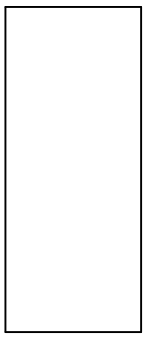
Door	Size					Door				Frame				Hardware		Notes
#	1050	1220	other	Single	Pair	Mat'l	ULC	Type	Fin.	Mat'l	Type	Finish	Detail	Code	Acous.	
MAIN FLOOR																
D-100A	X				X	AL		3	PREF	AL	B	PREF	3	1		1,2,3,4,5
D-100B	X				X	AL		3	PREF	AL	B	PREF	2	2		1,2,8
D-103	X			X		MW		5	PT	MW	D	PT		3		10
D-104	X			X		HM		1	PT	HM	A	PT	1	4		9
D-105	X			X		HM		1	PT	HM	A	PT	1	5		9
D-106	X			X		HM		1	PT	HM	A	PT	1	5		9
D-107	X			X		HM		1	PT	HM	A	PT	1	6		9
D-109		X		X		AL		4	PREF	AL	C	PREF	2	7		1,8
D-110	X			X		HM		1	PT	HM	A	PT	1	8		9
D-111	X			X		HM		1	PT	HM	A	PT	1	11		2,5,9
D-112A	X			X		HM		1	PT	HM	A	PT	1	9		2,5,9
D-112B	X			X		HM		1	PT	HM	A	PT	1	9		2,5,9
D-113	X			X		HM		1	PT	HM	A	PT	1	10		2,5,9
D-115A	X			X		HM		1	PT	HM	A	PT	1	8		2,5,9
D-115B	X			X		HM		1	PT	HM	A	PT	1	8		2,5,9
D-116	X			X		HM		1	PT	HM	A	PT	1	10		2,5,9
D-118B	X			X		HM		1	PT	HM	A	PT	1	8		2,5,9
D-118C	X			X		HM		1	PT	HM	A	PT	1	8		2,5,9
D-119	X			X		HM		1	PT	HM	A	PT	1	11		2,5,9
D-120A		X		X		AL		3	PREF	AL	A	PREF	2	12		1,2,11
D-120B		X		X		AL		1	PREF	AL	C	PREF	2	13		1,3,4
D-121	X			X		HM		1	PT	HM	A	PT	1	14		9
D-122	X			X		HM		1	PT	HM	A	PT	1	9		2,5,9
D-123A	X			X		AL		3	PREF	AL	E	PREF	3	15		1,3,4
D-124	X			X		HM		1	PT	HM	A	PT	1	16		9
D-125	X			X		HM		1	PT	HM	A	PT	1	17		7,9
D-126	X			X		HM		1	PT	HM	A	PT	1	14		
BASEMENT																
D-001A			900	X		HM	3/4 HR	1	PT	HM	A	PT	1	18		6,12
D-001B			900	X		HM	3/4 HR	1	PT	HM	A	PT	1	18		6,12
D-002			900	X		HM	3/4 HR	1	PT	HM	A	PT	1	19		9,12
D-003A			900	X		HM	3/4 HR	1	PT	HM	A	PT	1	20		9,12
D-003B			900	X		HM	3/4 HR	1	PT	HM	A	PT	1	21		9,12
D-004			900	X		HM	3/4HR	1	PT	HM	A	PT	1	22		9,12,13
MEZZANINE																
D-200	X			X		HM		1	PT	HM	A	PT	1	23		9

ABBREVIATIONS:

HM	HOLLOW METAL
IHM	INSULATED HOLLOW METAL
SCWD	SOLID CORE WOOD
PREF	PREFINISHED
AL	ALUMINUM
GL	GLAZING
PT	PAINT
STL	STEEL
ISTL	INSULATED STEEL
S	STAIN
MW	MILLWORK GATE AS DETAILED
FG	FRAMELESS GLASS

NOTES:

1. ALUMINUM DOOR SIZE 1067 X 2134 TYPICAL
2. AUTO DOOR OPERATOR AS SPECD
3. THERMALLY BROKEN FRAME AND INSULATED DOOR.
4. SEE WINDOW SCHEDULE FOR CURTAIN WALL
5. ELECTRIC STRIKE
6. DOOR HEIGHT 900 - SITE CONFIRM TO MAXIMIZE
7. FIRE SEPARATION BUT NO RATING REQUIRED
8. SEE WINDOW SCHED FOR EXT. STOREFRONT FRAMING
9. USE CLOSEST STOCK METRIC WIDTH X 2150 HIGH
10. REFER TO MILLWORK DETAILS FOR GATE CONSTR.
11. FRAME TO SUIT FRAMELESS GLASS THICKNESS
12. SMOKE SEALS AND DOOR BOTTOM
13. 4-SIDED FRAME



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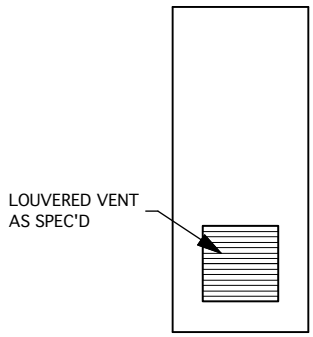
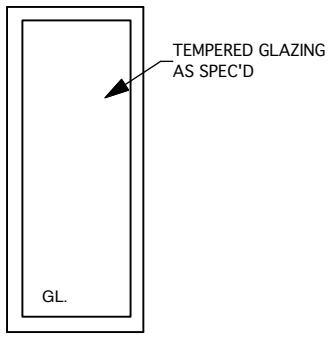
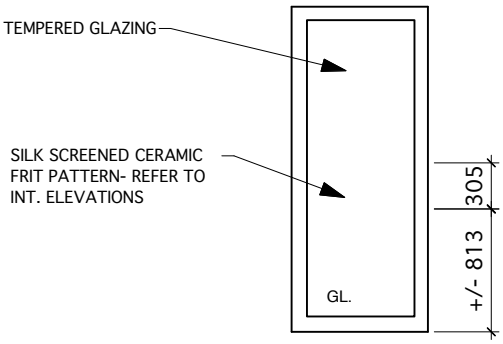

LOUVERED VENT
AS SPEC'D

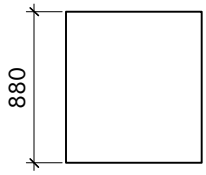
2


TEMPERED GLAZING
AS SPEC'D
GL.

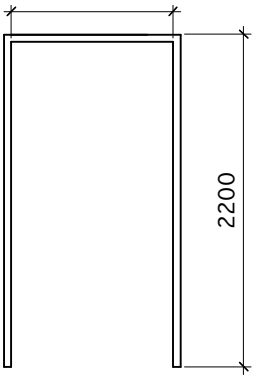
3


TEMPERED GLAZING
SILK SCREENED CERAMIC
FRIT PATTERN- REFER TO
INT. ELEVATIONS
GL.
305
+/- 813

4


880

5



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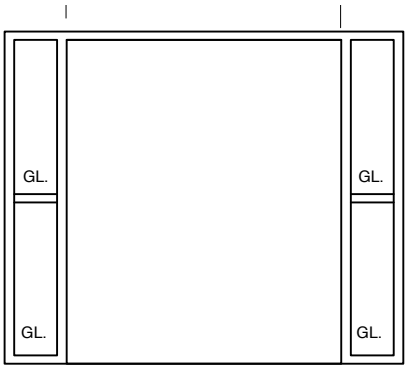

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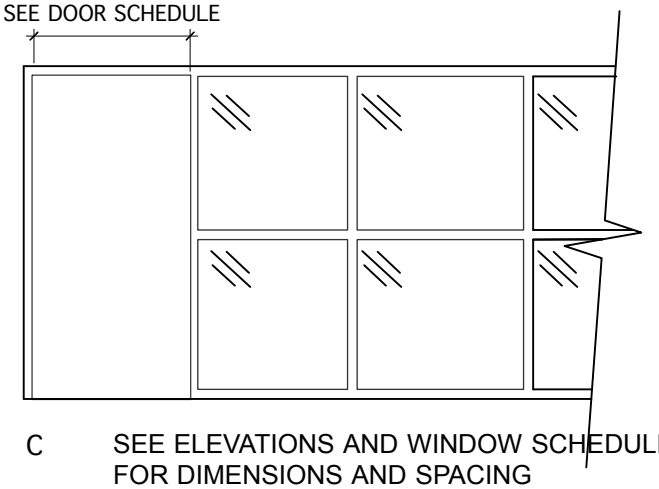
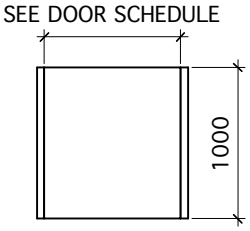


C SEE ELEVATIONS AND WINDOW SCHEDULE FOR DIMENSIONS AND SPACING



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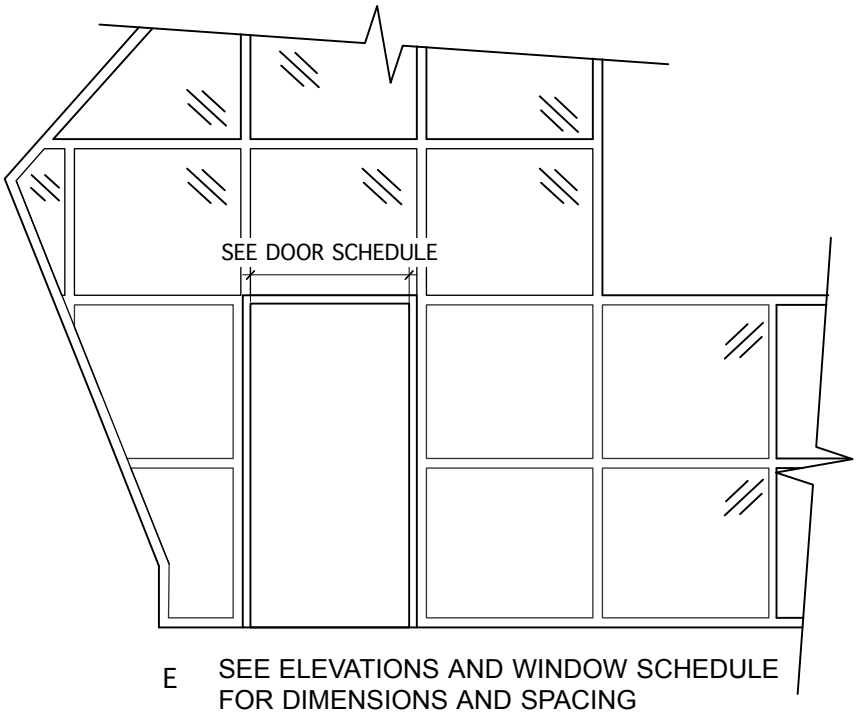
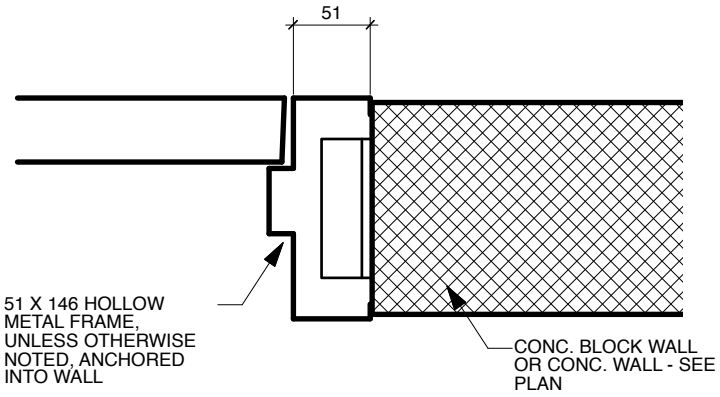


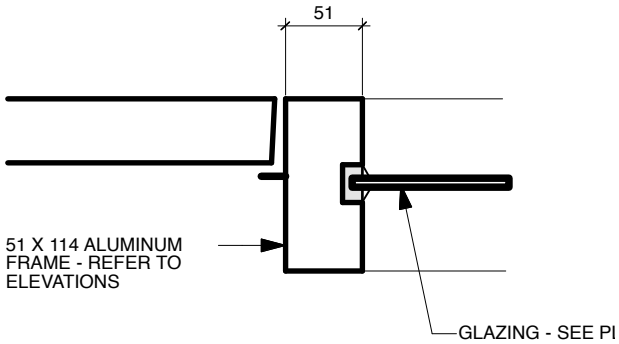
E SEE ELEVATIONS AND WINDOW SCHEDULE FOR DIMENSIONS AND SPACING

NOTE: SEE FLOOR PLAN & SECTIONS
FOR WALL CONSTRUCTION

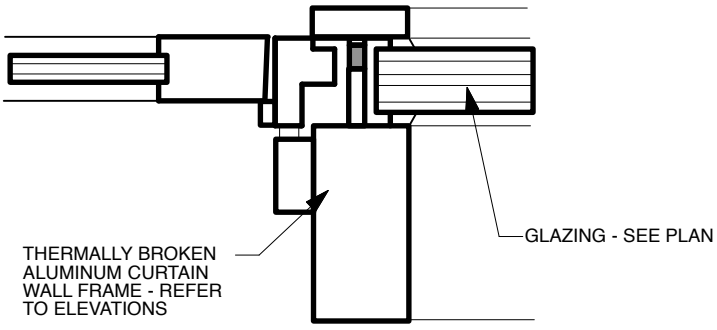
1. INTERIOR METAL FRAME



2. INTERIOR ALUM. FRAME



3. EXTERIOR CURTAIN WALL ALUMINUM FRAME



Set: 1.0

8	Hinge	T4A3386 NRP 114mm x 114mm	US32D	MK
1	Exit Device	16 AD8410 862	US32D	SA
1	Exit Device	16 53 AD8410 106 x 862	US32D	SA
2	Mortise Cylinder	Schlage to Suit	626	SC
1	Mortise Cylinder	BEST to Suit	626	BE
2	Concealed Overhead Stop	6-X36	630	RF
1	Door Closer	351 OZ	EN	SA
1	Drop Plate	351B	EN	SA
1	Door Operator	6020	689	NO
1	Threshold	172A		PE
1	Weatherstrip and Sweep	By Door Supplier		00
2	Actuator	639		NO

Notes: Actuators to be wired through the latch bolt monitor. Actuators to only be active when latchbolt is retracted. Latches can be held back by use of cylinder dogging.

Set: 2.0

8	Hinge	T4A3786 114mm x 114mm	US26D	MK
2	Push Bar & Pull	BF15747	US32D	RO
2	Concealed Overhead Stop	6-X36	630	RF
1	Door Closer	351 OZ	EN	SA
1	Drop Plate	351B	EN	SA
1	Door Operator	6020	689	NO
2	Actuator	639		NO

Set: 3.0

2	Hinge	1502 114mm x 102mm	US26D	MK
1	Exit Lock	AL25D SAT	626	SC
1	Kick Plate	K1050 250mm	US32D	RO

Set: 4.0

4	Hinge	TA2714 NRP 114mm x 102mm	US26D	MK
1	Entry Lock	AL53 P D SAT	626	SC
1	Door Closer	1431 PS	EN	SA
1	Kick Plate	K1050 250mm	US32D	RO

Set: 5.0

4	Hinge	TA2714 114mm x 102mm	US26D	MK
1	Entry Lock	AL53 P D SAT	626	SC
1	Door Stop	441H	US26D	RO

Set: 6.0

4	Hinge	TA2714 114mm x 102mm	US26D	MK
1	Entry Lock	AL53 P D SAT	626	SC
1	Concealed Overhead Stop	2-X36	630	RF

Set: 7.0

4	Hinge	TA2314 NRP 114mm x 102mm	US32D	MK
2	Mortise Cylinder	Schlage to Suit	626	SC
1	Push Bar & Pull	BF15747	US32D	RO
1	Concealed Overhead Stop	6-X36	630	RF
1	Door Closer	SRI 1431 OZ	EN	SA
1	Drop Plate	1431B	EN	SA
1	Threshold	172A		PE
1	Weatherstrip and Sweep	By Door Supplier		00

Set: 8.0

4	Hinge	T4A3386 NRP 114mm x 114mm	US32D	MK
1	Mortise Classroom Deadlock	L463	626	SC
1	Push Plate	70E	US32D	RO
1	Pull Plate	111x70C	US32D	RO
1	Door Operator	6020	689	NO
1	Kick Plate	K1050 250mm	US32D	RO
1	Wall Stop	406	US32D	RO
2	Actuator	639		NO
1	Monitor	LMS-1		SU

Notes: Wire actuators through the LMS latch monitor switch. Actuators to be disabled when deadbolt is thrown.

Set: 9.0

4	Hinge	TA2314 114mm x 101mm	US32D	MK
1	Mortise Deadlock	L496	630	SC
1	Push Plate	70E	US32D	RO
1	Pull Plate	111x70C	US32D	RO
1	Automatic Operator	5730	689	NO
1	Kick Plate	K1050 250mm	US32D	RO
1	Wall Stop	406	US32D	RO
2	Actuator	639		NO
1	Monitor	LMS-1		SU

Notes: Wire actuators through the LMS latch monitor switch. Actuators to be disabled when deadbolt is thrown.

Set: 10.0

4	Hinge	TA2314 114mm x 101mm	US32D	MK
1	Mortise Deadlock	L496	630	SC
1	Push Plate	70E	US32D	RO
1	Pull Plate	111x70C	US32D	RO
1	Concealed Overhead Stop	6-X36	630	RF
1	Automatic Operator	5730	689	NO
1	Kick Plate	K1050 250mm	US32D	RO
2	Actuator	639		NO
1	Monitor	LMS-1		SU

Notes: Wire actuators through the LMS latch monitor switch. Actuators to be disabled when deadbolt is thrown.

Set: 11.0

4	Hinge	T4A3386 NRP 114mm x 114mm	US32D	MK
1	Mortise Deadlock	L462	626	SC
1	Push Plate	70E	US32D	RO
1	Pull Plate	111x70C	US32D	RO
1	Door Operator	6020	689	NO
1	Kick Plate	K1050 250mm	US32D	RO
1	Wall Stop	406	US32D	RO
2	Actuator	639		NO
1	Monitor	LMS-1		SU

Notes: Wire actuators through the LMS latch monitor switch. Actuators to be disabled when deadbolt is thrown.

Set: 12.0

4	Hinge	TA2714 NRP 114mm x 102mm	US26D	MK
1	Mortise Deadlock	MS1850S Series	628	AD
1	Mortise Cylinder	Schlage to Suit	626	SC
1	Cylinder	4066 Series Thumbturn	628	AD
1	Push Bar & Pull	BF15747	US32D	RO
1	Automatic Operator	5730	689	NO
1	Wall Stop	406	US32D	RO
2	Actuator	639		NO

Set: 13.0

4	Hinge	TA2314 NRP 114mm x 102mm	US32D	MK
1	Mortise Deadlock	MS1850S Series	628	AD
2	Mortise Cylinder	Schlage to Suit	626	SC
1	Push Bar & Pull	BF15747	US32D	RO
1	Automatic Operator	5710	689	NO
1	Wall Stop	406	US32D	RO
2	Actuator	639		NO
1	Threshold	172A		PE
1	Weatherstrip and Sweep	By Door Supplier		00

Set: 14.0

4	Hinge	TA2714 NRP 114mm x 102mm	US26D	MK
1	Storeroom Lock	ND80 P D RHO	626	SC
1	Door Closer	1431 PS	EN	SA
1	Concealed Overhead Stop	6-X36	630	RF

Set: 15.0

4	Hinge	TA2314 NRP 114mm x 102mm	US32D	MK
1	Exit Device (Exit Only)	8510	US32D	SA
1	Concealed Overhead Stop	6-X36	630	RF
1	Door Closer	SRI 1431 OZ	EN	SA
1	Drop Plate	1431B	EN	SA
1	Threshold	172A		PE
1	Weatherstrip and Sweep	By Door Supplier		00

Set: 16.0

4	Hinge	TA2314 NRP 114mm x 102mm	US32D	MK
1	Storeroom Lock	ND80 P D RHO	626	SC
1	Concealed Overhead Stop	6-X36	630	RF
1	Door Closer	1431 PS	EN	SA 1
1	Gasketing	S88BL		PE
1	Door Bottom	4131CRL		PE

Set: 17.0

4	Hinge	TA2314 114mm x 101mm	US32D	MK
1	Classroom Lock	ND70 P D RHO	626	SC
1	Door Closer	SRI 1431 O	EN	SA
1	Kick Plate	K1050 250mm	US32D	RO
1	Wall Stop	406	US32D	RO
1	Gasketing	S88BL		PE
1	Door Bottom	4131CRL		PE

Set: 18.0

2	Spring Hinge	1502 114mm x 101mm	US26D	MK
1	Passage Set	AL10S SAT	626	SC
1	Gasketing	S88BL		PE

Set: 19.0

3	Hinge	TA2714 NRP 114mm x 102mm	US26D	MK
1	Storeroom Lock	AL80 P D SAT	626	SC
1	Door Closer	1431 PS	EN	SA
1	Gasketing	S88BL		PE
1	Door Bottom	4131CRL		PE

Set: 20.0

3	Hinge	TA2714 NRP 114mm x 102mm	US26D	MK
1	Storeroom Lock	AL80 P D SAT	626	SC
1	Door Closer	1431 P9	EN	SA
1	Wall Stop	406	US32D	RO
1	Gasketing	S88BL		PE
1	Door Bottom	4131CRL		PE

Set: 21.0

3	Hinge	TA2714 114mm x 102mm	US26D	MK
1	Passage Set	AL10S SAT	626	SC
1	Door Closer	1431 P9	EN	SA
1	Wall Stop	406	US32D	RO
1	Gasketing	S88BL		PE
1	Door Bottom	4131CRL		PE

Set: 22.0

3	Hinge	TA2714 114mm x 102mm	US26D	MK
1	Storeroom Lock	AL80 P D SAT	626	SC
1	Door Closer	1431 O	EN	SA
1	Wall Stop	406	US32D	RO
1	Gasketing	S88BL		PE

Notes: 4 sided frame.

Set: 23.0

3	Hinge	TA2714 NRP 114mm x 102mm	US26D	MK
1	Storeroom Lock	AL80 P D SAT	626	SC
1	Door Closer	1431 P9	EN	SA
1	Wall Stop	406	US32D	RO

END OF SECTION

PART 1 GENERAL

1.1 RELATED SECTIONS

.1 Section 08 06 00 – Door and Hardware Schedule

.2 Section 07 92 00 - Joint Sealants

.3 Section 08 71 20 - Door Hardware

.4 Section 08 80 00 - Glazing

.5 Section 09 90 00 - Painting

1.2 REFERENCES

.1 American Society for Testing and Materials (ASTM), latest edition.

.1 ASTM A 653M, Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvanealed) by the Hot-Dip Process

.2 ASTM B 29, Specification for Pig Lead

.3 ASTM B 749, Specification for Lead and Lead Alloy Strip, Sheet and Plate Products

.2 Canadian General Standards Board (CGSB), latest edition.

.1 CAN/CGSB-1.181, Ready-Mixed Organic Zinc-Rich Coating

.2 CGSB 41-GP-19Ma, Rigid Vinyl Extrusions for Windows and Doors

.3 CAN/CGSB-51.20-M, Thermal Insulation, Polystyrene, Boards and Pipe Covering

.4 CGSB 51-GP-21M, Thermal Insulation, Urethane and Isocyanurate or Unfaced

.3 Canadian Standards Association (CSA), latest edition.

.1 CSA A101-M, Thermal Insulation, Mineral Fibre, for Buildings

.2 CAN/CSA-G40.21-M, Structural Quality Steels

.3 CSA W59-M, Welded Steel Construction (Metal Arc Welding)

.4 Canadian Steel Door and Frame Manufacturers' Association, (CSDFMA), latest edition.

.1 CSDFMA, Specifications for Commercial Steel Doors and Frames

.2 CSDFMA, Recommended Selection and Usage Guide for Commercial Steel Doors

.5 National Fire Protection Association (NFPA), latest edition.

.1 NFPA 80, Fire Doors and Windows

.2 NFPA 252, Door Assemblies, Fire Tests

.6 Underwriters' Laboratories of Canada (ULC), latest edition.

.1 CAN4-S104M- M80, Fire Tests of Door Assemblies

.2 CAN4-S105M-M, Fire Door Frames

1.3 DESIGN REQUIREMENTS

.1 Design exterior frame assembly to accommodate to expansion and contraction when subjected to minimum and maximum surface temperature of -35ºC to 35ºC.

.2 Maximum deflection for exterior steel entrance screens, under wind load of 1.2 kPa, not to exceed 1/175th of span.

1.4 SHOP DRAWINGS

.1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.

.2 Indicate each type of door, material, steel core thicknesses, mortises, reinforcements, location of exposed fasteners, openings, glazed, louvered, arrangement of hardware and fire rating and finishes.

.3 Indicate each type frame material, core thickness, reinforcements, glazing stops, location of anchors and exposed fastenings and reinforcing, fire rating, finishes.

.4 Include schedule identifying each unit, with door marks and numbers relating to numbering on drawings and door schedule.

.5 Submit test and engineering data, and installation instructions.

1.5 REQUIREMENTS OF REGULATORY AGENCIES

.1 Steel fire rated doors and frames: labelled and listed by an organization accredited by Standards Council of Canada in conformance with CAN4-S104M or latest for ratings specified or indicated.

.2 Provide fire labelled frame products for those openings requiring fire protection ratings, and as scheduled. Products shall be tested in strict conformance with latest editions of: CAN4-S104, ASTM E 152, or NFPA 252 and shall have a ULC or cUL label.

PART 2 PRODUCTS

2.1 MATERIALS

.1 Hot dipped galvanized steel sheet: to ASTM A 653M, latest edition. Minimum base steel thickness to be in accordance with CSDFMA Table 1 - Thickness for Component Parts, latest edition.

.2 Reinforcement channels: to CAN/CSA-G40.21, latest edition, and Type 44W coating designation to ASTM A 653M, latest edition.

.3 Cast or rolled pure sheet lead: to ASTM B 29 or latest, weight: 14.6 kg/m2, thickness 1.2 mm.

.4 Composites: balance of core materials used in conjunction with lead: in accordance with manufacturers' proprietary design.

2.2 DOOR CORE MATERIALS

.1 Honeycomb construction:

.1 Structural small cell, 24.5 mm maximum kraft paper 'honeycomb', weight: 36.3 kg per ream minimum, density: 16.5 kg/m3 minimum sanded to required thickness.

.2 Stiffened: face sheets welded, insulated core.

.1 Fibreglass to CSA A101 latest edition; semi-rigid type to RSI 2.3.

.2 Polyurethane to CGSB 51-GP-21M, latest edition; rigid, modified poly/isocyanurate, closed cell board type to density of 32 kg/m3.

.3 Temperature rise rated (TRR): core composition to limit temperature rise on unexposed side of door to 250ºC at 30 minutes minimum or as required by Building Code. Core to be tested as part of a complete door assembly, in accordance with latest editions of: CAN4-S104, ASTM E 152, or NFPA 252, covering Standard Method of Tests of Door Assemblies and having a ULC or cUL label.

.4 Thermal insulation material must:

.1 Not require being labelled as poisonous, corrosive, flammable or explosive under the Consumer Chemical and Container Regulations of the Hazardous Products Act;

.2 Be manufactured using a process that uses chemical compounds with the minimum ozone depletion potential (ODP) available.

2.3 ADHESIVES

.1 Select Adhesives which:

.1 Do not contain volatile organic compounds in excess of 5 % by weight as measured by EPA Method 24-24A, 40 C.F.R., Part 60, Appendix A (1991), as demonstrated through calculation from records of the amounts of constituents used to make the product;

.2 Are accompanied by detailed instructions for proper application so as to minimize health concerns and maximize performance;

.3 Are accompanied by information describing proper disposal methods for containers.

.2 Honeycomb cores and steel components: heat resistant, spray grade, resin reinforced neoprene/rubber (polychloroprene) based, low viscosity, contact cement.

.3 Polystyrene and polyurethane cores: heat resistant, epoxy resin based, low viscosity, contact cement.

.4 Lock-seam doors: fire resistant, resin reinforced polychloroprene, high viscosity, and sealant/adhesive.

2.4 PAINTING

.1 Touch-up primer to meet CAN/CGSB-1.181, latest edition.

.2 Protect weatherstripping and final finish from scratches or other blemishes.

2.5 ACCESSORIES

.1 Door silencers: single stud rubber/neoprene type.

.2 Exterior top caps: PVC

.3 Interior top and bottom caps and exterior bottom cap: steel.

.4 Fabricate glazing stops as formed channel, minimum 16 mm height, accurately fitted, butted at corners and fastened to frame sections with counter-sunk oval head sheet metal screws.

.5 Metallic paste filler to manufacturer's standard.

.6 Fire labels: metal riveted, with ULC or cUL rating.

.7 Glazing: see Section 08 80 00.

.8 Make provisions for glazing as indicated and provide necessary glazing stops.

.1 Provide removable stainless steel glazing beads for dry glazing of snap-on type.

.2 Design exterior glazing stops to be tamperproof.

.9 Centre mullions of same type, material, and gauge to match adjacent frame. Where intended to be removable, provide any tools required for easy removal.

2.6 FRAMES FABRICATION GENERAL

.1 Fabricate frames in accordance with CSDFMA specifications.

.2 Fabricate frames to standard profiles, depths, and face dimensions as indicated on drawings and details. Unless otherwise noted, bottom frames to be 100 (4”) high typical.

.3 Frame thicknesses: Typically, 16-gauge minimum for thermally broken exterior frames and 18 gauge minimum for welded interior frames, except where ULC fire ratings or temperature rise ratings require frames to be of a thicker gauge.

.4 Blank, reinforce, drill and tap frames for mortised, templated hardware, and electronic hardware using templates provided by finish hardware supplier. Reinforce frames for surface mounted hardware.

.5 Protect mortised cutouts with steel guard boxes.

.6 Prepare frame for door silencers: 3 at latch side of single door jambs plus 2 at head of double doors.

.7 Manufacturer's nameplates on frames and screens are not permitted.

.8 Conceal fastenings except where exposed fastenings are indicated.

.9 Provide factory-applied touch up primer at areas where zinc coating has been removed during fabrication.

.10 Insulate exterior frame components with polyurethane insulation.

2.7 FRAME ANCHORAGE

.1 Provide appropriate anchorage to floor and wall construction.

.2 Locate each wall anchor immediately above or below each hinge reinforcement on hinge jamb and directly opposite on strike jamb.

.3 Provide 2 anchors for rebate opening heights up to 1520 mm and 1 additional anchor for each additional 760 mm of height or fraction thereof.

.4 Locate anchors for frames in existing openings not more than 150 mm from top and bottom of each jambs and intermediate at 660 mm o.c. maximum.

2.8 FRAMES: WELDED TYPE

.1 Welding in accordance with CSA W59, latest edition.

.2 Accurately miter or mechanically join frame product and securely weld on inside of profile.

.3 Cope accurately and securely weld butt joints of mullions, transom bars, centre rails and sills.

.4 Grind welded joints and corners to a flat plane, fill with metallic paste and sand to a uniform smooth finish.

.5 Securely attach floor anchors to inside of each jamb profile.

.6 Weld in 2 temporary jamb spreaders per frame to maintain proper alignment during shipment.

.7 Securely attach lead to inside of frame profile from return to jamb soffit (inclusive) on door side of frame only.

2.9 FRAMES WITH MULLIONS AND TRANSOM BARS

.1 Mullions and transom bars shall be joined to adjacent members by welding, unless otherwise noted, to maintain alignment of parts and assure performance of completed frames when field assembled. An exception is where vertical mullions (between a pair of doors) are noted to be removable; these mullions shall be mechanically fastened to the frame and provided with floor anchors.

2.10 DOOR FABRICATION GENERAL

.1 Doors: swing type, flush, with provision for glass and/or louvre openings as indicated.

.2 Exterior doors: polyurethane insulation core. Interior doors: honeycomb construction.

.3 Tack weld and fill door edges. Seams: Grind-welded joints to a flat plane, fill with metallic paste filler and sand to a uniform smooth finish.

.4 Doors: manufacturers' proprietary construction, tested and/or engineered as part of a fully operable assembly, including door, frame, gasketing and hardware in accordance with ASTM E 330 or latest.

.5 Blank, reinforce, drill doors and tap for mortised, templated hardware and electronic hardware.

.6 Factory prepare holes 12.7 mm diameter and larger except mounting and through-bolt holes, on-site, at time of hardware installation.

.7 Reinforce doors where required, for surface mounted hardware. Provide flush PVC top caps to exterior doors. Provide inverted, recessed, spot welded channels to top and bottom of interior doors.

.8 Provide factory-applied touch-up primer at areas where zinc coating has been removed during fabrication.

.9 Provide fire labeled doors for all openings requiring fire protection ratings, and as scheduled. Products shall be tested in strict conformance with the latest editions of CAN4-S104, ASTM E 152, or NFPA 252 and shall have a ULC or cUL label.

.10 Manufacturer's nameplates on doors are not permitted.

2.11 DOORS: HONEYCOMB CORE CONSTRUCTION

.1 Form face sheets for exterior doors from 18-gauge sheet steel with polyurethane core laminated under pressure to face sheets.

.2 Form face sheets for interior fire rated doors from 18 gauge sheet steel with gypsum core laminated under pressure to face sheets (temperature rise rated where scheduled).

2.12 HOLLOW STEEL CONSTRUCTION

.1 Form face sheets for doors from 18 gauge sheet steel minimum.

.2 Reinforce doors with vertical stiffeners, securely welded to each face sheet at 150mm on centre maximum.

.3 Fill voids between stiffeners of exterior doors with polyurethane core.

.4 Fill voids between stiffeners of fire rated interior doors with temperature rise rated core.

2.13 THERMALLY BROKEN DOORS AND FRAMES

.1 Fabricate thermally broken doors by using insulated core and separating exterior parts from interior parts with continuous interlocking thermal break.

.2 Thermal break: rigid polyvinylchloride extrusion conforming to CGSB 41-GP-19Ma, latest edition.

PART 3 EXECUTION

3.1 INSTALLATION GENERAL

.1 Install labelled steel fire rated doors and frames to NFPA 80, except where specified otherwise.

.2 Install doors and frames to CSDFMA Installation Guide.

3.2 FRAME INSTALLATION

.1 Set frames plumb, square, level and at correct elevation.

.2 Secure anchorages and connections to adjacent construction.

.3 Brace frames rigidly in position while building-in. Install temporary horizontal wood spreader at third points of door opening to maintain frame width. Provide vertical support at centre of head for openings over 1200 mm wide. Remove temporary spreaders after frames are built-in.

.4 Make allowances for deflection of structure to ensure structural loads are not transmitted to frames.

.5 Caulk perimeter of frames between frame and adjacent material.

.6 Maintain continuity of air barrier and vapour retarder.

3.3 DOOR INSTALLATION

.1 Install doors and hardware in accordance with hardware templates and manufacturer's instructions and Section 08 71 00 - Door Hardware; adjust operable parts for correct function.

.2 Provide even margins between doors and jambs and between doors and finished floor/thresholds as follows:

.1 Hinge side: 1.0mm.

.2 Latch side and head: 1.5mm.

.3 Finished floor, top of carpet, noncombustible sill, and thresholds: 13mm.

.3 Install glazing and/or louvers as scheduled.

3.4 FINISH REPAIRS

.1 Touch up with primer finishes damaged during installation.

.2 Fill exposed frame anchors and surfaces with imperfections with metallic paste filler and sand to a uniform smooth finish.

END OF SECTION

PART 1 GENERAL

1.1 RELATED SECTIONS

.1 Section 07 62 00 – Sheet Metal Flashing

.2 Section 07 92 00 - Joints Sealants

.3 Section 08 06 00 – Door and Hardware Schedule

.4 Section 08 71 20 – Door Hardware

.5 Section 08 80 00 - Glazing

.6 Section 08 44 13 – Glazed Aluminum Curtain Walls

.7 Division 26 00 00 - Electrical

1.2 REFERENCES

.1 Aluminum Association Designation System for Aluminum Finishes, latest edition.

.2 American Society for Testing and Materials (ASTM), latest edition.

.1 ASTM E 330, Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference

.3 Canadian General Standards Board (CGSB), latest edition.

.1 CGSB 1.40-M, Primer, Structural Steel, Oil Alkyd Type

.4 Canadian Standards Association (CSA), latest edition.

.1 CAN/CSA-G40.21, Structural Quality Steels

.2 CSA G164-M, Hot Dip Galvanizing of Irregularly Shaped Articles

1.3 DESIGN CRITERIA

.1 Design frames and doors in exterior walls to:

.1 Accommodate expansion and contraction within service temperature range of -35 to 35ºC.

.2 Limit deflection of mullions to maximum 1/175th of clear span when tested to ASTM E 330 under wind load of 1.2 kpa.

1.4 SHOP DRAWINGS

Submit shop drawings in accordance with Section 01 33 00. Indicate each type of door and frame, extrusion profiles, method of assembly, section and hardware reinforcement, locations of exposed fasteners, finishes and location of manufacturer's nameplates.

.1 Submit catalogue details for each type of door and frame illustrating profiles, dimensions and methods of assembly.

1.5 CLOSEOUT SUBMITTALS

.1 Provide maintenance data for cleaning and maintenance of aluminum finishes for incorporation into manual specified in Section 01 77 00 - Closeout Submittals.

1.6 PROTECTION

.1 Apply temporary protective coating to finished surfaces. Do not use coatings that will become hard to remove or leave residue.

.2 Leave protective covering in place until final cleaning of building.

1.7 WARRANTY

.1 Provide a written one (1) year warranty to cover any defects in materials, manufacture, workmanship, and installation, from the Date of Substantial Performance.

PART 2 PRODUCTS

2.1 MATERIALS

.1 Aluminum extrusions: Aluminum Association alloy AA6063-T6 anodizing quality.

.2 Steel reinforcement: to CAN/CSA-G40.21, grade 300 W.

.3 Fasteners: stainless steel, finished to match adjacent material.

.4 Weatherstrip: mohair pile.

.5 Door bumpers: black neoprene.

.6 Isolation coating: alkali resistant.

.7 Sealants: to CAN/CGSB 19.13-M87 or latest.

.8 Sheet Aluminum to AA6063-T5 alloy, 2mm thick, in matching finish, and bonded to substrate where indicated on drawings.

2.2 ALUMINUM DOORS (REFER TO DOOR TYPES SCHEDULED)

.1 Exterior doors: Kawneer Insulclad 260 series, Alumicor Insuldoor 100A INS series, or U.S. Aluminum 250-T series. Locations: D-101A, D-109, & D-120B.

.2 Interior storefront doors: Kawneer 350 Swing Doors, Alumicor 100A series, or U.S. Aluminum 250 series.

.3 Dual glazing stops: tamperproof type.

.4 Hardware: (Confirm with Door Hardware Section)

.1 Exterior Entrance Door hardware for each door set:
- Standard aluminum continuous threshold
- Standard continuous Sweep and weatherstripping
- Standard weatherstripping at jambs and head including two-way astragal

2.3 ALUMINUM FRAMES (REFER TO FRAME TYPES SCHEDULED)

.1 Exterior storefront framing: Extruded aluminum with thermal break to meet CAN A440 performance levels for air leakage (fixed), water leakage (B7), wind load (C4), and condensation resistance (frame I71, glass I64). Acceptable products: Kawneer Trifab VG

451T series (centre glazed), Alumicor 3400 series, or U.S. Aluminum IT451 series. Locations: for interior glazing between new Spray Pad Pool Deck and Viewing Lobby/MPR 120, interior glazing between Corridor 109 and existing Pool Deck, and where indicated on drawings.

.2 Interior storefront framing: Extruded aluminum. Acceptable products: Kawneer Trifab VG 451 series (centre glazed), Alumicor 1800 series, or U.S. Aluminum 451 series. Locations: at interior of Vestibule 100 and where indicated on the drawings.

2.4 ALUMINUM FINISHES

.1 'Black' anodized finish typical, in accordance with Aluminum Association Designation System for Aluminum Finishes.

2.5 STEEL FINISHES

.1 Finish steel clips and reinforcing steel with zinc coating to CSA G164.

2.6 FABRICATION

.1 Doors and framing by same manufacturer.

.2 Fabricate doors and frames to profiles and maximum face sizes as shown on drawings and schedules, with allowance for glazing and spandrel panels.

.3 Provide structural steel reinforcement as required.

.4 Fit joints tightly, secure mechanically, and conceal fastenings.

.5 Mortise, reinforce, drill and tap doors, frames and reinforcements to receive hardware using templates in Section 08 71 00 - Door Hardware.

.6 Isolate aluminum from direct contact with dissimilar metals, concrete and masonry.

PART 3 EXECUTION

3.1 INSTALLATION

.1 Set frames plumb, square, and level at correct elevation in alignment with adjacent Work and anchor securely.

.2 Make allowances for deflection of structure to ensure that structural loads are not transmitted to frames.

.3 Install doors and hardware in accordance with hardware templates and manufacturer's instructions. Adjust operable parts for correct function.

.4 Glazing for aluminum doors and frames as per Section 08 80 00.

3.2 CAULKING

.1 Seal joints to provide weathertight seal at outside and air, vapour seal at inside.

.2 Apply sealant as per Section 07 92 00. Conceal sealant within aluminum Work except where exposed use is permitted by Contract Administrator.

END OF SECTION

Part 1 GENERAL

1.1 RELATED WORK

.1 Section 06 10 00 – Rough Carpentry
.2 Section 06 20 00 – Finish Carpentry
.3 Section 08 11 00 – Steel Doors and Frames
.4 Section 09 22 16 – Non-structural Metal Framing
.5 Section 09 90 00 – Painting

1.2 QUALITY ASSURANCE

.1 Conform to the requirements of AWMAC (Architectural Woodwork Manufacturers' Association of Canada) Quality Standards, latest edition.
.2 Lumber identification: by grade stamp of an agency certified by Canadian Lumber Standards Accreditation Board, such as the certification standards for use in Canada, including: the CSA Sustainable Forest Management Standard (CSA); the Forest Stewardship Council's Principles and Standards (FSC); and the Sustainable Forestry Initiative (SFI), or other approved agency.

1.3 REGULATORY REQUIREMENTS

.1 Conform to applicable codes for all fire rated doors and panels. All rated doors shall carry the applicable ULC/WH labels.

1.4 SUBMITTALS

.1 Submit shop drawings and product data to requirements of Section 01 33 00. Indicate door types, elevations, construction, stile and rail reinforcement, internal blocking for hardware attachment, and cutouts for glazing or louvers.
.2 Upon request, submit product data and MSDS to LEED requirements in Section 01 47 15.

1.5 DELIVERY, STORAGE, AND HANDLING

.1 Deliver products to Site, and store and protect products, to requirements of Section 01 60 00.
.2 Accept products of this section on site in new condition and verify no damage.
.3 Protect doors with resilient packaging and sealed with heat shrink plastic. Break this seal on-site to allow for ventilation.

1.6 WARRANTY

.1 Provide a written manufacturer's limited lifetime warranty against all defects in materials and manufacture, including warpage, delamination, and any degradation of face finishes.
.2 Provide a written installer's (1) one-year warranty to cover any defects in installation, workmanship, and operation, from the Date of Substantial Performance.

Part 2 PRODUCTS

2.1 DOOR TYPES

.1 Flush Interior Doors (non-rated): 45mm thick with solid core wood product agrifibre construction, institutional grade, with solid hardwood edging to match face veneers at top, bottom, & sides and LVL rails and stiles. Door faces to be 3mm hardboard, paint grade, where scheduled. Standard of acceptance: Baillargeon Institutional Grade Doors, or Jeld-Wen flush non-rated doors with Environ Biocomposites Manufacturing core.

.2 Refer to Door Schedule for ratings, locations, and quantities.

2.2 DOOR MATERIALS AND ASSEMBLY

.1 Particleboard, hardboard, plywood, agrifibre, and all other materials used in the assembly of these doors shall typically have 0% added urea formaldehyde content (NAUF).
.2 Bond all rails and stiles to the core.
.3 Adhesives shall be Type 1 PVA cross-link adhesive or other type with 0% added urea formaldehyde content (NAUF).

2.3 ACCESSORIES

.1 Glazing Stops: solid clear maple or birch with mitered corners; installed with small head countersunk colour-matched screws or small finishing nails.

2.4 FABRICATION

.1 Fabricate non-rated doors in accordance with AWMAC Quality Standards.
.2 Fabricate fire rated doors in accordance with AWMAC Quality Standards and to ULC requirements. Attach fire rating label to door edge.
.3 Provide cut-outs in doors for glazing, louvers, and any other openings or hardware as scheduled.
.2 Reinforce all doors with solid blocking for all finish hardware scheduled and premachine.

Part 3 EXECUTION

3.1 INSTALLATION

.1 Install doors as indicated on the drawings and as specified in Section 06 20 00 to be plumb, level, and to operate as intended.

END OF SECTION

PART 1 GENERAL

.1 SUMMARY

.1. Aluminum curtain wall systems, complete with reinforcing, shims, anchors and attachment devices, and all accessories necessary to complete the Work.

.2 RELATED SECTIONS

.1 Section 05 50 00 - Metal Fabrications

.2 Section 07 25 00 - Vapour and air barriers

.3 Section 07 84 00 - Fire Stopping

.4 Section 07 92 00 - Joint Sealants

.5 Section 08 11 16 - Aluminum Doors and Frames

.6 Section 08 45 00 – Translucent Glazing Units

.7 Section 08 53 13 – Aluminum Windows

.8 Section 08 80 00 - Glazing

.3 REFERENCES

.1 Aluminum Association Designation System For Aluminum Finishes (AA)-latest edition

.1 DAF-45, Designation System For Aluminum Finishes.

.2 Architectural Aluminum Manufacturers Association (AAMA) – latest edition

.1 AAMA CW-DG-1, Aluminum Curtain Wall Design Guide Manual.

.2 AAMA CW-10, Curtain Wall Manual #10 Care and Handling of Architectural Aluminum From Shop to Site.

.3 AAMA CW-11, Curtain Wall Manual - Design Windloads for Buildings and Boundary Layer Wind Tunnel Testing.

.4 AAMA T1R-A1, Sound Control for Aluminum Curtain Walls and Windows.

.5 AAMA 501, Methods of Test for Exterior Walls.

.6 AAMA 503, Voluntary Specification for Field Testing of Metal Storefronts, Curtain Wall and Sloped Glazing Systems.

.7 AAMA 611, Voluntary Specification for Anodized Architectural Aluminum

.8 AAMA 612, Voluntary Specification, Performance Requirements, and Test Procedures for Combined Coatings of Anodic Oxide and Transparent Organic Coatings on Architectural Aluminum

.9 AAMA 2603, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels.

.10 AAMA 2604, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels or latest.

.11 AAMA 2605, Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels

.12 AAMA MCWM-1 Metal Curtain Wall Manual

.13 AAMA CWG-1, Installation of Aluminum Curtain Walls

.14 AAMA 501.5 Test Method for Thermal Cycling of Exterior Walls

.3 American National Standards Institute (ANSI): latest edition

1. Z97.1 Specifications and Methods of Test for Safety Glazing Material Used in Buildings.

.4 Federal Specifications (FS): latest edition

1. TT-P-645A Primer, Paint, Zinc Chromate, Alkyd Type.

.5 Flat Glass Marketing Association (FGMA): latest edition

1. Glazing Manual.

.6 American Society for Testing and Materials (ASTM) – latest edition

.1 ASTM A 36/A36M, Specification for Structural Steel or latest.

.2 ASTM A 123M, Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.

.3 ASTM A 167-99, Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.

.4 ASTM B 209M, Specification for Aluminum and Aluminum-Alloy Sheet and Plate Metric.

.5 ASTM B 221M, Specification for Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.

.6 ASTM E 283, Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.

.7 ASTM E 330, Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.

.8 ASTM E 331, Test Method for Water Penetration of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference or latest.

.9 ASTM E547, Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Cyclic Static Air Pressure Difference

.10 ASTM E 413, Classification for Rating Sound Insulation.

.11 ASTM E 1105, Test Method for Field Determination of Water Penetration of Installed Exterior Windows, Curtain Walls, and Doors by Uniform or Cyclic Static Air Pressure Difference.

.7 Canadian General Standards Board (CGSB) – latest edition

.1 CAN/CGSB 1.108-M, Bituminous Solvent Type Paint.

.2 CAN/CGSB-12.20-M, Structural Design of Glass for Buildings.

.8 Canadian Standards Association (CSA) – latest edition

.1 CSA G40.20-04/G40.21, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steels.

.2 CAN/CSA-S136, Cold Formed Steel Structural Members.

.3 CAN/CSA-S157, Strength Design in Aluminum.

.4 CSA W59.2-M, Welded Aluminum Construction.

.5 EcoLogo CCD-045, Sealants and Caulking Compounds.

.6 CCD-048 Recycled Water-Borne Surface Coatings.

.7 CCD-047 Architectural Surface Coatings.

.9 The Society for Protective Coatings (SSPC)

.1 SSPC - Paint 20 Zinc Rich Coating.

.2 SSPC - Paint 25 Red Iron Oxide, Zinc Oxide, Raw Linseed Oil and Alkyd Primer (Without Lead and Chromate Pigments).

.4 PERFORMANCE REQUIREMENTS

.1 General Standard: In addition to requirements shown or specified, comply with applicable provisions of AAMA CW-DG-1-96 Aluminum Curtain Wall Design Guide Manual and AAMA CWG-1-89 Installation of Aluminum Curtain Walls for design, materials, fabrication and installation of component parts.

.2 Design and size components to withstand dead and live loads caused by pressure and suction of wind, acting normal to plane of system as calculated in accordance with A440S1-09.

.3 Design and size components to withstand seismic loads and sway displacement as calculated in accordance with the current Manitoba Building Code. Limit mullion deflection to flexure limit of glass, with full recovery of glazing materials.

.4 Confirm glass units and glass dimensions are sized to limits established in CAN/CGSB-12.20 or latest.

.5 Without damage to components or deterioration of seals, provide system to accommodate:

.1 Movement within system.

.2 Movement between system and perimeter framing components.

.3 Dynamic loading and release of loads.

.4 Deflection of structural support framing.

.5 Shortening of building concrete structural columns.

.6 Creep of concrete structural members.

.6 Air infiltration shall not exceed 0.2 l/sm2(0.04 cfm/ft2) in accordance with ASTM E283 with pressure difference of 300 Pa (6.24 p.s.f.).

.7 Structural performance to CSA CAN3-S157 and maximum deflection of 1/175th of the span when tested in accordance with ASTM E 330 at design pressure (DP) Design pressure determined by CSA A440S1-09.

.8 No permanent deformation of any frame member beyond 0.2% of it span when tested in accordance with ASTM E330 at 150% Design Pressure.

.9 Water infiltration: No uncontrolled water penetration when tested in accordance with ASTM E 331 at test pressure of 730 Pa 152psf, or 20 percent of full positive design wind load, whichever is greater. No water infiltration in accordance with ASTM E457 (four cycles) with pressure differential of 730 Pa (15.2psf)

.10 Composite frame assembly to have min. 7224 N/100mm (1650lbf/2 in.) resistance to shear between aluminum and the thermal break materials.

.11 Allow for expansion and contraction within system components caused by a cycling temperature range of 95ºC over a 12 hour period without causing detrimental affect including buckling, excess stress on framing, anchors, fasteners or glass, sealant failure, or reduction in performance

.12 Drain water entering joints, condensation occurring in glazing channels, or migrating moisture occurring within system, to the exterior by a weep drainage network.

.13 Maintain continuous air barrier and vapour retarder throughout assembly, primarily in line with inside pane of glass and heel bead of glazing compound.

.14 Ensure no vibration harmonics, wind whistles, noises caused by thermal movement, thermal movement transmitted to other building elements, loosening, weakening, or fracturing of attachments or components of system occur.

.15 Reinforce curtain wall system to accommodate window washing guide rails. Provide anchors sufficiently rigid to resist loads caused by equipment platform, without damage to wall system.

.16 Double glazed windows shall have a rated U Value of 2.0 W/m2K or less. Triple glazed windows shall have a rated U Value of 1.7 or less.

.17 Sound Transmission Loss: When tested to ASTM E90 and ASTM E1425, the Sound Transmission Class (STC) and Outdoor/Indoor Transmission Class (OITC) shall not be less than: STC 31 or OITC 26 based upon 1” insulating glass (1/4", 1/2" AS, 1/4"), STC 37 or OITC 30 based upon 1” laminated glass (1/4" laminated, 1/2" AS, 1/4” laminated).

1.4 SOURCE QUALITY CONTROL

.1 Design structural support framing components to CAN/CSA-S157 or latest, under direct supervision of a Professional Structural Engineer experienced in design of this Work and licensed in the Province of the Work.

1.5 SUBMITTALS

.1 All submittals shall be in accordance with Section 01 33 00 - Submittal Procedures. Indicate dimensions, framed opening requirements and tolerances, adjacent construction, reinforcing, anchorage, anticipated deflection under load, interface with related Work, weep drainage network, thermal breaks, expansion and contraction joint location and details, and field welding required. Include component dimensions; describe components within assembly, anchorage and fasteners, glass and infill, and internal drainage details. Indicate typical glazing details, locations of various types and thickness of glass, and internal sealant requirements as recommended by sealant manufacturer.

.3 Shop drawings shall be sealed, and signed by a Professional Engineer in the province of the Work, including all integral components specified in this section.

.4 Clearly show where and how manufacturer's system deviates from Contract Drawings and these Specifications.

.5 Design data shall include structural and physical characteristics of framing members, dimensional limitations, special installation requirements, engineering data and previous test results, to prove performance and other supportive data.

1.6 OTHER SUBMITTALS

At the time of shop drawing submission, the curtain wall manufacturer shall also submit accurate support documentation for the Manitoba Hydro Commercial Building Envelope Program and LEED Certification, as follows:

.1 Proof of energy performance for total window U-value (frame and glazing) based on standard ASTM test size. This proof may be reference to current listing with: Energy Star Canada, National Fenestration Rating Council (NFRC), OR may be a computer simulated performance test reports. These reports shall be signed and by an independent NFRC/CSA accredited simulation laboratory, and prepared in accordance with CSA A440.2 or NFRC701.03 (latest editions). **Submit these reports with the shop drawings.**

.2 Provide a label for all glazing units that indicate Window specifications as per section 088000.

1.7 REGULATORY REQUIREMENTS

.1 Conform to applicable code for acoustic attenuation, sound transmission, and wind load requirements.

1.8 DELIVERY, STORAGE, AND HANDLING

.1 Deliver, store, handle and protect materials in accordance with Section 01 60 00.

.2 Handle Work of this section in accordance with AAMA CW-10.

.3 Protect prefinished aluminum surfaces with wrapping or strippable coating. Do not use adhesive papers or sprayed coatings, which bond when exposed to sunlight or weather.

1.9 SEQUENCING

.1 Coordinate Work of this section with installation of fire stopping, air barrier, vapour barrier, and flashing.

1.10 WASTE MANAGEMENT AND DISPOSAL

.1 Remove from the Site and dispose of all packaging materials at appropriate recycling facilities. Dispose of all corrugated cardboard packaging material in appropriate on-site bin for recycling in accordance with waste management program.

1.11 WARRANTY

.1 Provide a written manufacturer's warranty against any defects in materials and workmanship for 2 years from the Date of Substantial Performance.

.2 Provide written installer's warranty for the Work to be watertight, free from defective materials, defective workmanship, glass breakage due to defective design, and for replacement components which fail within 2 years from the Date of Substantial Performance, including coverage of the following:

1. Complete watertight and airtight system installation within specified tolerances.
2. Completed installation will remain free from rattles, wind whistles and noise due to thermal and wind pressure.
3. System is structurally sound and free from distortion.
4. Glass and glazing gaskets will not break or "pop" from frames due to design wind load pressure, expansion or contraction movement, or structural loading.
5. Glazing sealants and gaskets will remain free from abnormal deterioration or dislocation due to sunlight, weather or oxidation.

.3 Provide a written thermal integrity warranty for 10 years from date of Substantial Performance against thermal barrier system failure resulting from the following:

1. Longitudinal and transverse thermal barrier shrinkage.
2. Thermal barrier cracking.
3. Structural failure of the thermal barrier material.
4. Loss of adhesion or loss of prescribed edge pressure on glazing material resulting in excessive air and water infiltration.

1.12 MOCK-UP

1. Provide mock-up of window installation including frame, glazing, all air and vapour barrier seals.
2. Reviewed mock-up may remain as part of the Work, only if accepted by the Contract Administrator.

PART 2 PRODUCTS

2.1 MATERIALS

.1 Extruded aluminum: ASTM B 221M or latest.

.2 Sheet aluminum: ASTM B 209M or latest.

.3 Sheet steel: CAN/CSA-S136M or ASTM A 446/A 446M or latest.

.4 Steel sections: CAN/CSA-G40.21M or latest; shaped to suit mullion sections.

.5 Fasteners: stainless or aluminum.

2.2 SYSTEM DESCRIPTION

.1 Vertical glazed curtain wall system to sizes and patterns indicated on the drawings; thermally-broken tubular aluminum sections with self-supporting framing, shop fabricated, factory finished, with related accessories including exterior corners, door frames, flashings, anchorage, and attachment devices. Assembled system to permit re-glazing of individual glass units without removal of structural mullion sections. Temperature index of frame shall be 78 in accordance with CAN/CSA-A440. Acceptable products: Kawneer series 1600 UT System 1- capped (triple glazed), Alumicor Thermawall 2600 Series, or

U.S. Aluminum HP3253SG series, with enhanced thermal break and accessories for glazing as specified in 08 80 00. Locations: at exterior of new addition typically, and where indicated on the drawings.

.2 'Black' anodized aluminum finish typical in accordance with Alum. Association AA-M12C22A31; with capped frames typical.

2.3 FABRICATION

.1 Take accurate field measurements to verify required dimensions, prior to fabrication.

.2 Fabricate system components with minimum clearances and shim spacing around perimeter of assembly, yet enable installation and dynamic movement of perimeter seal.

.3 Accurately fit and secure joints and corners. Make joints flush, hairline, and weatherproof.

.4 Prepare components to receive anchor devices. Install anchors.

.5 Arrange fasteners and attachments to ensure concealment from view.

.6 Prepare system components to receive exterior doors and hardware as specified in other Sections.

.7 Reinforce framing members with steel within curtain wall sections, as required for all external imposed loads.

.8 Visible manufacturer's identification labels not permitted.

PART 3 EXECUTION

3.1 EXAMINATION

.1 Refer to drawings for general locations of this Work. Verify dimensions, tolerances, and method of attachment with other work.

.2 Site confirm that wall openings and that adjoining air and vapour barrier materials are ready to receive work of this section.

3.2 INSTALLATION

.1 Install curtain wall system and accessories in accordance with the manufacturer's instructions.

.2 Installation to AAMA CWG-1-89 Installation of Aluminum Curtain Walls

.3 Attach system to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities. Align assemblies to be plumb and level, free of warp or twist, and aligning with adjacent Work, to the following tolerances:

.1 1/8 inch in 20 feet (3 mm in 6 M) vertically and horizontally.

.2 1/4 inch in 40 feet (6 mm in 12 M) either direction.

.4 Limit offsets in theoretical end-to-end and edge-to-edge alignment:

.1 1/16 inch (2 mm) where surfaces are flush or less than 1/2 inch (13 mm) out of flush and separated by not more than 2 inches (51 mm).

.2 1/8 inch (3 mm)

.3 for surfaces separated by more than 2 inches (51 mm).

.4 Step in face: 1/16 inch (2 mm) maximum.

.5 Jog in alignment: 1/16 inch (2 mm) maximum.

.6 Location: 1/4 inch (6 mm) maximum deviation of any member at any location.

.7 Tolerances are not accumulative.

.5 Provide alignment attachments and shims to permanently fasten system to building structure. Clean weld surfaces; apply protective primer to field welds and adjacent surfaces.

.6 Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances and align with adjacent work.

.7 Provide thermal isolation where components penetrate or disrupt building insulation.

.8 Install flashings as detailed.

.9 Coordinate installation of firestop insulation at each floor slab edge.

.10 Coordinate attachment and seal of perimeter air and vapour barrier materials.

.11 Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.

.12 Install glass in accordance with Section 08 80 00.

.13 Install perimeter sealant to method required to achieve performance criteria and installation criteria in accordance with Section 07 92 00 - Joint Sealers.

.14 Install other integral components of this section [at locations X, Y, Z].

3.3 PROTECTION

.1 Clean surfaces in compliance with manufacturer's recommendations; remove excess mastic, mastic smears and other foreign materials.

.2 Clean metal surfaces exercising care to avoid damage.

.3 Protect finished Work from damage.

END OF SECTION

Part 1 GENERAL

1.1 RELATED SECTIONS

.1 Section 07 92 00 – Sealants

.2 Section 08 11 16 – Aluminum Doors

.3 Section 08 71 20 – Door Hardware

.4 Section 08 80 00 – Glazing

1.2 REFERENCES

.1 Aluminum Association Designation System For Aluminum Finishes (AA), latest edition: DAF 45, Designation System For Aluminum Finishes.

.2 American Architectural Manufacturers Association (AAMA), latest edition

.1 AAMA 611-98, Voluntary Specifications for Anodized Finishes Arch. Aluminum

.1 AAMA 612-02, Voluntary Specifications, Performance Requirements, and Test Procedures for Combined Coatings of Anode Oxide and Transparent Organic Coatings on Architectural Aluminum.

.2 AAMA 2603-02, Voluntary Specification Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels.

.3 AAMA 2604-02, Voluntary Specification Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels.

.4 AAMA 2605-02, Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels.

.5 American Society for Testing and Materials International, (ASTM), latest edition

.1 ASTM B209-02a, Specification for Aluminum and Aluminum-Alloy Sheet and Plate

.2 ASTM B221-02, Specification for Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes

.3 ASTM C1401-02, Guide for Structural Sealant Glazing.Canadian General Standards Board (CGSB), latest edition.

.4 CAN/CGSB 1.108-M, Bituminous Solvent Type Paint.CAN/CGSB-12.20-M, Structural Design of Glass for Buildings

.6 Canadian Standards Association (CSA International), latest edition.

.1 CAN3-S157-M, Strength Design in Aluminum

.2 CSA W59.2-M, Welded Aluminum Construction

.7 Environmental Choice Program (ECP), latest edition

.1 CCD-45, Sealants and Caulking Compounds.

.2 CCD-47, Surface Coatings.

.3 CCD-48, Recycled Water-Borne Surface Coatings.

1.3 PERFORMANCE REQUIREMENTS

.1 Design and size components to withstand dead and live loads caused by any pressure acting normal to plane of structural glazing system (as calculated in accordance with NBC) as measured in accordance with AAMA CW-11 and 13 or ASTM E330.

.2 Design and size components to withstand seismic loads and sway displacement as calculated in accordance with MBC.

.3 Limit mullion/glazing deflection to flexure limit of glass with full recovery of glazing materials.

.4 Size glass units and glass dimensions to limits established in CAN/CGSB-12.20.SPEC

.5 Take measures to ensure no vibration harmonics, wind whistles, or noises caused by movement transmitted to other building elements, such as loosening, weakening, or fracturing of attachments or components of the system occur.

1.4 SUBMITTALS

.1 Submit product data, samples (upon request), and shop drawings in accordance with Section 01 33 00 - Submittal Procedures. On shop drawings, clearly indicate all components within an assembly, component dimensions, anchorage and fasteners, and glass intended, as well as framed opening requirements and tolerances, adjacent construction, affected related Work, expansion and contraction details, and any field welding required.

.2 Construct a sample mock-up on-site to illustrate component assembly, glazing materials, attachments, anchors, sealants, and operation. Allow 24 hours for inspection of mock-up by Contract Administrator before proceeding with Work. When accepted, mock-up will demonstrate minimum standard for this Work. The mock-up may remain as a part of finished work if accepted.

.3 Provide at least one extra hinge of each type specified to The City and deliver at completion of the Work.

1.5 DELIVERY, STORAGE, AND HANDLING

.1 Deliver, store, handle and protect materials in accordance with Section 01 60 00 and handle Work of this section in accordance with AAMA CW-10. Protect prefinished aluminum surfaces with wrapping. Do not use adhesive papers or sprayed coatings that bond when exposed to sunlight or weather.

1.6 WARRANTY

.1 Provide a minimum 1-year written warranty to cover any defects in materials, assembly, installation, and workmanship, from the Date of Substantial Performance.

Part 2 PRODUCTS

2.1 MATERIALS

.1 Extruded aluminum: ASTM B221 and Sheet aluminum: ASTM B209.

.2 Anchors and Fasteners: stainless steel or anodized aluminum with finish to match hardware and as recommended.

.3 Glass units: 13mm (1/2”) thick, clear tempered structural glass with polished edges and nominal 3 (1/8”) gaps, or thickness as required by Code to suit spans indicated; refer to

Section 08 80 00. Where transoms are indicated or scheduled above door frames, these transoms shall be frameless structural glass panels as well.

.4 Door frame for Door D-120A: extruded aluminum, purpose made for structural glass, in a 'Black' anodized aluminum finish. Sized to fit a 1050 x 2134 (36" x 84") door, unless otherwise scheduled.

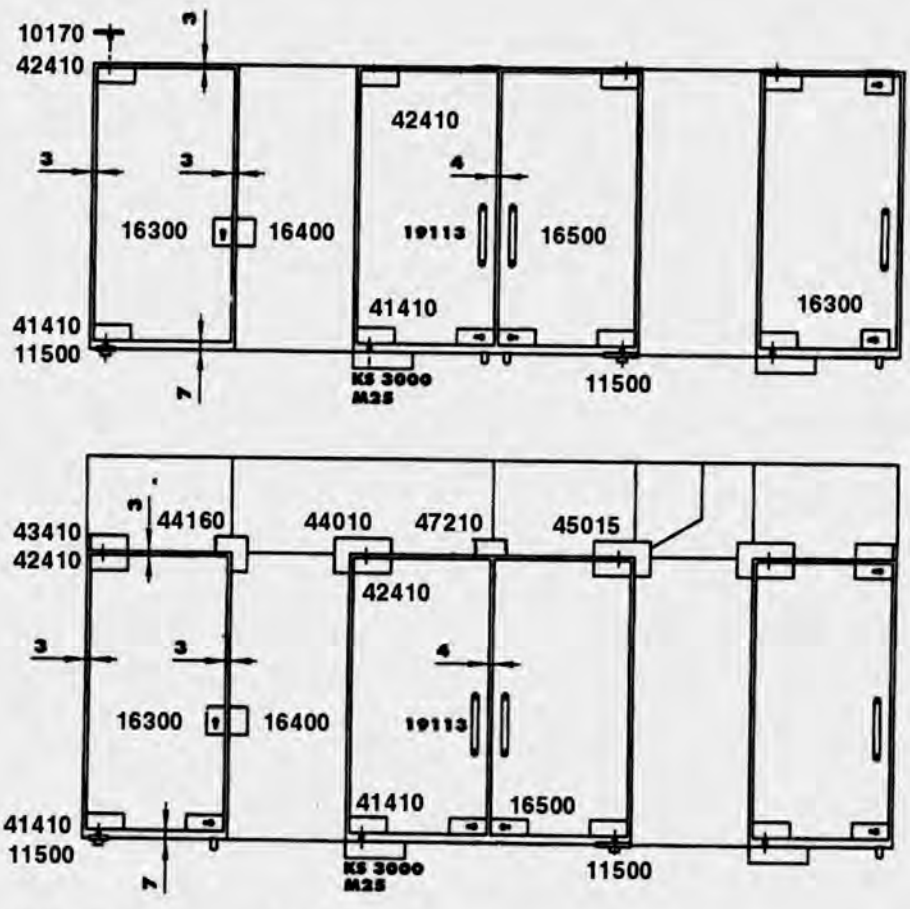
.5 Doors: refer to Door Schedule and Section 08 11 16, Aluminum doors.

.6 Miscellaneous hardware: Provide neoprene gaskets to cushion between glass surfaces and supporting substrates typical. Provide silicone caulking at joints between glass panels typical.

.7 Cylinders and keying: coordinate to match that specified in Section 08 71 20.

2.2 FRAMELESS INTERIOR STRUCTURAL GLASS PARTITION SYSTEMS

.1 Provide all hardware and fasteners required for rigid securement at top and bottom of structural glass partitions to floors, jambs, ceilings, and/or bulkheads, (swinging door hardware by Section 08 11 16). Hardware finish: 'Black' anodized aluminum, unless otherwise noted. Standard of acceptance: CASMA, BridgeWall Office Partition Systems (as dist. By Westline Sales, tel. 204-467-7642). Bridgewall components: P11125 base rail, P12125 top rail, fully recessed, unless otherwise noted. Refer to sample CASMA diagram below as an example; refer to Contract drawings for actual sizes, patterns, and locations intended.



10170 - Top flush mounted stud pivot
11500 - Bottom flush mount adjustable pivot
16300 - Patch lock for jamb or strike housing
16400 - Patch strike housing for lock
16500 - Patch lock for floor strike
43410 - Top wall mount transom support pivot patch
44010 - Sidelight transom support pivot patch
44610 - Sidelight transom support door stop
45015 - Sidelight transom support pivot patch with stabilizer fin
47210 - Transom double door stop

Part 3 EXECUTION

3.1 INSTALLATION

.1 Comply with manufacturer's written instructions for assembly and installation.

.2 Attach this system to building structure to allow for sufficient adjustment to accommodate construction tolerances and other irregularities. Provide alignment attachments and shims to permanently fasten this system to building structure. Clean any welded surfaces; apply protective primer to field welds and adjacent surfaces.

.3 Align this system to be plumb and level, and free of warp or twist. Maintain assembly dimensional tolerances and align with adjacent work.

.4 At the time of Substantial Performance, recheck and adjust all hardware to operate smoothly and as intended.

3.2 CLEANING

.1 Remove protective material from prefinished aluminum surfaces.

.2 Wash down surfaces with a solution of mild detergent in warm water, applied with soft, clean wiping cloths. Take care to remove dirt from corners. Wipe surfaces clean.

.3 Remove excess sealant by moderate use of mineral spirits or other solvent acceptable to sealant manufacturer.

3.3 PROTECTION

.1 Protect finished Work from damage.

END OF SECTION.

Part 1 GENERAL

1.1 SUMMARY

.1 Section Includes:

.1 Glass-Based Light Diffusing Insulating Glazing Units (TGUs)

.2 Related Work

.1 Section 01 47 15 – LEED Sustainable Requirements

.2 Section 07 92 00 – Sealants

.3 Section 08 44 13 – Glazed Aluminum Curtain Walls

.4 Section 08 51 13 - Aluminum Windows

.5 Section 08 80 00 - Glazing

1.2 SUBMITTALS

.1 All submittals shall be in accordance with Section 01 33 00 including manufacturer's technical data, installation instructions, and maintenance instructions.

.2 Submit shop drawings which indicate glazing types, frame types, sizes, locations, and performance characteristics.

.3 Spectrophotometer test results: Submit spectrophotometer test results for TGU units shipped to Site for warranty purposes.

1.3 QUALITY ASSURANCE

.1 Glazing Standards: Comply with recommendations of Flat Glass Marketing Association (FGMA) "Glazing Manual" and "Sealant Manual" except where more stringent requirements are indicated. Refer to those publications for definitions of glass and glazing terms not otherwise defined in this section or other referenced standards.

.2 Glazing Standards: Comply with recommendations of Insulating Glass Manufacturers Association (IGMA) except where more stringent requirements are indicated.

.3 Industry standards for glass: ASTM C 1036-01 “Standard Specification for Flat Glass” or latest, ASTM C 1048-04 “Standard Specification Heated Flat Glass – Kind HS, Kind FT Coated and Uncoated Glass” or latest.

.4 16 CFR 1201 “Safety Standard for Architectural Glazing Materials”.

.5 Single Source Responsibility for Glass: To ensure consistent quality of appearance and performance, provide glass produced by a single primary manufacturer for each kind and condition of glass indicated and composed of primary glass obtained from a single source for each type and class required.

1.4 MULLION/FRAMING DESIGN

.1 Provide framing system with minimum 6 (1/4”) diameter or slot design of 5 (3/16”) x 10 (3/8”) vent/drainage holes for each TGU.

.2 Keep glazing rebate clear of protrusions except glass support setting blocks and spacer shims. Setting blocks shall be designed or positioned to allow water passage to weep or vent holes.

.3 Provide glazing stops with plane, continuous and uniform supports for surfaces of TGU.

.4 Frame joints shall be adequately sealed to prevent water and air infiltration from exterior and interior.

.5 Glazing installation must ensure that intra-frame cavity is drained and vented to outside as per TGU manufacturer's recommendations.

.6 Edge clamping pressure must be sufficient to achieve an air and watertight seal but should not exceed 10 lbs. per linear inch to avoid risk of unit damage.

.7 Structurally design frame members to withstand wind loads and dead loads transferred by TGU. Frame members shall not deflect more than lesser of length/175 or 3/4" at full design load. Support edges of TGU to resist wind and other loads. Minimum bite on glass edge shall be 13 mm (1/2") to firmly support TGU when exposed to static and dynamic loads.

.8 Height of glass stops may vary depending on area of TGU, external forces and functions. Manufacturers of glass, framing, sealed units & sealants as well as architectural specification should be consulted. Many unit assembly sealants must be shielded from direct sunlight, depending upon glass specified. A stop height of approximately 19 mm (3/4") is commonly used. Minimum bite on glass edge shall be 13 mm (1/2") to firmly support insulating glass unit when exposed to static and dynamic loads.

.9 Use structurally adequate thermally broken frames with the TGU to minimize condensation on interior surfaces in cold weather. Thermal stress on the TGU is reduced when thermally broken frames are used.

.10 Seal units to the interior to create a complete air barrier and to prevent migration of air and moisture from entering glazing cavity from building interior.

.11 The 'intra-frame cavity', located between each TGU and the framing system must be vented and self-draining as per TGU manufacturer's recommendations.

.12 Glazing clearances must be sufficient to accommodate manufacturing tolerances in TGU size and overall thickness and to ensure that the TGU "floats" within retaining system as per the manufacturer's recommendations.

1.5 DELIVERY, STORAGE, AND HANDLING

.1 Protect units during delivery, storage and handling to comply with manufacturer's directions and as required to prevent edge damage to glass.

1.6 PROJECT CONDITIONS

.1 Environmental Conditions: Do not proceed with glazing when ambient and substrate temperature conditions are outside limits permitted by glazing material manufacturer or when joint substrates are wet due to rain, frost, condensation or other causes.

1.7 WARRANTY

.1 Submit TGU manufacturer's warranty against defects and workmanship for a period of five (5) years from Substantial Performance, including:

.1 Discoloration of honeycomb or veil material by more than 2.0 ΔE (ASTM D 2244-02e1, latest edition);

.2 Loss of light transmittance greater than 3%, determined according to manufacturer's technical data;

.3 Seal leakage;

.4 Substantial deterioration of insulating insert;

.5 Crushing or corrosion of spacer;

.6 Buildup of visible internal moisture.

Part 2 PRODUCTS

2.1 ACCEPTABLE TRANSLUCENT GLAZING UNIT MANUFACTURERS

.1 Advanced Glazings Limited, tel: 902.794.2899 or 1.888.452.0464

2.2 TRANSLUCENT GLAZING UNITS (TGU)

.1 Design and Appearance: The Translucent Glazing Unit shall be of a design such as to present a monolithic glass section without visible internal framing, support or other solid member inside of the perimeter spacer. The ability to use nearly any type or manufacture of architectural flat glass shall enable the visual integration of translucent surfaces with those of nearby vision glass as well as ensuring that the appearance of the translucent glazing surfaces does not deteriorate over the life of the building. The employment of separate technologies for thermal insulation and light diffusion shall be such as to ensure that different thermal insulation specifications do not affect light transmission.

.2 TGU Description:

.1 Air filled preassembled units consisting of:

.1 Two lites of glass;

.2 Proprietary honeycomb transparent insulation core aligned perpendicular to glazing, for TGU thermal insulation;

.3 Translucent veils attached to both to glass surfaces;

.4 Continuous perimeter metal spacer bar separated from glass surfaces with foam tape;

.5 Glass lites connected together with spacer bar using structural silicone sealant.

.6 Airspace within TGU filled with air pressure equalized to atmospheric pressure with stainless steel capillary pressure equalization (vent) tube located at top right corner of TGU, positioned with tube opening pointing downward (viewed from building interior).

.7 Glazing unit shall not contain in excess of .01 parts per million by weight each of Volatile Organic Compounds, asbestos, resorcinol-formaldehyde, pheono-resorcinol formaldehyde, urea formaldehyde, CFC, HFC, HCFC, Halon, Benzene, Cadmium (and compounds, Carbon tetrachloride, Cyanide (and compounds) Toluene, Xylenes, Lead. 1,1,1,Trichlorethane, Trichlorethylene, MEK, and MIK.2

.2 Overall thickness and size:

.1 Minimum thickness: 2.5” plus glass lites.

.2 Maximum overall size, edge of glass: 1524 X 3658 (60” x 144”)

.3 Frame compatibility: **Solera “T”** (75mm thick enhanced insulated glass unit with 25mm offset to fit into standard aluminum curtain wall and aluminum window systems).

.4 TGU performance:

.1 Thermal insulation (U-value): 0.2 (Btu/hr·ft²·°F)

.2 Daylight transmittance: 34%

.3 Light Diffusion Power (LDP): excellent

.4 Daylight to solar heat gain ratio: LSG = 1.08

.5 Solar heat grain coefficient (no shade): SHGC = 0.32

.6 Sound transmittance class (STC) (ASTM E 70-97): 35

.7 Maximum color shift: 2∆E over 5 years.

.8 Flame spread (ASTM E 84): 5.

.9 Smoke developed (ASTM E 84-054e1) or latest: 10.

.10 Spacer resistance to crushing: 500 lbs/lineal Ft.

.3 Glass:

.1 Exterior lite: 6mm annealed Clear by PPG, Pilkington.

.2 Interior lite: 6mm tempered Clear by PPG, Pilkington

.4 Veil: AGL401 exterior, AGL545 interior

.5 Spacer bar:

.1 Extruded aluminum to suit frame type.

.6 Foam tape: polyolefin.

.7 Capillary pressure equalization (vent) tube: stainless steel, diameter to allow for pressure equalization while also preventing uptake of particulate matter. 4" in length with a .013"-.033" inner diameter.

2.3 ELASTOMERIC GLAZING SEALANTS AND PREFORMED GLAZING TAPES

.1 General: Provide products of type indicated and complying with following requirements:

.1 Glazing sealants and glazing tapes: to glazing frame manufacturer's standards.

.2 Compatibility: Select glazing sealants and tapes of proven compatibility with other materials with which they will come into contact, including glass products, seals of insulating glass units, and glazing channel substrates, under conditions of installation and service, as demonstrated by testing and field experience.

.3 Suitability: Comply with recommendations of sealant and glass manufacturers for selection of glazing sealants and tapes which have performance characteristics suitable for applications indicated and conditions at time of installation.

.4 Elastomeric Sealant Standard: Provide manufacturer's standard chemically curing, elastomeric sealant of base polymer indicated which complies with ASTM C 920-05 requirements, including those for Type, Grade, Class and Uses.

.5 Colors: Provide color of exposed sealants indicated or, if not otherwise indicated, as selected by The City's Representative from manufacturer's standard colors.

2.4 MISCELLANEOUS GLAZING MATERIALS

.1 Compatibility: Provide materials with proven record of compatibility with surfaces contacted in installation.

.2 Cleaners, Primers and Sealers: Type recommended by sealant or gasket manufacturer and as per Section 01 47 15 for VOC limits.

.3 Setting Blocks, Spacers: as designed and supplied by TGU manufacturer.

Part 3 EXECUTION

3.1 EXAMINATION:

.1 Glazier to inspect the Work of glass framing erector for compliance with manufacturing and installation tolerances, including those for size, squareness, offsets at corners; for presence and functioning of weep system; for existence of minimum required face or edge clearances; and for effective sealing of joinery. Provide a written report, listing conditions detrimental to performance of glazing work. Do not allow the Work to proceed until unsatisfactory conditions have been corrected.

3.2 PREPARATION:

.1 Clean glazing channels and other framing members to receive glass, immediately before glazing. Remove coatings, which are not firmly bonded to substrates. Remove lacquer from metal surfaces where elastomeric sealants are indicated for use.

3.3 GLAZING, GENERAL

.1 Keep pressure equalization (vent) tube free of obstructions that limit free flow of air in and out of vent tube.

.2 Comply with combined printed recommendations of glass manufacturers, of manufacturers of sealants, gaskets and other glazing materials, except where more stringent requirements are indicated, including those of referenced glazing standards.

.3 Protect glass from edge damage during handling and installation; use a rolling block in rotating glass units to prevent damage to glass corners. Do not impact glass with metal framing. Use suction cups to shift TGU within openings; do not raise or drift glass with a pry bar. Rotate glass with flares or bevels along one horizontal edge that would occur in vicinity of setting blocks so that these are located at top of opening. Remove from project and dispose of glass units with edge damage or other imperfections of kind that, when installed, weakens glass and impairs performance and appearance.

.4 Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction sealant-substrate testing.

.5 Anchor components securely in place in manner indicated. Shim and allow for movement resulting from changes in thermal conditions. Provide separators and isolators to prevent corrosion, electrolytic deterioration, and "freeze-up" of moving joints.

.6 Glazing: Inspect glass and framing for compliance with manufacturing and installation tolerances, including size, squareness, and offsets at corners; for existence of minimum face or edge clearances; and for effective sealing of joinery.

.1 Avoid point loading of glass. Do not proceed with glazing Work until unsatisfactory conditions have been corrected. Do not field-cut glass.

.2 Field-Glazed Structural Silicone Glazing Work: Clean frames and glass surfaces with an approved solvent. Prime surfaces and apply structural sealant in accordance with manufacturer's recommendations. Clean excess structural sealant. Mechanically hold glass firmly in place until sealant is sufficiently cured. Install compressible backer rods in joint before applying weatherseal sealant.

3.4 GLAZING

.1 Install setting blocks of proper size in sill rabbet, located one quarter of glass width from each corner, but with edge nearest corner not closer than 6" from corner, unless otherwise required.

.2 Provide spacers inside and out, of correct size and spacing to preserve required face clearances, for glass sizes larger than 50 united inches (length plus height), except where gaskets or glazing tapes with continuous spacer rods are used for glazing. Provide 1/8" minimum bite of spacers on glass and use thickness equal to sealant width, except with sealant tape use thickness slightly less than final compressed thickness of tape.

.3 Provide edge blocking to comply with requirements of referenced glazing standard, except where otherwise required by glass unit manufacturer. Set units of glass in each series with uniformity of pattern, draw, bow and similar characteristics.

3.5 PROTECTION AND CLEANING

.1 Remove nonpermanent labels and clean surfaces.

.2 Protect glass from contact with contaminating substances resulting from construction operations. If, despite such protection, contaminating substances do come into contact with glass, remove immediately by method recommended by glass manufacturer.

.3 Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less often than once a month, for build-up of dirt, scum, alkali deposits or staining. When examination reveals presence of these forms of residue, remove by method recommended by glass manufacturer.

.4 Remove and replace glass which is broken, chipped, cracked, abraded or damaged in other ways during construction period, including natural causes, accidents and vandalism.

3.6 TGU SCHEDULE

.1 Locations: as noted on Exterior Window Schedule on the drawings.

END OF SECTION

Part 1 GENERAL

1.1 RELATED SECTIONS

1. Section 07 25 00 – Air/Vapour Barriers
2. Section 07 62 00 - Sheet Metal Flashing and Trim
3. Section 07 92 00 – Sealants
4. Section 08 44 13 – Glazed Aluminum Curtain Walls
5. Section 08 80 00 - Glazing

1.2 REFERENCES, latest editions.

1. NAFS, NAFS-08, AAMA/WDMA/CSA 101/I.S.2/A440-08, North American Fenestration Standard/Specification for windows, doors and skylights
2. A440S1, Canadian Supplement to AAMA/WDMA/CSA 101/I.S.2/A440
3. National Building Code of Canada and Manitoba Building Code including amendments
4. NFRC 100, Procedure for Determining Fenestration Product U-Factors
5. NFRC 701.03, NFRC Simulation Reporting Requirements
6. CSA A440 and A440.2, Fenestration Energy Performance

1.3 PERFORMANCE

1. Based on the rainscreen principle, water penetrating into window joints, cavities, & channels shall be minimized and shall be designed to naturally drain to the exterior and out, through a weep drainage system. Windows shall conform to all applicable requirements of AAMA/WDMA/CSA 101/I.S.2/A440 and CSA A440S1. Windows shall be less than, or equal to, the window size tested to AAMA/WDMA/CSA 101/I.S.2/A440, in both width and height.
2. Window performance grades shall be determined according to the procedures and calculations in A440S1-09.
3. Windows shall conform to the requirements of all applicable Building Codes and shall comply with CSA-A440, including ‘A2’ air infiltration/exfiltration levels, ‘B’ water tightness, and ‘C’ wind load resistance, certified by an accredited independent laboratory or be on the ENERGY STAR qualified list.
4. Windows shall allow for expansion and contraction within system components caused by a cycling temperature range of 95ºC, over a 12-hour period without causing detrimental effects, including buckling, excess stress on framing, anchors, fasteners or glass, sealant failure, or reduction in performance.
5. The Temperature Index value shall be 66 or greater, when tested in accordance with CSA A440.2. Alternatively, the temperatures shall be shown to be above 2.8C, 50mm from the sightline on the glass and 10mm from the glass on the frame when the exterior temperature is -33C and the interior temperature is 21C. There shall be no condensation @ 22 degrees Celsius (indoor design temperature), with an indoor Relative humidity of 30% and @ -33 degrees Celsius (outdoor design temperature).
6. Sound Transmission Loss: When tested to ASTM E90 and ASTM E1425, the Sound Transmission Class (STC) and Outdoor/Indoor Transmission Class (OITC) shall not be

less than: STC 31 or OITC 26 based upon 1” insulating glass (1/4", 1/2" AS, 1/4"), STC 37, or OITC 30 based upon 1” laminated glass (1/4" laminated, 1/2" AS, 1/4” laminated).

7. Triple-glazed operating windows shall have a rated U Value of 2.0 W/m^2K or less typically.

1.4 SUBMITTALS

.1 Submit shop drawings and product data in accordance with Section 01 33 00. Indicate finishes, unit dimensions, rough opening tolerances, anchorage, and fastener types, air/vapour barrier tie-in to wall assembly, manufacturer’s installation instructions, and any related Work by others. Where engineering is required for larger spans or heights, provide an Engineer’s seal (in the province of the Work) and signature, on the shop drawings.

.2 Submit proof of performance and any support documentation (for the [Manitoba Hydro Commercial Building Envelope Program) as follows:

.1 Proof of energy performance for total window U-value (frame and glazing combined), based on the standard ASTM test size. This proof may be referenced to a current listing with: Energy Star Canada, National Fenestration Rating Council (NFRC), OR may be a computer simulated performance test report signed by an independent NFRC/CSA accredited simulation laboratory, and prepared in accordance with CSA A440.2-09 or NFRC701.03-2010. **Submit this proof of performance at same time as the shop drawings.**

.2 Provide a label for all glazing units that indicate Window specifications as specified in Section 088000.

1.5 DELIVERY, STORAGE, AND HANDLING

.1 Deliver, store, and protect all products to and on-site, in accordance with Section 01 60 00 and with manufacturer’s written instructions.

.2 Accept products on-site only in new condition and verify that there is no damage.

.3 Manufacturer shall provide a removable coating on product to protect all prefinished surfaces and finishes.

1.6 WARRANTY

.1 Provide a written (2) two- year manufacturer’s warranty to cover any defects in manufacture, materials, and operation, from the Date of Substantial Performance.

.2 Provide a written ten (10) year glass manufacturer’s warranty to cover the failure of any air seals or glazing and any defects in manufacture, materials, and workmanship, from the Date of Substantial Performance.

.3 Provide a written one (1) year installer’s warranty to cover any defects in installation, workmanship, and operation, from the Date of Substantial Performance.

1.7 MOCK-UP

1. Provide a mock-up of a typical window installation including glass, air barrier and vapour barrier tie-in and seal, for the Contract Administrator’s review.

2. Upon approval by the Contract Administrator, the approved mock-up may remain as part of the Work.

1.8 WASTE MANAGEMENT

.1 Separate and recycle waste materials in accordance with Section 01 74 21.
.2 Place materials defined as hazardous or toxic waste in designated containers.
.3 Use the least toxic sealants, adhesives, sealers, and finishes necessary to comply with the requirements of this Section and Section 07 92 00.
.4 Close and seal tightly all partly-used sealant containers and store protected in well ventilated fire-safe area at moderate temperature. Place used sealant tubes and other containers in areas designated for hazardous materials.

Part 2 PRODUCTS

2.1 MATERIALS

.1 Extruded Aluminum: AA6063-T5 alloy, minimum 1.6 mm thick.

.2 Sheet Aluminum: AA6063-T5 alloy, 2mm thick, bonded to substrate where required.

.3 Concealed sheet aluminum: utility grade (or other aluminum grades where approved)

.4 Fasteners: Non-magnetic, stain and corrosion resistant stainless steel to ASTM E-149.

.5 Thermal break: glass-reinforced nylon or foamed urethane, 19mm thick minimum.

.6 Glazing seals: extruded EPDM or neoprene gaskets or other where approved (where in contact with Silicone sealant shall be silicone compatible).

.7 Weatherstripping: Q-Lon air-seal gasket on interior with Santoprene bulb-type "rain screen" gasket on the exterior to provide weather barrier. Dust seal to be flexible PVC. Secondary seal to be dual durometer Santoprene (or other where approved).

2.2 WINDOWS

.1 Operating windows: Extruded aluminum with thermal break to meet AAMA/WDMA/CSA 101/I.S.2/A440 latest edition, for performance grade as determined by A440S1-09 latest edition. Acceptable products to be compatible with curtain wall system: Kawneer 5525 Isoweb series (triple glazed), Alumicor Rainblade 1990 series (triple glazed), or U.S. Aluminum equal series. All window units to be by same manufacturer as curtain wall system. Refer to drawings for sizes, patterns, locations, and quantities.

.2 Flashings: refer to Section 07 62 00.and provide isolation coating.

.3 Insect Screen: To AAMA/WDMA/CSA 101/I.S.2/A440-08 SMA 1201-2002 Screen Manufacturer’s Association Specifications for Insect Screens for Windows, Sliding Doors, and Swinging Doors, SMA7001-1992 Warning Label Standard for Window Insect Screens, Heavy Duty Classification with 18 x 14 aluminum mesh in baked enamel aluminum frame – colour to match window frame.

.4 Provide mullion coupling units and sill trays for window types indicated on drawings.

.5 Concealed Stainless Steel Hinges, E-Gard Roto Gear Operators and metal Cam are manufactured by " TRUTH Hardware". Hardware is installed with fasteners into patented back-up reinforcements. Include related extension rods to suit roto operators, where windows are more than 1800mm above finished floor.

2.3 GLAZING MATERIALS

.1 Glazing Materials: refer to Section 08 80 00.

2.4 FABRICATION

1. Fabricate windows allowing for minimum clearances and shim spacing around perimeter of assembly, yet enabling installation.
2. Accurately fit and secure corners tight and rigid. Make corner joints flush, hairline, and weatherproof. Seal corner joints with sealant.
3. Develop drainage holes with moisture pattern to exterior.
4. Prepare components to receive anchor devices. Fabricate anchorage items.
5. Provide internal reinforcement in mullions as required to meet NAFS with galvanized steel members to maintain rigidity.
6. Site glaze window units.
7. Accommodate mechanical and thermal movements of glazing and framing to maintain required edge clearances
8. Provisions to replace glazing in field
9. Provide a mechanism capable of controlling the free-swinging or openable part of the windows so that the maximum allowable opening width does not exceed that permitted by Code when in full open position.

2.6 FINISHES

.1 'Black' anodized aluminum finish typical in accordance with Aluminum Association Designation System for Aluminum Finishes. Natural Anodized Aluminum to AAMA 611-12, AAMA 2604, AAMA 2605.

.2 All aluminum is to be shaped first and then finished.

.3 Concealed Steel Items: Galvanized in accordance with CSA G164M, to 610 g/sq m

.4 Apply one coat of bitumen paint to concealed aluminum and steel surfaces in contact with cementitious or dissimilar materials.

Part 3 EXECUTION

3.1 INSPECTION

.1 Verify that surfaces are ready to receive Work and verify opening dimensions on-site with shop drawings.

.2 Verify wall openings and adjoining air and vapour seal materials are ready to receive Work of this Section.

.3 Beginning of installation means acceptance of substrate.

3.2 INSTALLATION

.1 Install window frames, glass and glazing in accordance with manufacturers instructions.

.2 Use anchorage devices to securely attach frame to structure.

.3 Align window frame plumb and level, free of warp or twist. Maintain dimensional tolerances, aligning with adjacent Work.

.2 Coordinate attachment and seal of air and vapour barrier materials.

.3 Pack fibrous insulation in shim spaces at perimeter to maintain continuity of thermal barrier.

.4 Install glass in accordance with Section 08 80 00.

.5 Install perimeter type sealant, backing materials, and installation requirements in accordance with Section 07 92 00. Apply sealant to ends of sill for watertight seal. Seal inside perimeter continuous to maintain air seal. Allow drainage below sill to exterior.

3.3 CLEANING

.1 Remove protective material from prefinished aluminum surfaces.

.2 Wash down exposed surfaces using a solution of mild detergent in warm water, applied with soft, clean wiping cloths. Take care to remove dirt from corners. Wipe surfaces clean.

.3 Remove excess sealant by moderate use of mineral spirits or other solvent acceptable to sealant manufacturer.

END OF SECTION

Part 1 GENERAL

1.1 RELATED SECTIONS

.1 Section 08 06 00 – Door and Hardware Schedule

.2 Section 08 07 71 – Hardware Sets

.2 Division 26 00 00: Electrical wiring for strikes, releases, and locks.

1.2 REFERENCES – latest editions.

.1 Canadian Steel Door and Frame Manufacturers' Association (CSDFMA)
- .1 CSDFMA Canadian Metric Guide for Steel Doors and Frames (Modular Construction): standard hardware location dimensions.
- .2 Canadian General Standards Board (CGSB)

.2 CAN/CGSB-69.17-M, Bored and Preassembled Locks and Latches

.3 CAN/CGSB-69.18-M, ANSI/BHMA A156.1, Butts and Hinges

.4 CAN/CGSB-69.19, ANSI/BHMA A156.3, Exit Devices

.5 CAN/CGSB-69.20-M, ANSI/BHMA A156.4-1 Door Controls (Closers)

.6 CAN/CGSB-69.21-M, ANSI/BHMA A156.5, Auxiliary Locks and Associated Products

.7 CAN/CGSB-69.22-M, ANSI/BHMA A156.6, Architectural Door Trim

.8 CAN/CGSB-69.24-M, ANSI/BHMA A156.8, Door Controls - Overhead Holders

.9 CAN/CGSB-69.26, ANSI/BHMA A156.10, Power-operated Pedestrian Doors

.10 CAN/CGSB-69.28-M, ANSI/BHMA A156.12, Interconnected Locks and Latches

.11 CAN/CGSB-69.29, ANSI/BHMA A156.13-19, Mortise Locks and Latches

.12 CAN/CGSB-69.30, ANSI/BHMA A156.14, Sliding and Folding Door Hardware

.13 CAN/CGSB-69.31-M, ANSI/BHMA A156.15, Closer/Holder Release Device

.14 CAN/CGSB-69.32-M, ANSI/BHMA A156.16, Auxiliary Hardware

.15 CAN/CGSB-69.33-M, ANSI/BHMA A156.17, Self-closing Hinges and Pivots

.16 CAN/CGSB-69.34, ANSI/BHMA A156.18, Materials and Finishes

.17 CAN/CGSB-69.35-M, ANSI/BHMA A156.19, Power Assist and Low Energy Power Operated Doors

.18 CAN/CGSB-69.36-M, ANSI/BHMA A156.20, Strap and Tee Hinges and Hasps

1.3 SUBMITTALS

.1 Submit manufacturer's printed product literature, specifications, and data sheets in accordance with Section 01 33 00 - Submittal Procedures.

.2 Submit cut sheets for each hardware type and model with the Shop Drawings in accordance with Section 01 33 00 - Submittal Procedures.

.3 Submit contract hardware list and indicate specified hardware, make, model, material, function, size, finish, and other pertinent information.

.4 Submit in final project manuals.

.5 Submit operation, installation, and maintenance data for all finish hardware including door closers, locksets, door holders, electrified hardware, and exit hardware for project manuals, as specified in Section 01 78 00.

1.4 QUALITY ASSURANCE

.1 Comply with the following regulatory requirements:

.1 Hardware for doors at fire separations and exit doors certified by the Canadian Certification Organization, as accredited by the Standards Council of Canada.

.2 Certified test reports showing compliance with specified performance characteristics and physical properties.

.3 Product certificates signed by the manufacturer certifying that materials comply with specified performance characteristics, criteria, and physical requirements.

.4 Conduct a pre-installation meeting to verify project requirements, manufacturer's installation instructions, and manufacturer's warranty requirements.

.5 Unless noted otherwise, provide a 1-year warranty for all hardware and associated components. Automatic door operators and their related components shall have a 2-year warranty (including the motor and the operating unit).

1.5 DELIVERY, STORAGE, AND HANDLING

.1 Packing, Shipping, Handling and Unloading:

.2 Deliver, store, handle and protect materials in accordance with Section 01 60 00.

.3 Package each item of hardware including fastenings, separately or in like groups of hardware, label each package as to item definition and location.

.4 Store all finishing hardware in locked, clean and dry area, until ready for use.

1.6 WASTE DISPOSAL AND MANAGEMENT

.1 Separate and recycle waste materials in accordance with Section 01 74 21.

.2 Remove from Site and dispose of packaging materials at appropriate recycling facilities.

.3 Dispose of corrugated cardboard, polystyrene, plastic packaging material in appropriate on-site bin for recycling in accordance with waste management program.

1.7 MAINTENANCE

.1 Provide maintenance materials in accordance with Section 01 78 00.

.2 Supply two sets of wrenches for door closers, locksets, and fire exit hardware.

1.8 WARRANTY

.1 Provide a written one (1) year manufacturer’s warranty to cover any defects in materials, manufacturing, and finishes, and provide an installer’s warranty to cover defects in installation and workmanship, for the same period from the Date of Substantial Performance.

Part 2 PRODUCTS

2.1 HARDWARE ITEMS

.1 Use one manufacturer's products only for similar items.

2.2 DOOR HARDWARE (also refer to Hardware Schedule in Division 00)

.1 Locks and latches:

.1 Bored and preassembled locks and latches: to CAN/CGSB-69.17 or latest, with lever handles as stated in Hardware Schedule. Acceptable manufacturer: Best series for exterior and Schlage series 'D' for interior (to match existing keyways).

.2 All locksets/latchsets with levers to have 70mm backset typically.

.3 All locksets/latchsets with knobs to have 127mm backset typically.

.2 Butts and hinges:

.1 Butts and hinges: to CAN/CGSB-69.18 or latest, designated by letter A and numeral identifiers, followed by size and finish, listed in Hardware Schedule. Hsaper or equal on exterior doors with non-removable pins.

.2 Self-closing hinges and pivots: to CAN/CGSB-69.33 or latest, designated by letter K and numeral identifiers listed in Hardware Schedule, [with suffix letter F indicating listed for used on fire doors].

.3 Strap and tee hinges and hasps: to CAN/CGSB-69.36 or latest, designated by letter A and numeral identifiers listed in Hardware Schedule.

.4 Provide 1 ½ pair of butts for door up to 914mm (36") wide x 2200mm (84") high and 2 pairs of butts for doors larger than these dimensions.

.3 Exit devices: to CAN/CGSB 69.19 or latest, as listed in Hardware Schedule.

.1 Acceptable manufacturer is Von Duprin 99 series or Sargent 80 series.

.4 Auxiliary item(s): door co-ordinator, type 21, for pairs of doors with overlapping astragals.

.5 Door Closers and Accessories:

.1 Door controls (closers): to CAN/CGSB-69.20 or latest, designated by letter C and numeral identifiers listed in Hardware Schedule, in accordance with CAN/CGSB-69.20, table A1. Acceptable manufacturer is LCN.

.2 Door controls - overhead holders: to CAN/CGSB-69.24 or latest, designated by letter C and numeral identifiers listed in Hardware Schedule.

.3 Closer/holder release devices: to CAN/CGSB-69.31 or latest, designated by letter C and numeral identifiers listed in hardware schedule.

.4 Door co-ordinator: for pairs of doors with overlapping astragal.

.6 Architectural door trim: to CAN/CGSB-69.22 or latest, designated by letter J and numeral identifiers as listed in Hardware Schedule.

.1 Door protection plates: kick plate on push side of door unless otherwise noted, 1.27 mm thick aluminum or stainless steel, with countersunk oval head stainless steel screws. Length to be full width of door less 50mm (2").

.2 Push/pull plates: 1.27 mm thick stainless steel.

.3 Thresholds at exterior doors: width listed x full width of door opening, extruded aluminum mill finish, serrated surface, with thermal break of rigid PVC and minimal lip to permit barrier free access. Acceptable manufacturer: K.N. Crowder, Pemko.

.4 Anti-Vandal trim (where scheduled): heavy duty 12 ga. stainless steel, fully through-bolted, extra security for latchbolt, barrier-free compliant with matte plastic coated grip and no exposed exterior fasteners.

.7 Weatherstripping:

.1 Exterior head and jamb seals: extruded aluminum frame in a clear anodized finish with closed cell neoprene.

.2 Exterior door bottom seal: extruded aluminum frame in a clear anodized finish with closed cell neoprene or nylon brush inserts.

.3 Exterior door astragal: adjustable extruded aluminum frame in a clear anodized finish, with a pile insert.

.8 Barrier-Free Power Door Operator System: (coordinate with drawings and Hardware Schedule); submit manufacturer's install sheet as shop drawing.

.1 Power-operated pedestrian doors to CAN/CGSB-69.26.

.2 Power assist and low energy power operated doors to CAN/CGSB-69.35: single door operation with actuators, electric strikes, control boxes, and all related hardware. Surface mounted type with ability to adjust operation speed. Acceptable products: Norton 6000/5700 series, LCN 4642, Horton series 4000, Gyro-Tech GT-500, Besam SW200i, Stanley Magic Swing, or Ditec Entrematic HA-8.

.3 Control boxes: complete with electric strike relay.

.4 Wall mounted, hard-wired, low voltage, vertical actuators with UL listed switch components: 150 (6") wide x 952 (37.5") high. Heavy duty, anodized clear aluminum cover with contrasting wheelchair symbol and "Push to Open". Surface mount actuator on both sides of a door, typically with bottom of actuator at 150 (6") above finished floor/grade. Locations: At Vestibule, typically provide 3 interior actuators and 1 exterior actuator. At interior doors where scheduled and indicated on the drawings, provide one actuator on both sides of door. Refer to drawings for locations and site confirm final locations on-site with Contract Administrator. Acceptable product: Camden Door Controls #CM-7536/4BZ.

.7 Sequence exterior and interior Vestibule doors to operate independently.

.8 Provide switched line voltage to control box. Locate bypass switch above housing mechanism and wire so switch will also act as an on-off switch for the door operator.

.9 Housing for door operators to extend across full door frame width. For manual doors, provide heavy-duty closers behind the housing.

2.3 FASTENINGS

.1 Use only fasteners provided by manufacturer. Failure to comply may void warranties and applicable licensed labels.

.2 Supply screws, bolts, expansion shields and other fastening devices required for satisfactory installation and operation of hardware.

.3 Exposed fastening devices to match finish of hardware.

.4 Where pull is scheduled on one side of door and push plate on other side, supply fastening devices, and install so pull can be secured through door from reverse side. Install push plate to cover fasteners.

.5 Use fasteners compatible with material through which they pass.

2.4 KEYING ACCESS

.1 Doors to be keyed differently; submit a master keying schedule and a detailed keying schedule for review with The City.

.2 Provide keys in duplicate for every lock in this Contract and provide three master keys for each MK or GMK group. Stamp keying code number on keys and on cylinders.

.3 Provide a wall-mounted, lockable, key cabinet capable of holding the number of keys supplied.

.4 Use temporary cores for exterior doors during construction and provide permanent cores and keys to the The City at Substantial Performance.

Part 3 EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

.1 Compliance: comply with manufacturer's written data, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.

.2 Furnish wood and metal door and frame manufacturers with complete instructions and templates for preparation of their work to receive hardware.

.3 Furnish manufacturers' instructions for proper installation of each hardware component.

3.2 INSTALLATION

.1 Install hardware to standard hardware location dimensions in accordance with Canadian Metric Guide for Steel Doors and Frames (Modular Construction) prepared by Canadian Steel Door and Frame Manufacturers' Association.

.2 Coordinate locations of door stops to stop the swing of doors before reaching adjacent objects.

.3 Coordinate location of key control cabinet with The City and install.

.4 Use only manufacturer's supplied fasteners; failure to comply may void manufacturer's warranties and applicable licensed labels. Use of "quick" type fasteners, unless specifically supplied by manufacturer, is unacceptable.

.5 General guidelines for hardware mounting heights above the finished floor, unless noted otherwise:
- .1 Push and pull plates: 915mm (36”) to bottom of plates
- .2 Locksets/latchsets: 915mm (36”) to centreline of latch
- .3 Panic hardware: 1007mm (39 5/8”) to centreline or as per manufacturer
- .4 Dead lock: 1200mm (48”) to the top of the lock

3.3 ADJUSTING

.1 Adjust door hardware, operators, closures and controls for optimum, smooth operating condition, safety and for weather tight closure.

.2 Lubricate hardware, operating equipment and other moving parts.

.3 Adjust door hardware to provide tight fit at contact points with frames.

3.4 CLEANING

.1 Perform cleaning after installation to remove construction and accumulated environmental dirt.

.2 Clean hardware with damp rag and approved non-abrasive cleaner, and polish hardware in accordance with manufacture's instructions.

.3 Remove protective material from hardware items where present.

.4 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers and provide written certification to the Contract Administrator that all hardware installed is as specified.

3.5 DEMONSTRATION

.1 Keying System Setup and Cabinet: Turn over all keys and key cabinet and provide signed proof of receipt from The City.

.1 Provide a briefing for the The City including the following:

- .1 Proper care, cleaning, and general maintenance of hardware.
- .2 Use, application and storage of wrenches for door closers, locksets, and exit hardware.
- .3 Demonstrate operation, moving components, adjustment features, and lubrication requirements.

END OF SECTION

Part 1 GENERAL

1.1 RELATED SECTIONS

.1 Section 07 92 00 - Joint Sealants

.2 Section 08 06 00 – Door and Hardware Schedule

.3 Section 08 11 00 – Steel Doors and Frames

.4 Section 08 11 16 – Aluminum Doors and Frames

.5 Section 08 44 13 – Glazed Aluminum Curtain Walls

.6 Section 08 44 32 – Structural Glass Systems and Hardware

.7 Section 08 51 13 – Aluminum Windows

1.2 REFERENCES

.1 American National Standards Institute (ANSI), latest edition

.1 ANSI/ASTM E330-02, Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference. or latest.

.2 ASTM E283-04, Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.

.3 ANSI Z97.1, Safety Glazing Materials Used in Buildings - Safety Performance Specifications and Methods of Test.

.2 American Society for Testing and Materials International, (ASTM), latest edition.

.1 ASTM C542, Specification for Lock-Strip Gaskets

.2 ASTM C1172, Standard Specification for Laminated Architectural Flat Glass.

.3 ASTM D790, Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials

.4 ASTM D1003, Test Method for Haze and Luminous Transmittance of Plastics

.5 ASTM D1929, Test Method for Determining Ignition Temperature of Plastics

.6 ASTM D2240, Test Method for Rubber Property - Durometer Hardness

.7 ASTM E84, Test Method for Surface Burning Characteristics of Building Materials

.8 ASTM F1233, Test Method for Security Glazing Materials and Systems

.3 Canadian General Standards Board (CGSB), latest edition.

.1 CAN/CGSB-12.1-M90, Tempered or Laminated Safety Glass

.2 CAN/CGSB-12.2-M91, Flat, Clear Sheet Glass

.3 CAN/CGSB-12.3-M91, Flat, Clear Float Glass

.4 CAN/CGSB-12.5-M86, Mirrors, Silvered

.5 CAN/CGSB 12.20-M89 - Structural Design of Glass for Buildings.

.6 CAN/CGSB-12.11-M90, Wired Safety Glass

.7 CAN/CGSB-12.12-M90, Plastic Safety Glazing

.4 Canadian Standards Association (CSA International), latest edition

.1 CSA A440.209, Energy Performance Evaluation of Windows and Sliding Glass Doors

.2 CSA Certification Program for Windows and Doors

.5 Environmental Choice Program (ECP),(Ecologo), latest edition

.1 CCD-045-95, Sealants and Caulking

.6 GANA (Glass Association of North America), latest edition

.1 GANA Glazing Manual

.2 GANA Laminated Glazing Reference Manual

.3 GANA Sealant Manual

.7 IGMA (Insulating Glass Manufacturers Alliance), latest edition

1.3 SYSTEM DESCRIPTION

.1 Performance Requirements:

.1 Provide continuity of building enclosure vapour and air barrier using glass and glazing materials as follow:

.1 Utilize inner light of multiple light sealed units for continuity of air and vapour seal.

.2 Size glass to withstand wind loads, dead loads and positive and negative live loads as measured in accordance with ANSI/ASTM E330 or latest.

.3 Limit glass deflection to flexural limit of glass with full recovery of glazing materials.

1.4 SUBMITTALS

.1 Product Data:

.1 Submit manufacturer's printed product literature, specifications and data sheet in accordance with Section 01 33 00 - Submittal Procedures.

.2 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.

.3 Upon request, submit samples in accordance with Section 01 33 00 - Submittal Procedures.

.4 Submit manufacturer's installation instructions.

.5 Provide maintenance data including cleaning instructions for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.

.6 Overall window frame and glazing U-vlaue performance: refer to related window frame specification sections.

.7 Refer to Window Frame Section for proof of energy performance submittals.

1.5 QUALITY ASSURANCE

.1 Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties. Conform to IGMAC – Quality Standard Specification and Glazing Recommendations for Sealed Insulated Glass Units for glazing installation methods.

.1 Provide shop inspection and testing and analysis of glass under provisions of Section 01 45 00 - Quality Control.

.2 Window supplier must supply a test report by an independent technical source showing compliance to CSA A440.2 (most current) or a current NFRC Certified Products Listing.

.3 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

.4 Pre-installation Meetings: conduct pre-installation meeting to verify project requirements, manufacturer's installation instructions and manufacturer's warranty requirements.

.5 Provide a label for all glazing units that indicate Window specifications in accordance with NFRC.

1.6 SITE CONDITIONS

.1 Environmental Requirements:

.1 Install glazing when ambient temperature is 10 degrees C minimum. Maintain ventilated environment for 24 hours after application.

.2 Maintain minimum ambient temperature before, during and 24 hours after installation of glazing compounds.

1.7 WASTE MANAGEMENT AND DISPOSAL

.1 Separate and recycle waste materials in accordance with Section 01 74 21.

.2 Divert metal cut-offs from landfill by disposal into on-site Metal recycling bin.

.3 Divert unused caulking and sealant materials from landfill through disposal at special wastes depot.

.4 Unused or damaged glazing materials are not recyclable and must not be diverted to municipal recycling programs.

.5 Remove form Site and dispose of packaging materials at appropriate recycling facilities.

.6 Dispose of corrugated cardboard, polystyrene, plastic packaging material in appropriate on-site bin for recycling in accordance with local regulations.

Part 2 PRODUCTS

2.1 MATERIALS: FLAT GLASS

.1 Type A: Float Glass: to CAN2-12.3.M; glazing quality, thickness to suit opening size thickness and shall be in accordance with applicable Building Code, clear, visible light transmission 88% minimum.

.2 Type B: Safety Glass: to CAN2-12.1M; Type 2-Tempered, Glass B-Float, thickness to suit opening size thickness and shall be in accordance with applicable Building Code. Clear. All interior glazing (non-fire rated) to be Type B, unless otherwise noted.
A: Clear with surface applied decorative plastic film (refer to 2.2).

.3 Type D: Wired glass: to CAN/CGSB-12.11, min 6 mm thick. Type 1-Polished both sides (transparent) clear. Wired glass with Georgian – square wire mesh style, of 13 mm (1/2 inch) grid size in accordance with Building Code.

.4 Type F: Structural glass: thickness to suit spans to meet CAN/CGSB-12.20 and CAN2-12.1M; Type 2-Tempered, clear, in accordance with Building Code.
A: 1220 (4'-0") wide panels x continuous height to suit dimensions and spans for walls, as indicated on drawings. Apply plastic film where noted on drawings.
B: for continuous panels and shelving to suit dimensions and spans for display case, as detailed on drawings.

.5 Type G: Silvered Mirrored Glass: to CAN2-12.5M; float glass, tempered for normal use; 6 (1/4") thickness to suit sizes indicated on drawings, and in continuous lengths as much as possible, with concealed clip securement.

2.2 MATERIALS: HERMETICALLY SEALED INSULATING GLASS UNITS

.1 All double/triple glazed insulating units to CAN/CGSB-12.8 with a high performance edge spacer, double sealed. Heat strengthened glass shall be used where wind or thermal

loads require. Fully tempered glass shall be used where safety glazing is specifically required for code compliance and where specifically indicated. Edges of glass shall be straight cut, free from nicks and other imperfections conducive to breakage, arrissed where visible, without metal edge banding. Double seal to be PIB primary seal and silicone secondary seal, colour matched as specified. Secondary seal to be designed for structural silicone glazing limiting sealant stress to 138 kPa. Edge spacer core shall be straight and evenly set into glass units with a maximum variation in line of spacer core of plus or minus 2mm and the primary seal shall not extend past the inside edge of spacer core by more than 1.6mm. All units to have *Insulating Glass Manufacturers Association of Canada (*IGMAC) certification. Argon fill to a minimum of 90% fill. Glass thickness specified to be minimum and is subject to confirmation by Glazing Contractor.

.2 NFRC Labeling: All Glazed units shall have labels in accordance with NFRC. To be included on the label are the Window Manufacturer, window specifications including but not limited to; U-factor, SHGC, VT, Air Leakage rate, and Condensation Resistance, Window Type, Frame Type, Insulated Unit type, Inter-cavity space fill, Glass Coating, Orientation (if specified), and Schedule information. **Labels should be visible after installation and remain on the glass until the Contract Administrator has reviewed.**

.3 **Type 1**: Triple Pane Insulated Glass Units at exterior curtain wall typically and at interior curtain wall between Splash Pad and Viewing Lobby, to CAN/CGSB-12.8M or latest. Total overall unit thickness of 41 mm.

.1 Glass: to CAN/CGSB-12.1, CAN/CGSB-12.2, CAN/CGSB-12.3, CAN/CGSB-12.4 and CAN/CGSB-12.10 or latest. Thickness to suit window sizes as per CAN/CGSB- 12.20. Outer, middle, and inner panes to be Type B: safety glass, clear.

.2 Inter-cavity Space: 13mm (1/2”) thick air spaces between panes to be purged dry, filled with inert argon gas, and hermetically sealed, with a with a warm edge spacer (Super Spacer, XL bar, or Vilda V-92 bar)..

.3 Glass Coating: soft coat, sputtered **Low-E** coating on surface [#2 and #5 where triple glazed]. Acceptable Products: PPG Solarban60, AGC TiAC36 and TiAC40, Cardinal 272, or Guardian Sunguard SuperNeutral 68.

.4 Visible Light Transmittance: 0.50 or higher

.5 Shading coefficient (SHGC): Low Solar Gain

.4 **Type 2**: Double Pane Insulated Glass Units at all exterior doors (and interior doors D-109 & D-120B) where safety glass is required, and in storefront framing: between Splash Pad Pool Deck and Viewing Lobby/MPR 120, and between Corridor 109 & existing Pool Deck, to CAN/CGSB-12.8M or latest.

.1 Glass: to CAN/CGSB-12.1, CAN/CGSB-12.2, CAN/CGSB-12.3, CAN/CGSB-12.4 and CAN/CGSB-12.10 or latest. Thickness to suit window sizes as per CAN/CGSB- 12.20. Outer and inner panes to be Type B: safety glass, clear.

.2 Inter-cavity Space: 13mm (1/2”) thick air space (in doors, reduce to 6mm or ¼” air space) between panes to be purged dry, filled with inert argon gas and hermetically sealed, with a with a warm edge spacer (Super Spacer, XL bar, or Vilda V-92 bar).

.3 Glass Coating: soft coat, sputtered **Low-E** coating on surface #2 where dual glazed. Acceptable Products: PPG Solarban60, AGC TiAC36 and TiAC40, Cardinal 272, or Guardian Sunguard SuperNeutral 68.

.4 Visible Light Transmittance: 0.50 or higher

.5 Shading coefficient (SHGC): Low Solar Gain

2.3 PLASTIC FILMS

.1 Decorative Plastic Film: 2 mils thick, 3M Crystal™ Glass Finishes, or 7725SE-314 'Dusted Crystal'. Full printed colour pattern shown; Contract Administrator to provide graphic image files for printing onto film. Where possible, apply film on side of glass away from source of humidity or heat. Refer to drawings for extent

2.4 ACCESSORIES

.1 Setting blocks: ASTM C864, Neoprene, 80-90 Shore A durometer hardness to ASTM D2240 or latest, to suit glazing method, glass lightweight and area.

.2 Spacer shims: ASTM C864, Neoprene, 50-60 Shore A durometer hardness to ASTM D2240 or latest, 75 mm long x one half height of glazing stop x thickness to suit application. Self-adhesive on one face.

.3 Glazing tape:

.1 Preformed butyl compound with integral resilient tube spacing device, 10-15 Shore A durometer hardness to ASTM D2240 or latest; on release paper, black colour.

.2 Closed cell polyvinyl chloride foam, coiled on release paper over adhesive on two sides, maximum water absorption by volume 2%, designed for compression of 25 %, to effect an air and vapour seal.

.4 Glazing splines: ASTM C864, resilient polyvinyl chloride, extruded shape to suit glazing channel retaining slot.

.5 Glazing clips: manufacturer's standard type.

.6 Lock-strip gaskets: to ASTM C542, latest.

.7 Frameless Glass Entry Systems: Type 'F' Structural glass with hardware from Section 08 44 32.

Part 3 EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

.1 Compliance: Comply with manufacturer's written data, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.

3.2 EXAMINATION

.1 Verify Existing conditions before starting Work.

.2 Verify that openings for glazing are correctly sized and within tolerance.

.3 Verify that surfaces of glazing channels or recesses are clean, free of obstructions, and ready to receive glazing.

3.3 PREPARATION

.1 Clean contact surfaces with solvent and wipe dry.

.2 Seal porous glazing channels or recesses with substrate compatible primer or sealer.

.3 Prime surfaces scheduled to receive sealant.

.4 Install sealant in accordance with manufacturer's written instructions.

3.4 INSTALLATION: EXTERIOR

.1 Perform Work in accordance with IGMAC for glazing installation methods.

.2 Rest glazing on setting blocks and push against fixed stop with sufficient pressure to attain full contact.

.3 Install removable stops without displacing glazing tape/spline. Exert pressure for full continuous contact.

.4 Trim protruding tape edge.

.5 Fill gap between glazing and stop with sealant to depth equal to bite of frame on glazing, maximum 9 mm below sight line.

.6 Apply cap head of sealant along void between stop and glazing, to uniform line, flush with sight line. Tool or wipe sealant surface smooth.

3.5 INSTALLATION: INTERIOR

.1 Perform Work in accordance with IGMAC for glazing installation methods.

.2 Cut glazing tape to length and set against permanent stops, projecting 1.6 mm above sight line.

.3 Rest glazing on setting blocks and push against tape for full contact at perimeter of light or unit.

.4 Place glazing tape on free perimeter of glazing in same manner described.

.5 Install removable stop without displacement of tape. Exert pressure on tape for full continuous contact.

.6 Knife trim protruding tape.

3.6 INSTALLATION - PLASTIC FILM

.1 Install plastic film with adhesive, applied in accordance with film manufacturer's written instructions.

.2 Place without air bubbles, creases or visible distortion.

.3 Fit tight to glass perimeter with razor cut edge.

3.7 CLEANING

.1 Perform cleaning after installation to remove construction and accumulated environmental dirt.

.2 Remove traces of primer, caulking.

.3 Remove glazing materials from finish surfaces.

.4 Remove NFRC labels after Work is complete and Contract Administrator has reviewed it.

.5 Clean glass and mirrors using approved non-abrasive cleaner in accordance with manufacture's instructions.

.6 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

3.8 PROTECTION OF FINISHED WORK

.1 After installation, mark light with an "X" by using removable plastic tape or paste. Do not mark heat absorbing or reflective glass units.

3.9 SCHEDULE TYPES

.1 Sealed Insulating glass units at all exterior windows and sidelights: outer pane, medium pane, inner pane, and low E coatings, to be as noted in Part 2 MATERIALS.

.2 Sealed Insulating glass units in all glazed exterior and interior doors: outer pane to be Type B clear tempered glass (with low E coating as specified) and inner pane to be Type B clear tempered glass. Minimize air space to 6mm in doors only, to allow for stops either side to fit within overall door thickness.

.3 Safety glass between Spray Pad Pool Deck and Viewing Lobby/MPR 120, and between Corridor 109 and existing Pool Deck: sealed unit with dual pane with 13 (1/2") air space, Type B clear tempered glass.

.4 Safety glass at other interior windows, doors, and sidelights: single pane, Type B clear tempered glass, unless noted otherwise.

.5 Structural frameless glass wall panel system between Viewing Lobby/MPR 120 and Entry Lobby 102: Type F clear structural glass with plastic film decals as indicated on the drawings. Also refer to Section 08 44 32.

.6 Structural frameless glass panels and shelving at display case in Reception desk in Reception 103: Type F clear structural glass, and as detailed on drawings. Also refer to Section 06 40 00.

.7 Wired glass at all interior doors and windows in a fire-rated assembly: Type D, clear, wired glass.

.8 Mirrors: Type G with finished edges, size as per interior elevation drawings and details.

END OF SECTION