

This schedule is to be read in conjunction with the Drawings and Specification Sections.

Room No.	Room Name	Floor	Base	Walls				Ceiling	Notes:
				N	S	E	W		
SUB-BASEMENT									
001		EX	EX	EXP	EXP	EXP	EXP	MGW	
FIRST FLOOR									
101		EX	EX	EX	EX	EX	EX	EX	
102		EX	EX	EX	EX	EX	EXP	MGW	
103		EX	EX	EX	EX	EX	EX-ATR		
104		EX	EX	EX	EX	EX	EX-ATR		
105		EX	EX	EX	EXP	EX	EX	MGW	
106		EX	EX	EX	EX	EX	EX-ATR		
107		-	-	-	-	-	-		
108		EX	EX	EX	EX	EX	EX-ATR		
109		EX	EX	EX	EX	EX	EXP	MGW	
110		EX	EX	EX	EX	EX	EXP	MGW	
111		EX	EX	EX	EX	EXP	EXP	MGW	
112		EX	EX	EX	EX	EXP	EX	MGW	
113		EX	EX	EXP	EX	EX	EX-ATR		
114		EX	EX	EX	EXP	EX	EX		
115		EX	EX	EX	EXP	EX	EXP	MGW	
116		EX	EX	EX	EXP	EX	EX-ATR		
117		EX	EX	EX	EX	EX	EXP	MGW	
118		EX	EX	EXP	EX	EX	EX	MGW	
119		EX	EX	EXP	EXP	EXP	EX-ATR/GBP	New bulkheads this room	
120		EX	EX	EX	EX	EX	EX	MGW	
121		EX	EX	EX	EXP	EX	EX	MGW	
122		EX	EX	EX	EXP	EX	EX	MGW	
123		EX	EX	EX	EX	GBP	EXP	MGW	
124		EX	EX	EXP	EXP	EXP	EX-ATR		
125		EX	EX	EXP	EX	EX	EXP	MGW	
126		EX	EX	EX	EX	EX	EXP	MGW	

Room No.	Room Name	Floor	Base	Walls				Ceiling	Notes:
				N	S	E	W		
127		EX	EX	EX	EX	EX	EXP		
128		-	-	-	-	-	-		
129		EX	EX	EX	EX	EX	EXP		
130		EX	RB	EX	EX	EX	EX-ATR		
131		EX	RB	GBP/EXP	EXP	EXP	EXP		
132		EX	EX	EX	GBP/EXP	EX	EXP		
133		EX	EX	EX	EX	EX	EXP		
134		EX	RB	GBP	EX	EX	EX		
135		EX	RB	EXP	GBP	EXP	GBP		
136		EX	EX	EXP/GBP		EXP/GBP	EX-ATR/GBP	New bulkheads this room	
137		EX	EX	EXP		EXP	EX-ATR	New bulkheads this room	
138		EX	EX	EXP	EXP	EXP	GBP	New bulkheads this room	
139		EX	EX	EXP	EXP	EXP	EX-ATR/GBP	New bulkheads this room	
140		EX	EX	EX	EX	EX	EXP		
141		EX	EX	EX	EX	EX	EXP		
142		EX	EX	EX	EXP/GBP	EX	EXP		
143		EX	EX	EXP	EXP	EX	EX-ATR		
144		EX	EX	EXP	EX	EX	EXP		
145		EX	EX	EXP	EX	EX	EXP		
146		EX	EX	EX	EX	EX	EXP		
147		-	-	-	-	-	-		
SECOND FLOOR									
201		EX	EX	EX	EX	EXP	EX	EXP	
202		-	-	-	-	-	-	-	
203		EX	EX	EX	EX	EX	EX	EXP	
204		EX	EX	EXP	EX	EX	EX	EXP	
205		EX	EX	EXP	EX	EX	EX	EXP	
206		EX	EX	EX	EX	EX	EX	EXP	
207		EX	EX	EX	EX	EX	EX	EXP	
208		EX	EX	EX	EX	EXP	EX	EXP	

Room No.	Room Name	Floor	Base	Walls				Ceiling	Notes:
				N	S	E	W		
209		EX	EX	EX	EXP	EX	EXP		
210		EX	EX	EX	EX	EX	EXP		
211		EX	EX	EXP	EXP	EXP	GBP		
212		EX	EX	EX	EX	EXP	EX-ATR		
213		EX	EX	EX	EX	EX	EX-ATR		
214		EX	EX	EX	EX	EX	EX-ATR		
215		EX	EX	EX	EX	EX	EX-ATR		
216		EX	EX	EXP	EXP	EXP	EXP		
217		EX	EX	EXP	EX	EX	EX		
218		EX	EX	EXP	EXP	EX	EX		
219		EX	EX	EXP	EXP	EXP	GBP		
220		EX	EX	EX	EX	EX	EX-ATR		
221		EX	EX	EX	EX	EX	EXP		
222		EX	EX	EX	EX	EX	EXP		
223		EX	EX	EX	EX	EX	EX		
224		EX	EX	EX	EX	EX	EX		
225		EX	EX	EXP	EX	EX	EXP		
226		EX	EX	EX	EX	EX	EX		
227		EX	EX	EX	EX	EX	EXP		
228		EX	EX	EX	EX	EX	EXP		
229		EX	EX	EX	EX	EXP.GBP	EXP		
230		EX	EX	EXP	EXP	EX	EX-ATR		
231		EX	EX	EXP	EX	EX	EXP		
232		EX	EX	EXP	EX	EX	EXP		
233		EX	EX	EX	EX	EXP	EXP		
234		-	-	-	-	-	-		
235		EX	EX	EX	EX	EX	EXP		
236		EX	EX	EX	EX	EX	EXP		
237		EX	EX	EXP	EX	EX	EX		
238		EX	EX	EX	EX	EX	EXP		
239		EX	EX	GBP	EX	EX	EX-ATR		

Room No.	Room Name	Floor	Base	Walls				Ceiling	Notes:
				N	S	E	W		
240		EX	EX	EXP	EX	EX	EX		
241		EX	EX	EXP	EX	EX	EX		
242		EX	EX	EX	EX	EX	EXP		
245		EX	EX	EXP	EX	EX	EX		
244		EX	EX	EX	EX	EX	EXP		
245		EX	EX	EX	EX	EX	EXP		
246		EX	EX	EX	EXP/GBP	EX	EXP		
247		EX	EX	EXP	EX	EX	EX-ATR		
248		EX	EX	EX	EX	EX	EXP		
249		EX	EX	EXP	EX	EX	EXP		
250		EX	EX	EX	EX	EXP	EXP		
251		-	-	-	-	-	-		
THIRD FLOOR									
301		EX	EX	EX	EX	EX	EXP	EX	
302		-	-	-	-	-	-	-	
303		RSSF	RB	EXP/GBP	EXP	EXP	EXP	GBP	
304		RSSF	RB	EXP/GBP	EXP/GBP	EXP	EXP	GBP	
305		VCT	RB	GBP	GBP	GBP	GBP	GBP	
306		VCT	RB	-	EXP	GBP/EXP	EXP	AT-1	
307		RBF	RB	GBEP	GBEP	GBEP	GBEP	GBEP	
308		VCT	RB	GBP	GBP	GBP	GBP	AT-1	
309		VCT	RB	GBP	GBP	GBP	GBP	AT-2	
310		VCT	RB	GBP	GBP	GBP	GBP	GBP	
311		VCT	RB	GBP	GBP	GBP	GBP	GBP	
312		VCT	RB	GBP	GBP	GBP	GBP	AT-2	
313		CAR	RB	GBP	GBP	GBP	GBP	AT-2	
314		VCT	RB	-	GBP	GBP	GBP	AT-1	
315		VCT	RB	GBP	GBP	GBP	GBP	AT-1/GBP	
316		VCT	RB	GBP	-	-	GBP	AT-1/AT-2	
317		VCT	RB	GBP	GBP	GBP	GBP	AT-1/AT-2/GBP	

Room No.	Room Name	Floor	Base	Walls				Ceiling	Notes:
				N	S	E	W		
318		VCT	RB	-	GBP	GBP	AT-1/GBP		
319		CAR	RB	GBP	GBP	GBP	AT-2/GBP		
320		CAR	RB	GBP	GBP	GBP	AT-2/GBP		
321		CAR	RB	GBP	GBP	GBP	AT-2/GBP		
322		CAR	RB	GBP	GBP	GBP	AT-1/GBP		
323		CAR	RB	GBP	GBP	GBP	AT-2/GBP		
324		VCT	RB	EXP	GBP	GBP	GBP		
325		SDT	RB	GBP	GBP	GBP/EXP	GBP		
326		EX	EX	EX	EX	EX	EX		
327		VCT	RB	EXP	EXP	EXP	EXP		
328		VCT	RB	EXP	EXP	GBP	AT-2	One layer AT-2 tile	
329		EX	EX/RB	EXP	EXP	EXP	EXP		
330		RSSF	RB	GBP	GBP/EXP	GBP/EXP	AT-2/GBP		
331		RSSF	RB	GBP	GBP	GBP	AT-1		
332		CAR	RB	GBP	GBP	GBP	AT-2		
333		RSSF	RB	GBP	GBP	GBP	AT-1		
334		RSSF	RB	GBP	GBP	GBP	MPC/GBP		
335		RSSF	RB	GBP	GBP	GBP	MPC/GBP		
336		VCT	RB	GBP	GBP	GBP	AT-1/GBP		
337		CAR	RB	GBP	GBP	GBP	AT-2/GBP		
338		RSSF	RB	GBP	GBP	GBP	GBP		
339		RSSF	RB	GBP	GBP	GBP	GBP		
340		RSSF	RB	GBEP	GBEP	-	MPC/GBP	Non-perforated between grids L&M	
341		RSSF	RB	GBEP	GBEP	GBEP	GBEP		
342		RSSF	RB	GBEP	GBEP	GBEP	GBEP		
343		RSSF	RB	GBEP	GBEP	GBEP	GBEP		
344		RSSF	RB	GBEP	GBEP	GBEP	GBEP		
345		RSSF	RB	GBEP	GBEP	GBEP	GBEP		
346		RSSF	RB	GBEP	GBEP	GBEP	GBEP		
347		RSSF	RB	GBEP	GBEP	GBEP	GBEP		
348		CAR	RB	EXP	GBP	GBP	AT-2		

Room No.	Room Name	Floor	Base	Walls				Ceiling	Notes:
				N	S	E	W		
349		VCT	RB	EXP	EXP	EXP	EXP	EXP	
350		EX	EX	EX	EXP/GBP	EXP/GBP	EXP	EXP	
351		EX	EX	EXP/GBP	EXP	EXP/GBP	EXP/GBP	AT-1	
352		EX	EX	EXP	EXP	EXP	EXP	EXP	
353		EX	EX	EXP	EXP	EXP	EXP	EXP	
354		EX	EX/RB	EXP/GBP /CWT	EXP/GBP /CWT	EXP/GBP /CWT	EXP/GBP /CWT	EXP	Match height of new ceramic tile with the existing tile
354.1		EX	RB	GBP	GBP	GBP	GBP	EXP	
355		-	-	-	-	-	-	-	
356		VCT	RB	GBP	GBP	EXP	EXP	EXP	
357		VCT	RB	EXP/GBP	EXP	EXP	EXP	EXP	
358		EX	EX	EX	EX	EX	EX	EX	
359		EX	EX	EX	EX	EX	EX	EX	
360		VCT	RB	EXP	GBP	EXP	GBP	AT-2/GBP	One layer AT-2 tile
360.1		VCT	RB	EXP/GBP	GBP	EXP/GBP	GBP	AT-2/GBP	
361		VCT	RB	GBP	GBP	EXP	GBP	AT-1/GBP	
362		RSSF	RB	GBP	GBP	GBP	GBP	AT-1/AT-2/GBP	
363		RSSF	RB	GBEP	GBEP	GBEP	-	MCP/GBP	
364		CAR	RB	GBP	GBP	GBP	GBP	AT-2/GBP	
365		RSSF	RB	GBEP	GBEP	-	GBEP	MCP/GBP	
366		RSSF	RB	GBEP	GBEP	GBEP	GBEP	GBEP	
367		RSSF	RB	GBEP	GBEP	GBEP	GBEP	GBEP	
368		RSSF	RB	GBEP	GBEP	GBEP	GBEP	GBEP	
369		RSSF	RB	GBEP	GBEP	GBEP	GBEP	GBEP	
370		RSSF	RB	GBEP	GBEP	GBEP	GBEP	GBEP	
371		RSSF	RB	GBEP	GBEP	GBEP	GBEP	GBEP	
372		VCT	RB	GBP	GBP	GBP	GBP	AT-2/GBP	
373		VCT	RB	EXP	EXP/GBP	EXP	EXP	EXP	
374		EX	EX	EX	EXP/GBP	EXP/GBP	EX	EXP	
375		EX	EX	EXP/GBP	GBP	EXP/GBP	EXP/GBP	AT-1	
376		EX	EX	EXP	EXP	EXP	EXP	EXP	

Room No.	Room Name	Floor	Base	Walls				Ceiling	Notes:
				N	S	E	W		
377		EX	EX	EXP	EXP	EXP	EXP		
378		EX	EX	EX/EXP	EX/EXP	EX/EXP	EXP		
379		-	-	-	-	-	-		
380		-	-						
FOURTH FLOOR									
401		EX	EX	EX	EX	EX	EX	EX	
402		-	-	-	-	-	-	-	
403		EX	EX	EX	EX	EX	EX	EX	
404		EX	EX	EX	EX	EX	EX	EX	
405		EX	EX	EX	EX	EX	EX	EX	
406		VCT	RB	-	EXP	GBP/EXP	GBP	AT-1/GBP	
407		CAR	RB	GBP	GBP	GBP	GBP	AT-1/T-2/GBP	
408		CAR	RB	GBP	GBP	GBP	GBP	AT-1/AT-2/GBP	
409		CAR	RB	GBP	GBP	GBP	GBP	AT-1/AT-2/GBP	
410		VCT	RB	GBP	-	GBP	EXP	GBP/EXP	
411		CAR	RB	GBP	GBP	GBP	GBP	AT-1/T-2/GBP	
412		CAR	RB	GBP	GBP	GBP	GBP	AT-2/GBP	
413		CAR	RB	GBP	GBP	GBP	GBP	AT-1/T-2/GBP	
414		SDT	RB	EXP	GBP	EXP	EXP	GBP	
415		EX	EX	EX	EX	EX	EX	EXP	
416		VCT	EX/RB	EXP	EXP	EXP	EXP	EXP	
417		VCT	RB	EXP	EXP	EXP	EXP	AT-2/GBP	
418		VCT	RB	EXP	EXP	GBP	EXP	AT-1/GBP	
419		EX	EX	EX	EX	EX	EX	EX	
419.1		-	-	-	-	-	-	-	
420		CAR	RB	EXP	GBP	EXP	GBP	AT-2/GBP	
421		CAR	RB	GBP	GBP	EXP	-	AT-1/GBP	
422		SDT	RB	GBP	EXP	EXP	GBP	AT-2/GBP	
423		CAR	RB	EXP	EXP	GBP	GBP	AT-1/AT-2/GBP	
424		CAR	RB	EXP	EXP	GBP	EXP	AT-1/GBP	

Room No.	Room Name	Floor	Base	Walls				Ceiling	Notes:
				N	S	E	W		
425		VCT	RB	EXP	EXP	EXP	EXP	EXP	
426		EX	EX	EX	EX	EX	EX	EXP	
427		EX	EX	EXP/GBP	EXP/GBP	EXP/GBP	EXP/GBP	AT-1	
428		EX	EX	EXP	EXP	EXP	EXP	EXP	
429		EX	EX	EXP	EXP	EXP	EXP	EXP	
430		EX	EX	EXP	EXP	EXP	EXP	EXP	Patch holes in terrazzo floor
431		-	-	-	-	-	-	-	
432		VCT	RB	EXP	GBP	EXP	EXP	EXP	
433		RSSF	CWT	CWT/EXP	CWT/EXP	CWT/EXP	CWT/EXP	EXP	Ceramic wall tile 2000 high
434		EX	EX	EX	EX	EX	EX	EXP	
435		EX	EX	EX	EX	EX	EX	EXP	
436		VCT	RB	EXP/GBP	EXP/GBP	EXP	GBP	AT-2	One layer of AT-2 tile
436.1		VCT	RB	GBP	GBP	EXP	GBP	AT-2	One layer of AT-2 tile
437		CAR	RB	GBP	GBP	GBP	GBP	AT-1/AT-2/GBP	
438		CAR	RB	GBP	GBP	GBP	GBP	AT-1/AT-2/GBP	
439		VCT	RB	GBP	GBP	GBP	EXP	QT-1/GBP	
440		CAR	RB	GBP	GBP	GBP	GBP	AT-1/AT-2/GBP	
441		VCT	RB	EXP	EXP	EXP	EXP	EXP	
442		EX	EX	EX	EX	EX	EX	EXP	
443		EX	EX	GBP	EXP	EXP	EXP	AT-1	
444		EX	EX	EXP	EXP	EXP	EXP	EXP	
445		EX	EX	EXP	EXP	EXP	EXP	EXP	
446		EX	EX	EXP/GBP /CWT	EXP/GBP /CWT	EXP/GBP /CWT	EXP/GBP /CWT	EXP	Match height of new ceramic tile with the existing tile
446.1		EX	EX/RB	EXP/GBP	EXP/GBP	EXP/GBP	EXP/GBP	EXP	
447		-	-	-	-	-	-	-	
PENTHOUSE									
501		EX	EX	EX	EX	EX	EX	EX	
502		EX	EX	EX	EX	EX	EX	EX	

List of Abbreviations:



<b>FLOORS</b>		<b>WALL</b>	
CAR	CARPET TILE	CWT	CERAMIC WALL TILE
CFT	CERAMIC FLOOR TILE	EX	EXISTING TO REMAIN
EX	EXISTING TO REMAIN	EXP	EXISTING - PAINTED
RBF	RUBBER TILE FLOORING	GBP	GYPSUM BOARD – PAINTED
RSSF	RESILIENT SHEET SAFETY FLOORING	GBEP	GYPSUM BOARD – EPOXY PAINTED
VCT	VINYL COMPOSITE TILE		
SDT	STATIC DISSIPATIVE TILE		
<b>BASE</b>		<b>CEILING</b>	
EX	EXISTING TO REMAIN	AT-1	ACOUSTICAL CEILING TILE TYPE 1
RB	RUBBER BASE (09 68 00)	AT-2	ACOUSTICAL CEILING TILE TYPE2
CWT	CERAMIC WALL TILE	EX	EXISTING TO REMAIN
		EX-ATR	EXISTING ACOUSTIC TILE – REMOVE & REPLACE AS REQUIRED FOR NEW WORK
		EXP	EXISTING - PAINTED
		GBP	GYPSUM BOARD – PAINTED
		GBEP	GYPSUM BOARD – EPOXY PAINTED
		MPC	METAL PANEL CEILING
	<b>GENERAL NOTE</b>		
	PATCH, REPAIR AND PAINT ALL WALLS AND CEILINGS THROUGHOUT WHERE THEY ARE AFFECTED BY NEW WORK. REFER ALSO TO MECHANICAL AND ELECTRICAL DRAWINGS FOR COMPLETE SCOPE OF WORK.		



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**Part 1            General**

**1.1                REFERENCES**

- .1    American Society for Testing and Materials International, (ASTM)
  - .1    ASTM C36/C36M-03e1, Specification for Gypsum Wallboard.
  - .2    ASTM C475-12, Specification for Joint Compound and Joint Tape for Finishing Gypsum Board.
  - .3    ASTM C840-11, Specification for Application and Finishing of Gypsum Board.
  - .4    ASTM C841-03(2008), Standard Specification for Installation of Interior Lathing and Furring.
  - .5    ASTM C1002-07, Specification for Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs.
  - .6    ASTM C1047-10a, Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base.
  - .7    ASTM C1178/C1178M-11, Specification for Glass Mat Water-Resistant Gypsum Backing Board.
  - .8    ASTM C1396/C1396M-11, Standard Specification for Gypsum Board.
  - .9    ASTM C1629/C1629M-06(2011), Standard Classification for Abuse-Resistant Nondecorated Interior Gypsum Panel Products and Fiber-Reinforced Cement Panels
- .2    Association of the Wall and Ceilings Industries International (AWEI)
- .3    Canadian General Standards Board (CGSB)
  - .1    CAN/CGSB-51.34-M86(R1988), Vapour Barrier, Polyethylene Sheet for Use in Building Construction.
- .4    Underwriters' Laboratories of Canada (ULC)
  - .1    CAN/ULC-S102-2007, Surface Burning Characteristics of Building Materials and Assemblies.

**1.2                DELIVERY, STORAGE AND HANDLING**

- .1    Deliver materials in original packages, containers or bundles bearing manufacturers brand name and identification.
- .2    Store materials inside, level, under cover. Keep dry. Protect from weather, other elements and damage from construction operations and other causes.
- .3    Handle gypsum boards to prevent damage to edges, ends or surfaces. Protect metal accessories and trim from being bent or damaged.

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**1.3 SITE ENVIRONMENTAL REQUIREMENTS**

- .1 Maintain temperature minimum 10 degrees C, maximum 21 degrees C for 48 hours prior to and during application of gypsum boards and joint treatment, and for at least 48 hours after completion of joint treatment.
- .2 Apply board and joint treatment to dry, frost free surfaces.
- .3 Ventilation: Ventilate building spaces as required to remove excess moisture that would prevent drying of joint treatment material immediately after its application.

**1.4 WASTE MANAGEMENT AND DISPOSAL**

- .1 Separate and recycle waste materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
- .2 Divert unused metal materials from landfill to metal recycling facility.
- .3 Do not dispose of unused paint and caulking materials into sewer systems, into lakes, streams, onto ground or in other locations where it will pose health or environmental hazard.

**Part 2 Products**

**2.1 MATERIALS**

- .1 Standard board: to ASTM C36/C36M, Type X, 16 mm thick, 1200 mm wide x maximum practical length, ends square cut, edges bevelled.
- .2 Glass mat water-resistant gypsum backing board: to ASTM C1178/C1178M, 16 mm thick, 1200 mm wide x maximum practical length.
- .3 Abuse-resistant gypsum board: to ASTM C1396 and ASTM C1629, 12.7 mm thick, 1200 mm wide x maximum practical length, ends square cut, edges bevelled.
- .4 Metal furring runners, hangers, tie wires, inserts, and anchors required for installation to ASTM C841.
- .5 Drywall furring channels: 0.5 mm core thickness galvanized steel channels for screw attachment of gypsum board.
- .6 Resilient drywall furring: 0.5 mm base steel thickness galvanized steel for resilient attachment of gypsum board.
- .7 Metal channel stiffener: 19 x 1.4 mm thick cold rolled steel, coated with rust inhibitive coating.
- .8 Steel drill screws: to ASTM C1002.
- .9 Casing beads, corner beads, control joints and edge trim: to ASTM C1047, metal, zinc-coated by electrolytic process, 0.5 mm base thickness, perforated flanges, one piece length per location.

- .10 Sealants: in accordance with Section 07 92 00 - Joint Sealants.
- .11 Acoustic sealant: in accordance with Section 07 92 00 - Joint Sealants.
- .12 Polyethylene: to CAN/CGSB-51.34, Type 2.
- .13 Insulating strip: rubberized, moisture resistant, 3 mm thick closed cell neoprene strip, 12 mm wide, with self-sticking permanent adhesive on one face, lengths as required.
- .14 Joint compound: to ASTM C475, asbestos-free.

**Part 3 Execution**

**3.1 ERECTION**

- .1 Do application and finishing of gypsum board in accordance with ASTM C840 except where specified otherwise.
- .2 Erect hangers and runner channels for suspended gypsum board ceilings in accordance with ASTM C840 except where specified otherwise.
- .3 Support light fixtures by providing additional ceiling suspension hangers within 150 mm of each corner and at maximum 600 mm around perimeter of fixture.
- .4 Install work level to tolerance of 1:1200.
- .5 Frame with furring channels, perimeter of openings for access panels, light fixtures, diffusers, and grilles.
- .6 Furr for gypsum board faced vertical bulkheads within and at termination of ceilings.
- .7 Furr above suspended ceilings for gypsum board fire and sound stops and to form plenum areas as indicated.
- .8 Install wall furring for gypsum board wall finishes in accordance with ASTM C840, except where specified otherwise.
- .9 Furr openings and around built-in equipment, cabinets, access panels, on four sides. Extend furring into reveals. Check clearances with equipment suppliers.
- .10 Furr duct shafts, beams, columns, pipes and exposed services where indicated.
- .11 Erect drywall resilient furring transversely across studs, spaced maximum 600 mm on centre and not more than 150 mm from ceiling/wall juncture. Secure to each support with 25 mm drywall screw.

**3.2 APPLICATION**

- .1 Do not apply gypsum board until bucks, anchors, blocking, sound attenuation, electrical and mechanical work are approved.

- .2 Apply single and double layer gypsum board (as indicated on drawings) to metal furring or framing using screw. Maximum spacing of screws, 300 mm on centre.
  - .1 Single-Layer Application:
    - .1 Apply gypsum board on ceilings prior to application of walls in accordance with ASTM C840.
    - .2 Apply gypsum board vertically or horizontally, providing sheet lengths that will minimize end joints.
  - .2 Double-Layer Application:
    - .1 Install gypsum board for base layer and exposed gypsum board for face layer.
    - .2 Apply base layer to ceilings prior to base layer application on walls; apply face layers in same sequence. Offset joints between layers at least 250 mm.
    - .3 Apply base layers at right angles to supports unless otherwise indicated.
    - .4 Apply base layer on walls and face layers vertically with joints of base layer over supports and face layer joints offset at least 250 mm with base layer joints.
- .3 Apply water-resistant gypsum board where wall tiles to be applied. Apply water-resistant sealant to edges, ends, cut-outs which expose gypsum core and to fastener heads. Do not apply joint treatment on areas to receive tile finish.
- .4 Install ceiling boards in direction that will minimize number of end-butt joints. Stagger end joints at least 250 mm.
- .5 Install gypsum board on walls vertically to avoid end-butt joints. At stairwells and similar high walls, install boards horizontally with end joints staggered over studs, except where local codes or fire-rated assemblies require vertical application.
- .6 Install gypsum board with face side out.
- .7 Do not install damaged or damp boards.
- .8 Locate edge or end joints over supports. Stagger vertical joints over different studs on opposite sides of wall.

### **3.3 INSTALLATION**

- .1 Erect accessories straight, plumb or level, rigid and at proper plane. Use full length pieces where practical. Make joints tight, accurately aligned and rigidly secured. Mitre and fit corners accurately, free from rough edges. Secure at 150 mm on centre.
- .2 Install casing beads around perimeter of suspended ceilings.
- .3 Install casing beads where gypsum board butts against surfaces having no trim concealing junction and where indicated.
- .4 Install closed cell foam neoprene gasket where partitions abut window mullions, to provide sound seal gasket.

- .5 Construct control joints of preformed units set in gypsum board facing and supported independently on both sides of joint.
- .6 Provide continuous polyethylene dust barrier behind and across control joints.
- .7 Apply 12 mm diameter bead of acoustic sealant continuously around perimeter of first layer of multiple layers of gypsum board to seal gypsum board/structure junction where partitions abut fixed building components. Seal full perimeter of cut-outs around electrical boxes, ducts, and penetrations, in partitions where perimeter sealed with acoustic sealant.
- .8 Install access doors to electrical and mechanical fixtures specified in respective sections.
  - .1 Rigidly secure frames to furring or framing systems.
- .9 Finish face panel joints and internal angles with joint system consisting of joint compound, joint tape and taping compound installed according to manufacturer's directions and feathered out onto panel faces.
- .10 Gypsum Board Finish: finish gypsum board walls and ceilings to following levels in accordance with Association of the Wall and Ceiling Industries (AWCI) International Recommended Specification on Levels of Gypsum Board Finish:
  - .1 Levels of finish:
    - .1 Level 0: No taping, finishing or accessories required.
    - .2 Level 1: Embed tape for joints and interior angles in joint compound. Surfaces to be free of excess joint compound; tool marks and ridges are acceptable.
    - .3 Level 2: Embed tape for joints and interior angles in joint compound and apply one separate coat of joint compound over joints, angles, fastener heads and accessories; surfaces free of excess joint compound; tool marks and ridges are acceptable.
    - .4 Level 3: Embed tape for joints and interior angles in joint compound and apply two separate coats of joint compound over joints, angles, fastener heads and accessories; surfaces smooth and free of tool marks and ridges.
    - .5 Level 4: Embed tape for joints and interior angles in joint compound and apply three separate coats of joint compound over joints, angles, fastener heads and accessories; surfaces smooth and free of tool marks and ridges.
    - .6 Level 5: Embed tape for joints and interior angles in joint compound and apply three separate coats of joint compound over joints, angles, fastener heads and accessories; apply a thin skim coat of joint compound to entire surface; surfaces smooth and free of tool marks and ridges.
- .11 Finish corner beads, control joints and trim as required with two coats of joint compound and one coat of taping compound, feathered out onto panel faces.
- .12 Fill screw head depressions with joint and taping compounds to bring flush with adjacent surface of gypsum board so as to be invisible after surface finish is completed.
- .13 Sand lightly to remove burred edges and other imperfections. Avoid sanding adjacent surface of board.

- .14 Completed installation to be smooth, level or plumb, free from waves and other defects and ready for surface finish.
- .15 Mix joint compound slightly thinner than for joint taping.
- .16 Apply thin coat to entire surface using trowel or drywall broadknife to fill surface texture differences, variations or tool marks.
- .17 Allow skim coat to dry completely.
- .18 Remove ridges by light sanding or wiping with damp cloth.
- .19 Provide protection that ensures gypsum drywall work will remain without damage or deterioration at time of substantial completion.

### **3.4 CONTROL JOINTS**

- .1 Provide control joints at not greater than 9 m spacing on continuous gypsum board walls in a single plane and at not greater than 9 m spacing on ceilings and bulkheads except where indicated otherwise in the drawings.
  - .1 Confirm location of control joints with the Consultant prior to installation of gypsum board
- .2 Provide control joints of preformed units set in gypsum board facing and supported independently on both sides of joint. Interrupt top and bottom tracks at location of control joint.
- .3 Install control joints straight and true. Finish control joints as required with two coats of joint compound and one coat of taping compound, feathered out onto panel faces.

### **3.5 SCHEDULES**

- .1 Levels of finish: Interior partitions;
  - .1 Level 1:
    - .1 Plenums above suspended ceilings, inside of duct shafts and other gypsum board wall areas not exposed to view.
  - .2 Level 4:
    - .1 Vertical surfaces (walls, other than corridors) exposed to view.
    - .2 Ceilings and underside of bulkheads exposed to view.
  - .3 Level 5:
    - .1 Vertical surfaces (walls in corridors) exposed to view.

**END OF SECTION**



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**Part 1            General**

**1.1                REFERENCES**

- .1    American Society for Testing and Materials International, (ASTM).
  - .1        ASTM C645-11a, Specification for Nonstructural Steel Framing Members.
  - .2        ASTM C754-11, Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products.
- .2    Canadian Standards Association (CSA International)
  - .1        CSA W59-03(R2008),Welded Steel Construction (Metal Arc Welding).

**1.2                QUALITY ASSURANCE**

- .1    Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties.
- .2    Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

**1.3                WASTE MANAGEMENT AND DISPOSAL**

- .1    Separate and recycle waste materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
- .2    Divert unused metal materials from landfill to metal recycling facility.

**Part 2            Products**

**2.1                MATERIALS**

- .1    Non-load bearing channel stud framing: to ASTM C645, stud size as noted on drawings and Partition Schedule, roll formed from 0.478 mm steel (25ga) and from 1.146 steel (18ga) as noted on drawings and Partition Schedule; hot dipped galvanized steel sheet, for screw attachment of gypsum board. Knock-out service holes at 460 mm centres.
- .2    Floor and ceiling tracks: to ASTM C645, in widths to suit stud sizes, 32 mm flange height. Thickness as noted for studs in Partition Schedule.
- .3    Metal channel stiffener: cold rolled steel, coated with rust inhibitive coating.
- .4    Acoustical sealant: in accordance with Section 07 92 00 – Joint Sealants.
- .5    Insulating strip: rubberized, moisture resistant 3 mm thick closed cell neoprene strip, 12 mm wide, with self sticking permanent adhesive on one face, lengths as required.
- .6    Welding materials: to CSA W59.

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**Part 3 Execution**

**3.1 ERECTION**

- .1 Align partition tracks at floor and ceiling and secure at 400 mm on centre maximum.
- .2 Install damp proof course under stud shoe tracks of partitions on slabs on grade.
- .3 Place studs vertically at 400 mm and 600 mm on centre (refer to drawings) and not more than 50 mm from abutting walls, and at each side of openings and corners. Position studs in tracks at floor and ceiling. Cross brace steel studs as required to provide rigid installation to manufacturer's instructions.
- .4 Erect metal studding to tolerance of 1:1000.
- .5 Attach studs to bottom track using screws.
- .6 Co-ordinate simultaneous erection of studs with installation of service lines. When erecting studs ensure web openings are aligned.
- .7 Co-ordinate erection of studs with installation of door/window frames and special supports or anchorage for work specified in other Sections.
- .8 Provide two studs extending from floor to ceiling at each side of openings wider than stud centres specified. Weld studs together, placed alongside frame anchor clips.
- .9 Do welding work in accordance with CSA W59 unless specified otherwise
- .10 Erect track at head of door/window openings and sills of sidelight/window openings to accommodate intermediate studs. Secure track to studs at each end, in accordance with manufacturer's instructions. Install intermediate studs above and below openings in same manner and spacing as wall studs.
- .11 Frame openings and around built-in equipment, cabinets, access panels, on four sides. Extend framing into reveals. Check clearances with equipment suppliers.
- .12 Install steel studs or furring channel between studs for attaching electrical and other boxes.
- .13 Extend partitions to ceiling height except where noted otherwise on drawings.
- .14 Maintain clearance under beams and structural slabs to avoid transmission of structural loads to studs. Use double track slip joint.
- .15 Install continuous insulating strips to isolate studs from uninsulated surfaces.
- .16 Install two continuous beads of acoustical sealant or insulating strip under studs and tracks around perimeter of sound control partitions.

**3.2 CLEANING**

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

**END OF SECTION**



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**Part 1            General**

**1.1                REFERENCES**

- .1        American National Standards Institute (ANSI)/Ceramic Tile Institute (CTI)
  - .1            ANSI A108.1-99, Specification for the Installation of Ceramic Tile (Includes ANSI A108.1A-C, 108.4-.13, A118.1-.10, ANSI A136.1).
- .2        American Society for Testing and Materials International (ASTM)
  - .1            ASTM C979/C979M-10, Standard Specification for Pigments for Integrally Coloured Concrete.
- .3        Canadian General Standards Board (CGSB)
  - .1            CAN/CGSB-75.1-M88, Tile, Ceramic.
  - .2            CAN/CGSB-25.20-95, Surface Sealer for Floors.
- .4        Terrazzo Tile and Marble Association of Canada (TTMAC)
  - .1            Tile Specification Guide 09 30 00, 2012-14, Tile Installation Manual.
  - .2            Tile Maintenance Guide 2014.

**1.2                SUBMITTALS**

- .1        Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2        Provide product data in accordance with Section 01 33 00 - Submittal Procedures.
  - .1            Include manufacturer's information on:
    - .1            Ceramic tile, marked to show each type, size, and shape required.
    - .2            Chemical resistant mortar and grout (Epoxy and Furan).
    - .3            Cementitious backer unit.
    - .4            Dry-set cement mortar and grout.
    - .5            Divider strip.
    - .6            Elastomeric membrane and bond coat.
    - .7            Reinforcing tape.
    - .8            Levelling compound.
    - .9            Latex cement mortar and grout.
    - .10          Commercial cement grout.
    - .11          Organic adhesive.
    - .12          Slip resistant tile.
    - .13          Waterproofing isolation membrane.
    - .14          Fasteners.
- .3        Provide samples in accordance with Section 01 33 00 - Submittal Procedures.
  - .1            Base tile: submit duplicate sample panels of each colour, texture, size, and pattern of tile.

- .2 Wall tile: submit duplicate sample panels of each colour, texture, size, and pattern of tile.
- .3 Floor tile: submit duplicate sample panels of each colour, texture, size, and pattern of tile.
- .4 Metal trim: submit duplicate samples, 150mm in length, of each metal trim.
- .5 Adhere tile samples to 11 mm thick plywood and grout joints to represent project installation.

### **1.3 MOCK-UP**

- .1 Construct mock-ups in accordance with Section 01 45 00 - Quality Control.
- .2 Allow 48 hours for inspection of mock-up by Departmental Representative before proceeding with work.
- .3 When accepted, mock-up will demonstrate minimum standard for this work. Mock-up may remain as part of finished work.

### **1.4 QUALITY ASSURANCE**

- .1 Quality Assurance Submittals:
  - .1 Manufacturer's Instructions: manufacturer's installation instructions.
  - .2 Tile installer: minimum 5 years proven experience.

### **1.5 DELIVERY, STORAGE AND HANDLING**

- .1 Packing, shipping, handling and unloading:
  - .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Waste Management and Disposal:
  - .1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

### **1.6 AMBIENT CONDITIONS**

- .1 Maintain air temperature and structural base temperature at ceramic tile installation area above 12 degrees C for 48 hours before, during, and 48 hours after, installation.
- .2 Do not install tiles at temperatures less than 12 degrees C or above 38 degrees C.
- .3 Do not apply epoxy mortar and grouts at temperatures below 15 degrees C or above 25 degrees C.

### **1.7 MAINTENANCE**

- .1 Extra Materials:
  - .1 Provide maintenance materials in accordance with Section 01 78 00 - Closeout Submittals.

- .2 Provide minimum 2% of each type and colour of tile required for project for maintenance use. Store where directed.
- .3 Maintenance material same production run as installed material.

## **Part 2 Products**

### **2.1 WALL TILE**

- .1 Ceramic tile: to CAN/CGSB-75.1, Type 4, Class MR 1, 100 x 100 x 10 mm size, rounded edges, glazed surface, solid colour as selected by Departmental Representative from manufacturer's standard range. Matching square edge trim to suit application.

### **2.2 BASE TILE**

- .1 Base: square edge; type, size, colour and texture to match adjacent wall material.

### **2.3 FLOOR TILE**

- .1 Ceramic tile: to CAN/CGSB-75.1, Type 4, Class MR 1, 300 x 300 x 9 mm size, square edges, unglazed porcelain, slip resistant surface, matte finish. Colour as selected by Departmental Representative from manufacturer's standard range.
- .2 Acceptable manufacturers:
  - .1 Ames Tile and Stone Ltd.
  - .2 Olympia Tile
  - .3 Approved alternate.

### **2.4 TRIM SHAPES**

- .1 Conform to applicable requirements of adjoining floor and wall tile.
- .2 Use slip resistant trim shapes for horizontal surfaces of showers, overflow ledges, recessed steps, shower curbs, drying area curbs, and stools.
- .3 Use trim shapes sizes conforming to size of adjoining field wall tile, including existing spaces, unless specified otherwise.
- .4 Internal and External Corners: provide trim shapes as follows where indicated.
  - .1 Bullnose shapes for external corners including edges.
  - .2 Coved shapes for internal corners.

### **2.5 MORTAR AND ADHESIVE MATERIALS**

- .1 Latex additive: formulated for use in cement mortar and thin set bond coat.
- .2 Water: potable and free of minerals and chemicals which are detrimental to mortar and grout mixes.

### **2.6 BOND COAT**

- .1 Latex Cement mortar: to ANSI A108.1, two-component universal dry-set mortar.

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## **2.7 GROUT**

- .1 Colouring Pigments:
  - .1 Pure mineral pigments, limeproof and nonfading, complying with ASTM C979.
  - .2 Colouring pigments to be added to grout by manufacturer.
  - .3 Job coloured grout are not acceptable.
  - .4 Use in Commercial Cement Grout, Dry-Set Grout, and Latex Cement Grout.
  - .5 Colour: to be selected from manufacturer's standard range.
- .2 Latex Cement Grout: to ANSI A108.1, fast curing, high early strength, polymer-modified, stain resistant, sanded mix for floors, unsanded mix for walls and floors with polished tiles commercial tile grout.

## **2.8 ACCESSORIES**

- .1 Finishing and edge strips: purpose made metal.
  - .1 Top edge of ceramic tile: extruded, clear anodized aluminum.
- .2 Transition Strips: purpose made profiled metal, stainless steel type, maximum slope 1:2. Height as required.
- .3 Sealant: in accordance with Section 07 92 00 - Joint Sealants.
- .4 Floor sealer and protective coating: to CAN/CGSB-25.20, to tile and grout manufacturer's recommendations.

## **2.9 PATCHING AND LEVELLING COMPOUND**

- .1 Cement base, acrylic polymer compound, manufactured specifically for resurfacing and leveling concrete floors. Products containing gypsum are not acceptable.
- .2 Have not less than the following physical properties:
  - .1 Compressive strength - 25 MPa.
  - .2 Tensile strength - 7 MPa.
  - .3 Flexural strength - 7 MPa.
  - .4 Density - 1.9.
- .3 Capable of being applied in layers up to 50 mm thick, being brought to feather edge, and being trowelled to smooth finish.
- .4 Ready for use in 48 hours after application.

## **2.10 CLEANING COMPOUNDS**

- .1 Specifically designed for cleaning masonry and concrete and which will not prevent bond of subsequent tile setting materials including patching and leveling compounds and elastomeric waterproofing membrane and coat.
- .2 Materials containing acid or caustic material are not acceptable.



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**Part 3 Execution**

**3.1 MANUFACTURER'S INSTRUCTIONS**

- .1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheets.

**3.2 WORKMANSHIP**

- .1 Do tile work in accordance with TTMAC Tile Installation Manual 2012-2014, "Ceramic Tile", except where specified otherwise.
- .2 Apply tile to clean and sound surfaces.
- .3 Fit tile around corners, fitments, fixtures, drains and other built-in objects. Maintain uniform joint appearance. Cut edges smooth and even. Do not split tiles.
- .4 Maximum surface tolerance 1:800.
- .5 Make joints between tile uniform and approximately 2 mm wide, plumb, straight, true, even and flush with adjacent tile. Ensure sheet layout not visible after installation. Align patterns.
- .6 Lay out tiles so perimeter tiles are minimum 1/2 size.
- .7 Sound tiles after setting and replace hollow-sounding units to obtain full bond.
- .8 Make internal angles square, external angles rounded.
- .9 Use round edged tiles and purpose made metal finishing strip at termination of wall tile panels, except where panel abuts projecting surface or differing plane.
- .10 Install purpose made finishing accessories at top edge of wall tile installation.
- .11 Install transition strips / floor profiles at junction of tile flooring and dissimilar materials.
- .12 Allow minimum 24 hours after installation of tiles, before grouting.
- .13 Clean installed tile surfaces after installation and grouting cured.

**3.3 WALL TILE**

- .1 Install in accordance with TTMAC detail 304W 2012-2013 Detail B.

**3.4 FLOOR SEALER AND PROTECTIVE COATING**

- .1 Apply in accordance with manufacturer's instructions.

**3.5 FIELD QUALITY CONTROL**

- .1 Manufacturer's Field Services:

- .1 Provide manufacturer's field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.

**3.6 CLEANING**

- .1 Proceed in accordance with Section 01 74 11 - Cleaning.

**END OF SECTION**

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**Part 1            General**

**1.1                REFERENCES**

- .1    American Society for Testing and Materials International (ASTM)
  - .1        ASTM E1264-08e1, Standard Classification for Acoustical Ceiling Products.
  - .2        ASTM E1477-98a(2013), Standard Test Method for Luminous Reflectance Factor of Acoustical Materials by Use of Integrating-Sphere Reflectometers.
- .2    Canadian General Standards Board (CGSB)
  - .1        CAN/CGSB-92.1-M89, Sound Absorptive Prefabricated Acoustical Units.
- .3    Canadian Standards Association (CSA International)
  - .1        CSA B111-1974(R2003), Wire Nails, Spikes and Staples.
- .4    Health Canada/Workplace Hazardous Materials Information System (WHMIS)
  - .1        Material Safety Data Sheets (MSDS).
- .5    Underwriter's Laboratories of Canada (ULC)
  - .1        CAN/ULC-S102-10, Surface Burning Characteristics of Building Materials and Assemblies.

**1.2                SUBMITTALS**

- .1    Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
- .2    Product Data: submit WHMIS MSDS in accordance with Section 02 81 01 - Hazardous Materials.

**1.3                QUALITY ASSURANCE**

- .1    Regulatory Requirements:
  - .1        Fire-resistance rated floor/ceiling and roof/ceiling assembly: certified by Canadian Certification Organization accredited by Standards Council of Canada.
- .2    Health and Safety:
  - .1        Do construction occupational health and safety in accordance with Section 01 35 29.06 - Health and Safety Requirements.

**1.4                PRE-INSTALLATION MEETING**

- .1    Convene pre-installation meeting two weeks prior to beginning work of this Section, with contractor's representative, Departmental Representative, and Consultants in accordance with Section 01 32 16.07 - Construction Progress Schedule - Bar (GANTT) Chart to:
  - .1        Verify project requirements.
  - .2        Review installation and substrate conditions.
  - .3        Co-ordination with other building subtrades.

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**1.5 DELIVERY, STORAGE AND HANDLING**

- .1 Protect on site stored or installed absorptive material from moisture damage.
- .2 Store extra materials required for maintenance, where directed by Departmental Representative.
- .3 Waste Management and Disposal:
  - .1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction /Demolition Waste Management and Disposal.
  - .2 Remove from site and dispose of packaging materials at appropriate recycling facilities.
  - .3 Collect and separate for disposal paper, plastic, polystyrene, corrugated cardboard, and packaging material for recycling in accordance with Waste Management Plan (WMP).

**1.6 ENVIRONMENTAL REQUIREMENTS**

- .1 Permit wet work to dry before beginning to install.
- .2 Maintain uniform minimum temperature of 15 degrees C and humidity of 20-40% before and during installation.
- .3 Store materials in work area 48 hours prior to installation.

**1.7 EXTRA MATERIALS**

- .1 Provide extra materials of acoustic units in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Provide acoustical units amounting to 5% of gross ceiling area for each pattern and type required for project.
- .3 Ensure extra materials are from same production run as installed materials.
- .4 Clearly identify each type of acoustic unit, including colour and texture.
- .5 Deliver to Departmental Representative, upon completion of the work of this section.

**Part 2 Products**

**2.1 MATERIALS**

- .1 Acoustic units for suspended ceiling system: to CAN/CGSB-92.1 and ASTM E1264, designated by AT-1 in Room Finish Schedule.
  - .1 Type XII, Form 2, Pattern E (match surface of Armstrong Optima Square Lay-in)
  - .2 Class A.
  - .3 Fibreglass with minimum 80% recycled content.
  - .4 Pattern: non-directional.
  - .5 Textures: fine.

- .6 Flame spread rating of 25 or less in accordance with CAN/ULC-S102.
- .7 Smoke developed 50 or less in accordance with CAN/ULC-S102.
- .8 Noise Reduction Coefficient (NRC) designation of 0.95.
- .9 Ceiling Attenuation Class (CAC) rating 26, in accordance with ASTM E1264
- .10 Light Reflectance (LR) range of 0.90 to ASTM E1477.
- .11 Edge type: square.
- .12 Colour: white.
- .13 Size: 610 x 1219 x 25 mm thick.
- .14 Shape: flat.
- .15 Humidity resistant: proprietary coating.
- .16 Surface coverings: low VOC paint.
- .17 Acceptable manufacturers:
  - .1 Armstrong, CGC, CertainTeed, or approved alternate.
- .2 Acoustic units for suspended ceiling system: to CAN/CGSB-92.1 and ASTM E1264, designated by AT-2 in Room Finish Schedule.
  - .1 Type XII, Form 2, Pattern E (match surface of Armstrong Ultima)
  - .2 Class A.
  - .3 Wet-formed mineral fibre with minimum 80% recycled content.
  - .4 Pattern: non-directional.
  - .5 Textures: fine.
  - .6 Flame spread rating of 25 or less in accordance with CAN/ULC-S102.
  - .7 Smoke developed 50 or less in accordance with CAN/ULC-S102.
  - .8 Noise Reduction Coefficient (NRC) designation of 0.60.
  - .9 Ceiling Attenuation Class (CAC) rating 40, in accordance with ASTM E1264
  - .10 Light Reflectance (LR) range of 0.90 to ASTM E1477.
  - .11 Edge type: tegular.
  - .12 Colour: white.
  - .13 Size: 610 x 610 x 19 mm thick.
  - .14 Shape: flat.
  - .15 Humidity resistant: proprietary coating.
  - .16 Surface coverings: low VOC paint.
  - .17 Acceptable manufacturers:
    - .1 Armstrong, CGC, CertainTeed, or approved alternate.
  - .18 Acoustical backing material:
    - .1 Size: 610 x 610 x 19mm thick.
    - .2 Material: Acoustical tile AT-2 (non-tegular) with finish material facing up. Laminate to top surface of finish ceiling tile at all AT-2 ceilings so that resultant tile is two tiles thick. (Typical)
- .3 Noise Control Curtain: Limp mass barrier (barium impregnated vinyl) to be installed between high and low acoustic ceilings at fan coil unit locations. Install back from perimeter so that not visible. Fold over at top and bottom and mechanically fasten at underside of structure above suspended ceiling. Match characteristics of Vibra-sonic 10

NL 1000P. Approximate weight 1 lbs/sq foot. Install in accordance with manufacturer's written instructions. Cut out as closely as possible for all penetrations through noise control curtain.

- .4 Adhesive: low VOC type recommended by acoustic unit manufacturer.
- .5 Staples, nails and screws: to CSA B111 non-corrosive finish as recommended by acoustic unit manufacturer.

**Part 3 Execution**

**3.1 EXAMINATION**

- .1 Do not install acoustical panels and tiles until work above ceiling has been inspected by Departmental Representative.

**3.2 INSTALLATION**

- .1 Install acoustical panels and tiles in ceiling suspension system.
- .2 Install laminated two-thick acoustic panels at all Type AT-2 ceilings.

**3.3 APPLICATION**

- .1 Install acoustical units parallel to building lines with edge unit not less than 50% of unit width. Refer to reflected ceiling plan.
- .2 Scribe acoustic units to fit adjacent work. Butt joints tight, terminate edges with moulding.

**3.4 INTERFACE WITH OTHER WORK**

- .1 Attend Pre-Installation Meeting to coordinate work of ceilings, mechanical units and electrical cable trays.
- .2 Co-ordinate ceiling work to accommodate components of other sections, such as light fixtures, diffusers, speakers, sprinkler heads, to be built into acoustical ceiling components.
- .3 Co-ordinate ceiling components to accommodate components associated with operation and maintenance of Mechanical fan coils units installed above suspended ceiling.

**END OF SECTION**

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**Part 1            General**

**1.1                REFERENCES**

- .1    American Society for Testing and Materials International (ASTM)
  - .1        ASTM C635-12, Standard Specifications for the Manufacture, Performance and Testing of Metal Suspension Systems for Acoustical Tile and Lay-In Panel Ceilings.
  - .2        ASTM C636/C636M-08, Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels.
- .2    Health Canada/Workplace Hazardous Materials Information System (WHMIS)
  - .1        Material Safety Data Sheets (MSDS).

**1.2                DESIGN REQUIREMENTS**

- .1    Maximum deflection: 1/360th of span to ASTM C635 deflection test.

**1.3                SUBMITTALS**

- .1    Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.

**1.4                DELIVERY, STORAGE AND HANDLING**

- .1    Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.
- .2    Waste Management and Disposal:
  - .1        Separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

**1.5                SEQUENCING**

- .1    Layout ceiling grid to ensure main tees do not interfere with access to mechanical units installed above the suspended ceiling. Cross tees to be removable at access points to mechanical units installed above the suspended ceiling.

**1.6                PRE-INSTALLATION MEETING**

- .1    Convene pre-installation meeting at request of Departmental Representative, with contractor's representative, Departmental Representative, and Consultants in accordance with Section 01 32 16.07 - Construction Progress Schedule - Bar (GANTT) Chart to:
  - .1        Verify project requirements.
  - .2        Review installation and substrate conditions.
  - .3        Co-ordination with Mechanical fan coil units and Electrical cable trays.

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**Part 2            Products**

**2.1                MATERIALS**

- .1            Heavy duty system to ASTM C635.
- .2            Basic materials for suspension system: commercial quality cold rolled steel.
- .3            Suspension system: non fire rated, made up as follows:
  - .1            Two directional exposed tee bar grid.
  - .2            Perimeter specialty grids.
  - .3            Recycled Content: 53% post-consumer content, 61% total content.
- .4            Exposed tee bar grid components for AT-1: shop painted satin sheen. Components die cut. Hot-dipped galvanized steel. Main tee with double web, rectangular bulb and 24 mm rolled cap on exposed face. Cross tee with rectangular bulb; web extended to form positive interlock with main tee webs; lower flange extended and offset to provide flush intersection. Wall moulding: L-shaped, hemmed edges, 43mm leg height, 24 mm reveal, shop painted satin sheen.
  - .1            Colour: White
  - .2            Acceptable material:
    - .1            Armstrong Prelude XL;
    - .2            Donn DX/DXL;
    - .3            Approved alternate.
- .5            Exposed tee bar grid components for AT-2: shop painted satin sheen. Components die cut. Hot-dipped galvanized steel. Main tee with double web, rectangular bulb and 24 mm rolled cap on exposed face. Cross tee with rectangular bulb; web extended to form positive interlock with main tee webs; lower flange extended and offset to provide flush intersection. Wall moulding: L-shaped, hemmed edges, 43mm leg height, 24 mm reveal, shop painted satin sheen.
  - .1            Colours: to match Armstrong 'Silver Gray'
  - .2            Acceptable material:
    - .1            Armstrong Prelude XL;
    - .2            Donn DX/DXL;
    - .3            Approved alternate.
- .6            Concealed tee system for snap in metal panel ceilings: shop painted satin sheen. Components die cut. Hot-dipped galvanized steel. Main tee with double web, rectangular bulb and 24 mm rolled cap on exposed face. Cross tee with rectangular bulb; web extended to form positive interlock with main tee webs; lower flange extended and offset to provide flush intersection. Wall moulding: L-shaped, hemmed edges, 43mm leg height, 24 mm reveal, shop painted satin sheen. Provide all snap bars, hangers, clips and accessories for a complete system.
  - .1            Colour: an all exposed surfaces: to match Armstrong 'Silver Gray'
  - .2            Acceptable material:
    - .1            Armstrong Prelude XL;
    - .2            Donn Fineline DXF;



- .3 Approved alternate.
- .7 Perimeter exposed suspension trim for metal panels: shop painted satin sheen. Extruded aluminum alloy. Unique L-shape, 150 mm wide horizontal face, and 64 mm leg height. Factory-welded and finished seamless corners. Complete system including connection clips.
  - .1 Colour: to match Armstrong 'Silver Gray'
  - .2 Acceptable material:
    - .1 Armstrong Axiom – Knife Edge Trim;
    - .2 Donn Compasso Slim Perimeter Trim;
    - .3 Approved alternate.
- .8 Perimeter exposed suspension trim for metal panel ceiling: shop painted satin sheen. Extruded aluminum alloy. Modified C-shape, 200 mm high vertical face, and 19 mm leg. Factory-welded and finished seamless corners. Complete system including connection clips.
  - .1 Colour: to match Armstrong 'Silver Gray'
  - .2 Acceptable material:
    - .1 Armstrong Axiom Classic Trim;
    - .2 Donn Compasso Standard;
    - .3 Approved alternate.
- .9 Hanger wire: galvanized soft annealed steel wire:
  - .1 3.6 mm minimum diameter for access tile ceilings. Increase sizes as required for ceiling loads.
- .10 Hanger inserts: purpose made.
- .11 Accessories: splices, clips, wire ties, snap bars, carrying channels, retainers and wall moulding, to complement suspension system components, as recommended by system manufacturer.

### **Part 3 Execution**

#### **3.1 MANUFACTURER'S INSTRUCTIONS**

- .1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheets.

#### **3.2 INSTALLATION**

- .1 Installation: in accordance with ASTM C636 except where specified otherwise.
- .2 Install suspension system to manufacturer's instructions.
- .3 Do not erect ceiling suspension system until work above ceiling has been reviewed by Departmental Representative.

- .4 Secure hangers to overhead structure using attachment methods as indicated and acceptable to Departmental Representative.
- .5 Install hangers spaced at maximum 1200 mm centres and within 150 mm from ends of main tees.
- .6 Lay out centre line of ceiling both ways, to provide balanced borders at room perimeter, with border units not less than 50% of standard unit width. Conform to general layout indicated on reflected ceiling plan.
- .7 Ensure suspension system is co-ordinated with location of related components.
- .8 Install wall moulding to provide correct ceiling height.
- .9 Completed suspension system to support super-imposed loads, such as lighting fixtures, diffusers, grilles and speakers.
- .10 Support at light fixtures and diffusers with additional ceiling suspension hangers within 150 mm of each corner and at maximum 600 mm around perimeter of fixture.
- .11 Interlock cross member to main runner to provide rigid assembly.
- .12 Frame at openings for light fixtures, air diffusers, speakers and at changes in ceiling heights.
- .13 Finished ceiling system to be square with adjoining walls and level within 1:1000.

### **3.3 CLEANING**

- .1 Proceed in accordance with Section 01 74 11 - Cleaning.
- .2 Touch up scratches, abrasions, voids and other defects in painted surfaces.

**END OF SECTION**

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**Part 1            General**

**1.1                REFERENCES**

- .1    Aluminum Association
  - .1        AA DAF45-03, Designation System for Aluminum Finishes.
- .2    American Society for Testing and Materials International (ASTM)
  - .1        ASTM A653/A653M-11, Standard Specification for Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by Hot-Dip Process.
- .3    Underwriters' Laboratories of Canada (ULC)
  - .1        CAN/ULC-S102-10, Method of Test for Surface Burning Characteristics of Building Materials and Assemblies.

**1.2                SUBMITTALS**

- .1    Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2    Provide product data in accordance with Section 01 33 00 - Submittal Procedures.
- .3    Provide shop drawings in accordance with Section 01 33 00 - Submittal Procedures.
  - .1        Submit reflected ceiling plans for patterns, grid locations, spacing, light locations, air diffusers and dimensions.
  - .2        Indicate lay-out, hanger spacing and fastening details, direction and size of panels, change in level details, and reveals.
  - .3        Indicate materials, gauges, thickness and finishes.
- .4    Quality Assurance Submittals:
  - .1        Manufacturer's Instructions: manufacturer's installation instructions.
- .5    Closeout Submittals:
  - .1        Provide operation and maintenance data for metal panel ceilings for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.

**1.3                QUALITY ASSURANCE**

- .1    Perform work in accordance with ASTM C635, Standard Specifications for Metal Suspension Systems and ASTM Recommended Practice for Installation of Metal Suspension Systems.
- .2    Provide Mock-ups: construct mock-ups in accordance with Section 01 45 00 - Quality Control.
- .3    Provide mock-up for evaluation of surface finishes and workmanship.
- .4    Provide initial production units for job-site assembly with other materials for review.

- .5 Co-ordinate type and location of mock-ups with project requirements. Accepted units will be used as standard for acceptance of production units. Remove and replace units which are not accepted.
- .6 Do not proceed with remaining work until workmanship, colour, and finish are reviewed and accepted by Departmental Representative.
- .7 When accepted, mock-up will demonstrate minimum standard of quality required for this work. Approved mock-up may remain as part of finished work.

#### **1.4 DELIVERY, STORAGE AND HANDLING**

- .1 Packing, shipping, handling and unloading:
  - .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements, supplemented as follows:
    - .1 Deliver materials to site in manufacturer's original, unopened containers with brand name and type marked on packaging.
    - .2 Handle and store materials in dry, watertight enclosures away from heavy traffic areas and in manner to prevent damage.
    - .3 Store metal panel ceiling units at same temperature and moisture conditions as where they are to be installed for minimum of 48 hours before installation.
  - .2 Waste Management and Disposal:
    - .1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

#### **1.5 SITE CONDITIONS**

- .1 Safety: comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of materials.
- .2 Ventilation:
  - .1 Provide continuous ventilation 24 hours per day, 2 days before, during and for 7 days after completion of installation.
  - .2 Ventilate enclosed spaces in accordance with Section 01 51 00 - Temporary Utilities.
- .3 Temperature and Humidity:
  - .1 Maintain air temperature of installation area above 16 degrees C and below 27 degrees C for 48 hours prior to, during, and for 48 hours following installation. Maintain air temperature above 13 degrees C thereafter.
  - .2 Maintain relative humidity below 71% for 48 hours prior to, during, and for 48 hours following installation.
  - .3 Closely approximate temperature and humidity to levels expected upon completion and occupation.

#### **1.6 SEQUENCING**

- .1 Layout light fixture and sprinkler head penetrations at centre of panel width.

- .2 Plan HVAC inlets and outlets to occur within centre of panel system or provide for equal distance on each side parallel to length of panels.

## **1.7 SCHEDULING**

- .1 Ensure following work is completed before installation of ceilings begins.
  - .1 Plastering, gypsum board finishing, painting and all dust-generating work: completed, and dry and cleaned to prevent air-borne dust.
  - .2 Mechanical, electrical, other work above ceiling: completed.
  - .3 Heating, ventilating and air-conditioning systems: installed and operating.

## **1.8 MAINTENANCE**

- .1 Extra Materials:
  - .1 Provide extra materials of metal panel ceiling components, and special maintenance tools in accordance with Section 01 78 00 - Closeout Submittals.
  - .2 Provide minimum 10% of gross ceiling area for each type and colour of metal panel and suspension grid.
  - .3 Supply two specialty tools for removal of metal panel ceilings.
  - .4 Extra materials to be from same production run as installed materials.
  - .5 Identify each carton and its contents.
  - .6 Deliver to Departmental Representative, upon completion this section's work
  - .7 Store where directed by Departmental Representative.

## **Part 2 Products**

### **2.1 MATERIALS**

- .1 Metal panel ceiling, perforated:
  - .1 Material: aluminum.
  - .2 Panel Size: square, 610 mm x 1220 mm x 1.02 mm thick metal.
  - .3 Perforation: 1.6 mm round holes.
  - .4 Perforation spacing: 5.74 mm centres, staggered pattern, 12% open area.
  - .5 Recycle content: 90%.
  - .6 Noise Reduction Coefficient (NRC) designation of 0.90, with acoustical backing panel.
  - .7 Light Reflectance (LR) range of 0.77 to ASTM E1477.
  - .8 Finish: factory pre-finished.
  - .9 Colour: to match Armstrong 'Silverlume.'
  - .10 Formed to create a continuous interlock with the suspension grid.
  - .11 Acceptable material:
    - .1 Armstrong MetalWorks Snap-In.
    - .2 CGC Celebration
    - .3 Approved alternate.
- .2 Metal panel ceiling, non-perforated:

- .1 Material: aluminum.
- .2 Panel Size: square, 610 mm x 1220 mm x 1.02 mm thickness metal.
- .3 Recycle content: 90%.
- .4 Light Reflectance (LR) range of 0.77 to ASTM E1477.
- .5 Finish: painted.
- .6 Colour: Armstrong "Silverlume."
- .7 Formed to create a continuous interlock with the suspension grid.
- .8 Acceptable material:
  - .1 Armstrong MetalWorks Snap-In.
  - .2 CGC Celebration
  - .3 Approved alternate.
- .3 Basic materials:
  - .1 Aluminum sheet: Aluminum Association alloy AA1100.
- .4 Attachment devices: sized for pull-out resistance of not less than 5 times the hanger design load as indicated in ASTM C635, Table 1, Direct hung.
- .5 Suspension system
  - .1 In accordance with Section 09 53 00 - Acoustical Suspension.
  - .2 Heavy duty system to ASTM C635.
- .6 Acoustical backing panel: manufacturer's standard acoustical inserts for use in perforated and non-perforated metal panels.
  - .1 Colour: black.
  - .2 Size: 610 x 1220 x 25mm thickness.
  - .3 Acceptable material: Armstrong 5823 - BioAcoustic Infill Panel or approved alternate.
- .7 Edge trim and seal: in accordance with Section 09 53 00 - Acoustical Suspension.
- .8 Accessories: splices, clips, wire ties, end closers, side closers, light and air seals, adjustable panel clips, to complement system components, as recommended by ceiling system manufacturer.

## 2.2 FINISHES

- .1 Baked enamel:
  - .1 Manufacturer's standard one-coat matte finish in standard colour, as indicated.
  - .2 Appearance and properties of anodized finishes designated by the Aluminum Association as Architectural Class 1, Architectural Class 2, and Protective and Decorative.

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**Part 3      Execution**

**3.1      MANUFACTURER'S INSTRUCTIONS**

- .1      Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheets.

**3.2      ERECTION**

- .1      Do not erect metal panels until work above ceiling has been reviewed by Departmental Representative.
- .2      Secure hangers to overhead structure using attachment methods as recommended by manufacturer.
- .3      Suspend hangers from building structural members plumb and free from contact with insulation or other objects within ceiling plenum.
- .4      Splay hangers where necessary to avoid obstructions and brace to offset resulting horizontal forces.
- .5      Install supplemental suspension members and hangers in form of trapezes or equivalent devices where obstructions interfere with required hanger spacing.
- .6      Ensure supplemental members are sized to support ceiling loads within performance limits of referenced standards.
- .7      Attach hangers securely and appropriately to structure by attaching to inserts and eye-screws.
- .8      Secure hangers in manner to prevent deterioration or failure due to age, corrosion or elevated temperatures.
- .9      Maximum spacing of hangers or supports: 1200 mm on centre along carrier and 300 mm from ends. Maximum spacing of carriers: 1200 mm on centre and 150 mm from ends of metal panels. Support each strip on at least 3 carriers. Stagger end joints.
- .10     Lay out metal panels according to reflected ceiling plan. Provide balanced borders at room perimeter.
- .11     Provide openings for recessed fixtures.
- .12     Locate ceiling access doors directly under items which require access.
- .13     Scribe and cut metal panel units for accurate fit at borders and other ceiling penetrations.
- .14     Provide hanger at each corner of openings of fixtures.
- .15     Install edge mouldings at edge of each metal panel ceiling area and at locations where edge of units would otherwise be exposed after completion of Work. Level mouldings with ceiling suspension system to 3 mm in 3600 mm.

- .16 Fasten mouldings to hollow masonry or stud construction with toggle bolts of similar self-expanding screw anchors.
- .17 Align panel joints in adjacent courses to form uniform, straight joints parallel to room axis in both directions, unless indicated differently.
- .18 Use manufacturer's field cut-off device for 90 degrees and 45 degrees end cuts.
- .19 Install acoustic media over metal panel ceiling area at right angles to panels, between main suspension channels, and to ensure continuous black appearance between linear strips.

### **3.3 CLEANING**

- .1 Proceed in accordance with Section 01 74 11 - Cleaning.
- .2 Clean dirty or discoloured surfaces of metal panel ceiling units in accordance with manufacturer's written recommendations.
- .3 Ensure units are free from defects.
- .4 Remove and replace damaged or improperly installed units.

**END OF SECTION**



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**Part 1      General**

**1.1      REFERENCES**

- .1 American Society for Testing and Materials International (ASTM)
  - .1 ASTM F1913, Standard Specification for Homogeneous Sheet Vinyl Floor Covering.
- .2 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
  - .1 Material Safety Data Sheets (MSDS).

**1.2      SUBMITTALS**

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Provide product data in accordance with Section 01 33 00 - Submittal Procedures.
- .3 Provide samples in accordance with Section 01 33 00 - Submittal Procedures.
  - .1 Submit duplicate 300 x 300 mm sample pieces of sheet material, 300 mm long base and edge strips.
- .4 Closeout Submittals:
  - .1 Provide maintenance data for resilient flooring for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.

**1.3      DELIVERY, STORAGE AND HANDLING**

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Waste Management and Disposal:
  - .1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

**1.4      AMBIENT CONDITIONS**

- .1 Maintain air temperature and structural base temperature at flooring installation area above 20 degrees for 48 hours before, during and 48 hours after installation.

**1.5      MAINTENANCE**

- .1 Extra Materials:
  - .1 Provide extra materials of resilient sheet flooring and adhesives in accordance with Section 01 78 00 - Closeout Submittals.
  - .2 Provide 7 m<sup>2</sup> of each colour, pattern and type flooring material required for project for maintenance use.
  - .3 Extra materials one piece and from same production run as installed materials.
  - .4 Identify each roll of sheet flooring and each container of adhesive.

- .5 Deliver to Departmental Representative, upon completion of the work of this section.
- .6 Store where directed by Departmental Representative.

## **Part 2 Products**

### **2.1 MATERIALS**

- .1 Resilient Safety Flooring: To ASTM F1913. Designated by RSSF on Room Finish Schedule.
  - .1 Homogeneous slip-resistant vinyl sheet
  - .2 Static coefficient of slip resistance in excess of 0.6 when tested to ASTM D2047, and R10 when tested to DIN 51130
  - .3 Pattern: match Tarkett "Granit Safe-T" .
  - .4 Thickness: 2.0 mm.
  - .5 Colour: as selected by Departmental Representative.
  - .6 Roll width: 2.0 m (nominal)
  - .7 Heat welding rod: colour-matched to suit selected material.
- .1 Resilient base: continuous, top set, complete with premoulded end stops and external corners:
  - .1 Type: rubber.
  - .2 Style: cove.
  - .3 Thickness: 2.03 mm.
  - .4 Height: 101.6 mm.
  - .5 Lengths: cut lengths minimum 2400 mm.
  - .6 Colour: selected by Departmental Representative.
- .2 Primers and adhesives: of types recommended by resilient flooring manufacturer for specific material on applicable substrate, above, on or below grade.
  - .1 Rubber floor adhesives: maximum VOC limit 50 g/l.
  - .2 Resilient base adhesives: maximum VOC limit 50 g/l.
- .3 Sub-floor filler and leveller: white premix latex requiring water only to produce cementitious paste as recommended by flooring manufacturer for use with their product.
- .4 Metal edge strips:
  - .1 Aluminum extruded, smooth, mill finish stainless steel with lip to extend under floor finish, shoulder flush with top of adjacent floor finish.
- .5 External corner protectors: stainless steel, type recommended by flooring manufacturer.
- .6 Edging to floor penetrations: stainless steel, type recommended by flooring manufacturer.
- .7 Sealer and wax: Do not wax.

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**Part 3 Execution**

**3.1 MANUFACTURER'S INSTRUCTIONS**

- .1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheets.

**3.2 SITE VERIFICATION OF CONDITIONS**

- .1 Ensure concrete floors are clean and dry by using test methods recommended by flooring manufacturer.

**3.3 PREPARATION**

- .1 Remove existing resilient flooring.
- .2 Remove or treat old adhesives to prevent residual, old flooring adhesives from bleeding through to new flooring and/or interfering with the bonding of new adhesives.
- .3 Clean floor and apply filler; trowel and float to leave smooth, flat hard surface. Prohibit traffic until filler cured and dry.
- .4 Remove sub-floor ridges and bumps. Fill low spots, cracks, joints, holes and other defects with sub-floor filler.
- .5 Prime and seal concrete slab to resilient flooring manufacturer's printed instructions.

**3.4 APPLICATION: FLOORING**

- .1 Provide high ventilation rate, with maximum outside air, during installation, and for 48 to 72 hours after installation. If possible, vent directly to outside. Do not let contaminated air recirculate through district or whole building air distribution system. Maintain extra ventilation for at least one month following building occupation.
- .2 Apply adhesive uniformly using recommended trowel. Do not spread more adhesive than can be covered by flooring before initial set takes place. Install application for "heavy duty" traffic; follow manufacturer's directions.
- .3 Lay flooring with seams parallel to exterior wall building lines to produce a minimum number of seams. Border widths minimum 1/3 width of full material.
- .4 Heat weld seams of linoleum sheet flooring in accordance with manufacturer's printed instructions.
- .5 As installation progresses and after installation roll flooring with 45 kg minimum roller to ensure full adhesion.
- .6 Cut flooring around fixed objects.
- .7 Install feature strips and floor markings where indicated. Fit joints tightly.
- .8 Continue flooring over areas which will be under built-in furniture.

- .9 Continue flooring through areas to receive movable type partitions without interrupting floor pattern.
- .10 Terminate flooring at centreline of door in openings where adjacent floor finish or colour is dissimilar.
- .11 Install metal edge strips at unprotected or exposed edges where flooring terminates.

### **3.5 APPLICATION: BASE**

- .1 Lay out base to keep number of joints at minimum.
- .2 Clean substrate and prime with one coat of adhesive.
- .3 Apply adhesive to back of base.
- .4 Set base against wall and floor surfaces tightly by using 3 kg hand roller.
- .5 Install straight and level to variation of 1:1000.
- .6 Scribe and fit to door frames and other obstructions. Use premoulded end pieces at flush door frames.
- .7 Cope internal corners. Use premoulded corner units for right angle external corners. Use formed straight base material for external corners of other angles.

### **3.6 FIELD QUALITY CONTROL**

- .1 Manufacturer's Field Services:
  - .1 Provide manufacturer's field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.

### **3.7 CLEANING**

- .1 Proceed in accordance with Section 01 74 11 - Cleaning.
- .2 Remove excess adhesive from floor, base and wall surfaces without damage.
- .3 Clean, floor and base surface to flooring manufacturer's printed instructions. Do not wax.

### **3.8 PROTECTION**

- .1 Protect new floors from time of final set of adhesive until final inspection.
- .2 Prohibit traffic on floor for 48 hours after installation.

**END OF SECTION**

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**Part 1            General**

**1.1                REFERENCES**

- .1 American Society for Testing and Materials International (ASTM)
  - .1 ASTM F1066-04(2010)e1, Standard Specification for Vinyl Composition Floor Tile.
  - .2 ASTM F1344-12, Standard Specification for Rubber Floor Tile.
- .2 Canadian General Standards Board (CGSB)
  - .1 CAN/CGSB-25.20-95, Surface Sealer for Floors.
- .3 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
  - .1 Material Safety Data Sheets (MSDS).

**1.2                SUBMITTALS**

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Provide product data in accordance with Section 01 33 00 - Submittal Procedures.
- .3 Provide samples in accordance with Section 01 33 00 - Submittal Procedures.
  - .1 Submit duplicate tile in size specified and 300 mm long base.
- .4 Closeout Submittals:
  - .1 Provide maintenance data for resilient flooring for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.

**1.3                DELIVERY, STORAGE AND HANDLING**

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Waste Management and Disposal:
  - .1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

**1.4                ENVIRONMENTAL REQUIREMENTS**

- .1 Maintain air temperature and structural base temperature at flooring installation area above 20 degrees C for 48 hours before, during and for 48 hours after installation.

**1.5                MAINTENANCE**

- .1 Extra Materials:
  - .1 Provide maintenance materials of resilient tile flooring, base and adhesive in accordance with Section 01 78 00 - Closeout Submittals.
  - .2 Provide two boxes of each colour, pattern and type flooring material required for this project for maintenance use.

- .3 Extra materials from same production run as installed materials.
- .4 Identify each container of floor tile and each container of adhesive.
- .5 Deliver to Departmental Representative, upon completion of the work of this section.
- .6 Store where directed by Departmental Representative.

## **Part 2 Products**

### **2.1 MATERIALS**

- .1 Resilient Vinyl Composite tile: to ASTM F1066, Composition 1 - non asbestos, Class 2 – through pattern tile. Designated by VCT on Room Finish ScheduleLayout in pattern on floor (to be provided) using maximum of three (3) colours (to be selected).
  - .1 Finish: plain.
  - .2 Thickness: 3.2 mm homogeneous wear layer.
  - .3 Size: 305 x 305 mm size.
  - .4 Colour: selected by Departmental Representative from manufacturer’s standard range of colours.
- .1 Rubber tile flooring: to ASTM F1344, Class 1-B – Homogeneous rubber tile, through pattern. Designated by RBF on Room Finish Schedule.
  - .1 Finish: smooth, surface design.
  - .2 Thickness: 3.2 mm.
  - .3 Size: 610 x 610 mm.
  - .4 Colour: selected by Departmental Representative from manufacturer’s standard range of colours.
- .2 Static dissipative vinyl tile: to ASTM F1066, designated by SDT on Room Finish Schedule.
  - .1 Pattern: marbelized.
  - .2 Thickness: 3.0 mm.
  - .3 Size: 305 mm x 305 mm tile.
  - .4 1.0 x 10 (to 6<sup>th</sup>) ohms resistance.
  - .5 Colour: selected by Departmental Representative.
  - .6 Acceptable manufacturers:
    - .1 Armstrong SDT
    - .2 Johnsonite Granit SD
    - .3 Or approved alternate.
- .3 Resilient base: continuous, top set, complete with premoulded end stops and external corners:
  - .1 Type: rubber.
  - .2 Style: cove.
  - .3 Thickness: 2.03 mm.
  - .4 Height: 101.6 mm.

- .5 Lengths: cut lengths minimum 2400 mm.
- .6 Colour: selected by Departmental Representative.
- .4 Primers and adhesives: waterproof, recommended by flooring manufacturer for specific material on applicable substrate, above, at or below grade.
  - .1 Flooring adhesives: maximum VOC limit 50 g/L.
  - .2 Cove base adhesives: maximum VOC limit 50 g/L.
- .5 Sub-floor filler and leveller: white premix latex requiring water only to produce cementitious paste as recommended by flooring manufacturer for use with their product.
- .6 Metal edge strips: aluminum extruded, smooth, mill finish with lip to extend under floor finish, shoulder flush with top of adjacent floor finish.
- .7 Sealer: type recommended by flooring manufacturer.
  - .1 Sealant: maximum VOC limit 50 g/L.
- .8 Wax: type recommended by flooring manufacturer.
- .9 Line paint: pigmented two component Polyurethane paint suitable for rubber flooring applications. Refer to drawings for painted line pattern in Room 307.

### **Part 3 Execution**

#### **3.1 MANUFACTURER'S INSTRUCTIONS**

- .1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheets.

#### **3.2 INSPECTION**

- .1 Ensure concrete floors are dry, by using test methods recommended by tile manufacturer.

#### **3.3 SUB-FLOOR TREATMENT**

- .1 Remove existing resilient flooring and carpeting.
- .2 Remove or treat old adhesives to prevent residual, old flooring adhesives from bleeding through to new flooring and/or interfering with the bonding of new adhesives.
- .3 Clean floor and apply filler; trowel and float to leave smooth, flat hard surface. Prohibit traffic until filler cured and dry.
- .4 Remove sub-floor ridges and bumps. Fill low spots, cracks, joints, holes and other defects with sub-floor filler.
- .5 Prime and seal concrete to flooring manufacturer's printed instructions.

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**3.4 TILE APPLICATION**

- .1 Provide high ventilation rate, with maximum outside air, during installation, and for 48 to 72 hours after installation. If possible, vent directly to outside. Do not let contaminated air recirculate through district or whole building air distribution system. Maintain extra ventilation for at least one month following building occupation.
- .2 Apply adhesive uniformly using recommended trowel in accordance with flooring manufacturer's instructions. Do not spread more adhesive than can be covered by flooring before initial set takes place.
- .3 Lay flooring with joints parallel to building lines to produce symmetrical tile pattern. Border tiles minimum half tile width.
- .4 Install flooring to square grid pattern with joints aligned to produce symmetrical tile pattern. Border tiles minimum half tile width.
- .5 As installation progresses, and after installation, roll flooring in 2 directions including resilient tile with 45 kg minimum roller to ensure full adhesion.
- .6 Cut tile and fit neatly around fixed objects.
- .7 Continue flooring through areas to receive movable type partitions without interrupting floor pattern.
- .8 Terminate flooring at centerline of door in openings where adjacent floor finish or colour is dissimilar.
- .9 Install metal edge strips at unprotected or exposed edges where flooring terminates.

**3.5 BASE APPLICATION**

- .1 Lay out base to keep number of joints at minimum. Base joints at maximum length available or at internal or premoulded corners.
- .2 Clean substrate and prime with one coat of adhesive.
- .3 Apply adhesive to back of base.
- .4 Set base against wall and floor surfaces tightly by using 3 kg hand roller.
- .5 Install straight and level to variation of 1:1000.
- .6 Scribe and fit to door frames and other obstructions. Use premoulded end pieces at flush door frames.
- .7 Cope internal corners. Use premoulded corner units for right angle external corners. Use formed straight base material for external corners of other angles, minimum 300 mm each leg.



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**3.6 LINE PAINTING**

- .1 Install line painting in strict accordance with manufacturer's instructions. Colour of lines on floor shall be selected by Departmental Representative. One colour to be selected.

**3.7 FIELD QUALITY CONTROL**

- .1 Manufacturer's Field Services:
  - .1 Provide manufacturer's field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.

**3.8 CLEANING**

- .1 Proceed in accordance with Section 01 74 11 - Cleaning.
- .2 Remove excess adhesive from floor, base and wall surfaces without damage.
- .3 Clean, seal and wax floor and base surface to flooring manufacturer's instructions. In carpeted areas clean, seal and wax base surface before carpet installation.
- .4 Do not wax rubber tile floor.

**3.9 PROTECTION**

- .1 Protect new floors from time of final set of adhesive until final inspection]
- .2 Prohibit traffic on floor for 48 hours after installation.
- .3 Use only water-based coating for linoleum.

**END OF SECTION**



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**Part 1            General**

**1.1                REFERENCES**

- .1 American Association of Textile Chemists and Colorists (AATCC)
  - .1 AATCC 23-2010, Color Fastness to Burnt Gas Fumes.
  - .2 AATCC 129-2011, Colour Fastness to Ozone in the Atmosphere Under High Humidities.
- .2 American Society for Testing and Materials (ASTM International)
  - .1 ASTM D1667-05(2011), Standard Specification for Flexible Cellular Materials-Poly (Vinyl Chloride) Foam (Closed-Cell).
  - .2 ASTM D5252-11, Standard Practice for the Operation of the Hexapod Drum Tester.
  - .3 ASTM D5417-11, Standard Practice for Operation of the Vettermann Drum Tester.
- .3 Canadian General Standards Board (CGSB)
  - .1 CAN/CGSB-4.2 No.77.1-94/ISO 4919:1978(R2012), Textile Test Methods - Carpets - Determination of Tuft Withdrawal Force.
  - .2 CAN/CGSB-4.129-93(R1997), Carpets for Commercial Use.
  - .3 CAN/CGSB-25.20-95, Surface Sealer Floors.
- .4 Carpet and Rug Institute (CRI)
  - .1 CRI-104-2011, Standard Installation of Commercial Carpet.
  - .2 IAQ Carpet Testing Program.
- .5 Underwriters' Laboratories of Canada (ULC)
  - .1 CAN/ULC-S102-10, Surface Burning Characteristics of Building Materials and Assemblies.

**1.2                SUBMITTALS**

- .1 Submit control submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit verification to demonstrate compliance with CAN/ULCS102 and CAN/ULCS102.2.
- .3 Submit proof that carpet has been tested and passed the Indoor Air Quality (IAQ) Carpet Testing Program requirements of the Carpet and Rug Institute (CRI) and the Canadian Carpet Institute (CCI).
- .4 Submit report verifying that tuft bind meets requirements of CAN/CGSB-4.129 when tested to CAN/CGSB-4.2 No.77.1.
- .5 Submit report outlining proposed dust control measures.
- .6 Submit carpet manufacturer's installation instructions: Indicate special procedures and perimeter conditions requiring special attention.

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**1.3 PRODUCT DATA**

- .1 Submit product data in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit product data sheet for each carpet, adhesive, carpet protection and subfloor patching compound.
- .3 Submit WHMIS MSDS - Material Safety Data Sheets acceptable to Labour Canada and Health Canada for carpet adhesive and seam adhesive. Indicate VOC content.
- .4 Submit data on specified products, describing physical and performance characteristics, sizes, patterns, colours, and methods of installation.

**1.4 SAMPLES**

- .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit duplicate 600 x 600 mm pieces of each carpet specified, duplicate pieces for each colour selected, 150 mm lengths of base and divider strips.

**1.5 CLOSEOUT SUBMITTALS**

- .1 Submit operation and maintenance data for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.
- .2 Submit maintenance data: Include maintenance procedures, recommendations for maintenance materials and equipment, and suggested schedule for cleaning.

**1.6 QUALIFICATIONS**

- .1 Installer Qualifications:
  - .1 Flooring contractor requirements:
    - .1 Specialty contractor normally engaged in this type of work, with prior experience in installation of these types of materials.
    - .2 Certified by carpet manufacturer prior to tender submission.
    - .3 Must not sub-contract labour without written approval of Departmental Representative.
  - .2 Be responsible for proper product installation, including floor testing and preparation as specified and in accordance with carpet manufacturers written instructions.

**1.7 REGULATORY REQUIREMENTS**

- .1 Indoor Air Quality: compliance with CRI/CCI Green Label Indoor Air Quality Program, CRI/CCI-IAQ requirements for maximum total volatile chemicals released into air. Label each carpet product with CRI/CCI-IAQ label.

**1.8 DELIVERY, STORAGE AND HANDLING**

- .1 Label packaged materials. For carpet tile products indicate nominal dimensions of tile and indicate installation direction.

- .2 Store packaged materials in original containers or wrapping with manufacturer's seals and labels intact.
- .3 Store carpeting and accessories in location as directed by Departmental Representative. Store carpet and adhesive at minimum temperature of 18°C and relative humidity of maximum 65% for minimum of 48 hours before installation.
- .4 Prevent damage to materials during handling and storage. Keep materials under cover and free from dampness.
- .5 Store materials in area of installation for minimum period of 48 hours prior to installation.
- .6 Modular carpet: store on pallet form as supplied by Manufacturer. Do not stack pallets.

## **1.9 WASTE MANAGEMENT AND DISPOSAL**

- .1 Separate and recycle waste materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal, and with Waste Reduction Workplan.
- .2 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .3 Collect and separate for disposal paper, plastic, and corrugated cardboard packaging material for recycling in accordance with Waste Management Plan.

## **1.10 ENVIRONMENTAL REQUIREMENTS**

- .1 Moisture: Ensure substrate is within moisture limits and alkalinity limits prescribed by manufacturer. Prepare moisture testing and provide report to Departmental Representative.
- .2 Temperature: Maintain ambient temperature of not less than 18 °C from 48 hours before installation to at least 48 hours after completion of work.
- .3 Relative humidity: Maintain relative humidity between 10 and 65% RH for 48 hours before, during and 48 hours after installation.
- .4 Safety: Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials.
- .5 Ventilation:
  - .1 Ventilate area of work as directed by Departmental Representative by use of approved portable supply and exhaust fans.]
  - .2 Ventilate enclosed spaces in accordance with Section 01 51 00 - Temporary Utilities. Provide fans with HEPA filters.
  - .3 Provide continuous ventilation during and after carpet application. Run ventilation system 24 hours per day during installation; provide continuous ventilation for 7 days after completion of carpet installation.
- .6 Test existing floor levelling compound for presence of asbestos contamination. Notify Departmental Representative for additional instructions where asbestos is discovered.

- .7 Do not install carpet until space is enclosed and weatherproof, wet-work in space is completed and nominally dry, work above ceilings is complete.

**1.11 EXTRA MATERIALS**

- .1 Provide extra materials of carpet, carpet base, and adhesives in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Provide 2% of each colour, pattern and type of carpeting tile for maintenance material.
- .3 Extra materials to be from same production run as installed materials.
- .4 Identify each package of carpet and each container of adhesive.
- .5 Deliver to Departmental Representative and store where directed by Departmental Representative.

**Part 2 Products**

**2.1 MANUFACTURERS**

- .1 Certified to Carpet and Rug Institute's and the Canadian Carpet Institute IAQ requirements.

**2.2 MODULAR CARPET**

- .1 Acceptable material:
  - .1 Shaw Contract Group, No Rules Collection, Diffuse Tile 59575, Colour: 'Flutter' 75761.
- .2 Carpet Tile Dimensions: 610 x 610 mm.
- .3 Carpet: to CAN/CGSB-4.129 and as follows:
  - .1 Certified for flammability to Health Canada regulations under "Hazardous Products (Carpet) Regulations", Part II of the Schedule.
  - .2 Maximum flame spread rating 300, maximum smoke developed classification 500, when tested to CAN/ULC-S102.
  - .3 Certified to Carpet and Rug Institute's and the Canadian Carpet Institute's IAQ requirements.
- .4 Performance rating: to ASTM D5252 or ASTM D5417.
- .5 Construction: tufted.
- .6 Pile Surface Appearance:
  - .1 Multi-level loop.
- .7 Pile fibre: to CAN/CGSB-4.129.
  - .1 Nylon: BCF.
    - .1 Type: Nylon 6.

- .8 Yarn Ply: 2- ply minimum.
- .9 Gauge: 47.24 per 10cm.
- .10 Stitch Rate: 35.43 per 10cm.
- .11 Tuft Density: 542.49 g/m<sup>2</sup>.
- .12 Pile Height: 5.84mm.
- .13 Kilotex Rating: 11.66 kilotex.
- .14 Yarn Dye Method: solution dyed.
- .15 Colourization: patterned.
- .16 Colourfastness to light: to CAN/CGSB-4.2No.18.3.
- .17 Colour Fastness to Atmospheric Fading: to AATCC 129 and AATCC 23.
- .18 Primary Backing: synthetic.
- .19 Secondary Backing: thermoplastic polyolefin compound.
  - .1 Recycled content: 100%.
  - .2 Density: as per ASTM D1667.
  - .3 Backing thickness: 2.4mm.
  - .4 Total weight: 2543g/m<sup>2</sup>.
- .20 Adhesive: mill applied releasable dry adhesive.

### **2.3 ACCESSORIES**

- .1 Base:
  - .1 Resilient base: 100mm high.
- .2 Seaming tape: types recommended by carpet manufacturer for purpose intended.
- .3 Seaming sealer adhesive: type recommended by carpet manufacturer for purpose intended.
- .4 Binder bars: aluminum.
- .5 Adhesive:
  - .1 Pressure sensitive type: recommended by carpet manufacturer for direct glue down installation of modular carpet or speciality backed carpets.
- .6 Carpet protection: non-staining heavy duty kraft paper.
- .7 Concrete floor sealer: to CAN/CGSB-25.20, Type 1.
- .8 Subfloor patching compound: white premix latex requiring water only to produce cementitious paste as recommended by flooring manufacturer for use with their product..

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**Part 3 Execution**

**3.1 DEMOLITION**

- .1 Remove and divert carpet for recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal, and with Waste Reduction Workplan. Coordinate with Departmental Representative.

**3.2 SUB-FLOOR TREATMENT**

- .1 Concrete shall be inspected to determine special care required to make it a suitable foundation for carpet. Cracks 3 mm wide or protrusions over 0.8 mm will be filled and levelled with appropriate and compatible latex patching compound.
- .2 Do not exceed manufacturer's recommendations for patch thickness.
- .3 Large patch areas are to be primed with a compatible primer.
- .4 Concrete substrates shall be cured, clean and dry.
- .5 Concrete substrates shall be free of paint, dirt, grease, oil, curing or parting agents, and other contaminates, including sealers, that may interfere with the bonding of the adhesive.
- .6 Wherever a powdery or porous concrete surface is encountered, a primer compatible with the adhesive shall be used to provide a suitable surface for glue-down installation.

**3.3 PREPARATION**

- .1 Prepare floor surfaces in accordance with CRI 104 Standard for Installation of Commercial Carpet.
- .2 Pre-condition carpeting following manufacturer's printed instructions.

**3.4 INSTALLATION**

- .1 Install carpeting using minimum of pieces.
- .2 Install in accordance with manufacturer's printed instructions and in accordance with Carpet and Rug Institute Standard for Installation of Commercial Carpet, CRI 104.
- .3 Install carpet after finishing work is completed but before demountable office partitions and telephone and electrical pedestal outlets are installed.
- .4 Finish installation to present smooth wearing surface free from conspicuous seams, burring and other faults.
- .5 Use material from same dye lot. Ensure colour, pattern and texture match within any one visual area. Maintain constant pile direction.
- .6 Adhesive seams and cross-joints. Seam edges must be sealed.



- .7 Fit neatly around architectural, mechanical, electrical and telephone outlets, and furniture fitments, around perimeter of rooms into recesses, and around projections.
- .8 Install carpeting to underfloor duct system and to access covers.
- .9 Extend carpet into toe spaces, door reveals, closets, open-bottomed obstructions, removable flanges, alcoves, and similar openings.
- .10 Install carpet smooth and free of bubbles, puckers, and other defects.

### **3.5 BINDER BARS**

- .1 Install binder bars at exposed carpet edges and centre under doors in door openings.

### **3.6 MODULAR CARPET**

- .1 Apply acrylic release type adhesive and install modular carpet in accordance with manufacturer's written instructions.
- .2 Lay modular carpet with butt seams.
- .3 Roll modular carpet with appropriate roller for complete contact of carpet with mill-applied adhesive to sub-floor.

### **3.7 SEAMS**

- .1 Seal edges of cut-outs as recommended by manufacturer.
- .2 Carpet visibility of seams and joints to acceptable industry standards.

### **3.8 BASE INSTALLATION**

- .1 Install resilient base in accordance with Section 09 65 19.

### **3.9 PROTECTION OF FINISHED WORK**

- .1 Vacuum carpets clean immediately after completion of installation. Protect traffic areas.
- .2 Prohibit traffic on carpet for a period of 24 hours until adhesive is cured.
- .3 Install carpet protection to satisfaction of Departmental Representative.

**END OF SECTION**



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**Part 1            General**

**1.1                REFERENCES**

- .1    Environmental Protection Agency (EPA)
  - .1        Test Method for Measuring Total Volatile Organic Compound Content of Consumer Products, Method 24 (for Surface Coatings).
- .2    Health Canada/Workplace Hazardous Materials Information System (WHMIS)
  - .1        Material Safety Data Sheets (MSDS).
- .3    The Master Painters Institute (MPI)
  - .1        Architectural Painting Specification Manual - February 2004.
  - .2        Standard GPS-1-05, MPI Green Performance Standard for Painting and Coatings.
- .4    National Fire Code of Canada.

**1.2                QUALITY ASSURANCE**

- .1    Qualifications:
  - .1        Contractor: to have a minimum of five years proven satisfactory experience. When requested, provide list of last three comparable jobs including, job name and location, specifying authority, and project manager.
  - .2        Qualified journeypersons as defined by local jurisdiction to be engaged in painting work
  - .3        Apprentices: may be employed provided they work under direct supervision of qualified journeyperson in accordance with trade regulations.
  - .4        Conform to latest MPI requirements for exterior painting work including preparation and priming.
  - .5        Materials: in accordance with MPI Painting Specification Manual "Approved Product" listing and from a single manufacturer for each system used.
  - .6        Paint materials such as linseed oil, shellac, and turpentine to be highest quality product of an approved manufacturer listed in MPI Painting Specification Manual and to be compatible with other coating materials as required.
  - .7        Retain purchase orders, invoices and documents to prove conformance with noted MPI requirements when requested by Departmental Representative.
  - .8        Standard of Acceptance:
    - .1            Vertical surfaces: No defects visible from a distance of 1000 mm at 90 degrees to surface.
    - .2            Final coat to exhibit uniformity of colour and uniformity of sheen across full surface area.

**1.3                PERFORMANCE REQUIREMENTS**

- .1    Environmental Performance Requirements:

- .1 Provide paint products meeting MPI "Environmentally Friendly" E3 ratings based on VOC (EPA Method 24) content levels and not to exceed VOC limits of Green Seal Standard GS-11 "Paints" 1993 and latest revision.
- .2 Green Performance in accordance with MPI Standard GPS-1.

#### **1.4 SCHEDULING**

- .1 Submit work schedule for various stages of painting to Departmental Representative for approval. Submit schedule minimum of 48 hours in advance of proposed operations.
- .2 Obtain written authorization from Departmental Representative for changes in work schedule.
- .3 Schedule painting operations to prevent disruption of occupants in and about building.

#### **1.5 SUBMITTALS**

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
  - .1 Submit manufacturer's printed product literature, specifications and datasheet and include product characteristics, performance criteria, physical size, finish and limitations.
  - .2 Submit WHMIS MSDS - Material Safety Data Sheets in accordance with Section 02 81 01 - Hazardous Materials.
- .3 Upon completion, submit records of products used. List products in relation to finish system and include the following:
  - .1 Product name, type and use.
  - .2 Manufacturer's product number.
  - .3 Colour numbers.
  - .4 MPI Environmentally Friendly classification system rating.
  - .5 Manufacturer's Material Safety Data Sheets (MSDS).
- .4 Provide samples in accordance with Section 01 33 00 - Submittal Procedures.
  - .1 Submit duplicate 200 x 300 mm sample panels of each paint, clear coating, and special finish with specified paint or coating in colours, gloss/sheen and textures required to MPI Painting Specification Manual standards submitted on the following substrate materials:
  - .2 When approved, samples shall become acceptable standard of quality for appropriate on-site surface with one of each sample retained on-site.
  - .3 Submit full range of available colours where colour availability is restricted.

#### **1.6 QUALITY CONTROL**

- .1 Provide mock-up in accordance with Section 01 45 00 - Quality Control.
- .2 When requested by Departmental Representative or Paint Inspection Agency, prepare and paint designated surface, area, room or item to requirements specified herein, with specified paint or coating showing selected colours, number of coats, gloss/sheen,

textures and workmanship to MPI Painting Specification Manual standards for review and approval. When approved, surface, area, room and/or items shall become acceptable standard of finish quality and workmanship for similar on-site work.

## **1.7 MAINTENANCE**

- .1 Extra Materials:
  - .1 Submit maintenance materials in accordance with Section 01 78 00 - Closeout Submittals.
  - .2 Submit one, one litre can of each type and colour of primer and finish coating. Identify colour and paint type in relation to established colour schedule and finish system.

## **1.8 DELIVERY, STORAGE AND HANDLING**

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements, supplemented as follows:
  - .1 Deliver and store materials in original containers, sealed, with labels intact.
  - .2 Labels: to indicate:
    - .1 Manufacturer's name and address.
    - .2 Type of paint or coating.
    - .3 Compliance with applicable standard.
    - .4 Colour number in accordance with established colour schedule.
  - .3 Remove damaged, opened and rejected materials from site.
  - .4 Provide and maintain dry, temperature controlled, secure storage.
  - .5 Observe manufacturer's recommendations for storage and handling.
  - .6 Store materials and supplies away from heat generating devices.
  - .7 Store materials and equipment in well-ventilated area with temperature range 7 degrees C to 30 degrees C.
  - .8 Store temperature sensitive products above minimum temperature as recommended by manufacturer.
  - .9 Keep areas used for storage, cleaning and preparation, clean and orderly to approval of Departmental Representative. After completion of operations, return areas to clean condition to approval of Departmental Representative.
  - .10 Remove paint materials from storage only in quantities required for same day use.
  - .11 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling storage, and disposal of hazardous materials.
  - .12 Fire Safety Requirements:
    - .1 Provide one 9 kg Type ABC fire extinguisher adjacent to storage area.
    - .2 Store oily rags, waste products, empty containers and materials subject to spontaneous combustion in ULC approved, sealed containers and remove from site on a daily basis.
    - .3 Handle, store, use and dispose of flammable and combustible materials in accordance with the National Fire Code of Canada.

- .2 Waste Management and Disposal:
  - .1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
  - .2 Paint, stain and wood preservative finishes and related materials (thinners, solvents, etc.) are regarded as hazardous products and are subject to regulations for disposal. Information on these controls can be obtained from Provincial Ministries of Environment and Regional levels of Government.
  - .3 Material which cannot be reused must be treated as hazardous waste and disposed of in an appropriate manner.
  - .4 Place materials defined as hazardous or toxic waste, including used sealant and adhesive tubes and containers, in containers or areas designated for hazardous waste.
  - .5 To reduce the amount of contaminants entering waterways, sanitary/storm drain systems or into the ground the following procedures shall be strictly adhered to:
    - .1 Retain cleaning water for water-based materials to allow sediments to be filtered out.
    - .2 Retain cleaners, thinners, solvents and excess paint and place in designated containers and ensure proper disposal.
    - .3 Return solvent and oil soaked rags used during painting operations for contaminant recovery, proper disposal, or appropriate cleaning and laundering.
    - .4 Dispose of contaminants in an approved legal manner in accordance with hazardous waste regulations.
    - .5 Empty paint cans are to be dry prior to disposal or recycling (where available).
  - .6 Where paint recycling is available, collect waste paint by type and provide for delivery to recycling or collection facility.
  - .7 Set aside and protect surplus and uncontaminated finish materials: . Deliver to or arrange collection by employees, individuals, or organizations for verifiable re-use or re-manufacturing.
  - .8 Close and seal tightly partly used sealant and adhesive containers and store protected in well ventilated fire-safe area at moderate temperature.

## **1.9 AMBIENT CONDITIONS**

- .1 Heating, Ventilation and Lighting:
  - .1 Ventilate enclosed spaces in accordance with Section 01 56 00 – Temporary Barriers and Enclosures.
  - .2 Do not perform painting work unless adequate and continuous ventilation and sufficient heating facilities are in place to maintain ambient air and substrate temperatures above 10 degrees C for 24 hours before, during and after paint application until paint has cured sufficiently.
  - .3 Where required, provide continuous ventilation for seven days after completion of application of paint.
  - .4 Co-ordinate use of existing ventilation system with Departmental Representative and ensure its operation during and after application of paint as required.

- .5 Provide temporary ventilating and heating equipment where permanent facilities are not available or supplemental ventilating and heating equipment if ventilation and heating from existing system is inadequate to meet minimum requirements.
- .6 Perform no painting work unless a minimum lighting level of 323 Lux is provided on surfaces to be painted. Adequate lighting facilities to be provided by General Contractor.
- .2 Temperature, Humidity and Substrate Moisture Content Levels:
  - .1 Unless specifically pre-approved by specifying body, Paint Inspection Agency and, applied product manufacturer, perform no painting work when:
    - .1 Ambient air and substrate temperatures are below 10 degrees C.
    - .2 Substrate temperature is over 32 degrees C unless paint is specifically formulated for application at high temperatures.
    - .3 Substrate and ambient air temperatures are expected to fall outside MPI or paint manufacturer's prescribed limits.
    - .4 Relative humidity is above 85% or when dew point is less than 3 degrees C variance between air/surface temperature.
    - .5 Rain or snow are forecast to occur before paint has thoroughly cured or when it is foggy, misty, raining or snowing at site.
  - .2 Perform no painting work when maximum moisture content of substrate exceeds:
    - .1 12% for concrete and masonry (clay and concrete brick/block).
    - .2 15% for wood.
    - .3 12% for plaster and gypsum board.
  - .3 Conduct moisture tests using a properly calibrated electronic Moisture Meter, except test concrete floors for moisture using a simple "cover patch test".
  - .4 Test concrete, masonry and plaster surfaces for alkalinity as required.
- .3 Surface and Environmental Conditions:
  - .1 Apply paint finish in areas where dust is no longer being generated by related construction operations or when wind or ventilation conditions are such that airborne particles will not affect quality of finished surface.
  - .2 Apply paint to adequately prepared surfaces and to surfaces within moisture limits noted herein.
  - .3 Apply paint when previous coat of paint is dry or adequately cured.
  - .4 Apply paint finishes when conditions forecast for entire period of application fall within manufacturer's recommendations.
  - .5 Do not apply paint when:
    - .1 Temperature is expected to drop below 10 degrees C before paint has thoroughly cured.
    - .2 Substrate and ambient air temperatures are expected to fall outside MPI or paint manufacturer's limits.
    - .3 Surface to be painted is wet, damp or frosted.
  - .6 Provide and maintain cover when paint must be applied in damp or cold weather. Heat substrates and surrounding air to comply with temperature and humidity conditions specified by manufacturer. Protect until paint is dry or until weather conditions are suitable.

- .7 Schedule painting operations such that surfaces exposed to direct, intense sunlight are scheduled for completion during early morning.
- .8 Remove paint from areas which have been exposed to freezing, excess humidity, rain, snow or condensation. Prepare surface again and repaint.
- .9 Paint occupied facilities in accordance with approved schedule only. Schedule operations to approval of Departmental Representative such that painted surfaces will have dried and cured sufficiently before occupants are affected.

**Part 2 Products**

**2.1 MATERIALS**

- .1 Paint materials listed in latest edition of MPI Approved Products List (APL) are acceptable for use on this project.
- .2 Paint materials for paint systems: to be products of single manufacturer.
- .3 Only qualified products with E3 "Environmentally Friendly" ratings are acceptable for use on this project.

**2.2 COLOURS**

- .1 Departmental Representative will provide Colour Schedule after Contract award.
- .2 Selection of colours will be from manufacturer's full range of colours.
- .3 Where specific products are available in restricted range of colours, selection will be based on limited range.
- .4 Each coat in multi coat system to be tinted slightly lighter colour than top coat to show visible difference between coats.

**2.3 MIXING AND TINTING**

- .1 Perform colour tinting operations prior to delivery of paint to site.
- .2 Where thinner is required, add thinner to paint manufacturer's recommendations. Do not use kerosene or organic solvents to thin water-based paints.
- .3 Thin paint for spraying according in accordance with paint manufacturer's instructions. If directions are not on container, obtain instructions in writing from manufacturer and provide copy of instructions to Departmental Representative.
- .4 Re-mix paint in containers prior to and during application to ensure break-up of lumps, complete dispersion of settled pigment, and colour and gloss uniformity.

**2.4 GLOSS/SHEEN RATINGS**

- .1 Paint gloss: defined as sheen rating of applied paint, in accordance with following values:

Gloss Level Category/	Units @ 60 Degrees/	Units @ 85 Degrees/
G1 - matte finish	0 to 5	max. 10



Gloss Level Category/	Units @ 60 Degrees/	Units @ 85 Degrees/
G2 - velvet finish	0 to 10	10 to 35
G3 - eggshell finish	10 to 25	10 to 35
G4 - satin finish	20 to 35	min. 35
G5 - semi-gloss finish	35 to 70	
G6 - gloss finish	70 to 85	
G7 - high gloss finish	> 85	

- .2 Gloss level ratings of painted surfaces as specified herein and as noted on Finish Schedule.

## 2.5 EXTERIOR PAINTING SYSTEMS

- .1 Asphalt Surfaces: zone/traffic marking for drive and parking areas, etc.
  - .1 EXT 2.1B - Alkyd zone/traffic marking finish.
- .1 Concrete Horizontal Surfaces: decks
  - .1 EXT 3.2F - Alkyd zone/traffic marking finish.
- .2 Galvanized Metal: not chromate passivated (doors and frames)
  - .1 EXT 5.3D - Pigmented polyurethane finish for use in high contact/high traffic areas.

## Part 3 Execution

### 3.1 MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheets.

### 3.2 PREPARATION

- .1 Perform preparation and operations for exterior painting in accordance with MPI Maintenance Repainting Manual except where specified otherwise.
- .2 Apply paint materials in accordance with paint manufacturer's written application instructions.
- .3 Clean and prepare exterior surfaces to be repainted in accordance with MPI Maintenance Repainting Manual requirements. Refer to the MPI Manual in regard to specific requirements and as follows:
  - .1 Remove dust, dirt, and surface debris by wiping with dry, clean cloths.
  - .2 Wash surfaces with a biodegradable detergent and clean warm water using a stiff bristle brush to remove dirt, oil and other surface contaminants.
  - .3 Rinse scrubbed surfaces with clean water until foreign matter is flushed from surface.
  - .4 Allow surfaces to drain completely and allow to dry thoroughly. Allow sufficient drying time and test surfaces using electronic moisture meter before commencing work.

- .5 Use water-based cleaners in place of organic solvents where surfaces will be repainted using water based paints.
- .6 Many water-based paints cannot be removed with water once dried. Minimize use of kerosene or such organic solvents to clean up water-based paints.
- .4 Clean metal surfaces to be repainted by removing rust, dirt, oil, grease and foreign substances in accordance with MPI requirements. Remove such contaminants from surfaces, pockets and corners to be repainted by brushing with clean brushes, blowing with clean dry compressed air, or brushing/vacuum cleaning as required.
- .5 Prevent contamination of cleaned surfaces by salts, acids, alkalis, other corrosive chemicals, grease, oil and solvents before priming and between applications of remaining coats. Touch-up, spot prime, and apply primer, paint, or pretreatment as soon as possible after cleaning and before deterioration occurs.
- .6 Do not apply paint until prepared surfaces have been accepted by Departmental Representative.
- .7 Sand and dust between coats as required to provide adequate adhesion for next coat and to remove defects visible from a distance up to 1000 mm.

### **3.3 EXISTING CONDITIONS**

- .1 Investigate existing substrates for problems related to proper and complete preparation of surfaces to be painted. Report to Departmental Representative damages, defects, unsatisfactory or unfavourable conditions before proceeding with work.
- .2 Conduct moisture testing of surfaces to be painted using a properly calibrated electronic moisture meter, except test concrete floors for moisture using a simple "cover patch test" and report findings to Departmental Representative. Do not proceed with work until conditions fall within acceptable range as recommended by manufacturer.

### **3.4 PROTECTION**

- .1 Protect existing building surfaces and adjacent structures from paint spatters, markings and other damage by suitable non-staining covers or masking. If damaged, clean and restore such surfaces as directed by Departmental Representative.
- .2 Protect items that are permanently attached such as Fire Labels on doors and frames.
- .3 Protect factory finished products and equipment.
- .4 Protect passing pedestrians, building occupants, and public in and about building.
- .5 Remove light fixtures, surface hardware on doors, and other surface mounted equipment, fittings and fastenings prior to undertaking painting operations. Store items and re-install after painting is completed.
- .6 Move and cover exterior furniture and portable equipment as necessary to carry out painting operations. Replace as painting operations progress.
- .7 As painting operations progress, place "WET PAINT" signs in pedestrian and vehicle traffic areas to approval of Departmental Representative.

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**3.5 APPLICATION**

- .1 Conform to manufacturer's application instructions unless specified otherwise. Apply paint by brush and roller.
- .2 Brush and Roller Application:
  - .1 Apply paint in a uniform layer using brush and/or roller of types suitable for application.
  - .2 Work paint into cracks, crevices and corners.
  - .3 Paint surfaces and corners not accessible to brush using spray, daubers and/or sheepskins. Paint surfaces and corners not accessible to roller using brush, daubers or sheepskins.
  - .4 Brush and/or roll out runs and sags, and over-lap marks. Rolled surfaces shall be free of roller tracking and heavy stipple unless approved by Departmental Representative Engineer Consultant .
  - .5 Remove runs, sags and brush marks from finished work and repaint.
- .3 Use dipping, sheepskins or daubers when no other method is practical in places of difficult access and when specifically authorized by Departmental Representative.
- .4 Apply coats of paint as continuous film of uniform thickness. Repaint thin spots or bare areas before next coat of paint is applied.
- .5 Allow surfaces to dry and properly cure after cleaning and between subsequent coats for minimum time period as recommended by manufacturer.
- .6 Sand and dust between coats to remove visible defects.
- .7 Finish surfaces both above and below sight lines as specified for surrounding surfaces, including such surfaces as projecting ledges.
- .8 Finish top, bottom, edges and cutouts of doors after fitting as specified for door surfaces.

**3.6 FIELD QUALITY CONTROL**

- .1 Inspection:
  - .1 Advise Departmental Representative when each surface and applied coating is ready for inspection. Do not proceed with subsequent coats until previous coat has been approved.
- .2 Manufacturer's Field Services:
  - .1 Provide manufacturer's field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.

**3.7 CLEANING**

- .1 Proceed in accordance with Section 01 74 11 - Cleaning.
  - .1 Remove paint where spilled, splashed, splattered or sprayed as work progresses using means and materials that are not detrimental to affected surfaces.

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**3.8 RESTORATION**

- .1 Clean and re-install hardware items removed before undertaken painting operations.
- .2 Remove protective coverings and warning signs as soon as practical after operations cease.
- .3 Remove paint splashings on exposed surfaces that were not painted. Remove smears and spatter immediately as operations progress, using compatible solvent.
- .4 Protect freshly completed surfaces from paint droppings and dust to approval of Departmental Representative. Avoid scuffing newly applied paint.
- .5 Restore areas used for storage, cleaning, mixing and handling of paint to clean condition as approved by Departmental Representative.

**3.9 SCHEDULE - NEW**

- .1 Exterior doors.
- .2 Concrete line markings.
- .3 As indicated on the drawings.

**END OF SECTION**

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**Part 1            General**

**1.1                REFERENCES**

- .1    Department of Justice Canada (Jus)
  - .1        Canadian Environmental Protection Act (CEPA), 1999, c. 33
- .2    Environmental Protection Agency (EPA)
  - .1        EPA Test Method for Measuring Total Volatile Organic Compound Content of Consumer Products, Method 24 - 1995, (for Surface Coatings).
- .3    Health Canada / Workplace Hazardous Materials Information System (WHMIS)
  - .1        Material Safety Data Sheets (MSDS).
- .4    Master Painters Institute (MPI)
  - .1        MPI Architectural Painting Specifications Manual, 2004.
- .5    National Fire Code of Canada - 2010
- .6    Society for Protective Coatings (SSPC)
  - .1        SSPC Painting Manual, Volume Two, 8th Edition, Systems and Specifications Manual.

**1.2                QUALITY ASSURANCE**

- .1    Qualifications:
  - .1        Contractor: minimum of five years proven satisfactory experience. Provide list of last three comparable jobs including, job name and location, specifying authority, and project manager.
  - .2        Journeymen: qualified journeymen who have "Tradesman Qualification Certificate of Proficiency" engaged in painting work.
  - .3        Apprentices: working under direct supervision of qualified trades person in accordance with trade regulations.
- .2    Mock-Ups:
  - .1        Construct mock-ups in accordance with Section 01 45 00 - Quality Control.
    - .1            Prepare and paint designated surface, area, room or item (in each colour scheme) to specified requirements, with specified paint or coating showing selected colours, gloss/sheen, textures.
    - .2            Mock-up will be used:
      - .1                To judge workmanship, substrate preparation, operation of equipment and material application and workmanship to MPI Architectural Painting Specification Manual standards.
    - .3            Locate where directed.
    - .4            Allow 48 hours for inspection of mock-up before proceeding with work.

- .5 When accepted, mock-up will demonstrate minimum standard of quality required for this work. Approved mock-up may not remain as part of finished work.
- .3 Health and Safety:
  - .1 Do construction occupational health and safety in accordance with Section 01 35 29.06 - Health and Safety Requirements.

### **1.3 SCHEDULING**

- .1 Submit work schedule for various stages of painting to Departmental Representative for review. Submit schedule minimum of 48 hours in advance of proposed operations.
- .2 Obtain written authorization from Departmental Representative for changes in work schedule.
- .3 Schedule painting operations to prevent disruption of occupants.

### **1.4 SUBMITTALS**

- .1 Submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
  - .1 Submit product data and instructions for each paint and coating product to be used.
  - .2 Submit product data for the use and application of paint thinner.
  - .3 Submit two copies of Workplace Hazardous Materials Information System (WHMIS) Material Safety Data Sheets (MSDS) in accordance with Section 01 33 00 - Submittal Procedures. Indicate VOCs during application and curing.
- .3 Samples:
  - .1 Submit full range colour sample chips to indicate where colour availability is restricted.
  - .2 Submit duplicate 200 x 300 mm sample panels of each paint, stain, clear coating, and special finish with specified paint or coating in colours, gloss/sheen and textures required to MPI Architectural Painting Specification Manual standards submitted on following substrate materials:
  - .3 Retain reviewed samples on-site to demonstrate acceptable standard of quality for appropriate on-site surface.
  - .4 Test reports: submit certified test reports for paint from approved independent testing laboratories, indicating compliance with specifications for specified performance characteristics and physical properties.
    - .1 Lead, cadmium and chromium: presence of and amounts.
    - .2 Mercury: presence of and amounts.
    - .3 Organochlorines and PCBs: presence of and amounts.
  - .5 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
  - .6 Manufacturer's Instructions:
    - .1 Submit manufacturer's installation and application instructions.

- .7 Closeout Submittals: submit maintenance data for incorporation into manual specified in Section 01 78 00 - Closeout Submittals include following:
  - .1 Product name, type and use.
  - .2 Manufacturer's product number.
  - .3 Colour numbers.
  - .4 MPI Environmentally Friendly classification system rating.

## **1.5 MAINTENANCE**

- .1 Extra Materials:
  - .1 Deliver to extra materials from same production run as products installed. Package products with protective covering and identify with descriptive labels. Comply with Section 01 78 00 - Closeout Submittals.
  - .2 Quantity: provide one - four litre can of each type and colour of primer, stain, and finish coating. Identify colour and paint type in relation to established colour schedule and finish system.
  - .3 Delivery, storage and protection: comply with Departmental Representative requirements for delivery and storage of extra materials.

## **1.6 DELIVERY, STORAGE AND HANDLING**

- .1 Packing, Shipping, Handling and Unloading:
  - .1 Pack, ship, handle and unload materials in accordance with Section 01 61 00 - Common Product Requirements and manufacturer's written instructions.
- .2 Acceptance at Site:
  - .1 Identify products and materials with labels indicating:
    - .1 Manufacturer's name and address.
    - .2 Type of paint or coating.
    - .3 Compliance with applicable standard.
    - .4 Colour number in accordance with established colour schedule.
- .3 Remove damaged, opened and rejected materials from site.
- .4 Storage and Protection:
  - .1 Provide and maintain dry, temperature controlled, secure storage.
  - .2 Store materials and supplies away from heat generating devices.
  - .3 Store materials and equipment in well-ventilated area with temperature range 7 degrees C to 30 degrees C.
- .5 Store temperature sensitive products above minimum temperature as recommended by manufacturer.
- .6 Keep areas used for storage, cleaning and preparation clean and orderly. After completion of operations, return areas to clean condition.
- .7 Remove paint materials from storage only in quantities required for same day use.
- .8 Fire Safety Requirements:

- .1 Provide one 9 kg Type ABC fire extinguisher adjacent to storage area.
  - .2 Store oily rags, waste products, empty containers and materials subject to spontaneous combustion in ULC approved, sealed containers and remove from site on a daily basis.
  - .3 Handle, store, use and dispose of flammable and combustible materials in accordance with National Fire Code of Canada requirements.
- .9 Waste Management and Disposal:
- .1 Separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
  - .2 Remove from site and dispose of packaging materials at appropriate recycling facilities.
  - .3 Collect and separate for disposal paper, plastic, polystyrene, corrugated cardboard, and packaging material for recycling in accordance with Waste Management Plan (WMP).
  - .4 Place materials defined as hazardous or toxic in designated containers.
  - .5 Handle and dispose of hazardous materials in accordance with CEPA, TDGA, Regional and Municipal, regulations.
  - .6 Ensure emptied containers are sealed and stored safely.
  - .7 Unused paint and coating materials must be disposed of at official hazardous material collections site as approved by Departmental Representative.
  - .8 Paint, stain and wood preservative finishes and related materials (thinners, and solvents) are regarded as hazardous products and are subject to regulations for disposal. Information on these controls can be obtained from Provincial Ministries of Environment and Regional levels of Government.
  - .9 Material which cannot be reused must be treated as hazardous waste and disposed of in an appropriate manner.
  - .10 Place materials defined as hazardous or toxic waste, including used sealant and adhesive tubes and containers, in containers or areas designated for hazardous waste.
  - .11 To reduce the amount of contaminants entering waterways, sanitary/storm drain systems or into ground follow these procedures:
    - .1 Retain cleaning water for water-based materials to allow sediments to be filtered out.
    - .2 Retain cleaners, thinners, solvents and excess paint and place in designated containers and ensure proper disposal.
    - .3 Return solvent and oil soaked rags used during painting operations for contaminant recovery, proper disposal, or appropriate cleaning and laundering.
    - .4 Dispose of contaminants in approved legal manner in accordance with hazardous waste regulations.
    - .5 Empty paint cans are to be dry prior to disposal or recycling (where available).
  - .12 Where paint recycling is available, collect waste paint by type and provide for delivery to recycling or collection facility.



**1.7 SITE CONDITIONS**

- .1 Heating, Ventilation and Lighting:
  - .1 Ventilate enclosed spaces in accordance with Section 01 56 00 - Temporary Barriers and Enclosures.
  - .2 Provide heating facilities to maintain ambient air and substrate temperatures above 10 degrees C for 24 hours before, during and after paint application until paint has cured sufficiently.
  - .3 Provide continuous ventilation for seven days after completion of application of paint.
  - .4 Coordinate use of existing ventilation system with Departmental Representative and ensure its operation during and after application of paint as required.
  - .5 Provide temporary ventilating and heating equipment where permanent facilities are not available or supplemental ventilating and heating equipment if ventilation and heating from existing system is inadequate to meet minimum requirements.
  - .6 Provide minimum lighting level of 323 Lux on surfaces to be painted.
- .2 Temperature, Humidity and Substrate Moisture Content Levels:
  - .1 Unless pre-approved written approval by Specifying body and product manufacturer, perform no painting when:
    - .1 Ambient air and substrate temperatures are below 10 degrees C.
    - .2 Substrate temperature is above 32 degrees C unless paint is specifically formulated for application at high temperatures.
    - .3 Substrate and ambient air temperatures are not expected to fall within MPI or paint manufacturer's prescribed limits.
    - .4 The relative humidity is under 85% or when the dew point is more than 3 degrees C variance between the air/surface temperature. Paint should not be applied if the dew point is less than 3 degrees C below the ambient or surface temperature. Use sling psychrometer to establish the relative humidity before beginning paint work.
    - .5 Rain or snow is forecast to occur before paint has thoroughly cured or when it is foggy, misty, raining or snowing at site.
    - .6 Ensure that conditions are within specified limits during drying or curing process, until newly applied coating can itself withstand 'normal' adverse environmental factors.
  - .2 Perform painting work when maximum moisture content of the substrate is below:
    - .1 Allow new concrete and masonry to cure minimum of 28 days.
    - .2 15% for wood.
    - .3 12% for plaster and gypsum board.
  - .3 Test for moisture using calibrated electronic Moisture Meter. Test concrete floors for moisture using "cover patch test".
  - .4 Test concrete, masonry and plaster surfaces for alkalinity as required.
- .3 Surface and Environmental Conditions:

- .1 Apply paint finish in areas where dust is no longer being generated by related construction operations or when wind or ventilation conditions are such that airborne particles will not affect quality of finished surface.
- .2 Apply paint to adequately prepared surfaces and to surfaces within moisture limits.
- .3 Apply paint when previous coat of paint is dry or adequately cured.
- .4 Additional interior application requirements:
  - .1 Apply paint finishes when temperature at location of installation can be satisfactorily maintained within manufacturer's recommendations.
  - .2 Apply paint in occupied facilities during silent hours only. Schedule operations to approval of Departmental Representative such that painted surfaces will have dried and cured sufficiently before occupants are affected.

## **Part 2 Products**

### **2.1 MATERIALS**

- .1 Paint materials listed in the MPI Approved Products List (APL) are acceptable for use on this project.
- .2 Provide paint materials for paint systems from single manufacturer.
- .3 Only qualified products with E3 "Environmentally Friendly" rating are acceptable for use on this project. Do not exceed VOC limits of Green Seal Standard GS-11 "Paints" 1993 and latest revision.
- .4 Conform to latest MPI requirements for interior painting work including preparation and priming.
- .5 Materials (primers, paints, coatings, varnishes, stains, lacquers, fillers, thinners, solvents, etc.) in accordance with MPI Architectural Painting Specification Manual "Approved Product" listing.
- .6 Linseed oil, shellac, and turpentine: highest quality product from approved manufacturer listed in MPI Architectural Painting Specification Manual, compatible with other coating materials as required.
- .7 Provide paint products meeting MPI "Environmentally Friendly" E3 ratings based on VOC (EPA Method 24) content levels.
- .8 Use MPI listed materials having minimum E3 rating where indoor air quality (odour) requirements exist.
- .9 Paints, coatings, adhesives, solvents, cleaners, lubricants, and other fluids:
  - .1 Water-based.
  - .2 Non-flammable.
  - .3 Manufactured without compounds which contribute to ozone depletion in the upper atmosphere.

- .4 Manufactured without compounds which contribute to smog in the lower atmosphere.
- .5 Do not contain methylene chloride, chlorinated hydrocarbons, and toxic metal pigments.
- .10 Formulate and manufacture water-borne surface coatings with no aromatic solvents, formaldehyde, halogenated solvents, mercury, lead, cadmium, hexavalent chromium or their compounds.
- .11 Flash point: 61.0 degrees C or greater for water-borne surface coatings and recycled water-borne surface coatings.
- .12 Ensure manufacture and process of both water-borne surface coatings and recycled water-borne surface coatings does not release:
  - .1 Matter in undiluted production plant effluent generating 'Biochemical Oxygen Demand' (BOD) in excess of 15 mg/L to natural watercourse or sewage treatment facility lacking secondary treatment.
  - .2 Total Suspended Solids (TSS) in undiluted production plant effluent in excess of 15 mg/L to natural watercourse or a sewage treatment facility lacking secondary treatment.
- .13 Water-borne paints and stains, recycled water-borne surface coatings and water borne varnishes to meet minimum "Environmentally Friendly" E3 rating.
- .14 Recycled water-borne surface coatings to contain 50 % post-consumer material by volume.
- .15 Recycled water-borne surface coatings must not contain:
  - .1 Lead in excess of 600.0 ppm weight/weight total solids.
  - .2 Mercury in excess of 50.0 ppm weight/weight total product.
  - .3 Cadmium in excess of 1.0 ppm weight/weight total product.
  - .4 Hexavalent chromium in excess of 3.0 ppm weight/weight total product.
  - .5 Organochlorines or polychlorinated biphenyls (PCBS) in excess of 1.0 ppm weight/weight total product.

## 2.2 COLOURS

- .1 Departmental Representative will provide Colour Schedule after Contract award.
- .2 Selection of colours from manufacturer's full range of colours.
- .3 Where specific products are available in restricted range of colours, selection based on limited range.
- .4 Each coat in multi coat system to be tinted slightly lighter colour than top coat to show visible difference between coats.

## 2.3 MIXING AND TINTING

- .1 Perform colour tinting operations prior to delivery of paint to site.

- .2 Where thinner is required, use and add thinner in accordance with paint manufacturer's recommendations. Do not use kerosene or similar organic solvents to thin water-based paints.
- .3 Thin paint for spraying in accordance with paint manufacturer's instructions.
- .4 Re-mix paint in containers prior to and during application to ensure break-up of lumps, complete dispersion of settled pigment, and colour and gloss uniformity.

**2.4 GLOSS/SHEEN RATINGS**

- .1 Paint gloss is defined as sheen rating of applied paint, in accordance with following values:

	Gloss @ 60 degrees	Sheen @ 85 degrees
Gloss Level 1 - Matte Finish (flat)	Max. 5	Max. 10
Gloss Level 2 - Velvet-Like Finish	Max.10	10 to 35
Gloss Level 3 - Eggshell Finish	10 to 25	10 to 35
Gloss Level 4 - Satin-Like Finish	20 to 35	min. 35
Gloss Level 5 - Traditional Semi-Gloss Finish	35 to 70	
Gloss Level 6 - Traditional Gloss	70 to 85	
Gloss Level 7 - High Gloss Finish	More than 85	

- .2 Gloss level ratings of painted surfaces as indicated herein and as noted on Finish Schedule.

**2.5 INTERIOR PAINTING SYSTEMS**

- .1 Concrete masonry units: smooth and split face block and brick:
  - .1 INT 4.2E - Institutional low odour/low VOC, G5, premium finish.
- .2 Galvanized metal: doors, frames, railings, misc. steel, pipes, overhead decking, and ducts.
  - .1 INT 5.3M – High-performance architectural latex, low odour/low VOC, G5 premium finish, over one coat of surface tolerant primer.
- .3 Dressed lumber: including doors, door and window frames, casings, mouldings:
  - .1 INT 6.3A - High performance architectural latex, G5 premium finish.
  - .2 INT 6.3W - Waterborne clear acrylic, G4 finish (over stain).
- .4 Plaster and gypsum board: gypsum wallboard, drywall, "sheet rock type material", and textured finishes:
  - .1 INT 9.2M - Institutional low odour/low VOC, G4 (ceilings only), premium finish.
  - .2 INT 9.2M - Institutional low odour/low VOC, G4, premium finish. (typical)
  - .3 INT 9.2F – Epoxy modified latex/low VOC, G4 (where “epoxy painted” noted on room finish schedule)

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**Part 3 Execution**

**3.1 MANUFACTURER'S INSTRUCTIONS**

- .1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and data sheet.

**3.2 GENERAL**

- .1 Perform preparation and operations for interior painting in accordance with MPI Architectural Painting Specifications Manual except where specified otherwise.
- .2 Apply paint materials in accordance with paint manufacturer's written application instructions.

**3.3 EXAMINATION**

- .1 Investigate existing substrates for problems related to proper and complete preparation of surfaces to be painted. Report to Departmental Representative damages, defects, unsatisfactory or unfavourable conditions before proceeding with work.
- .2 Conduct moisture testing of surfaces to be painted using properly calibrated electronic moisture meter, except test concrete floors for moisture using simple "cover patch test". Do not proceed with work until conditions fall within acceptable range as recommended by manufacturer.
- .3 Maximum moisture content as follows:
  - .1 Stucco, plaster and gypsum board: 12%.
  - .2 Concrete: 12%.
  - .3 Clay and Concrete Block/Brick: 12%.
  - .4 Wood: 15%.

**3.4 PREPARATION**

- .1 Protection:
  - .1 Protect existing building surfaces and adjacent structures from paint spatters, markings and other damage by suitable non-staining covers or masking. If damaged, clean and restore surfaces as directed by Departmental Representative.
  - .2 Protect items that are permanently attached such as Fire Labels on doors and frames.
  - .3 Protect factory finished products and equipment.
  - .4 Protect passing pedestrians, building occupants and public in and about the building.
- .2 Surface Preparation:
  - .1 Remove electrical cover plates, light fixtures, surface hardware on doors, bath accessories and other surface mounted equipment, fittings and fastenings prior to undertaking painting operations. Identify and store items in secure location and re-installed after painting is completed.

- .2 Move and cover furniture and portable equipment as necessary to carry out painting operations. Replace as painting operations progress.
- .3 Place "WET PAINT" signs in occupied areas as painting operations progress. Signs to approval of Departmental Representative.
- .3 Clean and prepare surfaces in accordance with MPI Architectural Painting Specification Manual requirements. Refer to MPI Manual in regard to specific requirements and as follows:
  - .1 Remove dust, dirt, and other surface debris by vacuuming, or wiping with dry, clean cloths.
  - .2 Wash surfaces with a biodegradable detergent and clean warm water using a stiff bristle brush to remove dirt, oil and other surface contaminants.
  - .3 Rinse scrubbed surfaces with clean water until foreign matter is flushed from surface.
  - .4 Allow surfaces to drain completely and allow to dry thoroughly.
  - .5 Prepare surfaces for water-based painting, water-based cleaners should be used in place of organic solvents.
  - .6 Use trigger operated spray nozzles for water hoses.
  - .7 Many water-based paints cannot be removed with water once dried. Minimize use of mineral spirits or organic solvents to clean up water-based paints.
- .4 Prevent contamination of cleaned surfaces by salts, acids, alkalis, other corrosive chemicals, grease, oil and solvents before prime coat is applied and between applications of remaining coats. Apply primer, paint, or pretreatment as soon as possible after cleaning and before deterioration occurs.
- .5 Where possible, prime non-exposed surfaces of new wood surfaces before installation. Use same primers as specified for exposed surfaces.
  - .1 Apply vinyl sealer to MPI #36 over knots, pitch, sap and resinous areas.
  - .2 Apply wood filler to nail holes and cracks.
  - .3 Tint filler to match stains for stained woodwork.
- .6 Sand and dust between coats as required to provide adequate adhesion for next coat and to remove defects visible from a distance up to 1000 mm.
- .7 Clean metal surfaces to be painted by removing rust, loose mill scale, welding slag, dirt, oil, grease and other foreign substances in accordance with MPI requirements. Remove traces of blast products from surfaces, pockets and corners to be painted by brushing with clean brushes and vacuum cleaning.
- .8 Touch up of shop primers with primer as specified.
- .9 Do not apply paint until prepared surfaces have been accepted by Departmental Representative.

### 3.5 APPLICATION

- .1 Apply paint by brush and roller. Conform to manufacturer's application instructions unless specified otherwise.

- .2 Brush and Roller Application:
  - .1 Apply paint in uniform layer using brush and/or roller type suitable for application.
  - .2 Work paint into cracks, crevices and corners.
  - .3 Paint surfaces and corners not accessible to brush using spray, daubers and/or sheepskins. Paint surfaces and corners not accessible to roller using brush, daubers or sheepskins.
  - .4 Brush and/or roll out runs and sags, and over-lap marks. Rolled surfaces free of roller tracking and heavy stipple.
  - .5 Remove runs, sags and brush marks from finished work and repaint.
- .3 Use dipping, sheepskins or daubers only when no other method is practical in places of difficult access.
- .4 Apply coats of paint continuous film of uniform thickness. Repaint thin spots or bare areas before next coat of paint is applied.
- .5 Allow surfaces to dry and properly cure after cleaning and between subsequent coats for minimum time period as recommended by manufacturer.
- .6 Sand and dust between coats to remove visible defects.
- .7 Finish surfaces both above and below sight lines as specified for surrounding surfaces, including such surfaces as tops of interior cupboards and cabinets and projecting ledges.
- .8 Finish closets and alcoves as specified for adjoining rooms.
- .9 Finish top, bottom, edges and cutouts of doors after fitting as specified for door surfaces.

### **3.6 MECHANICAL/ELECTRICAL EQUIPMENT**

- .1 Finished areas: Unless noted otherwise, paint all exposed conduits, piping (unless protected by metal clad pipe insulation, hangers (unless prefinished), and other mechanical and electrical equipment with colour and finish as selected by Departmental Representative.
- .2 Do not paint exposed ductwork in finished areas unless noted.
- .3 Boiler room, mechanical and electrical rooms: paint exposed conduits, piping, hangers, ductwork and other mechanical and electrical equipment.
- .4 Other unfinished areas: leave exposed conduits, piping, hangers, ductwork and other mechanical and electrical equipment in original finish and touch up scratches and marks.
- .5 Touch up scratches and marks on factory painted finishes and equipment with paint as supplied by manufacturer of equipment.
- .6 Do not paint over nameplates.
- .7 Keep sprinkler heads free of paint.

- .8 Paint inside of ductwork where visible behind grilles, registers and diffusers with primer and one coat of matt black paint.
- .9 Paint fire protection piping red.
- .10 Paint disconnect switches for fire alarm system and exit light systems in red enamel.
- .11 Paint natural gas piping yellow.
- .12 Paint both sides and edges of backboards for telephone and electrical equipment before installation. Leave equipment in original finish except for touch-up as required, and paint conduits, mounting accessories and other unfinished items.
- .13 Do not paint interior transformers and substation equipment.

### **3.7 FIELD QUALITY CONTROL**

- .1 Standard of Acceptance:
  - .1 Walls: no defects visible from a distance of 1000 mm at 90 degrees to surface.
  - .2 Ceilings: no defects visible from floor at 45 degrees to surface when viewed using final lighting source.
  - .3 Final coat to exhibit uniformity of colour and uniformity of sheen across full surface area.
- .2 Advise Departmental Representative when surfaces and applied coating is ready for inspection. Do not proceed with subsequent coats until previous coat has been approved.
- .3 Cooperate with inspection personnel and provide access to areas of work.
- .4 Retain purchase orders, invoices and other documents to prove conformance with noted MPI requirements when requested by Departmental Representative.

### **3.8 RESTORATION**

- .1 Clean and re-install hardware items removed before undertaken painting operations.
- .2 Remove protective coverings and warning signs as soon as practical after operations cease.
- .3 Remove paint splashings on exposed surfaces that were not painted. Remove smears and spatter immediately as operations progress, using compatible solvent.
- .4 Protect freshly completed surfaces from paint droppings and dust to approval of Departmental Representative. Avoid scuffing newly applied paint.
- .5 Restore areas used for storage, cleaning, mixing and handling of paint to clean condition as approved by Departmental Representative.

**END OF SECTION**