

Project Title:	Addendum No.:
Stanley Knowles Fit-Up	2
Project Location:	Project Number:
391 York Avenue Winnipeg, MB	R.056754.002
Consultant's Name	Date:
Prairie Architects Inc.	January 15, 2014
The following changes in the bid documents are effective immediately. The addendum will form part of the contract documents	
Drawings	
ARCHITECTURAL:	
1. A6-01 Room Finish Schedule, Door Schedule and Details <ol style="list-style-type: none"> Door Schedule: Notes: Modify Note 2, by adding the following to the end of the existing text: "Re-key existing lock where no new hardware set is identified." 	
2. MC-1A Main Floor Move Coordination Plan <ol style="list-style-type: none"> Add new Keynote #6: "Workstation chairs, including those indicated in Leadership offices, are to be relocated from the existing office locations at 275 Portage Avenue, 240 Graham Avenue, and Fourth Floor 391 York Avenue. Chairs are to be included among the items tagged at their source locations, identifying where they are to be delivered to, and are to be moved as part of the overall move component of the contract." 	
3. MC-1B Main Floor Move Coordination Plan <ol style="list-style-type: none"> Add new Keynote #6: "Workstation chairs, including those indicated in Leadership offices, are to be relocated from the existing office locations at 275 Portage Avenue, 240 Graham Avenue, and Fourth Floor 391 York Avenue. Chairs are to be included among the items tagged at their source locations, identifying where they are to be delivered to, and are to be moved as part of the overall move component of the contract." 	
4. MC-2 Second Floor Move Coordination Plan <ol style="list-style-type: none"> Add new Keynote #6: "Workstation chairs, including those indicated in Leadership offices, are to be relocated from the existing office locations at 275 Portage Avenue, 240 Graham Avenue, and Fourth Floor 391 York Avenue. Chairs are to be included among the items tagged at their source locations, identifying where they are to be delivered to, and are to be moved as part of the overall move component of the contract." 	
MECHANICAL:	
Reference: Mechanical Drawings (Issued for Tender/Construction – 16/11/13), Attached Mechanical Revision sheets, and attached full size drawings.	
1.1	<u>Drawing M1-02 Mechanical – Main Floor Plan - Plumbing</u>
.1	Revised sanitary piping serving Washroom W/C 224 on above floor. Refer to attached Mechanical Revision sheet MR-01 .
.2	Revise kitchen sink in Lunchroom 124 to <u>SK-2</u> .
.3	Provide ½" domestic cold water line below the counter from plumbing

serving sink SK-2 over to new Counter-Mounted Water Cooler in Lunchroom 124. Make all final connections.

- 1.2 Drawing M1-03 Mechanical – Second Floor Plan - Plumbing
 - .1 Revised domestic cold water piping and domestic hot water piping serving Washroom W/C 224. Refer to attached Mechanical Revision sheet **MR-02**.
 - .2 Provide ½" domestic cold water line below the counter from plumbing serving sink SK-2 over to new Counter-Mounted Water Cooler in Lunchroom 234. Make all final connections.
- 1.3 Drawing M2-01 Mechanical – Basement Floor Plan - HVAC
 - .1 Provide exhaust fan EF-2.N to serve Storage room B13. Duct exhaust up to main floor as shown. Provide fire damper at floor penetration. Refer to M2-04 for continuation.
 - .2 Provide transfer grille TG-1.N as indicated in door of room Storage room B13.
 - .3 Refer to attached Mechanical Revision sheet **MR-03**.
- 1.4 Drawing M2-03 Mechanical – Partial 2nd Floor Plan – Demo HVAC
 - .1 Provide additional ductwork demolition as indicated.
 - .2 Refer to attached Mechanical Revision sheet **MR-04** & **MR-05**.
- 1.5 Drawing M2-04 Mechanical – Main Floor Plan – New HVAC
 - .1 Provide new exhaust duct up from serving Storage room B13 below to ceiling level of main floor and out through exterior wall complete with aluminum hood and birdscreen. Refer to attached Mechanical Revision sheet **MR-06**.
 - .2 Provided locations of new fire dampers through fire rated separations and non-rated fire separations indicated on Architectural drawing A2-02. Refer to Architectural drawing A2-02 for all rated and non-rated fire separation locations. Refer to attached Mechanical Revision sheet **MR-07** & **MR-08**.
- 1.6 Drawing M2-05 Mechanical – Partial 2nd Floor Plan – New HVAC
 - .1 Provided locations of new fire dampers through fire rated separations and non-rated fire separations indicated on Architectural drawing A2-05. Refer to Architectural drawing A2-05 for all rated and non-rated fire separation locations.
 - .2 Added Drawing Note #11 and indicated area of application.
 - .3 Added Additional new ductwork to be completed.
 - .4 Refer to attached full size drawing **M2-05**.
- 1.7 Drawing M2-06 Mechanical – Roof Plan and Details – New HVAC
 - .1 Added gridline numbers to "Roof Plan". Refer to attached Mechanical Revision sheet **MR-09**.
- 1.8 Drawing M3-02 Mechanical – Main Floor Hydronic – Hydronic
 - .1 Existing Fan Coil 'CW-FC 116A' is to be relocated as indicated.
 - .2 Cap off existing hydronic lines as shown.
 - .3 Provide new hydronic lines to serve 'CW-FC 116A' at new location and tie into existing hydronic lines as shown.

	.2	Refer to attached full size drawing M3-02 .
1.9		<u>Drawing M4.0 Mechanical – Schedules</u>
	.1	Provided specification of sones on “Fan Schedule”.
	.2	Reduced size of units “AC-1.1/CU-1.N” & “AC-2.N/CU-2.N” on “Split AC Unit Schedule”.
	.3	Provided specification of “TG-1.N” on “Diffuser, Register, and Grille Schedule”.
	.4	Refer to attached full size drawing M4.0 .
<u>ELECTRICAL:</u>		
1.1		E1-03 Second Floor – Lighting Demolition
	.1	(No Changes)
1.2		E2-02 Main Floor – Power and Systems Demolition
	.2	Gridline D and 10; Disconnect existing Fan Coil CW-FC-116A. Fan Coil to be relocated by Mechanical Contractor.
1.3		E2-03 Second Floor – Power and Systems Demolition
	.3	Gridline A and 8; Disconnect existing Fan Coil CW-FC-218. Fan Coil to be relocated by Mechanical Contractor.
	.4	Gridline F and 11; Disconnect existing Fan Coil CW-FC-211. Fan Coil to be relocated by Mechanical Contractor.
1.4		E3-02 Main Floor Lighting Layout.
	.5	FNIB Health Lab 122; Provide under cabinet valence light under millwork. Provide separate switch. Provide single lamp T-8 strip fixture.
	.6	Lunchroom 124; Provide under cabinet valence light under millwork. Provide separate switch. Provide single lamp T-8 strip fixture.
1.5		E3-03 Second Floor - Lighting Layout
	.7	Immunization 222; Provide under cabinet valence light under millwork. Provide separate switch. Provide single lamp T-8 strip fixture.
	.8	Clinical Testing 223; Provide under cabinet valence light under millwork. Provide separate switch. Provide single lamp T-8 strip fixture.
	.9	Fit to Work 225; Provide under cabinet valence light under millwork. Provide separate switch. Provide single lamp T-8 strip fixture.
	.10	Lunchroom 234; Provide under cabinet valence light under millwork. Provide separate switch. Provide single lamp T-8 strip fixture.
1.6		E4-01 Basement – Power Layout
	.11	Pesticide Compliance B13; locate exhaust fan EF-2.N within this room. Provide 120 volt circuit from panel located in the electrical room. Provide starter with HOA. Connect starter controls to BAS system. See Mechanical schedules.
	.12	Entire drawing; remove card access from the drawing. These devices are existing to remain.
	.13	Panel ED-1 to be located on same wall as emergency distribution.
1.7		E4-02 Main Floor – Power Layout
	.14	Gridline D and 10; Fan Coil CW-FC-116A to be relocated be Mechanical Contractor to Gridline C and 4. Electrical contractor to allow for extending existing circuit and reconnecting Fan Coil at new location.
1.8		E4-03 Second Floor – Power Layout
	.15	W/C 224; provide wall mounted junction box below sink for electronic faucet. Run circuit 2A3-11 from existing panel and reuse existing circuit breaker.

	.16	Gridline A and 8; Fan Coil CW-FC-218 to be relocated be Mechanical Contractor to Gridline A and 7. Electrical contractor to allow for extending existing circuit and reconnecting Fan Coil at new location.
	.17	Gridline F and 11; Fan Coil CW-FC-211 to be relocated be Mechanical Contractor to Gridline D and 9. Electrical contractor to allow for extending existing circuit and reconnecting Fan Coil at new location.
	.18	Gridline B and 10; Exhaust Fan EF-1.N is located in this location on the roof. Provide 120 volt circuit from panel located in the electrical room. Provide starter with HOA. Connect starter controls to BAS system. See Mechanical schedules.
1.9	E5-02	Main Floor – Systems Layout
	.19	Gridline E and 5; provide fire alarm module for a fire-shutter door. Provide connections as per manufacture.
	.20	Entire Drawing; all fire alarm to be installed in red conduit to match existing fire alarm conduit within the building.
1.10	E5-03	Second Floor – System Layout
	.1	Entire Drawing; all fire alarm to be installed in red conduit to match existing fire alarm conduit within the building.
1.11	E6-02	Main Floor – Communications Layout
	.1	(No changes)
1.12	E6-03	Second Floor – Communication Layout
	.1	(No changes)
1.13	E7-04	Schedules
	.1	Motor/Equipment Schedule;
	.1	Remove EF-3.N from the list.
	.2	Add VAV-2.14.N, connect to nearest VAV circuit with capacity.
	.3	AC-1.N; Remove fed by panel BE2 circuit 3,5. AC unit will be fed from CU-1.N
	.4	CU-1.N; revise circuit from 7,9 to 22,23.
	.5	AC-2.N; Remove fed by panel BE2 circuit 11,13. AC unit will be fed from CU-2.N
	.6	CU-2.N; revise circuit from 15,17 to 24,25.
	.7	AC-3.N; Remove fed by panel BE2 circuit 39,40. AC unit will be fed from CU-3.N
	.8	CU-3.N; revise circuit from 41,42 to 26,27.
	.9	ERV-1.N; revise circuit '1' to circuit '28'
	.10	HU-1; Revise to HU-1.N and provide 15A-3P breaker in Panel '200'. Panel '200' is located on the main floor east electrical room.
	.11	RHC-1.N to RHC-6.N; revise voltage and Panel to 347V and Panel 200. Provide 15A-1P circuit breaker for RHC.
	.12	Add RHC-7.N (4.1kw), RHC-8.N (4.1kw), RHC-9.N (2.1kw)to schedule. All 347V from panel 200. Provide 15A-1P breaker for each RHC.
	.13	Add RHC-10.N (3.8kw) to schedule. 347V from Panel 100. Provide 15A-1P breaker.
	.2	Panel 'BE2'
	.1	Add Three (3) 40A-2P breakers, one for each (CU-1.N, CU-2.N and CU-3.N)
	.2	Add one (1) 15A-1P breaker for ERV-1.N

- 1.14 E8-01 Single Line Diagram
 - .1 (No changes)
- 1.15 E8-02 Systems Riser Diagram
 - .1 Clarification; The three (3) breakers off of MD-1 within the new work (two for emergency, one for RTU-1-N) are new breakers to be provide and installed by the electrical contractor.
 - .2 MD-1; Revise the 100A-3P breaker for RTU-1.N to 20A-3P and revise feeder 3#10 in 21mm C.

Specifications

ARCHITECTURAL:

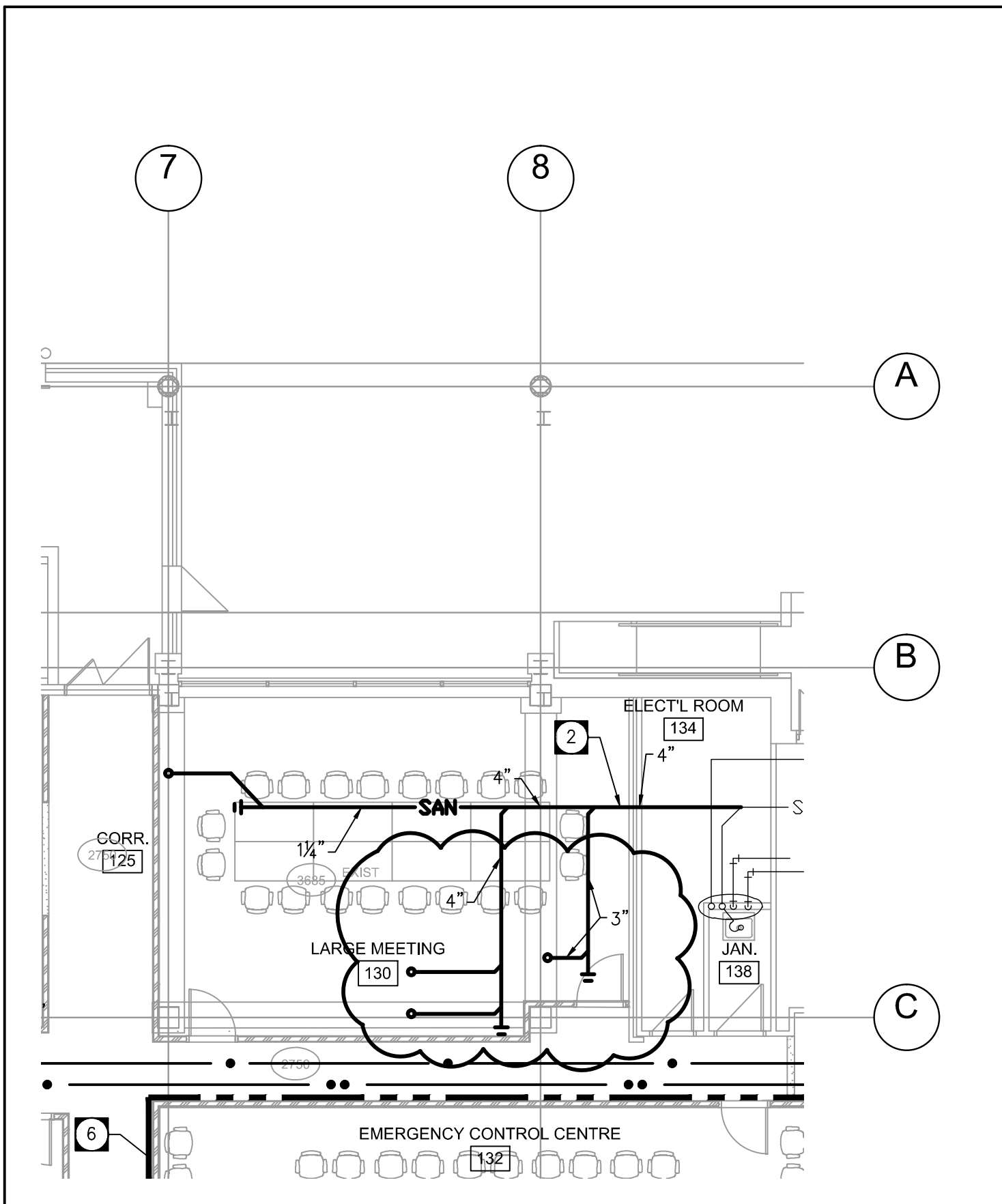
- 1. Section 07 81 00 – Applied Fireproofing
 - 1. **Add** entire section, as attached to this addendum.
- 2. Section 07 84 00 – Fire Stopping
 - 1. **Add** entire section, as attached to this addendum.
- 3. Section 08 33 13 – Coiling Counter Doors
 - 2. **Modify** item 2.3.1.1, by deleting existing text and replacing with the following: “Provide combination chain / controlled closing system operator including endless steel chain, geared reduction units, chain keeper, and electric wall mounted close control system for activation on signal from the fire alarm system, with manual day to day operation.”
- 4. Section 08 71 00 – Door Hardware
 - 1. **Modify** item 2.2.9.4 (page 5) by **deleting** the following text: “Door operators push bars by Ingress’r by Wikk Industries.” The remainder of this item is to remain as is, including reference to 114 mm discs as the required type/ configuration of actuator, to match existing installation in building.

MECHANICAL:

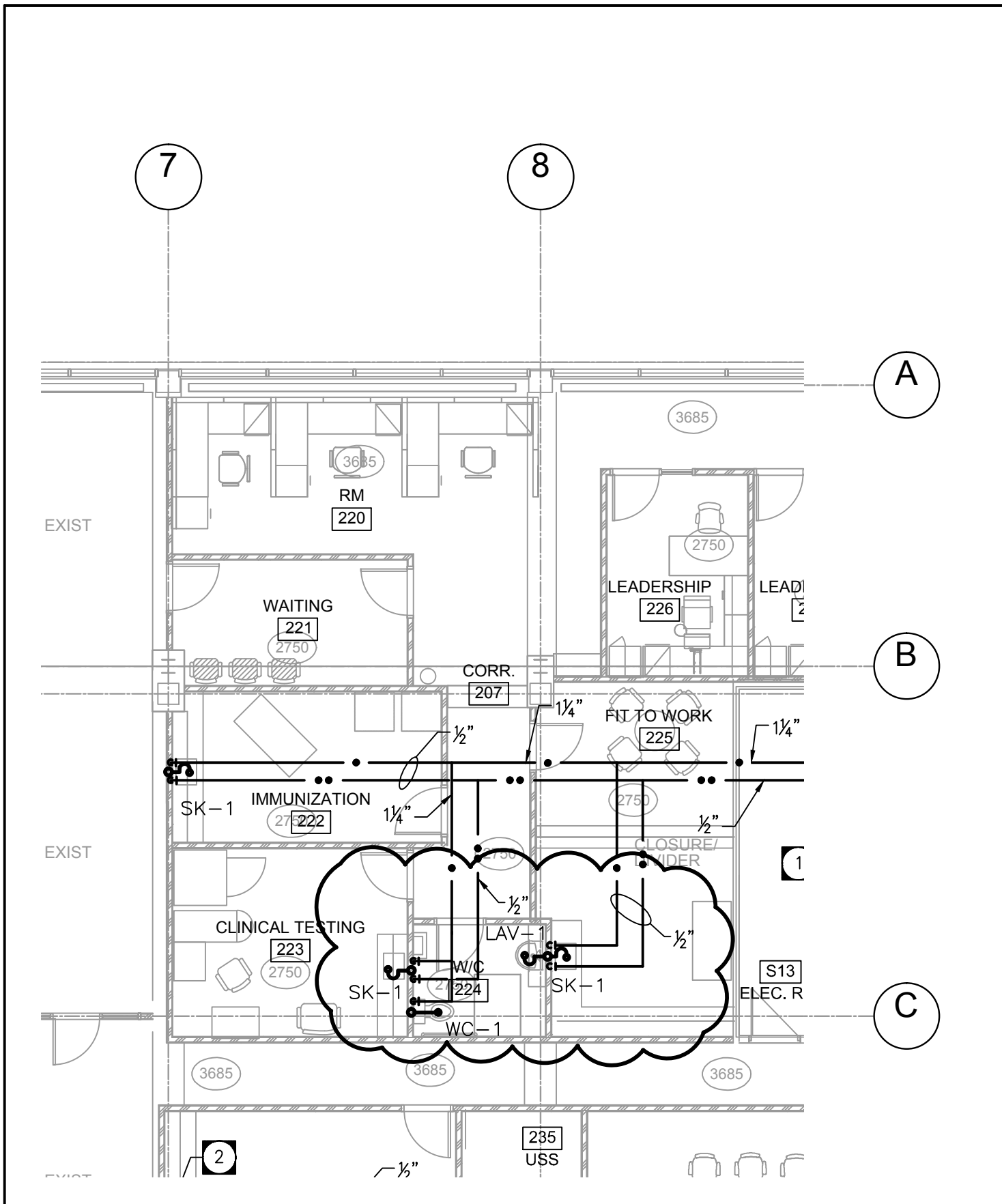
- .1 Specification Section ‘21 07 18 Thermal Insulation for Equipment shall’ be deleted.
 - 1. Section shall be **deleted**.
- .2 Specification Section ‘23 34 00 HVAC Fans’
 - 1. Article 2.2.2 shall be **revised** to read:

“The access for wiring shall be external. The motor disconnect shall be internal and of the plug-in type. The motor shall be mounted on vibration isolators. The fan wheel shall be of the forward-curved centrifugal type and dynamically balanced. All fans shall bear the AMCA Certified Ratings program AMCA Sound and Air Performance seal and shall be UL/cUL Listed. All fans to have sound rating less than 1.0 sone.”
- .3 Specification Section ‘23 81 23 Computer Room Air Conditioning’
 - 1. Article ‘2.5 Outdoor Air-Cooled Prop Fan Condensing Unit’ shall be **deleted**.

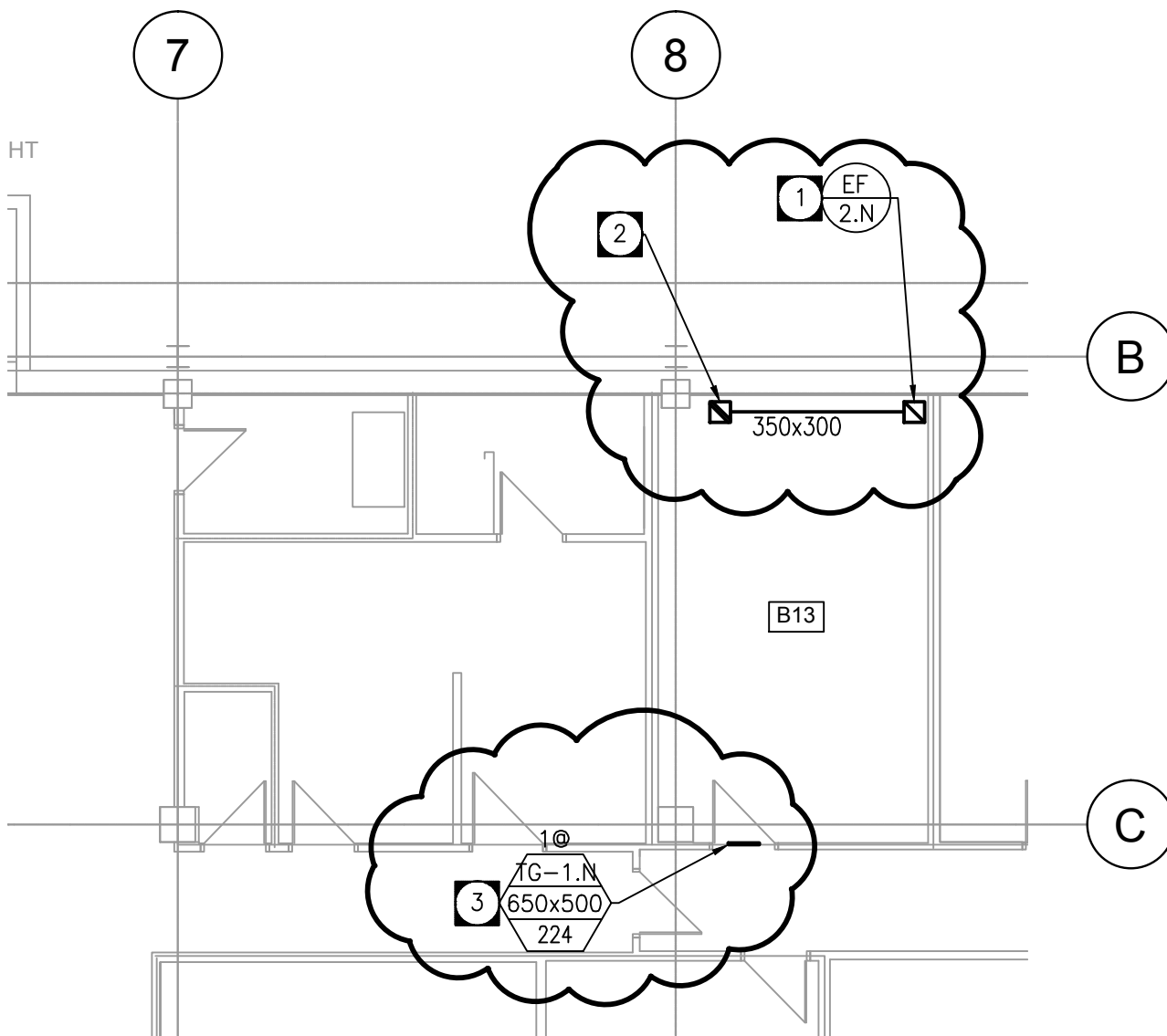
End of Addendum #2 Text



TOWER ENGINEERING GROUP UNIT 1-1140 WAVERLEY ST. WINNIPEG, MB. TEL: (204) 925-1150 FAX: (204) 925-1155	PROJECT TITLE:	STANLEY KNOWLES FIT-UP 391 YORK AVENUE	FILE: 13039 ADD 01
	DRAWING TITLE:	PARTIAL OF DRAWING M1-02 - MECHANICAL MAIN FLOOR PLAN - PLUMBING	DATE: 14/01/14
			DRAWING NO. / REVISION NO.
			MR-01

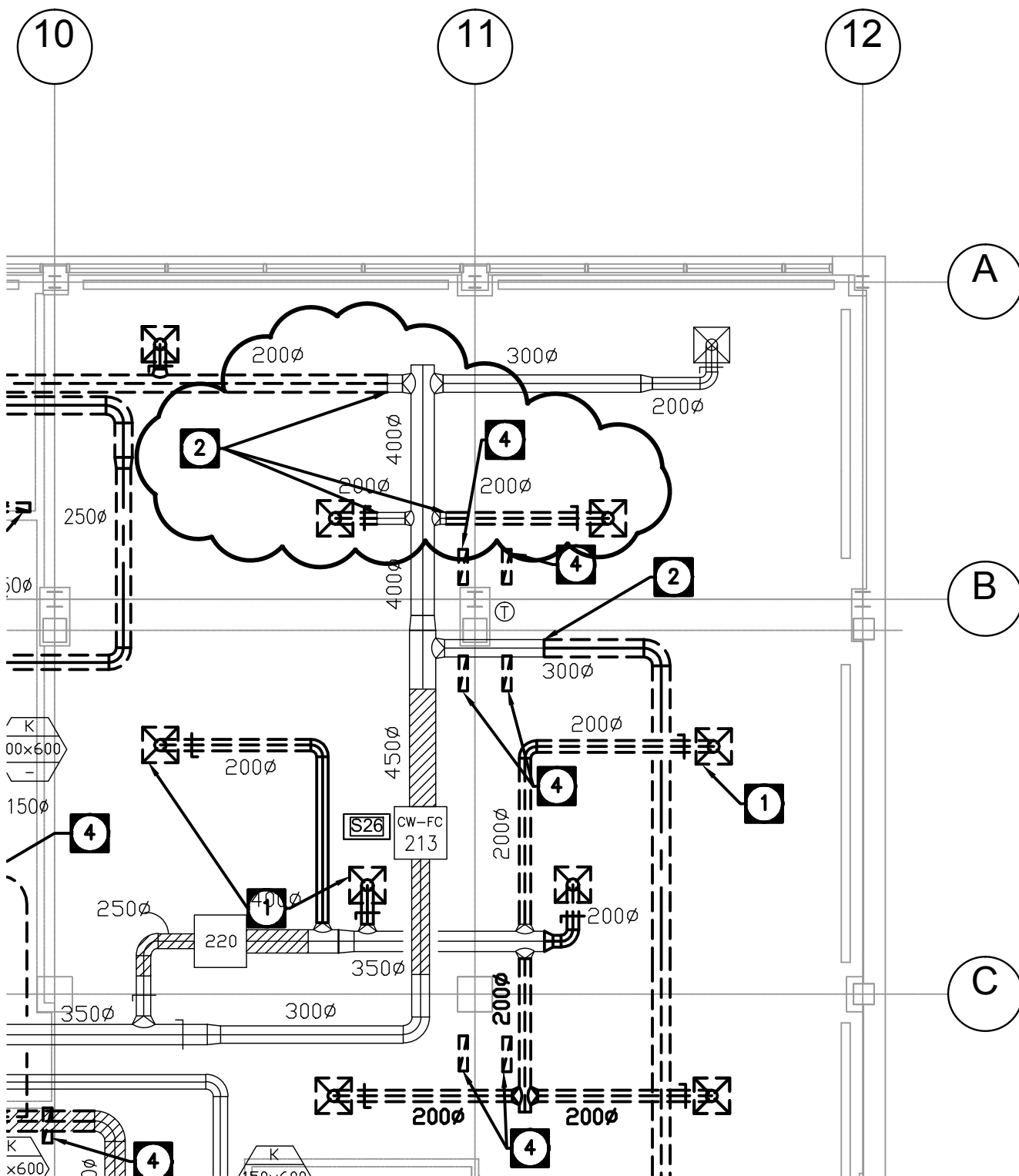


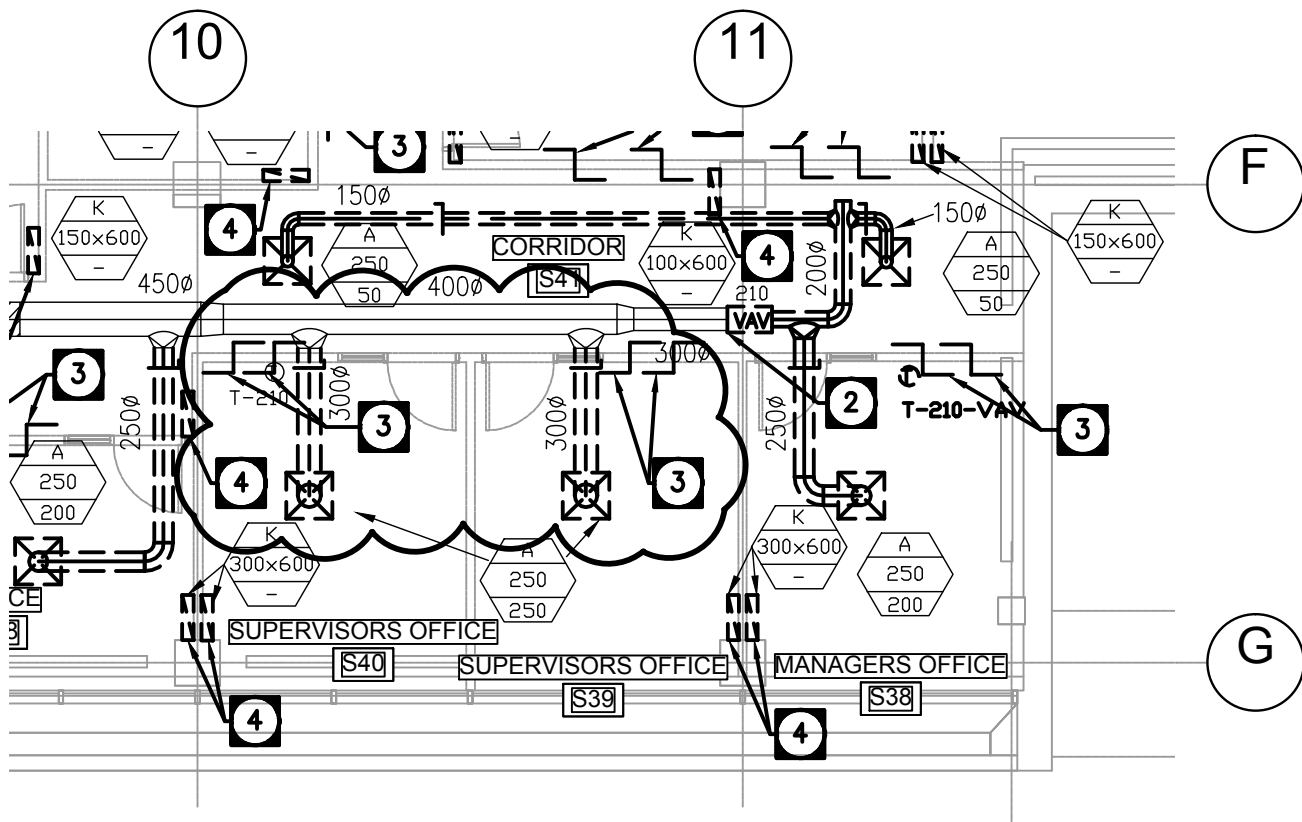
<div><div>TOWER</div><div>ENGINEERING</div><div>GROUP</div></div> <div>UNIT 1-1140 WAVERLEY ST. WINNIPEG, MB. TEL: (204) 925-1150 FAX: (204) 925-1155</div>	PROJECT TITLE:	STANLEY KNOWLES FIT-UP 391 YORK AVENUE	FILE: 13039 ADD 01
	DRAWING TITLE:	PARTIAL OF DRAWING M1-03 - MECHANICAL 2ND FLOOR PLAN - PLUMBING	DATE: 14/01/14
			DRAWING NO. / REVISION NO. MR-02

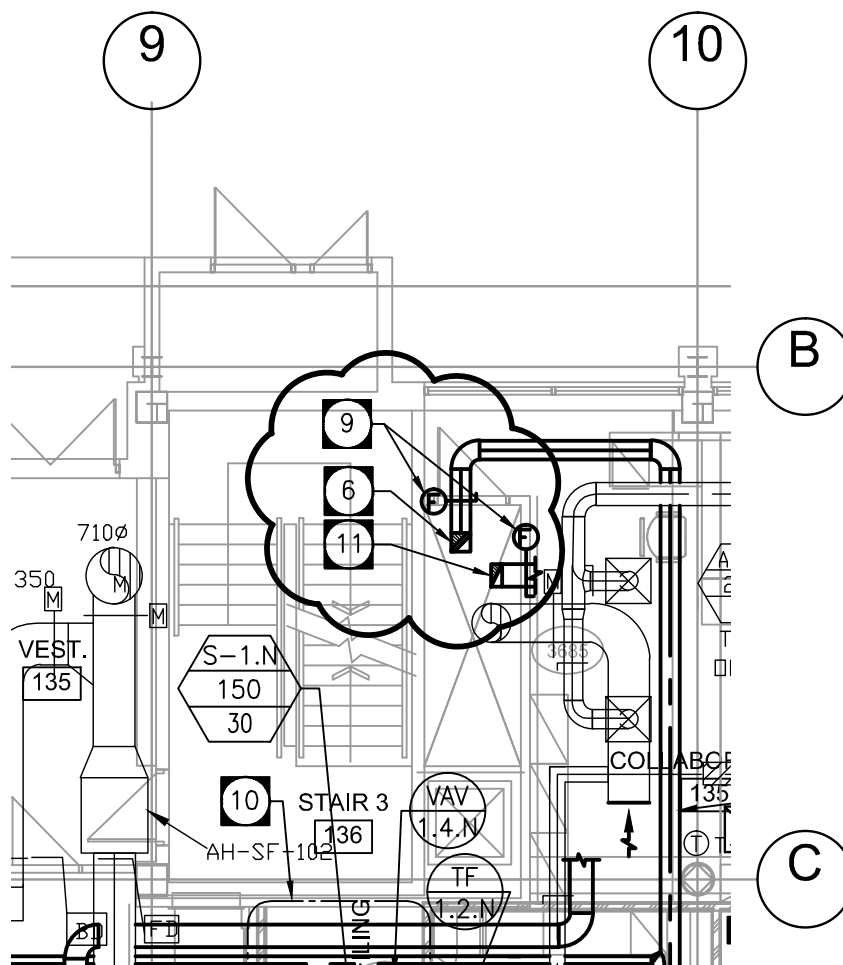


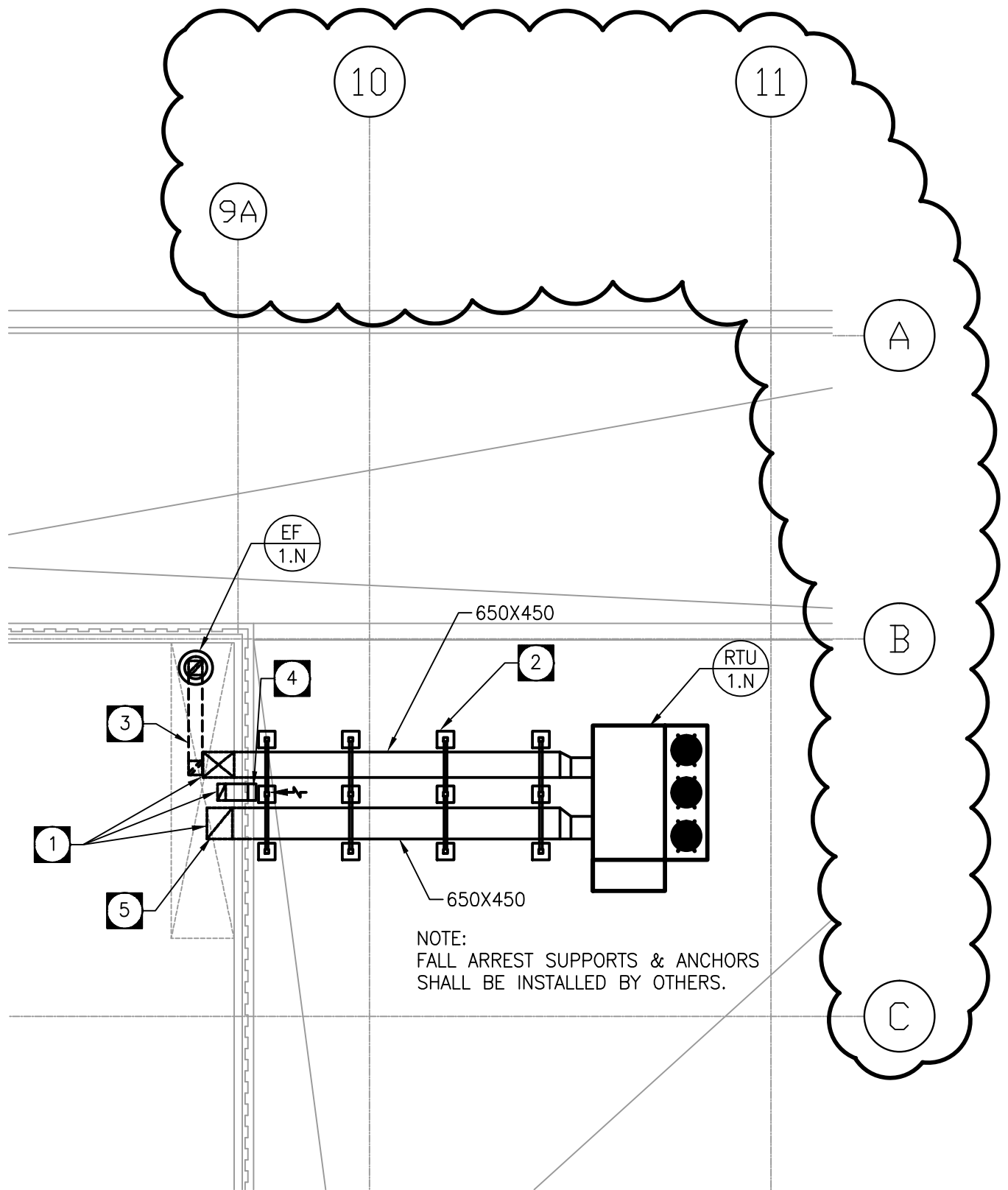
DRAWING NOTES:

- 1 NEW HORIZONTAL DISCHARGE EXHAUST FAN TO SERVE ROOM B13.
- 2 EXHAUST DUCT UP TO MAIN FLOOR. REFER TO MAIN FLOOR FOR CONTINUATION. PROVIDE FIRE DAMPER AT FLOOR PENETRATION.
- 3 PROVIDE NEW TRANSFER GRILLE IN DOOR.



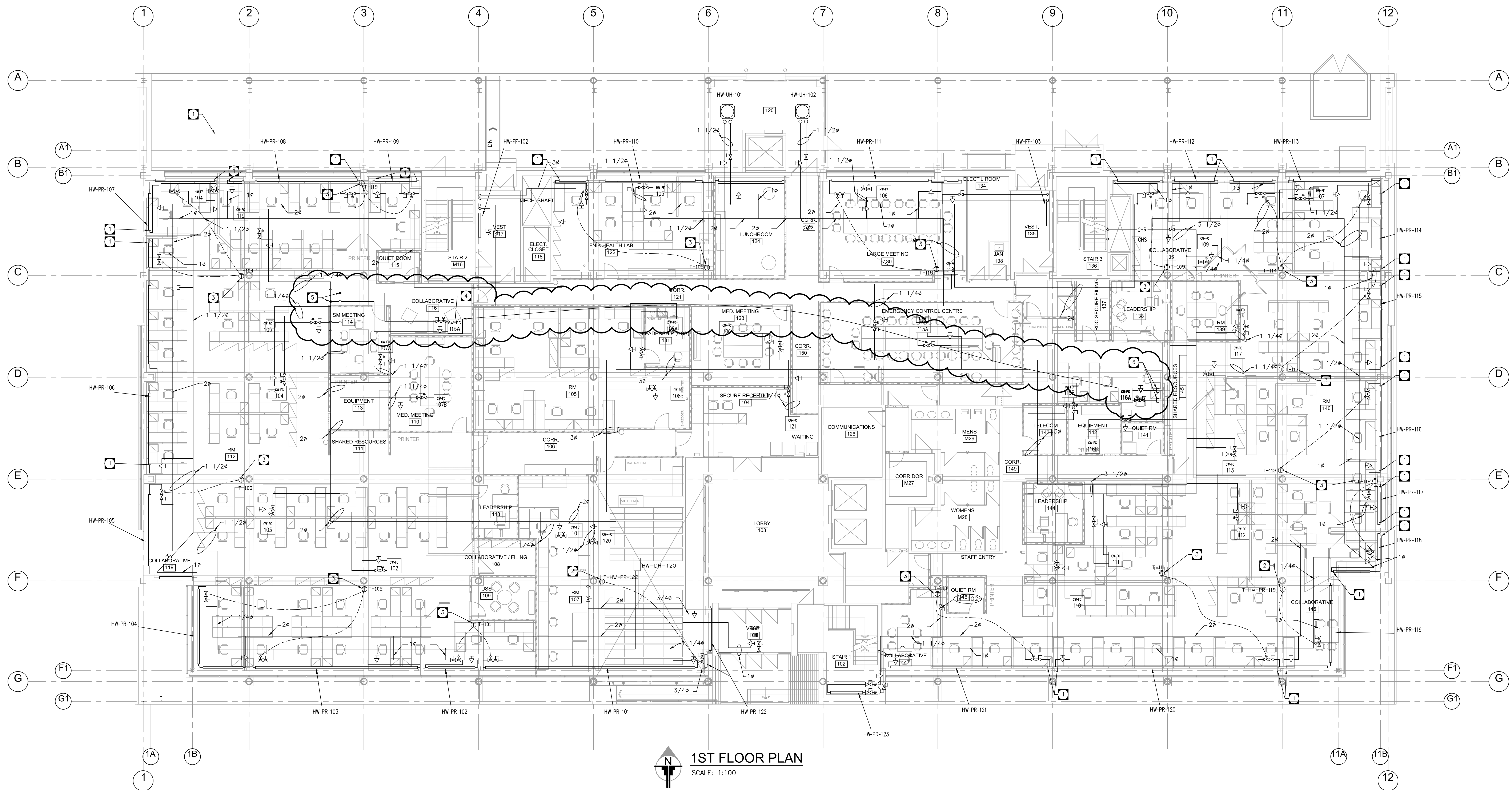






DRAWING NOTES:

- 1 PROVIDE NEW SURFACE MOUNTED ACCESS DOOR IN EXISTING RADIATION COVER FOR VALVE ACCESS, 300mm X 300mm IN SIZE.
- 2 EXISTING RADIATION THERMOSTAT
- 3 CONTROL RADIATION FROM THIS THERMOSTAT.
- 4 FAN COIL 116A TO BE RELOCATED TO APPROXIMATELY THIS LOCATION. SIZE NEW HYDRONIC PIPING SERVING UNIT TO MATCH EXISTING.
- 5 CONNECT NEW HYDRONIC PIPING TO EXISTING AT APPROXIMATELY THIS LOCATION.
- 6 CAP OFF EXISTING HYDRONIC PIPING AT APPROXIMATELY THIS LOCATION.



1ST FLOOR PLAN
SCALE: 1:100

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TOWER PROJECT NO. : 13039
TOWER ENGINEERING GROUP
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DO NOT SCALE DRAWINGS

1	ISSUED FOR ADDENDUM	14/01/14
2	ISSUED FOR TENDER/CONSTRUCTION	26/11/15
Revision/	Description/Description	Date/Date
Client/Client		

**PUBLIC WORKS
GOVERNMENT SERVICES
CANADA**

100-167 LOMBARD AVENUE
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WINNIPEG, MANITOBA R3C 2Z1

Project Site/Titre du projet

**STANLEY KNOWLES FIT-UP
391 YORK AVENUE**

Approved by/Approuvé par

DHO

Designed by/Conçu par

DHO

Drawn by/Dessiné par

SC

PWGS&C Project Manager/Administrateur de Projets TP&SC

OH

PWGS&C Architectural and Engineering Resources Manager/

Responsables Architecturaux et de Directeur d'ingénierie, TP&SC

SO

Client/Client

PWGS&C

Drawing Site/Titre du dessin

MECHANICAL

MAIN FLOOR HYDRONIC

HYDRONIC

Project No./No. du projet

R.056754.002

Sheet /Feuille

M3-02

OF 14

Revision no./

La Révision

no.

0

ROOF TOP UNIT SCHEDULE			
TAG	RTU-1.N		
SERVICE	PSHOP AREA		
DESCRIPTION	CUSTOM, PACKAGED ROOF TOP UNIT		
SUPPLY FAN			
AIR FLOW RATE (L/s / CFM)	1,510	3,200	
E.S.P. (Pa / in.WC)	436	1.75	
TYPE	PLENUM, VFD		
MOTOR SIZE (kW / HP)	1.12	1.5	
EXHAUST FAN			
AIR FLOW RATE (L/s / CFM)	1,510	3,200	
E.S.P. (Pa / in.WC)	374	1.50	
TYPE	PLENUM		
MOTOR SIZE (kW / HP)	1.12	1.5	
HEATING			
TYPE	NATURAL GAS		
CAPACITY CONTROL METHOD	4:1 MODULATING		
CAPACITY OUTPUT (kW / MBH)	58.6	200.0	
INPUT (kW / MBH)	46.9	160.0	
REQUIRED L.A.T.(WINTER), (C / F)	15.6	60.0	
COOLING			
TYPE	DIRECT EXPANSION, R410A		
COMPRESSORS	2 SCROLL		
NOMINAL CAPACITY (kW / MBH)	28.9	98.5	
REQUIRED L.A.T.(SUMMER), (C / F)	12.8	55.0	
FILTERS			
PREFILTER EFFICIENCY	MERV 8		
FINAL FILTER EFFICIENCY	MERV 14		
ECONOMIZER			
DIFF ENTHALPY CONTROL			
VENTILATION DATA			
MIN. O.A. FLOW RATE (L/s / CFM)	519	1,100	
PHYSICAL DATA			
WEIGHT (kg / lbs)	1,179	2,600	
LENGTH (m / in.)	3.76	148.00	
WIDTH (m / in.)	1.35	53.00	
HEIGHT (m / in.)	1.52	60.00	

FAN SCHEDULE											
TAG	SERVICE	TYPE	SONES	RPM	AIR FLOW RATE (L/s) (CFM)	E.S.P. (Pa) (in.WC)	MOTOR (kW) (HP)	MANUFACTURER SUPPLIED ACCESSORIES			
EF-1.N	LUNCH AND PRINT ROOMS	R	< 1.0	1511	224	475	187	0.124	1/6	AS, BD, DS, FC, BS, HC	1
EF-2.N	BASEMENT ROOM B13	R	< 1.0	1511	224	475	187	0.124	1/6	AS, BD, DS, FC, BS, HC	1
TF-1.1.N	VAV-1.2.N LEADERSHIP	CE	< 1.0	900	94	200	50	0.20	0.052	0.07	DS, IG
TF-1.2.N	VAV-1.4.N LEADERSHIP	CE	< 1.0	900	94	200	50	0.20	0.052	0.07	DS, IG
TF-1.3.N	VAV-1.5.N MEETING	CE	< 1.0	1,050	142	300	50	0.20	0.082	0.11	DS, IG
TF-1.4.N	VAV-1.6.N LEADERSHIP	CE	< 1.0	900	94	200	50	0.20	0.052	0.07	DS, IG
TF-1.5.N	VAV-1.7.N MEETING	CE	< 1.0	900	94	200	50	0.20	0.052	0.07	DS, IG
TF-1.6.N	VAV-1.9.N LEADERSHIP	CE	< 1.0	900	94	200	50	0.20	0.052	0.07	DS, IG
TF-1.7.N	VAV-1.10.N MEETING	CE	< 1.0	1,000	189	400	50	0.20	0.119	0.16	DS, IG
TF-1.8.N	CW-FC-105 MEETING	CE	< 1.0	1,050	142	300	50	0.20	0.082	0.11	DS, IG
TF-1.9.N	CW-FC-116A MEETING	CE	< 1.0	1,000	189	400	50	0.20	0.119	0.16	DS, IG
TF-1.10.N	CW-FC-116 LARGE MEETING	CE	< 1.0	1,000	189	400	50	0.20	0.119	0.16	DS, IG
TF-1.11.N	CW-FC-116 LARGE MEETING	CE	< 1.0	1,000	189	400	50	0.20	0.119	0.16	DS, IG
TF-1.12.N	AC-1 ECC	CE	< 1.0	1,000	189	400	50	0.20	0.119	0.16	DS, IG
TF-1.13.N	AC-1 ECC	CE	< 1.0	1,000	189	400	50	0.20	0.119	0.16	DS, IG
TF-2.1.N	VAV-2.1.N LEADERSHIP	CE	< 1.0	900	94	200	50	0.20	0.052	0.07	DS, IG
TF-2.2.N	VAV-2.2.N LEADERSHIP	CE	< 1.0	900	94	200	50	0.20	0.052	0.07	DS, IG
TF-2.3.N	VAV-2.3.N LEADERSHIP	CE	< 1.0	900	94	200	50	0.20	0.052	0.07	DS, IG
TF-2.4.N	VAV-2.4.N LEADERSHIP	CE	< 1.0	900	94	200	50	0.20	0.052	0.07	DS, IG
TF-2.5.N	VAV-2.5.N LEADERSHIP	CE	< 1.0	900	94	200	50	0.20	0.052	0.07	DS, IG
TF-2.6.N	VAV-2.6.N LEADERSHIP	CE	< 1.0	900	94	200	50	0.20	0.052	0.07	DS, IG
TF-2.7.N	VAV-2.7.N LEADERSHIP	CE	< 1.0	900	94	200	50	0.20	0.052	0.07	DS, IG
TF-2.8.N	VAV-2.8.N MEETING ROOM	CE	< 1.0	1,050	142	300	50	0.20	0.082	0.11	DS, IG
TF-2.9.N	VAV-2.9.N LEADERSHIP	CE	< 1.0	900	94	200	50	0.20	0.052	0.07	DS, IG
TF-2.10.N	VAV-2.10.N EPR COORD	CE	< 1.0	900	94	200	50	0.20	0.052	0.07	DS, IG
TF-2.11.N	VAV-2.11.N LEADERSHIP	CE	< 1.0	900	94	200	50	0.20	0.052	0.07	DS, IG
TF-2.12.N	VAV-2.12.N MEETING	CE	< 1.0	1,050	142	300	50	0.20	0.082	0.11	DS, IG
TF-2.13.N	VAV-2.13.N MEETING	CE	< 1.0	1,050	142	300	50	0.20	0.082	0.11	DS, IG
TF-2.14.N	VAV-2.14.N DUTY TO ACCOM	CE	< 1.0	900	94	200	50	0.20	0.052	0.07	DS, IG
TF-2.15.N	CW-FC-211 LARGE MEETING	CE	< 1.0	1,000	189	400	50	0.20	0.119	0.16	DS, IG
TF-2.16.N	LEADERSHIP PSCHP	CE	< 1.0	900	94	200	50	0.20	0.052	0.07	DS, IG
TF-2.16.N	LEADERSHIP PSCHP	CE	< 1.0	900	94	200	50	0.20	0.052	0.07	DS, IG
FAN TYPES:											
ABBREVIATIONS:											
NOTES:											

EXISTING FAN COIL AIR FLOW SCHEDULE						NOTES	
TAG	MANUFACTURER	MODEL	AIR FLOW RATE (L/s) (CFM)	E.S.P. (Pa) (in.WC)			
MAIN FLOOR							
CW-FC-101	ENGINEER AIR	JM-1500	620	1314	75	0.30	
CW-FC-102			620	1314	125	0.50	
CW-FC-103	ENGINEER AIR	JM-1000	470	996	75	0.30	
CW-FC-104	ENGINEER AIR	JM-1000	520	1102	75	0.30	
CW-FC-105	ENGINEER AIR	JM-1500	550	1166	75	0.30	
CW-FC-106	ENGINEER AIR	JM-1500	660	1398	75	0.30	
CW-FC-107A	ENGINEER AIR	JM-1500	580	1229	125	0.50	
CW-FC-107B	ENGINEER AIR	JM-1500	500	1060	125	0.50	
CW-FC-108A	ENGINEER AIR	JM-1500	520	1102	125	0.50	
CW-FC-108B	ENGINEER AIR	JM-1500	540	1144	125	0.50	
CW-FC-109	ENGINEER AIR	JM-1000	300	636	75	0.30	
CW-FC-110	ENGINEER AIR	JM-1500	790	1674	75	0.30	
CW-FC-111	ENGINEER AIR	JM-2000	640	1992	75	0.30	
CW-FC-112	ENGINEER AIR	JM-1000	455	964	125	0.50	
CW-FC-113	ENGINEER AIR	JM-1000	560	1188	75	0.30	
CW-FC-114	ENGINEER AIR	JM-1000	480	1017	75	0.30	
CW-FC-115A	ENGINEER AIR	JM-1500	570	1208	125	0.50	
CW-FC-115B	ENGINEER AIR	JM-1500	590	1250	125	0.50	
CW-FC-116A	ENGINEER AIR	JM-1000	490	1038	125	0.50	
CW-FC-116B	ENGINEER AIR	JM-1500	600	1271	125	0.50	
CW-FC-117	ENGINEER AIR	JM-2000	900	1907	125	0.50	
CW-FC-118	ENGINEER AIR	JM-1500	860	1399	125	0.50	
CW-FC-119	ENGINEER AIR	JM-1500	465	985	125	0.50	
CW-FC-121	ENGINEER AIR	JM-1000	400	848	125	0.50	
SECOND FLOOR							
CW-FC-209	ENGINEER AIR	JM-1500	800	1695	125	0.50	
CW-FC-210	ENGINEER AIR	JM-2000	807	1825	125	0.50	
CW-FC-211	ENGINEER AIR		500	1060	125	0.50	
CW-FC-212	ENGINEER AIR		350	742	125	0.50	
CW-FC-213	ENGINEER AIR	JM-1500	540	1144	75	0.30	
CW-FC-214	ENGINEER AIR	JM-1500	540	1144	75	0.30	
CW-FC-215B	ENGINEER AIR	JM-2000	640	1780	125	0.50	
CW-FC-216A	ENGINEER AIR	JM-1500	540	1144	125	0.50	
CW-FC-216B	ENGINEER AIR	JM-1500	720	1525	125	0.50	
CW-FC-218	ENGINEER AIR	LM-2-C	600	1272	125	0.50	
CW-FC-219	ENGINEER AIR	JM-1000	400	848	125	0.50	
CW-FC-220	ENGINEER AIR		400	848	125	0.50	
NOTES:							

ENERGY RECOVERY VENTILATORS			
TAG	ERV-1.N		
SERVICE	ECC VENTILATION		
DESCRIPTION	CEILING HUNG ERV UNIT		
SUPPLY FAN			
AIR FLOW RATE (L/s / CFM)	153		325
E S.P. (Pa / in WC)	187		0.75
RETURN FAN			
AIR FLOW RATE (L/s / CFM)	153		325
E S.P. (Pa / in WC)	187		0.75
SPEED			
HEAT EXCHANGER (WINTER)			
EFFECTIVENESS (%)	50.0		
FILTERS SECTION			
FILTER DEPTH / TYPE	1" PLEATED		
AVERAGE EFFICIENCY	30-40% ASHRAE		
PHYSICAL DATA			
LENGTH (m / in)	0.91		36.00
WIDTH (m / in)	0.43		17.00
HEIGHT (m / in)	0.58		23.00
ELECTRICAL DATA			
VOLTAGE/PHASE/FLA	115/1		
NOTES:			
1. PROVIDE WALL CONTROL OFF/STANDBY/LO/HIGH CONTROL			
2. PROVIDE DAMPER DEFROST OPTION			

SPLIT AC UNIT SCHEDULE									
TAG	SERVICE	DESCRIPTION	INDOOR UNIT				OUTDOOR UNIT		REFRIGERANT
			AIR FLOW RATE (L/s) (CFM)	TOTAL COOLING (kW) (BTU/H)	TOTAL HEATING (kW) (BTU/H)	SOUND (dB)			
AC-1.N / CU-1.N	ECC	CONCEALED CEILING HUNG	411	870	5.3	18	6.3	21.6	48
AC-2.N / CU-2.N	EQUIP RM	WALL HUNG CONSOLE	411	870	5.3	18	-	-	48
AC-3.N / CU-3.N	TELECOM	WALL HUNG CONSOLE	411	870	5.3	18	-	-	48
NOTES:									

ELECTRIC HEATING COIL SCHEDULE											
TAG	SERVICE	AIR SIDE									
		FLOW RATE (L/s) (CFM)	PRESS. DROP (Pa) (in.WC)	ENT. TEMP. (C) (F)	LVG. TEMP. (C) (F)	HEATING OUTPUT (kW) (MBH)					
RHC-1.N	QUIT ROOM	50	106	12	0.06	12.8	55.0	23.9	75.0	0.7	2.3
RHC-2.N	LEADERSHIP	90	190	12	0.05	12.8	55.0	23.9	75.0	1.2	4.1
RHC-3.N	LEADERSHIP	90	190	12	0.05	12.8	55.0	23.9	75.0	1.2	4.1
RHC-4.N	FIT TO WORK / CLINICAL EXAM	231	490	12	0.05	12.8	55.0	23.9	75.0	3.1	10.6
RHC-5.N	IMMUNIZATION	142	300	12	0.05	12.8	55.0	23.9	75.0	1.9	6.5
RHC-6.N	CLINICAL EXAM	156	330	12	0.05	12.8	55.0	23.9	75.0	2.1	7.1
RHC-7.N	OPEN OFFICE	302	640	12	0.05	12.8	55.0	23.9	75.0	4.1	13.8
RHC-8.N	OPEN OFFICE	302	640	12	0.05	12.8	55.0	23.9	75.0	4.1	13.8
RHC-9.N	WAITING/COORDINOR	156	330	12	0.05	12.8	55.0	23.9	75.0	2.1	7.1
RHC-10.N	ECC	153	325	12	0.05	-2.2	28.0	18.3	65.0	3.8	13.0
NOTES:											
1. DUCT HEATERS SHALL BE EQUIPPED WITH AIR FLOW PROOF SWITCH AND HIGH TEMPERATURE CUTOFF.											
2. PROVIDE MODULATING CONTROLS AND WALL THERMOSTAT.											

Part 1 GENERAL

1.1 REFERENCES

- .1 Underwriters Laboratories of Canada (ULC)
 - .1 CAN/ULC-S101, 1989.
 - .2 CAN/ULC-S102, 1988.

1.2 TEST REPORTS

- .1 Submit product data including certified copies of test reports verifying fireproofing applied to substrate as constructed on project will meet or exceed requirements of Specification.
- .2 Submit test results in accordance with CAN/ULC-S101 for fire endurance and CAN/ULC-S102 for surface burning characteristics.
- .3 For assemblies not tested and rated, submit proposals based on related designs using accepted fireproofing design criteria.

1.3 SAMPLES

- .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedure.
- .2 Submit duplicate 300 x 300 mm size sample of exposed fireproofing for approval of texture and colour.

1.4 MOCK-UP

- .1 Erect mock-up in accordance with Section 01 45 00 - Quality Control.
- .2 Apply fireproofing to approximately 10m² area of surfaces of mock-up-matching surface to be treated.
- .3 Allow 48 hours for inspection of mock-up by Consultant before proceeding with fireproofing work.

1.5 PROTECTION

- .1 At outdoor temperatures less than 5 Degrees C, ensure that a 5 Degrees C air and substrate temperature is maintained during and for 24 hours after application. Ensure that natural ventilation to properly dry the fireproofing during and subsequent to its application is provided. In enclosed areas lacking openings for natural ventilation, ensure that interior air is circulated and exhausted to the outside.
- .2 Provide temporary enclosures to prevent spray from contaminating air beyond application area.
- .3 Protect adjacent surfaces and equipment from damage by overspray, fall-out, and dusting of fireproofing materials.

Part 2 PRODUCTS

2.1 MATERIALS

- .1 Sprayed fireproofing: ULC certified cementitious or asbestos-free mineral fibre fireproofing qualified for use in ULC Designs specified.
- .2 Curing compound: type recommended by fireproofing manufacturer, qualified for use in ULC Designs specified.
- .3 Sealer: type recommended by fireproofing manufacturer, qualified for use in ULC Design specified.

Part 3 EXECUTION

3.1 PREPARATION

- .1 Substrate shall be free of material, which would impair bond.
- .2 Verify that painted substrate [s] are compatible and have suitable bonding characteristics to receive fireproofing.
- .3 Remove incompatible materials.
- .4 Ensure that items required to penetrate fireproofing are placed before installation of fireproofing.
- .5 Ensure that ducts, piping, equipment, or other items which would interfere with application of fireproofing are not positioned until fireproofing work is completed.

3.2 APPLICATION

- .1 Apply bonding adhesive or primer to substrate if recommended by manufacturer.
- .2 Apply fireproofing to correspond with tested assemblies, or acceptable calculation procedures to provide following fire resistance ratings.

Location
Steel beams

Rating
1 Hour

ULC Design No.
[Contractor to provide]

- .3 Apply fireproofing over substrate, building up to required thickness to cover substrate with monolithic blanket of uniform density and texture.
- .4 Apply fireproofing directly to open web joists without use of expanded lath.
- .5 Tamp smooth, surfaces [visible in finished work] [as indicated] .
- .6 Apply curing compound to surface of cementitious fireproofing as required by manufacturer.
- .7 Apply sealer to surface of mineral fibre fireproofing as required by manufacturer [in ventilation plenums] [where fireproofing is to be painted] and as indicated.

3.3 INSPECTION AND SITE TESTS

- .1 Inspection and testing of fireproofing will be carried out by Testing Laboratory designated by Consultant .

- .2 Include in price costs for testing.
- 3.4 PATCHING
 - .1 Patch damage to fireproofing caused by testing or by other trades before fireproofing is concealed, or if exposed, before final inspection.

END OF SECTION

PART 1 GENERAL

1.1 GENERAL DESCRIPTION OF THE WORK OF THIS SECTION

1. Provide fire and smoke stop systems consisting of a material, or combination of materials installed to maintain the integrity of the Fire Resistance Rating of the fire separation by maintaining an effective barrier against the spread of flame, smoke, heat and / or hot gases through penetrations, blank openings, construction joints, or at perimeter fire containment in or adjacent to the Fire Separation in accordance with the requirements of the National Building Code.
- .2 Only tested fire and smoke stop design listed systems shall be used in specific locations as follows and also as indicated in the schedule of firestop locations, Item 3.4:
 - .1 Service Penetrations for the passage of duct, cable tray, conduit, piping, electrical bus ways and raceways, empty / blank openings through vertical fire separations (walls and partitions), horizontal that have a fire separation (floor/ceiling assemblies), and vertical service fire separation shaft walls and partitions.
 - .2 Safing slot gaps between edge of floor slab fire separations and curtain walls.
 - .3 Openings between structurally separate sections of walls or floors that have a fire separation.
 - .4 Joints between the bottom of walls (gypsum board to floor system)
 - .5 Wall-to-wall joints (gypsum board to concrete or concrete block walls or control/expansion joints for masonry, concrete or gypsum board).
 - .5 Joints between the top of walls and ceilings or floor and roof assemblies, slip joint or concrete shrinkage joint detail.
 - .6 Mechanical and electrical recessed boxes through fire resistant membranes.
 - .7 Floor Expansion Joints (floor to floor, floor to wall).
 - .8 Control or expansion joints in vertical and horizontal fire separations.
 - .9 Systems installed to allow and be designed to accommodate movement (expansion) in all joints as indicated on architectural / structural drawings/specifications and plumbing pipes and sprinkler pipes that require movement during the activation of these systems.
 - .10 Openings around structural members, which penetrate horizontal and vertical fire separations and their fire resistant membranes.
 - .11 Fire-rated cable pathway devices.
 - .12 Marriage joints between fire rated duct wrap to fire rated floor and wall assemblies.
- .3 All fire separations to have a Fire Resistance Rating to them as indicated on drawings. All Non-rated Fire Separations to be assigned a 1-hour Fire Resistance Rating and an F-Rating of 1 hour minimum. Both sides of a non-rated fire separation to have a tested fire and smoke stop design listed system applied, to match or exceed the F-rating, as indicated.
- .4 All multiple service penetration through a fire separation must have a minimum space equal to the same size of the smallest pipe or greater, minimum 50mm, between pipes to be considered an individual services penetration. Penetrations where the space between penetrating items is less than 50mm will be classified as a multi-penetrations and a square or rectangular opening shall be constructed around the penetrations with a fire and smoke stop design listed system applied to the entire opening.
- .5 All horizontal and vertical fire separations are indicated on Drawing Documents, including Firestop Rating Requirements, assign time and construction types (assemblies). Firestop Sub-trade to include appropriate Design Listed Systems for each horizontal and vertical fire separation.

1.2 REFERENCES

- .1 Standard Method of Fire Tests Through Penetration Fire Stops, ULC-S115-M.2005/ CAN4-S115-M.2005 (or ASTM E814 or UL 1479 if accepted by the Authority Having Jurisdiction) Test Requirements.

- .2 Underwriters Laboratories of Canada (ULC) CAN4-S115-M.2005 under their designation of ULC-S115-M.2005 and publishes the results in FIRE RESISTANCE RATINGS DIRECTORY, ULC – list of equipment and materials for firestop systems and components.
- .3 Underwriters Laboratories (UL) ASTM E-814 under their designation of UL 1479, Fire-Tests of Through Penetration Firestops and publishes the results in FIRE RESISTANCE DIRECTORY. UL tests that meet the requirements of ULC-S115-M.2005 are given a cUL listing and are published by UL in Products Certified for Canada (cUL) Directory.
- .4 Latest edition of the ULC or cUL Listings for Firestop Systems and Components.
- .5 Tests for Fire Resistance of Building Joint Systems, UL 2079, Test Requirements.
- .6 Standard Tests for Resistive Joint Systems, ASTM E1966 under designation UL 2079.
- .7 Cyclic movement and measuring the minimum and maximum joint widths of Architectural Joint Systems, ASTM E1399.
- .8 Test Requirements: ASTM E2307, "Standard Test Method for Determining Fire Resistance of Perimeter Fire Barrier Systems Using Intermediate-Scale, Multi-Storey Test Apparatus".
- .9 Standard Test Method for Surface Burning Characteristics of Building Materials, CAN/ULC-S102-M or ASTM E84.
- .10 Method for Fire tests of Building Construction and Materials CAN/ULC-S101 or ASTM E119.
- .11 International Firestop Council Guidelines (IFC) for Evaluating Firestop Systems Engineering Judgements.
- .12 International Firestop Council (IFC) Inspection Guideline and ASTM E2174, Standard Practice for On-Site Inspection of Installed Firestop Systems and ASTM E2393, Standard Practice for On-Site Inspection of Installed Fire Resistive Joint Systems and Perimeter Fire Barriers.
- .13 M.O.P. Manual of Practice, (MOP) Guideline as set out by the Firestop Contractors International Association (FCIA).
- .14 National Building Code and the Manitoba Building Code.
- .15 NFPA 101-Life Safety Code
- .16 Canadian Electrical Code
- .17 Approval standard for approval of Firestop Contractor:
 - .1 ULC – Qualified Firestop Contractor Program
 - .2 UL – Qualified Firestop Contractor Program
 - .3 FM 4991 – Approval Standard for Approval of Firestop Contractors

1.3 QUALITY ASSURANCE

- .1 Work is to be undertaken by experienced Site Supervisor in their trade of material or system being used with a minimum of five (5) working years of experience utilizing that material/system, and shall provide a list of not less than five (5) successfully completed projects of similar scale and type.
- .2 All workers shall be certified by the manufacturer of the products and systems proposed for the Installation of this product. Proof of this certification will be required 48-hours after award of the project.
- .3 Firestop sub-trade to be a member of the Firestop Contractors International Association (FCIA) and be in good standing with this association. Contractor to provide within 48 hours after award of the project proof of their association of the FCIA.
- .4 Manufacturer shall ensure that their Fire Protection Engineers will oversee the project, and have a minimum five (5) years experience on the manufacturers design systems.
- .5 Manufacturers shall provide a letter in writing within 48 hours after award of the project that the Engineered Judgements shall be provided by their Fire Protection Engineer(s) as required to suit building conditions. All Engineered Judgements shall conform to IFC guidelines and the manufacturer shall be a member in good standing with the IFC or FCIA. Proof of membership to the IFC or FCIA shall be submitted within 48 hours after award of the project.
- .6 A Manufacturer's Qualified National or Local representative to be on-site during initial mock-up installation of firestop systems to ensure the mock-ups have been installed, based

- on the approved design system listings and to train appropriate sub-contractor personnel in proper selection and installation procedures.
- .7 Firestop Systems do not re-establish the structural integrity of load bearing partitions/assemblies, or support live loads and traffic. Installer shall consult the structural engineer prior to penetrating any load bearing assembly.
 - .8 For those firestop applications that exist for which no ULC or cUL tested system is available through a manufacturer, a Manufacturer's Engineered Judgement derived from similar ULC or cUL system designs or other tests will be submitted to local Authorities Having Jurisdiction for their review and approval prior to installation. Engineered Judgement drawings must follow requirements set forth by the International Firestop Council Guidelines
 - .9 A single source of Manufacturer Product shall be used on this Project. Materials of different manufacturers shall not be acceptable, unless otherwise indicated in this Section.
 - .10 Manufacturer to provide a written letter within 48-hours after the award of the project that if their systems are exposed in finished areas that their installed products can be primed and painted over to match the architectural finishes within those areas. If the Manufacturer deems that alternative methods may be required to allow their systems to be primed / painted over, they shall notify the Firestop Sub-trade prior to bid closing to allow the Firestop Sub-trade to alter their bid prior to closing. Firestop Sub-trade to include any additional; costs within their bid to suit this application.
- 1.4 DESCRIPTION
- .1 This section specifies firestopping material and/or systems intended to act as a fire stop and smoke seal system to protect against the passage of fire, hot gases and toxic smoke within fire separation for the Fire Resistance Rating of a wall, floor, ceiling or roof assemblies for any through-penetration item, membrane penetration poke-through termination device, blanks, gaps, voids or any un-penetrated joint or opening, to form a draft-tight barrier within or between construction assemblies and act to retard the passage of flame, smoke and toxic gases.
- 1.5 SAMPLES
- .1 Submit material samples of each type of proposed product in un-opened containers including all anchors/fasteners and damming material. These products shall be taken from the same batches / boxes of products that will be used on-site. Each product shall be tagged indicating the shelf life expiry date.
 - .2 Submit sample mock-ups of each system no larger than 600 x 600mm, 1-week prior to on-site mock-ups.
 - .3 Submit a sample of the proposed assembly identification penetration / joint plate.
 - .4 Submit sample of each fire separation (barrier) marking on a layer of 16mm gypsum board, 600 x 600mm in size. All edges have one layer of tape around the entire sample board. Provide sample of each marking on board sample.
 - .5 Submit copy of Life expectancy of each product installed from date of installation.
- 1.6 DESIGN SYSTEM LISTINGS/SHOP DRAWINGS
- .1 Submit Design System Listings, product data and Material Safety Data Sheets (MSDS) in accordance with Section 01300. Also provide the following product data on each proposed product:
 - .1 Technical data on out-gassing; off-gassing and age testing.
 - .2 Curing time.
 - .3 Chemical compatibility to other construction materials.
 - .2 Provide Certification by the Manufacturer that products supplied comply with local regulations controlling use of volatile organic compounds (VOC's) and are non-toxic to building occupants.
 - .1 According to ASTM E595.

- .2 Test Method: Environmental Protection Association, EPA Method 24.
- .3 Indoor Environmental Quality: Volatile Content: below 250 g/l.
- .3 To meet LEED requirements, refer to LEED procedures. (Not applicable)
- .4 Design System Listings shall show proposed material, including technical data, reinforcement, anchorage, fastenings and method of installation. Construction details shall accurately reflect actual job conditions.
- .5 Manufacturer may submit product data for materials and prefabricated devices, provided that descriptions are sufficient for identification at job site. Include Manufacturer's printed instructions for installation.
- .6 Provide ULC or cUL Design System Listings complete with product literature and MSDS sheets on each system for each application, for each area as indicated.
- .7 When more than one product is specified for the firestop Design Listing System or more than one backing/damming material is indicated, the firestop trade shall circle the item that they have chosen to use on this project.
- .8 Provide a list (matrix) of products, identifying the following for each.
 - .1 Product Name.
 - .2 Shelf Life.
 - .3 Life Expectancy.
 - .4 Temperature Range for installation.
 - .5 Humidity Range for installation.
 - .6 Curing Time.
 - .7 If required, alternative method to allow paint and primer to be applied over the installed system when exposed to finished areas.
- .9 Where there is no specific tested Design System Listings by the Prime Manufacturer and research from all other manufacturers has determined that no system is available for particular firestop configuration, the Firestopping Sub-Trade shall obtain from the Prime Manufacturer an Engineered Judgement (EJ) for submittal. Each EJ shall come with a drawing of the proposed system, a description of the system, Project Name and Room Name/Number that the EJ is located in, copies of all referenced Design Listings and signed/dated by the Manufacturer's Fire Protection Engineer. All EJ's must comply with the International Firestop Council (IFC) Guidelines for evaluating firestop systems Engineer Judgement. Note: Once the EJ has been reviewed, the Contractor shall submit the EJ to the Authority Having Jurisdiction (AHJ) for their acceptance, prior to installing the EJ. The Firestop Sub-trade must receive written approval by the AHJ.
- .10 Engineering Judgements (EJ's)
 - .1 EJ's shall be issued in lieu of tested systems when a tested Design Listing is not available for the current on site conditions.
 - .2 EJ's shall be issued only by firestop manufacturer's qualified technical personnel or, in concert with the manufacturer, by a knowledgeable registered Professional Engineer, or Fire Protection Engineer, or an independent testing agency that provides listing services for firestop systems.
 - .3 EJ's shall be based upon interpolations of previously tested firestop systems that are either sufficiently similar in nature or clearly bracket the conditions upon which the judgement is to be given. Additional knowledge and technical interpretations based upon accepted engineering principles, fire science and fire testing guidelines (e.g. ASTM E2031 – Standard Guide for Extension of Data from Fire Endurance Tests) may also be used as further support data.
 - .4 EJ's shall be based upon full knowledge of the elements of the construction to be protected and understanding of the probable behaviour of that construction and the recommended firestop system protecting it were they to be subjected to the appropriate Firestop Standard Fire Test method for the required fire rating duration.
 - .5 EJ's shall be limited to the specific conditions and configurations upon which the engineering judgement was rendered and should be based upon reasonable performance expectations for the recommended firestop system under those conditions.

- .6 EJ's shall be accepted only for a single specific job and location and should not be transferred to any other job or location without thorough and appropriate review of all aspects of the next job or location's circumstances.
- .7 EJ's shall be accepted in jurisdictions that permit Alternative Methods per applicable Model Building Code.
- .11 Submit design listings / shop drawings as follows:
 - .1 Submit shop drawings in accordance with section 01300.
 - .2 Bind shop drawings in a minimum of seven (7) vinyl hard covered Acco Customized three D-ring binders for 215 x 280mm size paper. Note: Binders not to be more than 2/3 full.
 - .3 Enclose title sheet, labelled "Fire and Smoke Stop System Drawing Design System Listings", project name, date and installation company name and Manufacturer of products name. Insert title in front and spine of binder.
 - .4 Include a Table of Contents at the front of each binder.
 - .5 Provide a list of each proposed Design Listing and corresponding service penetration type or joint type in a matrix spreadsheet schedule, indicating floor and wall system, including rating for each.
 - .6 Provide a list of each proposed Design Listing with approximate total quantity or amounts of each listing per floor on separate sheet.
 - .7 Each penetration shall be numbered corresponding to the exact same number of the plate penetration no. that is identified in Item No. 2.1.13.
 - .8 Organize each floor, wall and ceiling area indicating each room number, labelled with tabs of celluloid covers fastened to hard paper dividing sheets.
 - .9 Provide copies of all fire and smoke stop system ULC or cUL Design No. listings for each penetration type for all areas located.
 - .10 Provide product data, MSDS and all other technical data information required as indicated in Item No. 1.6.1 to 1.6.11.
 - .11 Provide certifications of each installer proposed on working on the Project.
- 1.7 DELIVERY, STORAGE, AND HANDLING
 - .1 Deliver materials undamaged in manufacturer's clearly labelled, unopened containers, identified with brand, type, and ULC or cUL label, complete with batch number, manufacturing date and shelf life expiry date.
 - .2 Coordinate delivery of materials with scheduled installation date to allow minimum storage time at job-site.
 - .3 Store materials under cover and protect from weather and damage in compliance with manufacturer's requirements, including temperature restrictions.
 - .4 Comply with recommended procedures, precautions or remedies described in Material Safety Data Sheets (MSDS) as applicable.
 - .5 Do not use damaged or expired material.
- 1.8 ENVIRONMENTAL REQUIREMENTS
 - .1 Do not install firestopping when ambient or substrate temperatures are outside limits permitted by Manufacturers or when substrates are wet, due to rain, frost, condensation, or other causes.
 - .2 Maintain this minimum temperature before, during and for three (3) days after installation of materials.
 - .3 Ventilate firestopping per Manufacturers' instructions by natural means or, where this is inadequate, forced air circulation.
 - .4 During installation, provide masking and drop sheets to prevent firestopping materials from contaminating any adjacent surfaces.
 - .5 Do not use materials that contain flammable solvents.
 - .6 Water based products are unacceptable in wet areas or areas that may be subject to occasional flooding.

1.9 PRECONSTRUCTION MEETING

- .1 The "Standard Construction Project Firestop Guideline" shall be reviewed in a meeting approximately two weeks after the award of the Project with the Contractor and all affected Sub-trades.
- .2 After Design System Listings Shop Drawings are reviewed by the Consultant and one week prior to the mock-up installation, the Contractor shall request that a mandatory pre-construction meeting be held.
- .3 All Sub-Trades that are affected, such as the concrete, masonry, hollow metal frame, curtain wall, gypsum board/steel stud, mechanical (including their Sub-Trades) and electrical (including their Sub-Trades) shall be in attendance, along with Firestopping Sub-Trade, Contractor, Consultant(s), Departmental Representative and Quality Assurance/Design Consultant.
- .4 Each Sub-Trade shall receive one copy of the Design System Listings Shop Drawings as copied and distributed by the Contractor.
- .5 Standard installation procedures shall be reviewed, scheduling / sequencing of other work around or that affects the outcome of the installation, precautions, annular opening sizes, wall/floor service single and multi – preparations, joints and perimeter joints shall be reviewed to ensure that all Sub-Trades and the Contractor understand the full complexity of the firestop installation, based on the approved Design System Listings Shop Drawings.
- .6 Contractor shall be responsible for taking minutes of this meeting and distributing these minutes to all affected trades.

1.10 MOCK-UPS

- .1 After Design System Listings Shop Drawings are reviewed by the Consultant, the Pre-Construction meeting is held and one-week prior to actual commencement of construction, provide field sample mock-up of each proposed ULC or cUL system for this project for Consultant review. This mock-up shall also include if required, work by other trades, to provide the required finish work, such as steel stud / gypsum board trade framing out multi-penetrations openings. The Firestop Sub-trade shall provide a minimum of three (3) of the selected mock-ups that are exposed to the room finishes and have mock-up systems primed and painted to match architectural finishes prior to the review, to allow Consultant (Architect) to verify the quality, colour, texture etc. to meet the design intent.
- .2 Mock-up locations shall be directed by the Departmental Representative.
- .3 Once mock-ups have been completed and materials have had adequate time to properly cure, notify the Consultant to perform their review. Minimum 48 hours is required to be given to the Consultant.
- .4 Reviewed mock-ups shall become the standards of workmanship and material against which installed work will be checked. Reviewed and approved mock-ups may be used in final construction.
- .5 Install assembly identification penetration / joint plate to each mock up that is reviewed.
- .6 Install fire separation (barrier) marking on one wall (20m long, minimum).
- .7 Local or National representation from the manufacturer shall be present during the Consultant mock-up review.
- .8 The Consultant shall provide Observation and Destructive Tests to each Mock-Up to ensure the mock-up firestop system meets or exceeds the approved Design System Listing. The Firestop Sub-Trade to include for all costs of these mock-ups, including cutting or removing the system to allow for visual review and then the replacement or re-installation of the system.
- .9 Upon completion of the review, the National and Local representative shall provide in writing to the Consultant that their review finds the mock-ups acceptable by the manufacturer and meets or exceeds the ULC or cUL design system listing requirements for each mock-up application.

- .10 Retain and maintain mock-ups during construction in an undisturbed condition as a standard for judging completed unit of work. Accepted mock-ups in an undisturbed condition at time of Substantial Performance may become part of completed unit of work.

1.11

DEFINITIONS

- .1 **Firestops:** specially tested materials or combination of materials used to establish or re-establish the integrity of a fire rated wall, floor, ceiling or roof assembly or other partition after the structure has been breached for the through-penetration of building service items or to close off openings left due to construction methods to prevent or limit the spread of fire, heat, gasses and smoke.
- .2 **Through-penetration:** opening or foreign material, pipes, conduits, ducts, cable trays, cable, wire, structural components or any other element passing completely through an opening in a fire rated barrier/assembly such that the full thickness of the rated material(s) is breached either in total or in part.
- .3 **Membrane penetration:** any penetration (as indicated in 1.12.2) of a fire rated barrier that breaches one side but does not pass completely through to the other side, including recessed electrical devices.
- .4 **System:** the combination of specific materials and/or devices, including the penetrating item(s) required to complete the firestop, as tested by an independent third party test facility.
- .5 **Barrier/Assembly:** a wall, floor, ceiling or roof assembly or other partition with a fire-smoke rating of 0, 1, 2, 3 or up to 4-hours.
- .6 **Fire Resistive Joint:** any joint or opening, whether static or dynamic, within or between adjacent sections of fire rated interior or exterior walls, floors, ceilings or roof decks.
- .7 **Fireblocking:** Building materials installed to resist the free passage of flame, smoke and noxious gases to other areas of the building through concealed spaces.
- .8 **Perimeter Fire Barrier System:** The perimeter joint protection that provides fire resistance to prevent the passage of fire from floor to floor within the building at the opening between the exterior wall assembly and the floor assembly.
- .9 **Intumescent:** Materials that expand with that to seal around objects threatened by fire.
- .10 **F-Rating:** the time a firestop, penetrating item, building, material, firestop material, can withstand direct flame without a burn through as tested to CAN4-S115-M2005/ULC-S115-M2005 or ASTM E814/UL 1479.
- .11 **T-Rating:** the amount of time a through-penetration firestop limits the temperature rise on the cold side-outside the test furnace – as tested to CAN4-S115-M2005/ULC-S115-M2005 or ASTM E814/UL 1479.
- .12 **L-Rating Air Leakage Test:** introduced by Underwriters Laboratories on August 9, 2004 for systems tested and listed in accordance with ANSI/UL 1479. Not exceeding 0.01524 cu. m/s per square meter of penetration opening at 74.7Pa at both ambient and elevated temperatures (204° C).
- .13 **W-Rating Washout Test:** introduced by UL's, UL1479 Standards Technical Panel, March 17, 2005.
- .14 **Non-Rated Fire Separations:** to be a separation that prevents the passage of fire and smoke for time period that allows the fire suppression system to be activated and contain the fire. For the purpose of this project, all Non-Rated Fire Separations as indicated on drawings to be assigned a minimum time of 60-minutes Fire Resistance Rating and shall be fire stopped on both sides of the fire separation.
- .15 **Single Penetration:** one service penetration through a fire separation.
- .16 **Multi-Penetration:** two or more service penetration through a fire separation where the minimum space between pipes must exceed 50mm and where sizes of pipe are larger than 50mm, the space must be larger than the largest pipe

between. (Example, one – 100mm diameter pipe and one – 150mm diameter pipe, the space between pipes must be greater than 150mm or otherwise the penetration will be considered a multi-penetration, when passing through a fire rated gypsum board partition. These gypsum board partitions must be framed out on all four sides with studs to match the ULC Design Wall System and the annular space must be boarded with rated gypsum board to match the ULC Design Wall System.

1.12 DAILY WORK SHEET

- .1 Firestop sub-trade, superintendent shall keep a daily log of all activities on site during the course of construction.
- .2 The Consultant shall make periodic reviews of these worksheets during the course of construction.

1.13 AS-BUILTS

- .1 Firestop sub-trade, shall provide as-built drawings, project manual schedules and firestop drawing details on site and make them available for periodic review by the Consultant.
- .2 These drawings, schedules and details shall be marked up on weekly basis showing all alterations, changes and confirmation of each Design Listing in relationship to the project schedules when provided as part of the bid document.

1.14 WARRANTY

- .1 Manufacturers shall warrant work of this Section against defects and deficiencies in the product material for a period of two (2) years from date of Substantial Performance, in accordance with General Conditions of Contract. Promptly correct any defects or deficiencies, which become apparent within warranty period at no expense to Owner.
- .2 Fire and smoke stop system Contractor hereby warrants workmanship on material installation for period of two (2) years from date of Substantial Performance, in accordance with General Conditions of Contract. Promptly correct any defects or deficiencies, which become apparent within warranty period at no expense to Owner.

1.15 MAINTENANCE DATA AND MATERIAL

- .1 Provide Operation and Maintenance Data and Material for Fire and Smoke-Stop Systems to incorporate into the Manual as specified in Section 01788.
- .2 Incorporate the following materials in the Operation and Maintenance Manual:
 - .1 Material Safety Data Sheets (MSDS)
 - .2 Product literature of each product used on this project.
 - .3 Approved Design Listings and Engineer Judgements
 - .4 Matrix schedule indicating all Design Listings and EJs and matching them to the penetration or joint type. Included in this schedule shall be a quantity of each Design Listing/EJ on each floor.
 - .5 Daily Worksheets.
 - .6 Certification:
 - .1 Manufacturers Certification cards of each installer that performs installation on the project.
 - .2 Written certification of FCIA Association.
 - .3 Written letters from the Manufacturers accepting installing during:
 - .1 Mock-ups
 - .2 Substantial performance.
 - .3 Manufacturer's Fire Protection Engineer who is responsible for issuing all Engineer Judgments.
 - .4 Verification on compliancy to be specified and local VOC requirements.
 - .5 Manufacturer's acceptance to having exposed systems to be primed and painted over.

- .7 Warranty:
 - .1 Manufacturers warranty
 - .2 Fire Stop Sub-Trade warranty
- .8 Life expectancy of each product installed on this project. List date of installation for each product and when the month / year of the expected expiration of each product.
- .9 Construction and progress photographs (Section 01300).
- .3 Contractors to provide a marked-up as-built to the Consultant eight (8) weeks prior to requesting total performance on the Project.

PART 2- PRODUCTS

2.1 MATERIALS

- .1 **Firestopping and smoke-seal systems:** in accordance with CAN4-S115-M2005 or ASTM E814.
 - .1 Asbestos-free materials and systems capable of maintaining an effective barrier against the passage of flame, smoke, water and toxic gases in compliance with requirements of CAN4-S115-M2005 or ASTM E814, and not to exceed opening sizes for which they are intended, in accordance with ULC or cUL Design Numbers or other Design System Listings acceptable to local Authority Having Jurisdiction.
 - .2 Firestopping materials/systems shall be flexible to allow for movement of building structure (refer to architectural and structural) and penetrating item(s) without affecting the adhesion or integrity of the system.
- .2 **Firestop Methods:**
 - .1 Method 1: non-combustible, semi-rigid, felt; minimum density 65 kg per cu/m²; depth 100 mm, length 1200 mm; width as required. Blanket type fire-stop to be listed, and labelled in accordance with file Guide 40-U19.13. Impale - clips; galvanized wire or 25 mm x 0.65 mm thick galvanized steel Z-clips with dimensions to match location of fire stop material and width of opening being sealed.
 - .2 Method 2: as per Method 1, without impale - clips.
 - .3 Method 3: Hose stream UL/cUL (Underwriters Laboratories USA) labelled.
 - .4 Method 4: Hose stream, fluid, gas and fire resistant elastomeric seal or non-shrink foam cement mortar proprietary certified assembly of a listed manufacturer.
 - .5 Methods 1 to 4: Methods used can be as per manufacturer's instructions, provided that their system employed meets or exceed the requirements of ULC/CAN4-S115-M2005 or ASTM E814.
- .3 **Mechanical or Electrical service:** penetration assemblies; certified in accordance with CAN4-S115-M2005 or ASTM E814 and listed in the ULC Guide No. 40 U19.
- .4 **Service - penetration fire-stop components:** Certified in accordance with CAN4-S115-M2005 or ASTM E814 and listed in the ULC Guide No. 40 U19.
- .5 **Fire Rated Cable Pathway Devices:** shall be used for ALL low-voltage, video, data and voice cabling, optical fibre raceways and certain high-voltage cabling where frequent cable moves, adds and changes may occur. Pathways required for high voltage cabling will be detailed on the drawings. Such devices shall:
 - .1 Provide ULC or cUL Systems permitting cable loads from; "Zero to 100% Visual Fill."
 - .2 Not have a constrictive inner liner that tightens around or compresses cables tightly together encouraging potential cross-talk or interference.
 - .3 Be "Zero-Maintenance", zero-maintenance is defined as; No action required by cabling technician to open and/or close pathway for cable moves, adds or changes, such as, but not limited to:
 - .1 Opening or closing of doors.
 - .2 Spinning rings to open or close inner liner.

- .3 Removal and or replacement of any material such as, but not limited to, firestop caulk, putty, pillows, bags, foam muffins, foam blocks, or foam closures of any sport.
- .4 Furnish letter from manufacturer certifying compliance with this definition of "Zero-Maintenance".
- .4 Pathways shall be engineered such that two or more devices may be ganged together for larger cable capacities.
- .5 Pathways shall be engineered to be re-enterable so they can be retrofitted and removed from around existing cables without cutting and re-splicing them.
- .6 Affix adhesive wall label immediately adjacent to devices to communicate to future cable technicians, authorities having jurisdiction and others the manufacturer of the device and the corresponding UL System number installed.
- .6 Fire-resistance rating of installed fire-stopping assembly not less than fire-resistance rating of surrounding substrate assembly (floor or wall) in accordance with the NBC.
- .7 Fire-stopping and smoke-seals at openings intended for re-entry such as cables; elastomeric seal or non-shrink foam cement mortar: do not use cementitious or rigid seal at such locations.
- .8 Firestopping and smoke-seals at openings around penetrations for pipes, ductwork and other mechanical items requiring sound and vibration control: elastomeric seal; do not use a cementitious or rigid seal at such locations.
- .9 **Primers:** to manufacturer's recommendation for specific material, substrate, and end-use.
- .10 Water (if applicable: portable, clean and free from injurious amounts of deleterious substrates.)
- .11 **Damming and back-up materials, supports and anchoring devices:** to manufacturer's recommendations, and in accordance with tested assembly being installed as acceptable to authorities having jurisdiction.
- .12 **Sealants for vertical joints:** non-sagging and having a flame-spread of not more than 25 and a maximum smoke development classification of 100 for walls and 50 for ceilings.
- .13 **Assembly identification penetration plate:** all fire/smoke stop systems that are installed are required to be identified by assembly adhesive label over a piece of 0.9mm aluminium metal backer plate; all plates to be adhered to walls/floors by acceptable adhesive to the backside of the plate. Lettering on all plates shall be printed, as follows:

- .1 Penetration / joint Assembly ID No.: _____
- .2 Floor Level: _____
- .3 Room No.: _____
- .4 Product: _____
- .5 ULC or cUL System Design No.: _____
- .6 Fire Rating Required: _____ hour(s)
- .7 Firestopping Contractor's Name: _____
- .8 Phone No. of Firestopping Contractor: _____
- .9 Installer's Name: _____
- .10 Date of Installation: _____

- .11 Re-penetrated by:

<u>Company</u>	<u>Installer</u>	<u>Date</u>
.1 _____	_____	_____
.2 _____	_____	_____
.3 _____	_____	_____

.4

- .12 Penetration / joint plate shall state that the fill material around the penetration is a fire stop system and it shall not be disturbed except by authorized personnel.
- .14 Fire Separation (Barrier) Markings: All vertical fire separations within ceiling spaces to be identified by continuously painted red, 75mm high stencil along upper wall. Marking to be painted 400mm above finished ceiling unless otherwise indicated. Final location to be determined on-site. Refer to drawings for locations of fire separations and rating required. Each rating shall be indicated every 6000mm O.C. with 75mm high red painted lines in between. Each rating shall be identified as the assigned hourly rating as indicated on the plans.

Schedule of Fire Separations:

.1	--- N/R---	Non-rated fire separation
.2	---3/4---	¾ hour fire separation
.3	---1.0---	1 hour fire separation
.4	---1.5---	1.5 hour fire separation
.5	---2.0---	2 hour fire separation

2.2 PRODUCT SYSTEMS

- .1 Single source responsibility: obtain firestop systems for each kind of penetration and construction condition indicated from a single manufacturer.
- .1 Materials of different manufacturers shall not be intermixed on the project, unless the design listing for existing condition on the Project cannot be found utilizing the Prime Manufacturer. In lieu of providing an Engineer Judgment, the Firestop Sub-trade must research all other manufacturers to provide a design listing for this condition that has been tested. If a tested system is found by utilizing a different Manufacturer, the system and the product shall be used to suit the condition on site. Contractor to avoid overlapping new product onto main product/firestopping material.
- .2 Acceptable Firestop Manufacturers.
- .1 AD Fire Protection Systems Inc. as distributed by:
Anchor Construction Industrial Products Ltd.
108 Parklane Avenue, Winnipeg, Manitoba R2R 0K2
Phone: (204) 633-0064
- .2 Hilti Fire Stop Systems as distributed by:
120 Bannister Road, Winnipeg, Manitoba R2R 0S3
Phone: (800) 363-4458
- .3 Rectorseal, Biofireshield or Meta Caulk as distributed by:
Canadian Thermal Technologies
44 Higgins Avenue, Winnipeg, Manitoba R3B 0A5
Phone: (204) 943-5622
- .4 STI, Specified Technologies Inc., Spec Seal Firestop Products, as distributed by:
Alsip's Industrial Products Ltd.
1 Cole Avenue
Winnipeg, Manitoba R2L 1J3
Phone: (204) 667-3330 x238

2.3 ACCEPTABLE FIRE RATED CABLE PATHWAY DEVICE MANUFACTURER

- .1 Specified Technologies Inc. (STI) EZ-Path™ Fire Rated Pathway

2.4 ACCEPTABLE FIRE STOP APPLICATORS

- .1 National Firestop Ltd.
405 Gunn Road, PO Box 16 Grp 514 RR5
Winnipeg, Manitoba R2C 2Z2

- Phone: (204) 777-0100
- .2 Total Fire Stop Systems Limited
Box 464
Stony Mountain, Manitoba R0C 3A0
Phone: (204) 344-5696
- .3 Western Construction Services Ltd.
300 Dawson Road N., Winnipeg, Manitoba R2J 0S7
Phone: (204) 956-9475
- .4 Secure Firestop
B-580 Dobbie Avenue,
Winnipeg, Manitoba R2K 1G4
Phone: (204) 667-8859
- .5 Adler Firestopping Ltd.
#23, 53016 Hwy 60
Acheson, Alberta T7X 5A7
Phone: (780) 962-9495

PART 3- EXECUTION

3.1 EXAMINATION

- .1 Verify substrate conditions, previously installed are acceptable for product installation in accordance with manufacturer's instructions and approved design system listings for each condition.
- .2 Ensure that opening / annular space does not exceed the maximum and minimum size or dimensions that is indicated on the approved Design Listing.
- .3 Verify that all joints, service penetrating elements and supporting devices/hangers have been properly installed as indicated on Approved Design Listings. All temporary lines and markings have been removed to meet the approved Design System Listings for each condition has been identified.
- .4 Verify that the proposed Firestopping system is composed of components that are compatible with each other, the substrates forming the openings, and the items, if any, penetrating the firestopping under conditions of application and service, as demonstrated by firestopping manufacturer based on testing and field experience.
- .5 Ensure no additional items have been installed through opening that does not appear on the approved Design Listing.
- .6 Ensure areas that are to be firestopped are accessible for proper application and conditions are suitable for installation of a firestop system. All areas must also be accessible for inspection.
- .7 Report in writing to the Consultant any defective surfaces or conditions affecting the firestop system installation, immediately and prior to commencing any installations.
- .8 Proceed only when defected surfaces or conditions have been corrected.
- .9 Ensure temperature within the areas of installation meets or exceeds the minimum temperature range for the products that will be installed in those areas, as based on the manufacturer's recommendations for a minimum two days prior and three days after installation.
- .10 Beginning of installation means acceptance of site conditions.

3.2 PREPARATION

- .1 Protect adjacent work areas and finish surfaces from damage during product installation.
- .2 Provide drop sheets or other satisfactory coverings for protection of adjacent areas in accordance with safe and good work practices.
- .3 In areas to be fire stopped ensure that sub-strate and service penetrations are clean, dry and frost free.
- .4 Use masking tape to prevent firestopping from contacting adjoining surfaces that will

- remain exposed upon completion of work. Remove tape as soon as it is possible to do so without disturbing the firestopping seal with substrates.
- .5 Examine sizes and conditions of voids to be filled to establish correct thicknesses and installation of materials.
 - .6 Prepare surfaces in contact with firestopping materials and smoke-seals to manufacturer's instructions.
 - .7 Maintain insulation around pipes and ducts penetrating fire separation. Confirm that fire stop system has been tested with actual pipe or duct insulation penetrating fire separation that is indicated in the approved ULC or cUL Design System Listing.
 - .8 Surfaces to which firestop materials are to be installed, shall be free of dirt, grease, oil, rust, laitance, release agents, water repellents, and any other substances that may affect proper adhesion.
 - .9 Ensure that multi-penetration openings have been framed and boarded out, all around the annular opening, prior to prepping the opening.
 - .10 Confirm that the temperature and humidity conditions during and after installation are being maintained as per manufacturers' recommendations.

3.3 INSTALLATION

- .1 Install firestopping and smoke-seal material and components in accordance with manufacturer's instructions and rated system as tested to ULC/CAN4-S115-M2005, and ULC or cUL Design System Listings.
- .2 Coordinate with other Sub-Trades to assure that all pipes, conduit, cable, and other items, which penetrate fire separations have been permanently installed prior to installation of firestop systems. All hangers, clamps, holding devices, etc. have been installed, leveled and completed by other trades prior to installing firestop systems.
- .3 Schedule the work to assure that fire separations and all other construction that conceals penetrations are not erected prior to the installation of fire and smoke stop systems.
- .4 Seal holes or voids made by through-penetrations, poke-through termination devices, and un-penetrated openings or joints to ensure that both continuity and integrity of fire-separation are maintained.
- .5 Provide temporary forming as required. Remove forming material only after firestop system has gained sufficient strength and after initial curing as per manufacturer's instructions.
- .6 Tool or trowel exposed surface to a neat finish.
- .7 Remove excess compound promptly as work progresses and upon completion.
- .8 Refer to Mechanical and Electrical Sections and drawings for further information.
- .9 Seal all voids between new fire rated wall assemblies and new or existing building walls to form a draft-tight barrier and act to retard the passage of flame, toxic gases and smoke.
- .10 Install firestop material to obtain fire resistance rating not less than the fire resistance rating of surrounding floor and wall assembly.

3.4 SCHEDULE OF FIRESTOP LOCATIONS

- .1 Fire stop and smoke-seal includes but not limited, to the following locations:
 - .1 Provide appropriate Firestop System when exposed to view, architectural finish, traffic, moisture, heat, movement and physical damage.
 - .2 Penetrations through fire-resistance-rated new or existing masonry, concrete, and gypsum board partitions/walls, floors and roof assemblies.
 - .3 Intersection of fire-resistance-rated new or existing masonry, concrete and gypsum board partitions.
 - .4 Joints at top and bottom of fire resistance rated new or existing concrete masonry and gypsum board partitions. Joints to allow for independent movement.
 - .5 Control and sway joints in fire-resistance-rated new or existing masonry and gypsum board partitions and walls.
 - .6 Penetrations through fire-resistance-rated floor slabs/systems, ceilings and roof.
 - .7 Openings and sleeves installed for future use through fire separations and unused openings and sleeves constructed as part of work.

- .8 Around mechanical and electrical assemblies/devices penetrating fire separations.
- .9 Between edge of fire-resistant floor or roof assemblies and exterior wall assemblies.
- .10 Between floors, walls, ceilings and roof assemblies at horizontal and vertical fire resistant ratings at floor expansion joints.
- .11 Rigid ducts: fire stopping to consist of bead of fire stopping material between retaining angle and fire separation and between retaining angle and duct, on each side of fire separation.
- .12 Mechanical and electrical recessed boxes in walls and partitions.
- .13 Where indicated on drawing and specification documents.
- .14 Cables entering into a fire-rated pass-thru device at fire-rated walls and floor assemblies at end of cable trays or otherwise indicated on electrical drawings and specifications.
- .15 The continuous joint between the marriage of the fire-rated wall and floor assemblies to the:
 - .1 Mechanical fire-rated duct wrap (refer to Mechanical).
 - .2 Mechanical Stand-By Generator muffler and exhaust pipe (calcium silicate pipe and block insulation) (refer to Electrical and Mechanical).

3.5 INSTALLING FIRESTOP JOINT SYSTEMS

- .1 Install joint fillers to provide support of firestop materials during application and at the position required to provide the cross-sectional shapes and depths of installed firestop material relative to joint widths that allow optimum sealant movement capability and develop fire-resistance rating required.
- .2 Install systems by proven techniques that result in firestop materials as recommended by the manufacturer:
 - .1 directly containing and fully wetting joint substrates.
 - .2 completely filling recesses provided for each joint configuration,
 - .3 providing uniform, cross-sectional shapes and depths relative to joint width that optimize movement capability.
 - .4 Tool non-sag firestop materials immediately after their application and prior to the time skinning begins. Form smooth, uniform beads of configuration indicated or required to:
 - .1 produce fire-resistance rating
 - .2 to eliminate air pockets
 - .3 to ensure contact and adhesion with sides of joint.

3.6 INSTALLATION OF ASSEMBLY IDENTIFICATION PENETRATION PLATE

- .1 Install adjacent to all through wall/floor service penetrations / joints that are firestopped and at joint penetrations. Provide one assembly identification plate per penetration opening and one assembly identification plate at every 6000mm along wall/floor joints.
- .2 Penetration / joint plate shall be completely filled out and installed prior to requesting substantial performance.
- .3 Clean substrate prior to applying penetration / joint plate.
- .4 Securely apply penetration / joint plate to substrate, by providing adequate adhesive.
- .5 Install all plates 50mm away from penetration or joint. Refer to details on Pages 18 -20 of this Section.

3.7 INSTALLATION OF FIRE SEPARATION (BARRIER) MARKINGS

- .1 Install/paint barrier markings parallel with ceiling, approximately 400mm above finished ceiling.

3.8 REPAIRS AND MODIFICATIONS

- .1 Identify damaged or re-entered seals requiring repair or modification.

- .2 Remove loose or damaged materials. If penetrating items are to be added, remove sufficient material to insert new elements. Cause no damage to the balance of the seal.
- .3 Ensure that surfaces to be sealed are clean and dry. Install materials in accordance with manufacturers specified installation and repair requirements ~~herein~~. Use only materials approved by manufacturer as suitable for repair of original seal. Do not mix different manufacturer's products.

3.9 MANUFACTURER'S FIELD QUALITY

- .1 Representative from Manufacturer shall perform periodic observations of firestopping systems:
 - .1 Examine firestop penetration seals for proper installation, labelling, adhesion and curing as may be appropriate for the respective seal material.
 - .2 Keep areas of work accessible and notify Consultant, code authorities and/or designated inspectors of work completion released for Consultant review.
 - .3 Document completion and observation as required.

3.10 CONSULTANT REVIEW

- .1 The Consultant shall review all submitted Design System Listings (shop drawings) prior to start up meeting (Refer to item No. 1.7)
- .2 The Consultant to provide an agenda for a start up meeting, will chair the meeting, record meeting minutes and distribute. (Refer to item No. 1.10)
- .3 The Consultant shall perform mock-up reviews as indicated in Item No. 1.11.
- .4 The Consultant shall provide random General Reviews during the course of the project.
- .5 Consultants shall be called to perform random Observation Reviews during the course of construction and prior to closing off any concealed areas. These observations shall be based on ASTM E2174 Standard Practice for on-site inspection of Installed Firestop Systems and ASTM E2393 Standard practice for On-Site Inspection of Installed Fire Resistive Joint Systems and Perimeter Fire Barriers. Contractor shall notify Consultant minimum of 72-hours prior to requesting review.
- .6 Firestopping Sub-Trade shall include for a minimum of 10% Observation Review of each Design Listing for each area of 900m2 (based on ASTM E2174). Perimeter Joints shall have a minimum 10% Observation Reviews of each Design Listing (based on ASTM E2393). Bottom and top of wall joints, wall to wall joints and building expansion joints shall have a minimum 10% Observation Reviews of each Design Listing.
- .7 The Consultant shall perform Exploratory Reviews (Destructive Test) based on ASTM E2174, and E2393 during the course of construction where the system will be cut out by the Firestopping Sub-Trade as directed by the Consultant and removed to ensure the firestop system installed meets or exceeds the Design System Listing as identified. (Contractor to include these costs in their base bids.)
- .8 Firestopping Sub-Trade shall include for a minimum of 2% Exploratory Review of each Design Listing for each area of 900m2 (based on ASTM E2174) for such exploratory reviews per approved Design System Listings. Perimeter Joints shall have a minimum cut test every 15 meters (based on ASTM E2393). Bottom and top of wall joints, wall to wall joints and building expansion joints shall have a minimum Exploratory Review every 15 meters.
- .9 The Firestopping Sub-Trade shall do all cutting and removal of the systems during mock-up and exploratory reviews for visual review and size determination (thickness, depth and/or width of the system) from the Consultant and local manufacturer's Representative. Once the review is completed and accepted, the Firestopping Sub-Trade shall replace the firestop system with new. All costs for cutting, removing and replacement shall be included in base bid.
- .10 The Consultant shall perform random reviews of the Firestop Sub-trade's General Performance during their visits, such as:
 - .1 Daily worksheet (construction progress).
 - .2 Construction photographs.

- .3 Product storage, handling and delivery.
 - .4 As-built schedules and drawings.
 - .5 Penetration / Joint plate installation.
 - .6 Barrier marking installation
 - .7 Protection of installed systems.
 - .11 All Exploratory Reviews (cut tests) must meet the Design Listed Systems minimum thickness, depth and/or widths of the annular requirements. No shrinkage of the product installation will be allowed.
 - .12 All noted items indicated in firestop reviews must be reviewed by the Firestop Sub-trade(s) and responded by written letter back to the Consultant on the direction the Firestop Sub-trade has or will be taking:
 - .1 Start-up Meetings.
 - .2 General Meetings.
 - .3 Design Listing (Shop Drawing) Review.
 - .4 Mock-Up Reviews.
 - .5 General Reviews.
 - .6 Product Reviews.
 - .7 Observation Reviews.
 - .8 Destructive Reviews.
 - .9 Substantial Performance Reviews.
 - .13 All scheduled reviews shall be performed by the Consultant as indicated and agreed to by the Firestop Sub-trade(s) and can only be cancelled a minimum of 72-hours prior to the review. All other cancellations less than 72-hours shall be back-charged.
- 3.10 CLEAN-UP
- .1 Remove equipment, excess materials and debris and clean adjacent surfaces immediately after application. Use methods and cleaning materials approved by Manufacturer.
 - .2 Protect firestopping during and after curing period from contact with contaminating substances. If damage caused by others, Owner Contractor, the Contractor shall instruct the Firestop Sub-Trade to make appropriate repairs and charge to appropriate trades.
 - .3 Remove temporary dams after initial set of fire stop and smoke seal materials.

END OF SECTION