to an entire area.
- B. Follow strict panel manufacturer guidelines when removing foreign substances from panel surfaces requiring mineral spirits or any solvents that are acceptable for use.

- Always test a small sample to validate compliance before applying to the entire glazing surface.
- C. Installer shall leave glazing system clean at completion of installation. Final cleaning is by others upon completion of project, following manufacturer's cleaning instructions.

END OF SECTION