1	EA	RIM EXIT DEVICE	3R0 2114 X 4914B (PASSAGE)	630	PHI
1	EA	CLOSER	D4550 SN (MOUNT REGULAR ARM - PULL SIDE)	689	SDC
1	EA	PROTECTION PLT	KO050 10" X 2" LDW X B4E/CSK (KICK)	630	TRM
1	EA	WALL STOP	1278CX (CONVEX)	626	TRM
1	EA	SEAL	5075B X LAR (HEAD/JAMBS)	BRN	NGP

HARDWARE SET # B48 - STORAGE (2-3070/HMXHM)

DOOR(S): 118
EACH TO HAVE:

QTY	UNIT	PRODUCT	DESCRIPTION	FINISH	MFG
6	EA	HINGE	FBB179 4.5 X 4.5 NRP	652	STN
2	EA	FLUSH BOLT	W3917-12	626	TRM
1	EA	LOCKSET	45H7D16H CORMAX (STOREROOM)	626	BST
2	EA	OVERHEAD STOP	4420 SERIES (TEMPLATE FOR 90°)	626	TRM
2	EA	SILENCER	1229A (HM/FRAME) OR 1229B (WD/FRAME)	GREY	TRM

HARDWARE SET # B49 - CENTRAL PLANT INTERIOR (2-3070/HMXHM/UL)

DOOR(S): 120A
EACH TO HAVE:

QTY	UNIT	PRODUCT	DESCRIPTION	FINISH	MFG
6	EA	HINGE	FBB179 4.5 X 4.5 NRP	652	STN
1	EA	SVR EXIT DEVICE	3R0 FL22 LBR (CARD READER O/S TRIM) (ACTIVE LEAF)	630	PHI
1	EA	CARD RDR TRIM	QUANTUM III X LEVER (ACTIVE LEAF)	626	SAF
1	EA	SVR EXIT DEVICE	3R0 FL2201 LBR (EXIT ONLY - NO O/S PLATE) (INACTIVE LEAF)	630	PHI
2	EA	CLOSER	D4550 CS SN (MOUNT PARALLEL ARM - PUSH SIDE)	689	SDC
2	EA	PROTECTION PLT	KO050 10" X 1" LDW X B4E/CSK	630	TRM
1	EA	SEAL	5075B X LAR (HEAD/JAMBS)	BRN	NGP

HARDWARE SET # B50 - ELECTRICAL EXTERIOR (3070/HMXHM)

DOOR(S): 122B

EACH TO HAVE:

QTY	UNIT	PRODUCT	DESCRIPTION	FINISH	MFG
3	EA	HINGE	FBB199 4.5 X 4.5 NRP	630	STN
1	EA	RIM EXIT DEVICE	3R0 21 (CARD READER O/S TRIM)	630	PHI
1	EA	CARD RDR TRIM	QUANTUM III X LEVER (ACTIVE LEAF)	626	SAF
1	EA	CLOSER	D4550 CS SN (MOUNT PARALLEL ARM - PUSH SIDE)	689	SDC
1	EA	PROTECTION PLT	KO050 10" X 2" LDW X B4E/CSK (KICK)	630	TRM
1	EA	SEAL	5075B X LAR (HEAD/JAMBS)	BRN	NGP
1	EA	SWEEP	601A X LAR	A	NGP
1	EA	THRESHOLD	425 X LAR X FASTENERS FOR SECURE ATTACHMENT TO SUBSTRATE	A	NGP
1	EA	RAIN DRIP	16A X OFW	A	NGP

HARDWARE SET # B51 - MAIN ELECTRICAL (3070/HMXHM/UL)

DOOR(S): 122A
EACH TO HAVE:

QTY	UNIT	PRODUCT	DESCRIPTION	FINISH	MFG
3	EA	HINGE	FBB179 4.5 X 4.5 NRP	652	STN
1	EA	RIM EXIT DEVICE	3R0 21 (CARD READER O/S TRIM)	630	PHI
1	EA	CARD RDR TRIM	QUANTUM III X LEVER (ACTIVE LEAF)	626	SAF
1	EA	CLOSER	D4550 SN (MOUNT PARALLEL ARM - PUSH SIDE)	689	SDC
1	EA	PROTECTION PLT	KO050 10" X 2" LDW X B4E/CSK (KICK)	630	TRM
1	EA	WALL STOP	1278CX (CONVEX)	626	TRM
1	EA	SEAL	5075B X LAR (HEAD/JAMBS)	BRN	NGP

HARDWARE SET # B52 - LOADING DOCK EXIT (2-3070/HMXHM)

DOOR(S): 123A
EACH TO HAVE:

QTY	UNIT	PRODUCT	DESCRIPTION	FINISH	MFG
6	EA	HINGE	FBB199 4.5 X 4.5 NRP	630	STN
1	EA	SVR EXIT DEVICE	3R0 22 (CARD READER O/S TRIM) (ACTIVE LEAF)	630	PHI
1	EA	CARD RDR TRIM	QUANTUM III X LEVER (ACTIVE LEAF)	626	SAF

1	EA	SVR EXIT DEVICE	3R0 2201 (EXIT ONLY - NO O/S PLATE) (INACTIVE LEAF)	630	PHI
2	EA	CLOSER	D4550 CS SN (MOUNT PARALLEL ARM - PUSH SIDE)	689	SDC
2	EA	PROTECTION PLT	KO050 10" X 6" LDW X B4E/CSK (DO NOT MOUNT UNDER BOTTOM LATCH CASE)	630	TRM
1	EA	SEAL	5075B X LAR (HEAD/JAMBS)	BRN	NGP
2	EA	SWEEP	601A X LAR	A	NGP
1	EA	THRESHOLD	425 X LAR X FASTENERS FOR SECURE ATTACHMENT TO SUBSTRATE	A	NGP

HARDWARE SET # B53 - ROLLUP OVERHEAD (BY MANUFACTURER)

DOOR(S): 123B, 123C
EACH TO HAVE:

QTY	UNIT	PRODUCT	DESCRIPTION	FINISH	MFG
1	EA	CARD READER	QUANTUM RCU IF REQ'D FOR DOOR OPERATION	BLK	SAF
1	EA	POWER SUPPLY	IF REQ'D FOR DOOR OPERATION/RCU	N/A	SAF

NOTE(S):

BALANCE OF ALL HARDWARE PROVIDED BY DOOR MANUFACTURER

HARDWARE SET # B54 - VARIOUS SPACES (3070/HMXHM)

DOOR(S): 125.2, 125.3, 125.5, 125.7, 125.8, 129.2A, 129.2B, 129.5, 129.6, 129.7, 129.8, 129.9, 129.10, 129.11, 130, 131.1, 131.2132, 133,
EACH TO HAVE:

QTY	UNIT	PRODUCT	DESCRIPTION	FINISH	MFG
3	EA	HINGE	FBB179 4.5 X 4.5 (NRP FOR OUT-SWING OPENINGS)	652	STN
1	EA	CARD LOCKSET	QUANTUM III X LEVER (BOH)	626	SAF
1	EA	WALL STOP	1278CX (CONVEX)	626	TRM
1	EA	FLOOR STOP	1215CKU	626	TRM
3	EA	SILENCER	1229A (HM/FRAME) OR 1229B (WD/FRAME)	GREY	TRM

HARDWARE SET # B55 - MECH/ELEC WORKSHOP (2-3070/HMXHM/UL)

DOOR(S): 125.4B
EACH TO HAVE:

QTY	UNIT	PRODUCT	DESCRIPTION	FINISH	MFG
6	EA	HINGE	FBB179 4.5 X 4.5	652	STN
2	EA	AUTO FLUSH BOLT	3820L X 3810L	626	TRM
1	EA	COORDINATOR	3094-B SERIES X LAR	PRIME	TRM
2	EA	CLOSER BRKTS	3095 OR 3096 AS REQ'D	PRIME	TRM
1	EA	CARD LOCKSET	QUANTUM III X LEVER (BOH)	626	SAF
2	EA	CLOSER	D4550 SN (MOUNT REGULAR ARM - PULL SIDE)	689	SDC
2	EA	PROTECTION PLT	KO050 10" X 1" LDW X B4E/CSK (KICK)	630	TRM
2	EA	FLOOR STOP	1215CKU	626	TRM
1	EA	SEAL	5075B X LAR (HEAD/JAMBS)	BRN	NGP

HARDWARE SET # B56 - CARPENTRY SHOP (2-3070/HMXHM)

DOOR(S): 125.6A
EACH TO HAVE:

QTY	UNIT	PRODUCT	DESCRIPTION	FINISH	MFG
6	EA	HINGE	FBB179 4.5 X 4.5	652	STN
2	EA	PUSH PLATE	1001-3 4 X 16	630	TRM
2	EA	PULL W/PLATE	1018-3 4 X 16	630	TRM
2	EA	CLOSER	D4550 SN (MOUNT REGULAR ARM - PULL SIDE)	689	SDC
1	EA	PROTECTION PLT	KO050 10" X 2" LDW X B4E/CSK (KICK)	630	TRM
2	EA	WALL STOP	1270CX (CONVEX)	626	TRM
2	EA	SILENCER	1229A (HM/FRAME) OR 1229B (WD/FRAME)	GREY	TRM

HARDWARE SET # B57 - EXTERIOR MAINT (2-3070/HMXHM)

DOOR(S): 125.9
EACH TO HAVE:

QTY	UNIT	PRODUCT	DESCRIPTION	FINISH	MFG
6	EA	HINGE	FBB199 4.5 X 4.5	630	STN
2	EA	FLUSH BOLT	W3917-12	626	TRM
1	EA	LOCKSET	45H7D16H CORMAX (STOREROOM)	626	BST

1	EA	CLOSER	D4550 CS SN (MOUNT PARALLEL ARM - PUSH SIDE) (ACTIVE LEAF)	689	SDC
1	EA	OVERHEAD STOP	4420 SERIES (INACTIVE LEAF)	626	TRM
1	EA	PROTECTION PLT	KO050 10" X 1" LDW X B4E/CSK (KICK)	630	TRM
1	EA	SEAL	5075B X LAR (HEAD/JAMBS)	BRN	NGP
2	EA	SWEEP	601A X LAR	A	NGP
1	EA	THRESHOLD	425 X LAR X FASTENERS FOR SECURE ATTACHMENT TO SUBSTRATE	A	NGP
1	EA	RAIN DRIP	16A X OFW	A	NGP

HARDWARE SET # B58 - STORAGE (2-3070/HMXHM)

DOOR(S): 126A, 126B
EACH TO HAVE:

QTY	UNIT	PRODUCT	DESCRIPTION	FINISH	MFG
6	EA	HINGE	FBB179 4.5 X 4.5	652	STN
2	EA	FLUSH BOLT	W3917-12	626	TRM
1	EA	CARD LOCKSET	QUANTUM III X LEVER (BOH)	626	SAF
1	EA	CLOSER	D4550 SN (MOUNT PARALLEL ARM - PUSH SIDE) (ACTIVE LEAF)	689	SDC
1	EA	OVERHEAD STOP	4420 SERIES (INACTIVE LEAF)	626	TRM
2	EA	PROTECTION PLT	KO050 10" X 1" LDW X B4E/CSK (KICK)	630	TRM
2	EA	FLOOR STOP	1215CKU	626	TRM
2	EA	SILENCER	1229A (HM/FRAME) OR 1229B (WD/FRAME)	GREY	TRM

HARDWARE SET # B59 - RESTAURANT LOBBY (2-3070/??X??) NEED DR/FRM MAT'L

DOOR(S): 179A
EACH TO HAVE:

QTY	UNIT	PRODUCT	DESCRIPTION	FINISH	MFG
2	EA	CONTINUOUS HGE	661HD X LAR	AL	STN
2	EA	CVR EXIT DEVICE	3R0 2608 X 2908B (CLASSROOM)	630	PHI
2	EA	CYLINDER	12E72 CORMAX (RIM)	626	BST
2	EA	CLOSER	D4550 CS SN X ALL REQ'D MOUNTING PLATES/BRACKETS (MOUNT PARALLEL ARM - PUSH SIDE)	689	SDC

GENERAL GUEST/HOTEL AREA

HARDWARE SET # H01 - ELEVATOR LOBBY (2-4070/WDXHM/UL)

DOOR(S): 201A, 301, 401, 501, 601, 701, 801, 901, 1001, 1101, 1201
EACH TO HAVE:

QTY	UNIT	PRODUCT	DESCRIPTION	FINISH	MFG
8	EA	HINGE	FBB168 5 X 4.5	652	STN
2	EA	SVR EXIT DEVICE	3R0 FL 2214 X 4914B (PASSAGE)	630	PHI
2	EA	CLOSER	D4550 SN (MOUNT REGULAR ARM - PULL SIDE)	689	SDC
2	EA	PROTECTION PLT	KO050 10" X 1" LDW X B4E/CSK (KICK)	630	TRM
2	EA	WALL MAGNET	2100 X EXTENSIONS AS REQ'D	630	ABH

NOTE(S):

WALL MAGNET HOLD OPENS POWERED AND RELEASED BY BUILDING FIRE ALARM

HARDWARE SET # H02 - ELEVATOR LOBBY, EXTERIOR (2-3094/??X??) NEED DR/FRM MAT'L

DOOR(S): 201B, 231
EACH TO HAVE:

QTY	UNIT	PRODUCT	DESCRIPTION	FINISH	MFG
6	EA	HINGE	FBB179 4.5 X 4.5	652	STN
2	EA	SVR EXIT DEVICE	3R0 2214 LBR X 4914B (PASSAGE)	630	STN
2	EA	CLOSER	D4550 CS SN (MOUNT PARALLEL ARM - PUSH SIDE)	689	SDC
2	EA	PROTECTION PLT	KO050 10" X 1" LDW X B4E/CSK (KICK)	630	TRM
2	EA	SWEEP	601A X LAR	A	NGP
1	EA	THRESHOLD	425 X LAR X FASTENERS FOR SECURE ATTACHMENT TO SUBSTRATE	A	NGP
1	EA	RAIN DRIP	16A X OFW	A	NGP

HARDWARE SET # H03 - SPA/FITNESS CENTER (2-3070/??X??) NEED DR/FRM MAT'L

DOOR(S): 236
EACH TO HAVE:

QTY	UNIT	PRODUCT	DESCRIPTION	FINISH	MFG

2	EA	CONTINUOUS HGE	661HD X LAR	AL	STN
1	EA	SVR EXIT DEVICE	3R0 22 LBR (CARD READER O/S TRIM) X DR HEIGHT (ACTIVE LEAF)	630	PHI
1	EA	CARD RDR TRIM	QUANTUM III X LEVER X BLE (ACTIVE LEAF)	626	SAF
1	EA	SVR EXIT DEVICE	3R0 2201 LBR (EXIT ONLY - NO O/S PLATE) X DR HEIGHT (INACTIVE LEAF)	630	PHI
2	EA	CLOSER	D4550 CS SN (MOUNT PARALLEL ARM - PUSH SIDE)	689	SDC
2	EA	PROTECTION PLT	KO050 10" X 1" LDW X B4E/CSK (KICK)	630	TRM
2	EA	SILENCER	1229A (HM/FRAME) OR 1229B (WD/FRAME)	GREY	TRM

HARDWARE SET # H04 - SPA/RECEPTION (2-4070/HMXHM)

DOOR(S):
EACH TO HAVE:

QTY	UNIT	PRODUCT	DESCRIPTION	FINISH	MFG
8	EA	HINGE	FBB168 5 X 4.5	652	STN
2	EA	SVR EXIT DEVICE	3R0 2208 X 4908B (PASSAGE)	630	PHI
2	EA	CYLINDER	12E72 CORMAX (RIM)	626	BST
2	EA	CLOSER	D4550 SN (MOUNT REGULAR ARM - PULL SIDE)	689	SDC
2	EA	PROTECTION PLT	KO050 10" X 1" LDW X B4E/CSK (KICK)	630	TRM
2	EA	SILENCER	1229A (HM/FRAME) OR 1229B (WD/FRAME)	GREY	TRM

HARDWARE SET # H05 - M/W TOILET (3070/HMXHM)

DOOR(S): 242, 243
EACH TO HAVE:

QTY	UNIT	PRODUCT	DESCRIPTION	FINISH	MFG
3	EA	HINGE	FBB191 4.5 X 4.5	630	STN
1	EA	PUSH PLATE	1001-3 4 X 16	630	TRM
1	EA	PULL W/PLATE	1018-3 4 X 16	630	TRM
1	EA	DEADBOLT	8T37S CORMAX (CLASSROOM)	626	BST
1	EA	CLOSER	D4550 SN (MOUNT REGULAR ARM - PULL SIDE)	689/SRI	SDC
1	EA	PROTECTION PLT	KO050 10" X 2" LDW X B4E/CSK (KICK)	630	TRM
1	EA	PROTECTION PLT	KO050 6" X 1" LDW X B4E/CSK (MOP)	630	TRM
1	EA	WALL STOP	1270CX (CONVEX)	626	TRM

1	EA	SWEEP	601A X LAR	A	NGP
1	EA	THRESHOLD	425 X LAR X FASTENERS FOR SECURE ATTACHMENT TO SUBSTRATE	A	NGP
1	EA	RAIN DRIP	16A X OFW	A	NGP

HARDWARE SET # H06 - POOL PUMP ROOM (3070/HMXHM)

DOOR(S): 244
EACH TO HAVE:

QTY	UNIT	PRODUCT	DESCRIPTION	FINISH	MFG
3	EA	HINGE	FBB191 4.5 X 4.5	630	STN
1	EA	CARD LOCKSET	QUANTUM III X LEVER (BOH)	626	SAF
1	EA	CLOSER	D4550 SN (MOUNT REGULAR ARM - PULL SIDE)	689/SRI	SDC
1	EA	PROTECTION PLT	KO050 10" X 2" LDW X B4E/CSK (KICK)	630	TRM
1	EA	PROTECTION PLT	KO050 6" X 1" LDW X B4E/CSK (MOP)	630	TRM
1	EA	WALL STOP	1270CX (CONVEX)	626	TRM
1	EA	SWEEP	601A X LAR	A	NGP
1	EA	THRESHOLD	425 X LAR X FASTENERS FOR SECURE ATTACHMENT TO SUBSTRATE	A	NGP
1	EA	RAIN DRIP	16A X OFW	A	NGP

HARDWARE SET # H07 - IDF, HK, T/E, SE LOBBY (3070/WDXHM/UL)

DOOR(S): 203, 206A, 206B, 207, 208B, 303, 306, 306B, 307, 308B, 403, 406A, 406B, 407, 408B, 503, 506A, 506B, 507, 508B, 603, 606A, 606B, 607, 608B, 703, 706A, 706B, 707, 708B, 803, 806A, 806B, 807, 808B, 903, 906A, 906B, 907, 908B, 1003, 1006A, 1006B, 1008B, 1007, 1103, 1106A, 1106B, 1107, 1108B, 1203, 1206A, 1206B, 1207, 1208B

EACH TO HAVE:

QTY	UNIT	PRODUCT	DESCRIPTION	FINISH	MFG
3	EA	HINGE	FBB179 4.5 X 4.5	652	STN
1	EA	CARD LOCKSET	QUANTUM III X LEVER (BOH)	626	SAF
1	EA	CLOSER	D4550 SN (MOUNT REGULAR ARM - PULL SIDE)	689	SDC
1	EA	PROTECTION PLT	KO050 10" X 2" LDW X B4E/CSK (KICK)	630	TRM
1	EA	FLOOR STOP	1215CKU	626	TRM
1	EA	SEAL	5075B X LAR (HEAD/JAMBS)	BRN	NGP

HARDWARE SET # H08 - STAIR 1 (3070/WDXHM/UL)

DOOR(S): 205, 208A, 305, 308A, 405, 408A, 505, 508A, 605, 608A, 705, 708A, 805, 808A, 905, 908A, 1005, 1008A, 1105, 1108A, 1205, 1208A,

EACH TO HAVE:

QTY	UNIT	PRODUCT	DESCRIPTION	FINISH	MFG
3	EA	HINGE	FBB179 4.5 X 4.5	652	STN
1	EA	LATCHSET	45H0N16H CORMAX (PASSAGE)	630	BST
1	EA	CLOSER	D4550 SN (MOUNT REGULAR ARM - PULL SIDE)	689	SDC
1	EA	PROTECTION PLT	KO050 10" X 2" LDW X B4E/CSK (KICK)	630	TRM
1	EA	FLOOR STOP	1215CKU	626	TRM
1	EA	SEAL	5075B X LAR (HEAD/JAMBS)	BRN	NGP

HARDWARE SET # H09 - VENDING (3070/WDXHM/UL)

DOOR(S): 442, 542, 641, 742, 842, 942, 1042, 1142, 1242

EACH TO HAVE:

QTY	UNIT	PRODUCT	DESCRIPTION	FINISH	MFG
3	EA	HINGE	FBB179 4.5 X 4.5	652	STN
1	EA	CARD LOCKSET	QUANTUM III X LEVER X BLE	626	SAF
1	EA	CLOSER	D4550 SN (MOUNT REGULAR ARM - PULL SIDE)	689	SDC
1	EA	PROTECTION PLT	KO050 10" X 2" LDW X B4E/CSK (KICK)	630	TRM
1	EA	FLOOR STOP	1215CKU	626	TRM
1	EA	SEAL	5075B X LAR (HEAD/JAMBS)	BRN	NGP

GUESTROOMS

HARDWARE SET # G01 - GUESTROOM ENTRY (3070/WDXHM/UL)

DOOR(S): G-A1, GA-3

EACH TO HAVE:

QTY	UNIT	PRODUCT	DESCRIPTION	FINISH	MFG
3	EA	HINGE	FBB179 4.5 X 4.5	652	STN
1	EA	CARD LOCKSET	QUANTUM III X GALA X BLE	626	SAF
1	EA	CLOSER	QDC311 F (MOUNT REGULAR ARM - PULL SIDE)	689	SDC
1	EA	WALL STOP	1270CX (CONVEX)	626	TRM
1	EA	DOOR GUARD	SDG-26D	626	NGP

1	EA	SEAL	5075C X LAR (HEAD/JAMBS)	CHAR	NGP
1	EA	VIEWER	976U	PL	TRM

NOTE(S):

MOUNT 2 EA VIEWERS AT HANDICAP GUESTROOMS

HARDWARE SET # G02 - GUESTROOM ENTRY (2-2670/WDXHM/UL)

DOOR(S): GA-2
EACH TO HAVE:

QTY	UNIT	PRODUCT	DESCRIPTION	FINISH	MFG
6	EA	HINGE	FBB179 4.5 X 4.5	652	STN
2	EA	FLUSH BOLT	W3917-12	626	TRM
1	EA	CARD LOCKSET	QUANTUM III X GALA X BLE	626	SAF
1	EA	CLOSER	QDC311 F (MOUNT REGULAR ARM - PULL SIDE)	689	SDC
2	EA	WALL STOP	1270CX (CONVEX)	626	TRM
1	EA	DOOR GUARD	SDG-26D	626	NGP
1	EA	SEAL	5075C X LAR (HEAD/JAMBS)	CHAR	NGP
1	EA	VIEWER	976U (INACTIVE LEAF)	PL	TRM

NOTE(S):

MOUNT 2 EA VIEWERS AT HANDICAP GUESTROOMS

HARDWARE SET # G03 - CLOSET, BATHROOM, BEDROOM (VARIOUS WIDTH BARN DOORS)

DOOR(S): G-B1, G-B2, G-B3, G-B4, G-C1
EACH TO HAVE:

QTY	UNIT	PRODUCT	DESCRIPTION	FINISH	MFG
1	SET	BARN DR HDWE	402 X ALL NECESSARY HARDWARE FOR COMPLETE INSTALLATION	BLK	BDH
2	EA	PULL	TBD (ALLOWANCE = $20.00 EACH)	TBD	TBD

HARDWARE SET # 100 - MISCELLANEOUS MATERIAL

DOOR(S):
EACH TO HAVE:

QTY	UNIT	PRODUCT	DESCRIPTION	FINISH	MFG
1	EA	LOCK BOX	3200 SERIES SURFACE MTD	BLK	KNX
1	EA	KEY CABINET	2018 SERIES X 150% CAPACITY	N/A	MMF
2	%	CARD LOCK	2% ADDITIONAL STOCK - QUANTUM III X LEVER X ADB X BLE	626	SAF
3	EA	CLOSER BODY	D4550 BODY ONLY	689	SDC

END OF SECTION 087100

SECTION 088000

GLAZING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes:
1. Glass for windows doors interior borrowed lites storefront framing glazed curtain walls.
2. Glazing sealants and accessories.

1.3 DEFINITIONS

A. Glass Manufacturers: Firms that produce primary glass, fabricated glass, or both, as defined in referenced glazing publications.

B. Glass Thicknesses: Indicated by thickness designations in millimeters according to ASTM C 1036.

C. IBC: International Building Code.

D. Interspace: Space between lites of an insulating-glass unit.

1.4 COORDINATION

A. Coordinate glazing channel dimensions to provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Glass Samples: For each type of [glass product other than clear monolithic vision glass] [the following products]; 12 inches square.
1. Tinted glass.
2. Coated glass.
3. Laminated glass.
4. Insulating glass.

C. Glazing Accessory Samples: For [sealants] [and] [colored spacers], in 12-inch lengths.[Install sealant Samples between two strips of material representative in color of the adjoining framing system.]

D. Glazing Schedule: List glass types and thicknesses for each size opening and location. Use same designations indicated on Drawings.

E. Delegated-Design Submittal: For glass indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For [Installer] [manufacturers of insulating-glass units with sputter-coated, low-E coatings] [glass testing agency] [and] [sealant testing agency].

B. Product Certificates: For glass.

C. Product Test Reports: For [tinted glass] [coated glass] [insulating glass] [and] [glazing sealants], for tests performed by a qualified testing agency.
   1. For glazing sealants, provide test reports based on testing current sealant formulations within previous 36-month period.

D. Preconstruction adhesion and compatibility test report.

1.7 QUALITY ASSURANCE

A. Manufacturer Qualifications for Insulating-Glass Units with Sputter-Coated, Low-E Coatings: A qualified insulating-glass manufacturer who is approved[and certified] by coated-glass manufacturer.

B. Installer Qualifications: A qualified installer who employs glass installers for this Project who are certified under the National Glass Association's Certified Glass Installer Program.

C. Glass Testing Agency Qualifications: A qualified independent testing agency accredited according to the NFRC CAP 1 Certification Agency Program.

D. Sealant Testing Agency Qualifications: An independent testing agency qualified according to ASTM C 1021 to conduct the testing indicated.

E. Mockups: Build mockups to demonstrate aesthetic effects and to set quality standards for materials and execution.
   1. Install glazing in mockups specified in [Section 084113 "Aluminum-Framed Entrances and Storefronts"] [Section 085113 "Aluminum Windows"] [Section 084413 "Glazed Aluminum Curtain Walls"] <Insert Section number and title> to match glazing systems required for Project, including glazing methods.
   2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Protect glazing materials according to manufacturer's written instructions. Prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.

B. Comply with insulating-glass manufacturer's written instructions for venting and sealing units to avoid hermetic seal ruptures due to altitude change.

1.9 FIELD CONDITIONS

A. Environmental Limitations: Do not proceed with glazing when ambient and substrate temperature conditions are outside limits permitted by glazing material manufacturers and when glazing channel substrates are wet from rain, frost, condensation, or other causes.
   1. Do not install glazing sealants when ambient and substrate temperature conditions are outside limits permitted by sealant manufacturer or are below 40 deg F.

1.10 WARRANTY

A. Manufacturer's Special Warranty for Coated-Glass Products: Manufacturer agrees to replace coated-glass units that deteriorate within specified warranty period. Deterioration of coated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning coated glass contrary to manufacturer's written instructions. Defects include peeling, cracking, and other indications of deterioration in coating.
   1. Warranty Period: [10] <Insert number> years from date of Substantial Completion.

B. Manufacturer's Special Warranty for Laminated Glass: Manufacturer agrees to replace laminated-glass units that deteriorate within specified warranty period. Deterioration of laminated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning laminated glass contrary to manufacturer's written instructions. Defects include edge separation, delamination materially obstructing vision through glass, and blemishes exceeding those allowed by referenced laminated-glass standard.
   1. Warranty Period: [Five] [10] <Insert number> years from date of Substantial Completion.

C. Manufacturer's Special Warranty for Insulating Glass: Manufacturer agrees to replace insulating-glass units that deteriorate within specified warranty period. Deterioration of insulating glass is defined as failure of hermetic seal under normal use that is not attributed to glass breakage or to maintaining and cleaning insulating glass contrary to manufacturer's written instructions. Evidence of failure is the obstruction of vision by dust, moisture, or film on interior surfaces of glass.
   1. Warranty Period: [10] <Insert number> years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis-of-Design Glass Product: Subject to compliance with requirements, provide product indicated in glass schedules or comparable product by one of the following:
   1. AGC Glass Company North America, Inc.
   2. Guardian Industries Corp.
   3. Oldcastle BuildingEnvelope.
   4. Pilkington North America Inc.
   5. PPG Industries, Inc.
   6. Viracon, Inc.

B. Source Limitations for Glass: Obtain from single source from single manufacturer for each glass type.
   1. Obtain tinted glass from single source from single manufacturer.
   2. Obtain reflective-coated glass from single source from single manufacturer.

C. Source Limitations for Glazing Accessories: Obtain from single source from single manufacturer for each product and installation method.

2.2 PERFORMANCE REQUIREMENTS

A. General: Installed glazing systems shall withstand normal thermal movement and wind and impact loads (where applicable) without failure, including loss or glass breakage attributable to the following: defective manufacture, fabrication, or installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; or other defects in construction.

B. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design glazing.

C. Structural Performance: Glazing shall withstand the following design loads within limits and under conditions indicated determined according to the IBC and ASTM E 1300.

1. Design Wind Pressures: As indicated on Drawings.
2. Design Wind Pressures: Determine design wind pressures applicable to Project according to ASCE/SEI 7, based on heights above grade indicated on Drawings.
   a. Wind Design Data: As indicated on Drawings.
   b. Basic Wind Speed: [85 mph] [90 mph] [100 mph] [110 mph] <Insert value>.
   c. Importance Factor: [1.0] <Insert factor>.
   d. Exposure Category: [B] [C] [D].
3. Design Snow Loads: <Insert design snow load> [As indicated on Drawings].
4. Thickness of Patterned Glass: Base design of patterned glass on thickness at thinnest part of the glass.
5. Probability of Breakage for Sloped Glazing: For glass surfaces sloped more than 15 degrees from vertical, design glass for a probability of breakage not greater than 0.001.
6. Maximum Lateral Deflection: For glass supported on all four edges, limit center-of-glass deflection at design wind pressure to not more than 1/50 times the short-side length or 1 inch, whichever is less.
7. Differential Shading: Design glass to resist thermal stresses induced by differential shading within individual glass lites.

D. Windborne-Debris-Impact Resistance: Exterior glazing shall comply with [basic] [enhanced]-protection testing requirements in ASTM E 1996 for [Wind Zone 1] [Wind Zone 2] [Wind Zone 3] [Wind Zone 4] when tested according to ASTM E 1886. Test specimens shall be no smaller in width and length than glazing indicated for use on Project and shall be installed in same manner as glazing indicated for use on Project.
   1. Large-Missile Test: For glazing located within 30 feet of grade.
   2. Small-Missile Test: For glazing located more than 30 feet above grade.

E. Safety Glazing: Where safety glazing is indicated, provide glazing that complies with 16 CFR 1201, Category II.

F. Thermal and Optical Performance Properties: Provide glass with performance properties specified, as indicated in manufacturer's published test data, based on procedures indicated below:
   1. For monolithic-glass lites, properties are based on units with lites [6 mm thick] [of thickness indicated].
   2. For laminated-glass lites, properties are based on products of construction indicated.
   3. For insulating-glass units, properties are based on units of thickness indicated for overall unit and for each lite.
   4. U-Factors: Center-of-glazing values, according to NFRC 100 and based on LBL's WINDOW 5.2 computer program, expressed as Btu/sq. ft. x h x deg F.
   5. Solar Heat-Gain Coefficient and Visible Transmittance: Center-of-glazing values, according to NFRC 200 and based on LBL's WINDOW 5.2 computer program.
   6. Visible Reflectance: Center-of-glazing values, according to NFRC 300.

2.3 GLASS PRODUCTS, GENERAL

A. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below unless more stringent requirements are indicated. See these publications for glazing terms not otherwise defined in this Section or in referenced standards.
   1. GANA Publications: ["Laminated Glazing Reference Manual" and]"Glazing Manual."
   2. AAMA Publications: AAMA GDSG-1, "Glass Design for Sloped Glazing," and AAMA TIR A7, "Sloped Glazing Guidelines."
   3. IGMA Publication for Sloped Glazing: IGMA TB-3001, "Guidelines for Sloped Glazing."
   4. IGMA Publication for Insulating Glass: SIGMA TM-3000, "North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial and Residential Use."

B. Safety Glazing Labeling: Where safety glazing is indicated, permanently mark glazing with certification label of [the SGCC] [the SGCC or another certification agency acceptable to authorities having jurisdiction] [or] [manufacturer]. Label shall indicate manufacturer's name, type of glass, thickness, and safety glazing standard with which glass complies.

C. Insulating-Glass Certification Program: Permanently marked either on spacers or on at least one component lite of units with appropriate certification label of IGCC.

D. Thickness: Where glass thickness is indicated, it is a minimum.[Provide glass that complies with performance requirements and is not less than the thickness indicated.]
1. Minimum Glass Thickness for Exterior Lites: [6 mm] <Insert thickness designation>.
2. Thickness of Tinted Glass: Provide same thickness for each tint color indicated throughout Project.

E. Strength: Where annealed float glass is indicated, provide annealed float glass, heat-strengthened float glass, or fully tempered float glass[as needed to comply with "Performance Requirements" Article]. Where heat-strengthened float glass is indicated, provide heat-strengthened float glass or fully tempered float glass[as needed to comply with "Performance Requirements" Article]. Where fully tempered float glass is indicated, provide fully tempered float glass.

2.4 GLASS PRODUCTS

A. Ultraclear Float Glass: ASTM C 1036, Type I, Class I (clear), Quality-Q3; and with visible light transmission of not less than 91 percent[and solar heat gain coefficient of not less than 0.87].
1. Basis-of-Design Product: <Insert manufacturer's name; product name or designation>.

B. Fully Tempered Float Glass: ASTM C 1048, Kind FT (fully tempered), Condition A (uncoated) unless otherwise indicated, Type I, Class 1 (clear) or Class 2 (tinted) as indicated, Quality-Q3.
1. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed unless otherwise indicated.

C. Heat-Strengthened Float Glass: ASTM C 1048, Kind HS (heat strengthened), Type I, Condition A (uncoated) unless otherwise indicated, Type I, Class 1 (clear) or Class 2 (tinted) as indicated, Quality-Q3.
1. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed unless otherwise indicated.

2.5 LAMINATED GLASS

A. Laminated Glass: ASTM C 1172. Use materials that have a proven record of no tendency to bubble, discolor, or lose physical and mechanical properties after fabrication and installation.
1. Construction: Laminate glass with [polyvinyl butyral interlayer] [ionomeric polymer interlayer] [or] [cast-in-place and cured-transparent-resin interlayer] to comply with interlayer manufacturer's written instructions.
2. Interlayer Thickness: Provide thickness not less than that indicated and as needed to comply with requirements.
3. Interlayer Color: Clear unless otherwise indicated.

B. Windborne-Debris-Impact-Resistant Laminated Glass: Comply with requirements specified above for laminated glass except laminate glass with[one of] the following to comply with interlayer manufacturer's written instructions:
1. Polyvinyl butyral interlayer.
2. Polyvinyl butyral interlayers reinforced with polyethylene terephthalate film.
3. Ionomeric polymer interlayer.
4. Cast-in-place and cured-transparent-resin interlayer.
5. Cast-in-place and cured-transparent-resin interlayer reinforced with polyethylene terephthalate film.

2.6 INSULATING GLASS

A. Insulating-Glass Units: Factory-assembled units consisting of sealed lites of glass separated by a dehydrated interspace, qualified according to ASTM E 2190.
   1. Sealing System: Dual seal, with manufacturer's standard primary and secondary sealants.
   2. Spacer: Manufacturer's standard spacer material and construction.
   3. Desiccant: Molecular sieve or silica gel, or a blend of both.

2.7 MISCELLANEOUS GLAZING MATERIALS

A. General: Provide products of material, size, and shape complying with referenced glazing standard, with requirements of manufacturers of glass and other glazing materials for application indicated, and with a proven record of compatibility with surfaces contacted in installation.

B. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.

C. Setting Blocks: Elastomeric material with a Shore, Type A durometer hardness of 85, plus or minus 5.

D. Spacers: Elastomeric blocks or continuous extrusions of hardness required by glass manufacturer to maintain glass lites in place for installation indicated.

E. Edge Blocks: Elastomeric material of hardness needed to limit glass lateral movement (side walking).

F. Cylindrical Glazing Sealant Backing: ASTM C 1330, Type O (open-cell material), of size and density to control glazing sealant depth and otherwise produce optimum glazing sealant performance.

2.8 FABRICATION OF GLAZING UNITS

A. Fabricate glazing units in sizes required to fit openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing publications, to comply with system performance requirements.
   1. Allow for thermal movements from ambient and surface temperature changes acting on glass framing members and glazing components.
      a. Temperature Change: [120 deg F, ambient; 180 deg F, material surfaces] <Insert temperature change>.

B. Clean-cut or flat-grind vertical edges of butt-glazed monolithic lites to produce square edges with slight chamfers at junctions of edges and faces.

C. Grind smooth and polish exposed glass edges and corners.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine framing, glazing channels, and stops, with Installer present, for compliance with the following:
   1. Manufacturing and installation tolerances, including those for size, squareness, and offsets at corners.
   2. Presence and functioning of weep systems.
   3. Minimum required face and edge clearances.
   4. Effective sealing between joints of glass-framing members.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings not firmly bonded to substrates.

B. Examine glazing units to locate exterior and interior surfaces. Label or mark units as needed so that exterior and interior surfaces are readily identifiable. Do not use materials that leave visible marks in the completed Work.

3.3 GLAZING, GENERAL

A. Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.

B. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass includes glass with edge damage or other imperfections that, when installed, could weaken glass, impair performance, or impair appearance.

C. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction testing.

D. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.

E. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.

F. Provide spacers for glass lites where length plus width is larger than 50 inches.
   1. Locate spacers directly opposite each other on both inside and outside faces of glass. Install correct size and spacing to preserve required face clearances, unless gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances and to comply with system performance requirements.
   2. Provide 1/8-inch minimum bite of spacers on glass and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.

G. Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and according to requirements in referenced glazing publications.

H. Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics.

I. Set glass lites with proper orientation so that coatings face exterior or interior as specified.

J. Where wedge-shaped gaskets are driven into one side of channel to pressurize sealant or gasket on opposite side, provide adequate anchorage so gasket cannot walk out when installation is subjected to movement.

K. Square cut wedge-shaped gaskets at corners and install gaskets in a manner recommended by gasket manufacturer to prevent corners from pulling away; seal corner joints and butt joints with sealant recommended by gasket manufacturer.

3.4 GASKET GLAZING (DRY)

A. Cut compression gaskets to lengths recommended by gasket manufacturer to fit openings exactly, with allowance for stretch during installation.

B. Insert soft compression gasket between glass and frame or fixed stop so it is securely in place with joints miter cut and bonded together at corners.

C. Installation with Drive-in Wedge Gaskets: Center glass lites in openings on setting blocks, and press firmly against soft compression gasket by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.

D. Installation with Pressure-Glazing Stops: Center glass lites in openings on setting blocks, and press firmly against soft compression gasket. Install dense compression gaskets and pressure-glazing stops, applying pressure uniformly to compression gaskets. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.

E. Install gaskets so they protrude past face of glazing stops.

3.5 CLEANING AND PROTECTION

A. Immediately after installation remove nonpermanent labels and clean surfaces.

B. Protect glass from contact with contaminating substances resulting from construction operations. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for buildup of dirt, scum, alkaline deposits, or stains.
   1. If, despite such protection, contaminating substances do come into contact with glass, remove substances immediately as recommended in writing by glass manufacturer. Remove and replace glass that cannot be cleaned without damage to coatings.

C. Remove and replace glass that is damaged during construction period.

D. Wash glass on both exposed surfaces not more than four days before date scheduled for inspections that establish date of Substantial Completion. Wash glass as recommended in writing by glass manufacturer.

3.6 MONOLITHIC GLASS SCHEDULE

A. Glass Type [GL-<#>]: Ultraclear annealed heat-strengthened fully tempered float glass.
   1. Minimum Thickness: [6 mm] <Insert thickness designation>.
   2. Safety glazing required.

3.7 LAMINATED GLASS SCHEDULE

A. Glass Type [GL-<#>]: Tinted laminated glass with two plies of float glass with outer ply tinted and inner ply clear.
   1. Basis-of-Design Product: <Insert manufacturer's name; product name or designation>.
   2. Tint Color: [Blue] [Blue-green] [Bronze] [Green] [Gray] <Insert color>.
   3. Minimum Thickness of Each Glass Ply: [3 mm] [4 mm] [5 mm] [6 mm] [As indicated] <Insert thickness designation>.
   4. Interlayer Thickness: [0.030 inch] [0.060 inch] [0.090 inch].
   5. Winter Nighttime U-Factor: <Insert value> maximum.
   6. Summer Daytime U-Factor: <Insert value> maximum.

7. Visible Light Transmittance: <Insert number> percent minimum.
8. Solar Heat Gain Coefficient: <Insert value> maximum.
9. Safety glazing required.

B. Glass Type [GL-<#>]: Ceramic-coated, laminated vision glass with two plies of float glass.
1. Basis-of-Design Product: <Insert manufacturer's name; product name or designation>.
2. Outer Ply: [Clear] [Ultraclear] [Tinted] float glass.
3. Tint Color: [Blue] [Blue-green] [Bronze] [Green] [Gray] <Insert color>.
4. Inner Ply: [Clear] [Ultraclear] float glass.
5. Ceramic Coating Color and Pattern: [As selected by Architect from manufacturer's full range] [Match Architect's samples] <Insert one manufacturer's color and pattern designation if matching is required> <Insert manufacturer; color and pattern designation>.
6. Minimum Thickness of Each Glass Ply: [3 mm] [4 mm] [5 mm] [6 mm] [As indicated] <Insert thickness designation>.
7. Interlayer Thickness: [0.030 inch] [0.060 inch] [0.090 inch].
8. Coating Location: [Second] [Third] [Fourth] surface.
9. Winter Nighttime U-Factor: <Insert value> maximum.
10. Summer Daytime U-Factor: <Insert value> maximum.
11. Visible Light Transmittance: <Insert number> percent minimum.
12. Solar Heat Gain Coefficient: <Insert value> maximum.
13. Safety glazing required.

C. Glass Type [GL-<#>]: Reflective-coated, laminated spandrel glass with two plies of float glass with inner ply clear.
1. Basis-of-Design Product: <Insert manufacturer's name; product name or designation>.
2. Coating Type: [Pyrolytic] [Sputter-coating (vacuum deposition process)].
3. Coating Color: [Gold] [Pewter] [Silver] <Insert color>.
4. Outer Ply: [Clear] [Tinted] float glass.
5. Tint Color: [Blue] [Blue-green] [Bronze] [Green] [Gray] <Insert color>.
6. Minimum Thickness of Each Glass Ply: [3 mm] [4 mm] [5 mm] [6 mm] [As indicated] <Insert thickness designation>.
7. Interlayer Thickness: [0.030 inch] [0.060 inch] [0.090 inch].
8. Coating Location: [First] [Second] [Third] surface.
9. Outdoor Visible Reflectance: <Insert number> percent maximum.
10. Winter Nighttime U-Factor: <Insert value> maximum.
11. Summer Daytime U-Factor: <Insert value> maximum.

3.8 INSULATING GLASS SCHEDULE

A. Glass Type [GL-<#>]: Low-E-coated, tinted insulating glass.
1. Basis-of-Design Product: <Insert manufacturer's name; product name or designation>.
2. Overall Unit Thickness: [1 inch] [5/8 inch] <Insert dimension>.
3. Minimum Thickness of Each Glass Lite: [3 mm] [4 mm] [5 mm] [6 mm] <Insert thickness designation>.
4. Outdoor Lite: Tinted [annealed] [heat-strengthened] [fully tempered] float glass.
5. Tint Color: [Blue] [Blue-green] [Bronze] [Green] [Gray] <Insert color>.
6. Interspace Content: [Air] [Argon].
7. Indoor Lite: Clear [annealed] [heat-strengthened] [fully tempered] float glass.
8. Low-E Coating: [Pyrolytic on second] [Pyrolytic on third] [Sputtered on second] [Sputtered on third] [Pyrolytic or sputtered on second or third] surface.
9. Winter Nighttime U-Factor: <Insert value> maximum.
10. Summer Daytime U-Factor: <Insert value> maximum.
11. Visible Light Transmittance: <Insert number> percent minimum.
12. Solar Heat Gain Coefficient: <Insert value> maximum.
13. Safety glazing required.

B. Glass Type [GL-<#>]: -coated, insulating spandrel glass.
   1. Basis-of-Design Product: <Insert manufacturer's name; product name or designation>.
   2. Coating Color: [As selected by Architect from manufacturer's full range] [Match Architect's samples] <Insert one manufacturer's color designation if matching is required> <Insert manufacturer; color designation>.
   3. Overall Unit Thickness: [1 inch] <Insert dimension>.
   4. Minimum Thickness of Each Glass Lite: [5 mm] [6 mm] <Insert thickness designation>.
   5. Outdoor Lite: [Clear] [Ultraclear] [annealed] [heat-strengthened] [fully tempered] float glass.
   6. Interspace Content: [Air] [Argon].
   7. Indoor Lite: [Clear] [Ultraclear] [annealed] [heat-strengthened] [fully tempered] float glass.
   8. Coating Location: Fourth surface.
   9. Winter Nighttime U-Factor: <Insert value> maximum.
   10. Summer Daytime U-Factor: <Insert value> maximum.

C. Glass Type [GL-<#>]: -coated, low-E, insulating spandrel glass.
   1. Basis-of-Design Product: <Insert manufacturer's name; product name or designation>.
   2. Coating Color: [As selected by Architect from manufacturer's full range] [Match Architect's samples] <Insert one manufacturer's color designation if matching is required> <Insert manufacturer; color designation>.
   3. Overall Unit Thickness: [1 inch] <Insert dimension>.
   4. Minimum Thickness of Each Glass Lite: [5 mm] [6 mm] <Insert thickness designation>.
   5. Outdoor Lite: [Annealed] [Heat-strengthened] [Fully tempered] [Ultraclear annealed] [Ultraclear heat-strengthened] [Ultraclear fully tempered] float glass.
   6. Interspace Content: [Air] [Argon].
   7. Indoor Lite: [Annealed] [Heat-strengthened] [Fully tempered] [Ultraclear annealed] [Ultraclear heat-strengthened] [Ultraclear fully tempered] float glass.
   8. Low-E Coating: [Pyrolytic on second] [Pyrolytic on third] [Sputtered on second] [Sputtered on third] [Pyrolytic or sputtered on second or third] surface.
   9. Opaque Coating Location: Fourth surface.
   10. Winter Nighttime U-Factor: <Insert value> maximum.
   11. Summer Daytime U-Factor: <Insert value> maximum.

D. Glass Type [GL-<#>]: , tinted, insulating spandrel glass.
   1. Basis-of-Design Product: <Insert manufacturer's name; product name or designation>.
   2. Coating Color: [As selected by Architect from manufacturer's full range] [Match Architect's samples] <Insert one manufacturer's color designation if matching is required> <Insert manufacturer; color designation>.
   3. Overall Unit Thickness: [1 inch] <Insert dimension>.
   4. Minimum Thickness of Each Glass Lite: [5 mm] [6 mm] <Insert thickness designation>.
   5. Outdoor Lite: Tinted [annealed] [heat-strengthened] [fully tempered] float glass.
   6. Tint Color: [Blue] [Blue-green] [Bronze] [Green] [Gray] <Insert color>.
   7. Interspace Content: [Air] [Argon].
   8. Indoor Lite: Clear [annealed] [heat-strengthened] [fully tempered] float glass.
   9. Coating Location: Fourth surface.
   10. Winter Nighttime U-Factor: <Insert value> maximum.
   11. Summer Daytime U-Factor: <Insert value> maximum.

END OF SECTION 088000

SECTION 089119

FIXED LOUVERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:
1. Fixed, louvers.

1.3 DEFINITIONS

A. Louver Terminology: Definitions of terms for metal louvers contained in AMCA 501 apply to this Section unless otherwise defined in this Section or in referenced standards.

B. Horizontal Louver: Louver with horizontal blades (i.e., the axes of the blades are horizontal).

C. Vertical Louver: Louver with vertical blades (i.e., the axes of the blades are vertical).

D. Drainable-Blade Louver: Louver with blades having gutters that collect water and drain it to channels in jambs and mullions, which carry it to bottom of unit and away from opening.

E. Wind-Driven-Rain-Resistant Louver: Louver that provides specified wind-driven rain performance, as determined by testing according to AMCA 500-L.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.
1. For louvers specified to bear AMCA seal, include printed catalog pages showing specified models with appropriate AMCA Certified Ratings Seals.

B. Shop Drawings: For louvers and accessories. Include plans, elevations, sections, details, and attachments to other work. Show frame profiles and blade profiles, angles, and spacing.
1. Show weep paths, gaskets, flashing, sealant, and other means of preventing water intrusion.
2. Show mullion profiles and locations.

C. Samples: For each type of metal finish required.

D. Delegated-Design Submittal: For louvers indicated to comply with structural[and seismic] performance requirements, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.5 INFORMATIONAL SUBMITTALS

A. Product Test Reports: Based on evaluation of comprehensive tests performed according to AMCA 500-L by a qualified testing agency or by manufacturer and witnessed by a qualified testing agency, for each type of louver and showing compliance with performance requirements specified.

B. Windborne-debris-impact-resistance test reports.

1.6 QUALITY ASSURANCE

A. Welding Qualifications: Qualify procedures and personnel according to the following:
   1. AWS D1.2/D1.2M, "Structural Welding Code - Aluminum."
   2. AWS D1.3/D1.3M, "Structural Welding Code - Sheet Steel."
   3. AWS D1.6/D1.6M, "Structural Welding Code - Stainless Steel."

1.7 FIELD CONDITIONS

A. Field Measurements: Verify actual dimensions of openings by field measurements before fabrication.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations: Obtain louvers from single source from a single manufacturer where indicated to be of same type, design, or factory-applied color finish.

2.2 PERFORMANCE REQUIREMENTS

A. Delegated Design: Design louvers, including comprehensive engineering analysis by a qualified professional engineer, using structural[**and seismic**] performance requirements and design criteria indicated.

B. Structural Performance: Louvers shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated without permanent deformation of louver components, noise or metal fatigue caused by louver-blade rattle or flutter, or permanent damage to fasteners and anchors. Wind pressures shall be considered to act normal to the face of the building.
   1. Wind Loads: Determine loads based on pressures as indicated on Drawings.
   2. Wind Loads: Determine loads based on a uniform pressure of [20 lbf/sq. ft.] [30 lbf/sq. ft.] <Insert value>, acting inward or outward.
   3. Wind Loads: Determine loads based on pressures indicated below:
      a. Corner Zone: Within <Insert distance> of building corners, uniform pressure of <Insert design wind pressure>, acting inward, and <Insert design wind pressure>, acting outward.
      b. Other Than Corner Zone: Uniform pressure of <Insert design wind pressure>, acting inward, and <Insert design wind pressure>, acting outward.

C. Windborne-Debris-Impact Resistance: Louvers located within 30 feet of grade shall pass [basic] [enhanced]-protection, large-missile testing requirements in ASTM E 1996 for [Wind Zone 1] [Wind Zone 2] [Wind Zone 3] [Wind Zone 4] when tested according to ASTM E 1886. Test specimens shall be no smaller in width and length than louvers indicated for use on Project.

D. Seismic Performance: Louvers, including attachments to other construction, shall withstand the effects of earthquake motions determined according to [ASCE/SEI 7] <Insert requirement>.
   1. Design earthquake spectral response acceleration, short period (Sds) for Project is <Insert value>.
   2. Component Importance Factor: [1.5] [1.0].

E. Louver Performance Ratings: Provide louvers complying with requirements specified, as demonstrated by testing manufacturer's stock units identical to those provided, except for length and width according to AMCA 500-L.

F. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes.

1. Temperature Change (Range): [120 deg F, ambient; 180 deg F, material surfaces] <Insert temperature range>.

G. SMACNA Standard: Comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" for fabrication, construction details, and installation procedures.

2.3 FIXED, EXTRUDED-ALUMINUM LOUVERS

A. Horizontal, Nondrainable-Blade Louver <Insert drawing designation>:
1. Manufacturers: Subject to compliance with requirements, [provide products by the following] [provide products by one of the following] [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:
2. Basis-of-Design Product: Subject to compliance with requirements, provide [product indicated on Drawings] <Insert manufacturer's name; product name or designation> or comparable product by one of the following:
   a. Airolite Company, LLC (The).
   b. American Warming and Ventilating; a Mestek company.
   c. Arrow United Industries; a division of Mestek, Inc.
   d. Construction Specialties, Inc.
   e. Greenheck Fan Corporation.
   f. Reliable Products, Inc.
   g. Ruskin Company; Tomkins PLC.
3. Louver Depth: [2 inches] [4 inches] [6 inches] <Insert dimension>.
4. Blade Profile: Plain blade without center baffle.
5. Frame and Blade Nominal Thickness: Not less than [0.080 inch] [0.060 inch for blades and 0.080 inch for frames].
6. Mullion Type: Exposed.
7. Louver Performance Ratings:
   a. Free Area: Not less than [7.5 sq. ft.] [8.0 sq. ft.] [8.5 sq. ft.] <Insert value> for 48-inch- wide by 48-inch- high louver.
   b. Point of Beginning Water Penetration: Not less than [700 fpm] [750 fpm] [800 fpm] [850 fpm] [900 fpm] [950 fpm] <Insert value>.
   c. Air Performance: Not more than [0.10-inch wg] <Insert value> static pressure drop at [650-fpm] [700-fpm] [750-fpm] <Insert value> free-area [exhaust] [intake] velocity.

2.4 LOUVER SCREENS

A. General: Provide screen at [each exterior louver] [louvers indicated].
1. Screen Location for Fixed Louvers: Interior face.
2. Screening Type: Bird screening except where insect screening is indicated Insect screening.

B. Secure screen frames to louver frames with [stainless-steel machine screws] [machine screws with heads finished to match louver], spaced a maximum of 6 inches from each corner and at 12 inches o.c.

C. Louver Screen Frames: Fabricate with mitered corners to louver sizes indicated.
1. Metal: Same type and form of metal as indicated for louver to which screens are attached.[$ds~Reinforce extruded-aluminum screen frames at corners with clips.]
2. Finish: [Same finish as louver frames to which louver screens are attached] [Mill finish unless otherwise indicated].
3. Type: [Rewirable frames with a driven spline or insert] [Non-rewirable, U-shaped frames].

D. Louver Screening for Aluminum Louvers:
1. Bird Screening: Aluminum, 1/2-inch- square mesh, 0.063-inchwire.
2. Insect Screening: Aluminum, 18-by-16 mesh, 0.012-inchwire.

2.5 BLANK-OFF PANELS

A. Insulated, Blank-Off Panels: Laminated panels consisting of an insulating core surfaced on back and front with metal sheets and attached to back of louver.
1. Thickness: 2 inches.
2. Metal Facing Sheets: Aluminum sheet, not less than 0.032-inch nominal thickness.
3. Insulating Core: Rigid, glass-fiber-board insulation.
4. Edge Treatment: Trim perimeter edges of blank-off panels with louver manufacturer's standard [extruded-aluminum-channel frames, not less than 0.080-inchnominal thickness] [channel frames], with corners mitered and with same finish as panels.
5. Seal perimeter joints between panel faces and louver frames with gaskets or sealant.
6. Panel Finish: Same type of finish applied to louvers, but black color.
7. Attach blank-off panels with sheet metal screws.

2.6 MATERIALS

A. Aluminum Extrusions: ASTM B 221, Alloy 6063-T5, T-52, or T6.

B. Fasteners: Use types and sizes to suit unit installation conditions.
1. Use [Phillips flat-head] [hex-head or Phillips pan-head] [tamper-resistant] screws for exposed fasteners unless otherwise indicated.
2. For fastening aluminum, use aluminum or 300 series stainless-steel fasteners.
3. For color-finished louvers, use fasteners with heads that match color of louvers.

C. Postinstalled Fasteners for Concrete and Masonry: Torque-controlled expansion anchors, made from stainless-steel components, with capability to sustain, without failure, a load equal to 4 times the loads imposed, for concrete, or 6 times the load imposed for masonry, as determined by testing according to ASTM E 488, conducted by a qualified independent testing agency.

D. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187.

2.7 FABRICATION

A. Factory assemble louvers to minimize field splicing and assembly. Disassemble units as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.

B. Vertical Assemblies: Where height of louver units exceeds fabrication and handling limitations, fabricate units to permit field-bolted assembly with close-fitting joints in jambs and mullions, reinforced with splice plates.
1. Continuous Vertical Assemblies: Fabricate units without interrupting blade-spacing pattern [unless horizontal mullions are indicated] [where indicated].
2. Horizontal Mullions: Provide horizontal mullions at joints [unless continuous vertical assemblies are indicated] [where indicated].

C. Maintain equal louver blade spacing[, including separation between blades and frames at head and sill,] to produce uniform appearance.

D. Fabricate frames, including integral sills, to fit in openings of sizes indicated, with allowances made for fabrication and installation tolerances, adjoining material tolerances, and perimeter sealant joints.
1. Frame Type: [Channel] [Exterior flange] [Interior flange] unless otherwise indicated.

E. Include supports, anchorages, and accessories required for complete assembly.

F. Provide vertical mullions of type and at spacings indicated, but not more than is recommended by manufacturer, or 72 inches o.c., whichever is less.
   1. Exposed Mullions: Where indicated, provide units with exposed mullions of same width and depth as louver frame. Where length of louver exceeds fabrication and handling limitations, provide interlocking split mullions designed to permit expansion and contraction.
   2. Exterior Corners: Prefabricated corner units with mitered [and welded blades] [blades with concealed close-fitting splices] and with [fully recessed] [semirecessed] mullions at corners.

G. Provide [subsills made of same material as louvers] [or] [extended sills] for recessed louvers.

H. Join frame members to each other and to fixed louver blades with fillet welds [concealed from view] [, threaded fasteners, or both, as standard with louver manufacturer] unless otherwise indicated or size of louver assembly makes bolted connections between frame members necessary.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and openings, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Coordinate setting drawings, diagrams, templates, instructions, and directions for installation of anchorages that are to be embedded in concrete or masonry construction. Coordinate delivery of such items to Project site.

3.3 INSTALLATION

A. Locate and place louvers level, plumb, and at indicated alignment with adjacent work.

B. Use concealed anchorages where possible. Provide brass or lead washers fitted to screws where required to protect metal surfaces and to make a weathertight connection.

C. Form closely fitted joints with exposed connections accurately located and secured.

D. Provide perimeter reveals and openings of uniform width for sealants and joint fillers, as indicated.

E. Protect unpainted galvanized and nonferrous-metal surfaces that are in contact with concrete, masonry, or dissimilar metals from corrosion and galvanic action by applying a heavy coating of bituminous paint or by separating surfaces with waterproof gaskets or nonmetallic flashing.

F. Install concealed gaskets, flashings, joint fillers, and insulation as louver installation progresses, where weathertight louver joints are required. Comply with Section 079200 "Joint Sealants" for sealants applied during louver installation.

3.4 ADJUSTING AND CLEANING

A. Clean exposed louver surfaces that are not protected by temporary covering, to remove fingerprints and soil during construction period. Do not let soil accumulate during construction period.

B. Before final inspection, clean exposed surfaces with water and a mild soap or detergent not harmful to finishes. Thoroughly rinse surfaces and dry.

C. Restore louvers damaged during installation and construction so no evidence remains of corrective work. If results of restoration are unsuccessful, as determined by Architect, remove damaged units and replace with new units.
   1. Touch up minor abrasions in finishes with air-dried coating that matches color and gloss of, and is compatible with, factory-applied finish coating.

END OF SECTION 089119