



**Interior Office Alterations for  
Paramedic Services**  
430 Dufferin Street, Toronto, ON, M6K 2A3



---

	<b>Pages</b>
<b>INTRODUCTORY INFORMATION</b>	
00 00 01 Cover.....	1
00 01 10 Table of Contents.....	2
 <b>SPECIFICATIONS</b>	
<b>Division 01 – General Requirements</b>	
01 14 00 Work Restrictions.....	1
01 25 00 Substitution Procedures.....	2
01 26 00 Contract Modification Procedures.....	4
01 29 00 Payment Procedures .....	2
01 31 19 Project Meetings.....	2
01 32 00 Construction Progress Documentation.....	3
01 33 00 Submittal Procedures .....	3
01 40 00 Quality Requirements .....	2
01 56 00 Temporary Barriers and Enclosures.....	1
01 61 00 Common Product Requirements .....	2
01 73 00 Execution.....	2
01 73 29 Cutting and Patching .....	2
01 74 00 Cleaning and Waste Management .....	2
01 77 00 Closeout Procedures .....	1
01 78 00 Closeout Submittals.....	4
 <b>Division 02 – Existing Conditions</b>	
02 41 19 Selective Demolition .....	5
 <b>Division 08 - Openings</b>	
08 11 13 Hollow Metal Doors and Frames .....	7
08 21 00 Wood Doors.....	2
 <b>Division 09 – Finishes</b>	
09 22 16 Non-Structural Metal Framing .....	8
09 29 00 Gypsum Board .....	8
09 51 13 Acoustical Panel Ceilings .....	8
09 91 00 Painting .....	11
 <b>Appendix A</b>	
Door Schedule .....	16

---

**Pages**

**DRAWINGS**

NO.            Description

**ARCHITECTURAL DRAWINGS**

A0.01        Cover page  
A1.01        General Notes, Legends, Schedules, Section Details, Site Location & Interior Views  
A1.02        Key Plan & Demolition Plan & Notes  
A1.03        Proposed Floor Plan & Reflected Ceiling Plan  
A2.01        Interior Elevations, Sections & Sections

**ELECTRICAL DRAWINGS**

E-001        Legend And Drawings List  
E-002        Specifications  
E-200        Lighting  
E-300        Power And Systems 1/2  
E-301        Power And Systems 2/2

**MECHANICAL DRAWINGS**

M-010        Specifications, Legend And Drawings List  
M-300        Ductwork

**END OF THIS SECTION**

## 1.1 RESTRICTIONS ON USE OF PREMISES

- .1 Limit use of premises for *Work*, for storage, and for access, to allow;
  - .1 Partial *Owner* occupancy.
  - .2 Public usage.
- .2 Coordinate use of premises under direction of *Owner*.

## 1.2 WORK SEQUENCE

- .1 Schedule and construct *Work* in stages to accommodate *Owner's* continued use of adjacent premises during construction.

## 1.3 OWNER OCCUPANCY

- .1 *Owner* will occupy premises during entire construction period.
- .2 Cooperate with *Owner* in scheduling operations to minimize disruptions and to facilitate *Owner* usage.
- .3 *Work* may not be performed during *Owner's* normal business hours which are Monday to Friday from 8:00 a.m. to 05:00 p.m.
- .4 Allow for hours of work restrictions in construction progress schedule.

## 1.4 NOISY WORK RESTRICTIONS IN OCCUPIED FACILITIES

- .1 Schedule excessively noisy work to avoid disturbance to building occupants. Perform excessive noise generating work outside of *Owner's* business hours.
- .2 Use powder actuated devices only with *Consultant's* written permission.

## 1.5 MAINTAINING LIFE SAFETY SYSTEMS IN OCCUPIED FACILITIES

- .1 Maintain operational life safety systems and public access to exits in occupied areas during all stages of the *Work*.
- .2 Determine nature and exact locations of existing fire and smoke sensors prior to the commencement of the *Work*. Avoid direct or indirect jarring while working in adjacent areas and exercise caution to avoid triggering these devices.
- .3 Be responsible for costs incurred by *Owner* on account of false fire alarms activated as a result of the execution of the *Work* without adequate precautions.

END OF SECTION

## 1.1 DEFINITION

- .1 In this Section "Substitution" means a *Product*, a manufacturer, or both, not originally specified in *Contract Documents* by proprietary name but proposed for use by *Contractor* in place of a *Product*, a manufacturer, or both, specified by proprietary name.

## 1.2 SUBSTITUTION PROCEDURES

- .1 *Contractor* may propose a Substitution wherever a *Product* or manufacturer is specified by proprietary name(s), unless there is accompanying language indicating that Substitutions will not be considered.
- .2 *Contractor* may propose a Substitution wherever a *Product* or manufacturer is specified by proprietary name(s) and accompanied by language such as "or equal", "or approved equal", or other similar words. Do not construe such language as an invitation to unilaterally provide a Substitution without *Consultant's* prior acceptance in writing. Do not order or install any Substitution without a *Supplemental Instruction* or *Change Order*.
- .3 Provided a proposed Substitution submission includes all of the information specified in this Section under Submission Requirements For Proposed Substitutions, *Consultant* will promptly review and accept or reject the proposed Substitution.
- .4 *Consultant* may accept a Substitution if satisfied that:
  - .1 the proposed substitute *Product* is the same type as, is capable of performing the same functions as, interfaces with adjacent work the same as, and meets or exceeds the standard of quality, performance and, if applicable, appearance and maintenance considerations, of the specified *Product*,
  - .2 the proposed substitute manufacturer has capabilities comparable to the specified manufacturer, and
  - .3 the Substitution provides a benefit to *Owner*.
- .5 If *Contractor* fails to order a specified *Product* or order a *Product* by a specified manufacturer in adequate time to meet *Contractor's* construction schedule, *Consultant* will not consider that a valid reason to accept a Substitution.
- .6 If *Consultant* accepts a Substitution and subject to *Owner's* agreement, the change in the *Work* will be documented in the form of either a *Supplemental Instruction* or *Change Order* as specified in Section 01 26 00 – Contract Modification Procedures.
- .7 If a Substitution is accepted in the form of a *Supplemental Instruction* or *Change Order*, *Contractor* shall not revert to an originally specified *Product* or manufacturer without *Consultant's* prior written acceptance.

## 1.3 SUBMISSION REQUIREMENTS FOR PROPOSED SUBSTITUTIONS

- .1 Include with each proposed Substitution the following information:
  - .1 Identification of the Substitution, including product name and manufacturer's name, address, telephone numbers, and web site.
  - .2 Reason(s) for proposing the Substitution.

- .3 A statement verifying that the Substitution will not affect the *Contract Price* and *Contract Time* or, if applicable, the amount and extent of a proposed increase or decrease in *Contract Price* and *Contract Time* on account of the Substitution.
- .4 A statement verifying that the Substitution will not affect the performance [or warranty] of other parts of the *Work*.
- .5 Manufacturer's *Product* literature for the Substitution, including material descriptions, compliance with applicable codes and reference standards, performance and test data, compatibility with contiguous materials and systems, and environmental considerations.
- .6 Product samples as applicable.
- .7 A summarized comparison of the physical properties and performance characteristics of the specified *Product* and the Substitution, with any significant variations clearly highlighted.
- .8 Availability of maintenance services and sources of replacement materials and parts for the Substitution, as applicable, including associated costs and time frames.
- .9 If applicable, estimated life cycle cost savings resulting from the Substitution.
- .10 Details of other projects and applications where the Substitution has been used.
- .11 Identification of any consequential changes in the *Work* to accommodate the Substitution and any consequential effects on the performance of the *Work* as a whole. A later claim for an increase to the *Contract Price* or *Contract Time* for other changes in the *Work* attributable to the Substitution will not be considered.

END OF SECTION

## 1.1 SCHEDULE OF LABOUR RATES

- .1 Prior to the first application for payment, submit for the Consultant's review a schedule of labour rates for all trades and classifications of trades, such as journeymen, apprentices, and foremen that will be employed in the Work. Provide a breakdown of payroll burden component of labour rates.
- .2 Labour rates shall reflect the salaries, wages, and benefits paid to personnel in the direct employ of the Contractor, Subcontractors, and sub-Subcontractors, stated as hourly rates, that will be used when:
  - .1 preparing price quotations for Change Orders, and
  - .2 determining the cost of work attributable to Change Directives.
- .3 Labour rates stated in the schedule of labour rates shall be consistent with rates that will actually be paid, and payroll burden costs that will actually be incurred, in the normal performance of the Work, during regular working hours. Labour rates shall not include any additional overhead and profit component.
- .4 Where collective agreements apply, the labour rates shall not exceed those established by collective agreement.
- .5 Obtain the Owner's written acceptance of the schedule of labour rates before submitting the first Change Order quotation.
- .6 Accepted schedule of labour rates will be used solely for evaluating Change Order quotations and cost of performing work attributable to Change Directives.
- .7 The Contractor may request amendments to the accepted schedule of labour rates if changes in the labour rates that will actually be paid, or payroll burden cost that will actually be incurred, in the normal performance of the Work can be demonstrated. Obtain the Owner's written acceptance of such changes.

## 1.2 VALUATION OF CHANGES BASED ON AGREED UNIT PRICES

- .1 The Consultant may, at the outset of the Contract or at any other time, request the Contractor to submit unit prices anticipated to be required in valuing changes in the Work.
- .2 The Contractor shall submit such unit prices promptly upon request.
- .3 The unit prices shall be valid for a specified duration.
- .4 The unit prices shall exclude all fees for overhead and profit [and shall be subject to the percentage fees specified in this Section under Fees for Overhead and Profit – Change Orders].
- .5 The Consultant will evaluate the Contractor's quoted unit prices and, if accepted by the Owner in writing, the agreed unit prices shall be used to value subsequent proposed changes in the Work wherever they are applicable.

### 1.3 METHOD OF CONTRACT PRICE ADJUSTMENT - CHANGE ORDERS

- .1 Unless otherwise agreed, the adjustment of the Contract Price on account of a proposed change in the Work shall be based on a quotation for a fixed price increase or decrease to the Contract Price regardless of the Contractor's actual expenditures and savings.
- .2 If unit prices included in the stipulated price contract are applicable to the proposed change, the adjustment of the Contract Price shall be based on those unit prices, to the extent they apply.
- .3 If necessary and unless otherwise agreed, the adjustment of the GMP or the Target Contract Price on account of a proposed change in the Work shall be based on a quotation for an increase or decrease to the GMP or Target Contract Price. The increase or decrease shall include an adjustment to the Contractor's fixed fee, if any, as agreed by the Owner and the Contractor.

### 1.4 CHANGE ORDER PROCEDURES

- .1 Upon issuance by the Consultant to the Contractor of a proposed change in the Work, and unless otherwise requested in the proposed change or unless otherwise agreed:
  - .1 Submit to the Consultant a fixed price quotation for the proposed change in the Work within 5 days after receipt of the proposed change in the Work.
  - .2 If requested in the proposed change, provide a detailed breakdown of the price quotation including the following to the extent applicable, with appropriate supporting documentation:
    - .1 Estimated labour costs, including hours and applicable hourly rates based on the accepted schedule of labour rates.
    - .2 Estimated Product costs, including Supplier quotations, estimated quantities and unit prices.
    - .3 Estimated Construction Equipment costs.
    - .4 Enumeration of all other estimated costs included in the price quotation.
    - .5 Estimated credit amounts for labour and Products not required on account of the proposed change.
    - .6 Fees, not exceeding the applicable percentages for overhead and profit as specified in this Section.
    - .7 Where applicable, Subcontractor quotations, also including a detailed breakdown of all of the above.
  - .3 Include in the quotation the increase or decrease to the Contract Time, if any, for the proposed change, stated in number of days.
  - .4 Include in the quotation the number of days for which the quotation is valid.
  - .5 The quotation will be evaluated by the Consultant and the Owner and, if accepted by the Owner, be documented in the form of a signed Change Order.



#### 1.5 FEES FOR OVERHEAD AND PROFIT – CHANGE ORDERS

- .1 Where the Contractor's price quotation for a Change Order results in a net increase to the Contract Price, the Contractor's entitlement to a fee for overhead and profit in the quotation shall be as follows, as applicable:
  - .1 For work to be performed by the Contractor's own forces, 10% of the Contractor's price quotation before the Contractor's fee is applied.
  - .2 For work to be performed by a Subcontractor, 5% of the Subcontractor's price quotation including the Subcontractor's fee.
- .2 Where a Subcontractor's price quotation for a Change Order results in a net increase to the Subcontractor's contract price, the Subcontractor's entitlement to a fee for overhead and profit in the quotation shall be as follows, as applicable:
  - .1 For work to be performed by the Subcontractor's own forces, 10 % of the Subcontractor's price quotation before the Subcontractor's fee is applied.
  - .2 For work to be performed by a sub-Subcontractor, 5 % of the sub-Subcontractor's price quotation including the sub-Subcontractor's fee.
- .3 Where the Contractor's or a Subcontractor's price quotation for a Change Order results in a net decrease in price before adjustment for fees for overhead and profit, such a price quotation shall be for the net decrease without any adjustment for fees for overhead and profit.

#### 1.6 METHOD OF CONTRACT PRICE ADJUSTMENT - CHANGE DIRECTIVES

- .1 Unless the Owner and the Contractor reach an earlier agreement on the adjustment to the Contract Price by means of a Change Order that cancels the Change Directive, the adjustment in the Contract Price for change carried out by way of a Change Directive shall be determined as specified in the General Conditions of Contract after the change in the Work is completed.

#### 1.7 CHANGE DIRECTIVE PROCEDURES

- .1 If a Change Directive is issued for a change in the Work for which a proposed change was previously issued, but no Change Order has yet been signed, the Change Directive shall cancel the proposed change and any Contractor quotations related to that change in the Work.
- .2 When proceeding with a change in the Work under a Change Directive, keep accurate records of daily time sheets for labour and Construction Equipment, and invoices for Product and Construction Equipment costs. Submit such records to the Consultant daily until the Change Order superseding the Change Directive is issued.

## 1.8 FEES FOR OVERHEAD AND PROFIT – CHANGE DIRECTIVES

- .1 The Contractor's entitlement to a fee for overhead and profit on the Contractor's expenditures and savings attributable to a Change Directive shall be as follows, as applicable:
  - .1 For work performed by the Contractor's own forces, 10% of the Contractor's net increase in costs.
  - .2 For work performed by a Subcontractor, 5% of the sum of the Subcontractor's net increase in costs plus the Subcontractor's fee.
- .2 A Subcontractor's entitlement to a fee for overhead and profit on the Subcontractor's expenditures and savings attributable to a Change Directive shall be as follows, as applicable:
  - .1 For work performed by the Subcontractor's own forces, 10% of the Subcontractor's net increase in costs.
  - .2 For work performed by a Sub-subcontractor, 5% of the sum of the Sub-subcontractor's net increase in costs plus the Sub-subcontractor's fee.
- .4 Where a Change Directive results in net savings on account of work not required to be performed and a net decrease in the Contractor's or Subcontractor's cost, the net savings to the Contractor or Subcontractor shall be calculated without any adjustment for fees for overhead and profit.
- .5 When a Change Directive is ultimately recorded as a Change Order, there shall be no additional entitlement to fees for overhead and profit beyond those specified in this article.

## 1.9 SUPPLEMENTAL INSTRUCTIONS

- .1 The Consultant may issue Supplemental Instructions to provide clarifications to the Contract Documents, provide additional information, or make minor variations in the Work not involving adjustment in the Contract Price or Contract Time.
- .2 If the Contractor considers a Supplemental Instruction to require an adjustment in Contract Price or Contract Time, the Contractor shall promptly notify the Consultant and the Owner in writing and shall not proceed with any work related to the Supplemental Instruction pending receipt of a Change Order, a Change Directive, or, in accordance with the dispute resolution provisions of the General Conditions of Contract, a Notice in Writing of a dispute and instructions to proceed.

END OF SECTION

## 1.1 SCHEDULE OF VALUES

- .1 Prior to the first application for payment, submit for *Consultant's* review an initial schedule of values. Modify the initial schedule of values if and as requested by *Consultant*. Obtain *Consultant's* written acceptance of the initial schedule of values prior to the first application for payment.
- .2 Together with the first and all subsequent applications for payment, submit updated versions of the schedule of values to indicate the values, to the date of application for payment, of work performed and *Products* delivered to *Place of the Work*.
- .3 Provide the schedule of values in an electronic spreadsheet format that provides for inclusion of the following information:
  - .1 Identifying information including title and location of the *Work*, name of *Contractor*, number and date of application for payment, and period covered by the application for payment.
  - .2 A work breakdown structure that is sufficiently detailed and comprehensive to facilitate *Consultant's* evaluation of applications for payment at an appropriate level of detail.
  - .5 Provisions for approved *Change Orders*, allowances, so that the breakdown amounts indicated in the schedule of values aggregate to the current total *Contract Price*. Also provide for indicating the estimated value of *Change Directives* within the schedule of values, separately from the current total *Contract Price*.
  - .6 For each item in the work breakdown structure, provide as a minimum the following information, under headings as indicated:
    - .1 Breakdown Amount: A dollar amount, including an appropriate pro rata portion of *Contractor's* overhead and profit.
    - .2 Performed to Date: The value of *Work* performed and *Products* delivered to *Place of the Work* up to the date of the application for payment, stated as a percentage of the *Contract Price* and in dollars.
    - .3 Previously Performed: The value of *Work* performed and *Products* delivered to the *Place of the Work* for which payment has been previously certified, stated in dollars.
    - .4 Current Period: The value of *Work* performed and *Products* delivered to *Place of the Work* for which *Contractor* is currently applying for payment, stated in dollars.
    - .5 Balance to Complete: The value of *Work* not yet performed and *Products* not yet delivered to *Place of the Work*, stated in dollars.

## 1.2 CASH FLOW PROJECTION

- .1 Prior to the first application for payment submit, for *Consultant's* review, a forecast of approximate monthly progress payments for each month of the *Contract Time*.
- .2 Submit revised cash flow forecasts when required due to significant changes in rate of progress of the *Work* or significant changes in the *Contract Price* when requested by *Consultant*.

## 1.3 WORKERS' COMPENSATION CLEARANCE

- .1 Submit proof of workers' compensation clearance with each application for payment.

## 1.4 STATUTORY DECLARATIONS

- .1 Submit a statutory declaration in the form of CCDC 9A – Statutory Declaration of Progress Payment Distribution by *Contractor* with each application for payment except the first.

## 1.5 PAYMENT FOR PRODUCTS STORED OFF SITE

- .1 *Owner* may, due to extraordinary circumstances and at *Owner's* sole discretion, make payments for *Products* delivered to and stored at a location other than *Place of the Work*, subject to:
  - .1 a request submitted by *Contractor* in writing, with appropriate justification, and
  - .2 whatever conditions *Owner* or *Consultant* may establish for such payments, as required to protect *Owner's* interests.

END OF SECTION

## 1.1 CONSTRUCTION START-UP MEETING

- .1 Promptly after *Contract* award, the *Consultant* will establish the time and location of a construction start-up meeting to review and discuss administrative procedures and responsibilities. *Consultant* will notify *Contractor* at least 5 *Working Days* before the meeting.
- .2 Senior representatives of *Owner*, *Consultant*, and *Contractor*, including *Contractor's* project manager and site superintendent, shall be in attendance.
- .3 *Consultant's* representative will chair the meeting and record and distribute the minutes.
- .4 Agenda will include following:
  - .1 Appointment of official representatives of *Owner*, *Contractor*, *Subcontractors*, *Consultant*, and subconsultants.
  - .2 *Project* communications.
  - .3 *Contract Documents* for construction purposes.
  - .4 Documents at the site.
  - .5 *Contractor's* use of premises.
  - .6 *Owner-supplied Products*.
  - .7 Work restrictions.
  - .8 [*Contract* modification procedures.
  - .9 Payment procedures.
  - .10 Construction progress meetings.
  - .11 Construction progress schedule, including long lead time items.
  - .12 Submittals schedule and procedures.
  - .13 Quality requirements, including testing and inspection procedures.
  - .14 *Contractor's* mobilization.
  - .15 Temporary utilities.
  - .16 Existing utility services.
  - .17 Construction facilities.
  - .18 Temporary barriers and enclosures.
  - .19 Temporary controls.
  - .20 Field engineering and layout of work.
  - .21 Site safety.
  - .22 Site security.
  - .23 Cleaning and waste management.
  - .24 Closeout procedures and submittals.
  - .25 Commissioning
  - .26 Other items.

## 1.2 CONSTRUCTION PROGRESS MEETINGS

- .1 Schedule regular bi-weekly construction progress meetings for the duration of the *Work*. *Contractor* shall prepare meeting agendas, chair the meetings, and record and distribute the minutes.
- .2 Arrange for and provide physical space for meetings.
- .3 *Contractor* shall record in the meeting minutes significant decisions and identify action items and action dates by attendees or the parties they represent.
- .4 *Contractor* shall distribute copies of minutes within three *Working Days* after each meeting to meeting attendees and any affected parties who may not be in attendance.

- .5 Ensure that *Subcontractors* attend as and when appropriate to the progress of the *Work*.
- .6 Agenda for each meeting shall include the following, as a minimum:
  - .1 Approval of minutes of previous meeting.
  - .2 Work progress since previous meeting.
  - .3 Field observations, including any problems, difficulties, or concerns.
  - .4 Construction progress schedule.
  - .5 Submittals schedule.
  - .6 Proposed changes in the *Work*.
  - .7 Requests for information.
  - .8 Site safety issues.
  - .9 Other business.

END OF SECTION

## 1.1 SUMMARY

- .1 This Section specifies *Contractor's* responsibilities for preparation and submission of schedules and other documentation related to tracking construction progress.
- .2 The purpose of submitting progress schedules is to:
  - .1 inform *Owner* and *Consultant* of actual progress versus planned progress, and
  - .2 provide assurance that scheduling issues are being proactively identified and addressed in a timely manner, and that planned progress is being maintained as closely as possible.

## 1.2 CONSTRUCTION PROGRESS SCHEDULE

- .1 Format and Content:
  - .1 Prepare schedule in the form of a Critical Path Method (CPM) Gantt chart
  - .2 Provide a work breakdown structure identifying key activities, work packages, and major milestones, including long delivery *Products*, inspection and testing activities, shutdown or closure activities, and similar items, at a sufficient level of detail to effectively manage construction progress.
  - .3 Indicate milestone dates for *Ready-for-Takeover* and *Substantial Performance of the Work*.
- .2 Submission:
  - .1 Submit initial schedule to *Owner* and *Consultant* within 10 *Working Days* after *Contract* award.
  - .2 Submit schedule via e-mail as .pdf file.
  - .3 *Consultant* will review format and content of initial schedule and request necessary changes, if any, within 5 *Working Days* after receipt.
  - .4 If changes are required, resubmit finalized initial schedule within 5 *Working Days* after return of review copy.
  - 1. Submit updated progress schedule monthly to *Owner* and *Consultant*, indicating actual and projected start and finish dates with report date line and progress
  - .5 Include a written report with each updated progress schedule. Indicate work status to date comparing baseline to actual progress, current forecasts, identifying problem areas, anticipated delays and impact on schedule, and planned corrective actions.

### 1.3 SUBMITTALS SCHEDULE

- .1 Format and Content:
  - .1 Prepare schedule identifying all required *Shop Drawing*, *Product* data, and sample submissions.
  - .2 Prepare schedule in electronic format.
  - .3 Provide a separate line for each required submittal, organized by *Specifications* section names and numbers, and further broken down by individual *Products* and systems as required.
  - .4 For each required submittal, show planned earliest date for initial submittal, earliest date for return of reviewed submittal by *Consultant* and latest date for return of reviewed submittal without causing delay.
  - .5 Allow time in schedule for resubmission of submittals, should resubmission be necessary.
- .2 Submission:
  - .1 Submit initial schedule to *Consultant* within 20 *Working Days* after *Contract* award.
  - .2 Submit schedule via e-mail.
  - .3 Consultant will review format and content of initial schedule and request necessary changes, if any, within 10 *Working Days* after receipt.
  - .4 If changes are required, resubmit finalized schedule within 5 *Working Days* after return of review copy.
  - .5 Submit updated submittals schedule monthly to *Owner* and *Consultant*.

### 1.4 SCHEDULE MANAGEMENT

- .1 A schedule submitted as specified and accepted by *Consultant* shall become the baseline schedule and shall be used as the baseline for updates.
- .2 At each regular progress meeting, review and discuss current construction progress and submittals schedules with *Consultant* [and *Owner*], including activities that are behind schedule and planned measures to regain schedule slippage in key areas on or near the critical path.
- .3 Activities considered behind schedule are those with start or completion dates later than the dates shown on the baseline schedule.



## 1.5 RECORDING ACTUAL SITE CONDITIONS ON AS-BUILT DRAWINGS

- .1 Obtain from *Consultant* an electronic copy of the construction *Drawings* for the purpose of creating as-built drawings. Record information in electronic form, clearly identifying as-built deviations from the originally obtained construction *Drawings*.
- .2 Clearly label each drawing as "AS-BUILT DRAWING". Record information concurrently with construction progress. Do not conceal *Work* until required information is recorded.
- .3 Record actual construction including:
  - .1 Measured depths of elements of foundation in relation to finish first floor datum.
  - .2 Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
  - .3 Measured locations of pipes, ducts, conduits, outlets, fixtures, access panels, and appurtenances, referenced to visible and accessible features of construction.
  - .4 Field changes of dimension and detail.
  - .5 Changes made by *Change Orders* and *Supplemental Instructions*
  - .6 References to *Shop Drawings*, where *Shop Drawings* show more detail.
- .4 Do not use as-built drawings for construction purposes.

## 1.6 PROGRESS PHOTOGRAPHS

- .1 Arrange for periodic digital photography to document and provide a photographic record of the progress of the *Work*.
- .2 Arrange for final photographs to be taken by a professional photographer.
- .3 Identify each photograph by project name and date taken.
- .4 Submission: Submit .jpg format files in standard resolution via e-mail
- .5 Do not use progress or any other *Project* photographs for promotional purposes without *Owner's* written consent.

END OF SECTION

## 1.1 ADMINISTRATIVE

- .1 Submit specified submittals to *Consultant* for review. Submit with reasonable promptness and in orderly sequence so as to not cause delay in the *Work*. Failure to submit in ample time is not considered sufficient reason for an extension of *Contract Time* or for *Product* substitutions or other deviations from the *Drawings* and *Specifications*.
- .2 Where required by authorities having jurisdiction, provide submittals to such authorities for review and approval.
- .3 Do not proceed with *Work* affected by a submittal until review is complete.
- .4 Present *Shop Drawings*, *Product* data, and samples in [SI metric] [imperial] units. Where items or information is not produced in [SI Metric] [imperial] units, converted values are acceptable.
- .5 Review submittals, provide verified field measurements where applicable, and affix *Contractor's* review stamp prior to submission to *Consultant*. *Contractor's* review stamp represents that necessary requirements have been determined and verified, and that the submittal has been checked and coordinated with requirements of the *Work* and *Contract Documents*.
- .6 Verify field measurements and that affected adjacent work is coordinated.
- .7 Submittals not meeting specified requirements will be returned with comments.
- .8 Reproduction of construction *Drawings* to serve as background for *Shop Drawings* is not permitted.
- .9 Do not propose Substitutions or deviations from *Contract Documents* via *Shop Drawing*, *Product* data and sample submittals.

## 1.2 SHOP DRAWINGS AND PRODUCT DATA

- .1 Indicate *Products*, methods of construction, and attachment or anchorage, erection diagrams, connections, explanatory notes and other information necessary for completion of the *Work*.
- .2 Where *Products* attach or connect to other *Products*, indicate that such items have been coordinated, regardless of Section under which adjacent items will be supplied and installed. Indicate cross-references to *Drawings*, *Specifications* and other already reviewed *Shop Drawings*.
- .3 Accompany submittals with a transmittal information including:
  - .1 Date.
  - .2 *Project* title and number.
  - .3 *Contractor's* name and address.
  - .4 Identification of each submittal item and quantity.
  - .5 Other pertinent data.
- .4 *Shop Drawing* submittals shall include:
  - .1 Date and revision dates.
  - .2 *Project* title and number.

- .3 Name and address of:
  - .1 *Subcontractor*.
  - .2 *Supplier*.
  - .3 *Manufacturer*.
- .4 *Contractor's* stamp, date, and signature of *Contractor's* authorized representative responsible for *Shop Drawing* review, indicating that each *Shop Drawing* has been reviewed for compliance with *Contract Documents* and, where applicable, that field measurements have been verified.
- .5 Details of appropriate portions of the *Work* as applicable:
  - .1 Fabrication.
  - .2 Layout, showing dimensions, including identified field dimensions, and clearances.
  - .3 Setting or erection details.
  - .4 Capacities.
  - .5 Performance characteristics.
  - .6 Standards.
  - .7 Operating weight.
  - .8 Wiring diagrams.
  - .9 Single line and schematic diagrams.
  - .10 Relationships to other parts of the *Work*.
- .5 *Product* data submittals shall include material safety data sheets (SDS) for all controlled Products.
- .6 Submit electronic copy of *Shop Drawings* where specified in the technical *Specifications*.
- .7 Submit electronic copy of Product data sheets or brochures where specified in the technical *Specifications*.
- .8 Where a submittal includes information not applicable to the *Work*, clearly identify applicable information and strike out non-applicable information.
- .9 Supplement standard information to include details applicable to *Project*.
- .10 Allow 7 *Working Days* for *Consultant's* review of each submittal. Allow additional 5 *Working Days* where sub-*Consultant* review is required.
- .11 If upon *Consultant's* review no errors or omissions are discovered, or if only minor corrections are required as indicated, submittal will be returned and fabrication or installation of *Work* may proceed.
- .12 If upon *Consultant's* review significant errors or omissions are discovered, a so noted copy will be returned for correction and resubmission. Do not commence fabrication or installation.
- .13 *Consultant's* notations on submittals are intended to ensure compliance with *Contract Documents* and are not intended to constitute a change in the *Work* requiring change to the *Contract Price* or *Contract Time*. If *Contractor* considers any *Consultant's* notation to be a change in the *Work*, promptly notify *Consultant* in writing before proceeding with the *Work*.
- .14 Resubmit corrected submittals through same procedure indicated above, before any fabrication or installation of the *Work* proceeds. When resubmitting, notify *Consultant* in writing of any revisions other than those requested by *Consultant*.

### 1.3 SAMPLES

- .1 Submit samples for *Consultant's* review in duplicate where specified in the technical *Specifications*. Label samples as to origin, *Project* name, and intended use.
- .2 Deliver samples prepaid to site office.
- .3 Notify *Consultant* in writing of any deviations in samples from requirements of *Contract Documents*.
- .4 Where a required colour, pattern or texture has not been specified, submit full range of available *Products* meeting other specified requirements.
- .5 *Consultant* selection from samples is not intended to change the *Contract Price* or *Contract Time*. If a selection would affect the *Contract Price* or *Contract Time*, notify *Consultant* in writing prior to proceeding with the *Work*.
- .6 Resubmit samples as required by *Consultant* to comply with *Contract Documents*.
- .7 Reviewed and accepted samples will establish the standard against which installed *Work* will be reviewed.

END OF SECTION

## 1.1 REFERENCE STANDARDS

- .1 "Reference standards" means consensus standards, trade association standards, guides, and other publications expressly referenced in *Contract Documents*.
- .2 Where an edition or version date is not specified, referenced standards shall be deemed to be the latest edition or revision issued by the publisher at the time of bid closing. However if a particular edition or revision date of a specified standard is referenced in an applicable code or other regulatory requirement, the regulatory referenced edition or version shall apply.
- .3 Reference standards establish minimum requirements. If *Contract Documents* call for requirements that differ from a referenced standard, the more stringent requirements shall govern.
- .4 If compliance with two or more reference standards is specified and the standards establish different or conflicting requirements, comply with the most stringent requirement. Refer uncertainties to *Consultant* for clarification.
- .5 Within the *Specifications*, reference may be made to the following standards writing, testing, or certification organizations by their acronyms or initialisms:
  - .1 AA - Aluminum Association
  - .2 ACI - American Concrete Institute
  - .3 AISC - American Institute of Steel Construction
  - .4 ANSI - American National Standards Institute
  - .5 ASME - American Society of Mechanical Engineers
  - .6 ASTM - American Society for Testing and Materials
  - .7 AWMAC - Architectural Woodwork Manufacturers Association of Canada
  - .8 AWPA - American Wire Producers Association
  - .9 CGSB - Canadian General Standards Board
  - .10 CISC - Canadian Institute of Steel Construction
  - .11 CSA - Canadian Standards Association
  - .12 CSSBI - Canadian Sheet Steel Building Institute
  - .13 CWB – Canadian Welding Bureau
  - .14 ICEA - Insulated Cable Engineers Association
  - .15 IEEE - Institute of Electrical and Electronics Engineers
  - .16 IGMAC – Insulating Glass Manufacturers Association of Canada
  - .17 MPP – Master Painters Institute
  - .18 MSS - Manufacturers Standardization Society of the Valve and Fittings Industry
  - .19 NAAMM - National Association of Architectural Metal Manufacturers
  - .20 NEMA - National Electrical Manufacturers Association
  - .21 NFPA - National Fire Protection Association
  - .22 SSPC – The Society for Protective Coatings
  - .23 ULC - Underwriters' Laboratories of Canada

## 1.2 INDEPENDENT INSPECTION AND TESTING AGENCIES

- .1 Except as otherwise specified, *Owner* will retain and pay for independent inspection and testing agencies to inspect, test, or perform other quality control reviews of parts of the *Work*.
- .2 Retain and pay for inspection and testing that is for *Contractor's* own quality control or is required by regulatory requirements.

- .3 Employment of inspection and testing agencies by *Contractor* or *Owner* does not relieve *Contractor* from responsibility to perform the *Work* in accordance with *Contract Documents*.
- .4 Allow and arrange for inspection and testing agencies to have access to the *Work*, including access to off site manufacturing and fabrication plants.
- .5 For inspection and testing required by *Contract Documents* or by authorities having jurisdiction, provide *Consultant* and inspection and testing agencies with timely notification in advance of required inspection and testing.
- .6 Submit test samples required for testing in accordance with submittals schedule specified in Section 01 32 00 – Construction Progress Documentation.
- .7 Provide labour, *Construction Equipment* and temporary facilities to obtain and handle test samples on site.

### 1.3 INSPECTION AND TESTING AGENCY REPORTS

- .1 For inspection and testing required by *Contract Documents* or by regulatory requirements, and performed by *Contractor* retained inspection and testing agencies, submit to *Consultant* and *Owner* copies of reports. Submit within 5 days after completion of inspection and testing.
- .2 For inspection and testing performed by *Owner* retained inspection and testing agencies, copies of inspection and testing agency reports will be provided to *Contractor*.

### 1.4 MOCK-UPS

- .1 Prepare mock-ups of *Work* as specified in the technical *Specifications*. If a mock-up location is not indicated in the *Drawings* or *Specifications*, locate where directed by *Consultant*.
- .2 Modify mock-up as required until *Consultant* approval is obtained.
- .3 Approved mock-ups establish an acceptable standard for the *Work*.
- .4 Protect mock-ups from damage until the *Work* they represent is complete.
- .5 Unless otherwise specified in the technical *Specifications*, approved mock-ups forming part of the *Work* may remain as part of the *Work*.
- .6 Remove mock-ups only when the *Work* they represent is complete or when otherwise directed by *Consultant*.

END OF SECTION

BARRIERS AND ENCLOSURES

- GENERAL

- .1 Provide temporary barriers and enclosures necessary to protect the public [and building occupants] and to secure *Place of the Work* during performance of the *Work*.
- .2 Comply with applicable regulatory requirements.
- .3 Maintain temporary barriers and enclosures in good condition for the duration of the *Work*.
- .4 Remove temporary barriers and enclosures from *Place of the Work* when no longer required.

1.2 DUST TIGHT [SCREENS] [PARTITIONS]

- .1 Provide dust tight stud and gypsum board partitions to localize interior building areas from dust and noise generating activities.
- .2 Erect, maintain, and relocate partitions as required to facilitate construction operations and *Owner's* operational requirements.

1.3 FIRE ROUTES

- .1 Maintain fire access routes, including overhead clearances, for use by emergency response vehicles.

1.4 PROTECTION OF BUILDING FINISHES

- .1 Provide necessary temporary barriers and enclosures to protect existing and completed or partially completed finished surfaces from damage during performance of the *Work*.

END OF SECTION

## 1.1 GENERAL

- .1 Provide *Products* that are not damaged or defective, and suitable for purpose intended, subject to specified requirements. If requested by *Consultant*, furnish evidence as to type, source and quality of *Products* provided.
- .2 Unless otherwise specified, maintain uniformity of manufacture for like items throughout.
- .3 Permanent manufacturer's markings, labels, trademarks, and nameplates on *Products* are not acceptable in prominent locations, except where required by regulatory requirements or for operating instructions, or when located in mechanical or electrical rooms.

## 1.2 PRODUCT OPTIONS

- .1 Subject to the provisions of Section 01 25 00 –Substitution Procedures:
  - .1 Wherever a *Product* or manufacturer is specified by a single proprietary name, provide the named *Product* only.
  - .2 Wherever more than one *Product* or manufacturer is specified by proprietary name for a single application, provide any one of the named *Products*.
- .2 Wherever a *Product* is specified by reference to a standard only, provide any *Product* that meets or exceeds the specified standard. If requested by *Consultant*, submit information verifying that the proposed *Product* meets or exceeds the specified standard.
- .3 Wherever a *Product* is specified by descriptive or performance requirements only, provide any *Product* that meets or exceeds the specified requirements. If requested by *Consultant*, submit information verifying that the proposed *Product* meets or exceeds the specified requirements.

## 1.3 PRODUCT AVAILABILITY AND DELIVERY TIMES

- .1 Promptly upon Contract award and periodically during construction, review and confirm *Product* availability and delivery times. Order *Products* in sufficient time to meet the construction progress schedule and the *Contract Time*.
- .2 If a specified *Product* is no longer available, promptly notify *Consultant*. *Consultant* will take action as required.
- .3 If delivery delays are foreseeable, for any reason, promptly notify *Consultant*.
  - .1 If a delivery delay is beyond *Contractor's* control, *Consultant* will provide direction.
  - .2 If a delivery delay is caused by something that was or is within *Contractor's* control, *Contractor* shall propose actions to maintain the construction progress schedule for *Consultant's* review and acceptance.

## 1.4 STORAGE, HANDLING, AND PROTECTION

- .1 Store, handle, and protect *Products* during transportation to *Place of the Work* and before, during, and after installation in a manner to prevent damage, adulteration, deterioration and soiling.
- .2 Comply with manufacturer's instructions for storage, handling and protection.



- .3 Store packaged or bundled *Products* in original and undamaged condition with manufacturer's seals and labels intact. Do not remove from packaging or bundling until required in *Work*.
- .4 Comply with the requirements of the workplace hazardous materials information system (WHMIS) regarding use, handling, storage, and disposal of hazardous materials, including requirements for labeling and the provision of safety data sheets (MSDS).
- .5 Store *Products* subject to damage from weather in weatherproof enclosures.
- .6 Store sheet *Products* on flat, solid, supports and keep clear of ground. Slope to shed moisture.
- .7 Remove and replace damaged *Products*.

END OF SECTION

## 1.1 SUMMARY

- .1 Except where otherwise specified in technical *Specifications* or otherwise indicated on *Drawings*, comply with requirements of this Section.

## 1.2 MANUFACTURER'S INSTRUCTIONS

- .1 Install, erect, or apply *Products* in strict accordance with manufacturer's instructions.
- .2 Notify *Consultant*, in writing, of conflicts between *Contract Documents* and manufacturer's instructions where, in *Contractor's* opinion, conformance with *Contract Documents* instead of the manufacturer's instructions may be detrimental to the *Work* or may jeopardize the manufacturer's warranty.
- .3 Do not rely on labels or enclosures provided with *Products*. Obtain written instructions directly from manufacturers.
- .4 Provide manufacturer's representatives with access to the *Work* at all times. Render assistance and facilities for such access so that manufacturer's representatives may properly perform their responsibilities.

## 1.3 CONCEALMENT

- .1 Conceal pipes, ducts, and wiring in floors, walls and ceilings in finished areas:
  - .1 after review by *Consultant* and authority having jurisdiction, and
  - .2 where locations differ from those shown on *Drawings*, after recording actual locations on as-built drawings.
- .2 Provide incidental furring or other enclosures as required.
- .3 Notify *Consultant* in writing of interferences before installation.

## 1.4 FASTENINGS - GENERAL

- .1 Provide metal fastenings and accessories in same texture, colour and finish as adjacent materials.
- .2 Prevent electrolytic action and corrosion between dissimilar metals and materials by using suitable non-metallic strips, washers, sleeves, or other permanent separators to avoid direct contact.
- .3 Use non-corrosive fasteners and anchors for securing exterior work [and in spaces where high humidity levels are anticipated].
- .4 Space anchors within individual load limit or shear capacity and ensure they provide positive permanent anchorage.
- .5 Keep exposed fastenings to a minimum, space evenly and install neatly.
- .6 Do not use fastenings or fastening methods that may cause spalling or cracking of material to which anchorage is made.

## 1.5 FASTENINGS - EQUIPMENT

- .1 Use fastenings of standard commercial sizes and patterns with material and finish suitable for service.
- .2 Bolts shall not project more than one diameter beyond nuts.

## 1.6 FIRE RATED ASSEMBLIES

- .1 When penetrating fire rated walls, ceiling, or floor assemblies, completely seal voids with fire-stopping materials, smoke seals, or both, in full thickness of the construction element as required to maintain the integrity of the fire rated assembly.

## 1.7 LOCATION OF FIXTURES, OUTLETS AND DEVICES

- .1 Consider location of fixtures, outlets, and devices indicated on *Drawings* as approximate.
- .2 Locate fixtures, outlets, and devices to provide minimum interference, maximum usable space, and as required to meet safety, access, maintenance, acoustic, and regulatory, including barrier free, requirements.
- .3 Promptly notify *Consultant* in writing of conflicting installation requirements for fixtures, outlets, and devices. If requested, indicate proposed locations and obtain approval for actual locations.

## 1.8 PROTECTION OF COMPLETED WORK AND WORK IN PROGRESS

- .1 Adequately protect parts of the *Work* completed and in progress from any kind of damage.
- .2 Promptly remove, replace, clean, or repair, as directed by *Consultant*, work damaged as a result of inadequate protection.
- .3 Do not load or permit to be loaded any part of the *Work* with a weight or force that will endanger the safety or integrity of the *Work*.

## 1.9 REMEDIAL WORK

- .1 Notify *Consultant* of, and perform remedial work required to, repair or replace defective or unacceptable work. Ensure that properly qualified workers perform remedial work. Coordinate adjacent affected work as required.

END OF SECTION

## 1.1 REQUEST FOR CUTTING, PATCHING AND REMEDIAL WORK

- .1 Submit written request in advance of cutting, coring, or alteration which affects or is likely to affect:
  - .1 Structural integrity of any element of the *Work*.
  - .2 Integrity of weather-exposed or moisture-resistant elements.
  - .3 Efficiency, maintenance, or safety of any operational element.
  - .4 Visual qualities of sight-exposed elements.
  - .5 Work of *Owner* or other contractors.
  - .6 Warranty of *Products* affected.
- .2 Include in request:
  - .1 Identification of *Project*.
  - .2 Location and description of affected work, including drawings or sketches as required.
  - .3 Statement on necessity for cutting or alteration.
  - .4 Description of proposed work, and *Products* to be used.
  - .5 Alternatives to cutting and patching.
  - .6 Effect on work of *Owner* or other contractors.
  - .7 Written permission of affected other contractors.
  - .8 Date and time work will be executed.

## 1.2 PRODUCTS

- .1 Unless otherwise specified, when replacing existing or previously installed *Products* in the course of cutting and patching work, use replacement *Products* of the same character and quality as those being replaced.
- .2 If an existing or previously installed *Product* must be replaced with a different *Product*, submit request for substitution in accordance with Section 01 25 00 - Substitution Procedures.

## 1.3 PREPARATION

- .1 Inspect existing conditions in accordance with Section 01 71 00 - Examination and Preparation.
- .2 Provide supports to ensure structural integrity of surroundings; provide devices and methods to protect other portions of the *Work* from damage.
- .3 Provide protection from elements for areas that may be exposed by uncovering work.

## 1.4 EXISTING UTILITIES

- .1 Where the *Work* involves breaking into or connecting to existing services, give *Owner* 72 hours notice for necessary interruption of mechanical or electrical services.
- .2 Keep duration of interruptions to a minimum.
- .3 Carry out interruptions after regular working hours of occupants, preferably on weekends, unless *Owner's* prior written approval is obtained.

- .4 Protect and maintain existing active services. Record location of services, including depth, on as-built drawings.

#### 1.5 CUTTING, PATCHING, AND REMEDIAL WORK

- .1 Coordinate and perform the *Work* to ensure that cutting and patching work is kept to a minimum.
- .2 Perform cutting, fitting, patching, and remedial work [including excavation and fill,] to make the affected parts of the *Work* come together properly and complete the *Work*.
- .3 Provide openings in non-structural elements of the *Work* for penetrations of mechanical and electrical work.
- .4 Perform cutting by methods to avoid damage to other work
- .5 Provide proper surfaces to receive patching, remedial work, and finishing.
- .6 Perform cutting, patching, and remedial work using competent and qualified specialists familiar with the *Products* affected, in a manner that neither damages nor endangers the *Work*.
- .7 Do not use pneumatic or impact tools without *Consultant's* prior approval.
- .8 Ensure that cutting, patching, and remedial work does not jeopardize manufacturers' warranties.
- .9 Refinish surfaces to match adjacent finishes. For continuous surfaces refinish to nearest intersection. For an assembly, refinish entire unit.
- .10 Fit work to pipes, sleeves, ducts, conduit, and other penetrations through surfaces with suitable allowance for deflection, expansion, contraction, acoustic isolation, and firestopping.
- .11 Maintain fire ratings of fire rated assemblies where cutting, patching, or remedial work is performed. Completely seal voids or penetrations of assembly with firestopping material to full depth or with suitably rated devices.

END OF SECTION

## 1.1 REGULATORY REQUIREMENTS

- .1 Comply with applicable regulatory requirements when disposing of waste materials.
- .2 Obtain permits from authorities having jurisdiction and pay disposal fees where required for disposal of waste materials and recyclables.

## 1.2 GENERAL CLEANING REQUIREMENTS

- .1 Provide adequate ventilation during use of volatile or noxious substances. Do not rely on building ventilation systems for this purpose.
- .2 Use only cleaning materials recommended by manufacturer of surface to be cleaned, and as recommended by cleaning material manufacturer.
- .3 Prevent cross-contamination during the cleaning process.
- .4 Notify the *Consultant* of the need for cleaning caused by *Owner* or other contractors.

## 1.3 PROGRESSIVE CLEANING AND WASTE MANAGEMENT

- .1 Maintain the *Work* in a tidy and safe condition, free from accumulation of waste materials and construction debris.
- .2 Provide appropriate, clearly marked, containers for collection of waste materials and recyclables.
- .3 Remove waste materials and recyclables from work areas, separate, and deposit in designated containers at end of each *Working Day*. Collect packaging materials for recycling or reuse.
- .4 Remove waste materials and recyclables from *Place of the Work* daily
- .5 Clean interior building areas prior to start of finish work and maintain free of dust and other contaminants during finishing operations.
- .6 Schedule cleaning operations so that resulting dust, debris and other contaminants will not fall on wet, newly finished surfaces nor contaminate building systems.

## 1.4 FINAL CLEANING

- .1 Before final cleaning, arrange a meeting at *Place of the Work* to determine the acceptable standard of cleaning. Ensure that *Owner*, *Consultant*, *Contractor* and cleaning company are in attendance.
- .2 Remove from *Place of the Work* surplus *Products*, waste materials, recyclables, *Temporary Work*, and *Construction Equipment* not required to perform any remaining work.
- .3 Provide professional cleaning by a qualified, established cleaning company.
- .4 Lock or otherwise restrict access to each room or area after completing final cleaning in that area.

- .5 Re-clean as necessary areas that have been accessed by *Contractor's* workers prior to *Owner* occupancy.
- .6 Remove stains, spots, marks, and dirt from finished surfaces, electrical and mechanical fixtures, furniture fitments, walls, floors.
- .7 Clean and polish glass, mirrors, hardware, wall tile, stainless steel, chrome, porcelain enamel, baked enamel, plastic laminate, and all other finished surfaces, including mechanical and electrical fixtures. Replace broken, scratched or otherwise damaged glass.
- .8 Remove dust from lighting reflectors, lenses, lamps, bulbs, and other lighting surfaces.
- .9 Vacuum clean and dust exposed wall, floor, and ceiling surfaces, behind grilles, louvres and screens, above suspended ceiling tiles ].
- .10 Clean mechanical, electrical, and other equipment. Replace filters for mechanical equipment if equipment is used during construction.
- .11 Remove waste material and debris from crawlspace and other accessible concealed spaces.
- .12 Remove stains, spots, marks, and dirt from exterior facades.
- .13 Clean exterior and interior window glass and frames.

#### 1.5 WASTE MANAGEMENT AND DISPOSAL

- .1 Dispose of waste materials and recyclables at appropriate municipal landfills and recycling facilities in accordance with applicable regulatory requirements.
- .2 Do not burn or bury waste materials at *Place of the Work*.
- .3 Do not dispose of volatile and other liquid waste such as mineral spirits, oil, paints and other coating materials, paint thinners, cleaners, and similar materials together with dry waste materials or on the ground, in waterways, or in storm or sanitary sewers. Collect such waste materials in appropriate covered containers, promptly remove from *Place of the Work*, and dispose of at recycling facilities or as otherwise permitted by applicable regulatory requirements.
- .4 Cover or wet down dry waste materials to prevent blowing dust and debris.

END OF SECTION

## 1.1 READY-FOR-TAKEOVER

- .1 The prerequisites to attaining *Ready-for-Takeover* of the *Work* are described in the General Conditions of the *Contract*.

## 1.2 INSPECTION AND REVIEW BEFORE READY-FOR-TAKEOVER

- .1 *Contractor's Inspection*: Before applying for the *Consultant's* review to establish *Ready-for-Takeover* of the *Work*:
  - .1 Ensure that the specified prerequisites to *Ready-for-Takeover* of the *Work* are completed.
  - .2 Conduct an inspection of the *Work* to identify defective, deficient, or incomplete work.
  - .3 Prepare a comprehensive and detailed list of items to be completed or corrected.
  - .4 Provide an anticipated schedule and costs for items to be completed or corrected.
- .2 *Consultant's Review*: Upon receipt of the *Contractor's* application for review, together with the *Contractor's* list of items to be completed or corrected, the *Consultant* and the *Contractor* shall arrange a mutually satisfactory agreed date and time to jointly review the *Work*. The *Consultant* will advise the *Contractor* whether or not the *Work* is *Ready-for-Takeover*. Add additional items, if any, to the *Contractor's* list of items to be completed or corrected. Provide the *Consultant* with a copy of the revised list.
- .3 Maintain the list of items to be completed or corrected and promptly correct or complete defective, deficient and incomplete work. The *Contractor's* inspection and *Consultant's* review procedures specified above shall be repeated until the *Work* is *Ready-for-Takeover* and no items remain on the *Contractor's* list of items to be completed or corrected.
- .4 When the *Consultant* determines that the *Work* is *Ready-for-Takeover*, the *Consultant* will notify the *Contractor* and the *Owner* in writing to that effect.

## 1.3 PREREQUISITES TO FINAL PAYMENT

- .1 After *Ready-for-Takeover* of the *Work* and before submitting an application for final payment in accordance with the General Conditions of Contract:
  - .1 Correct or complete all remaining defective, deficient, and incomplete work.
  - .2 Remove from the *Place of the Work* all remaining surplus *Products*, *Construction Equipment*, and *Temporary Work*.
  - .3 Perform final cleaning and waste removal necessitated by the *Contractor's* work performed after *Ready-for-Takeover*, as specified in Section 01 74 00 – Cleaning and Waste Management.

## 1.4 SUBSTANTIAL PERFORMANCE OF THE WORK

- .1 independent of those for attaining *Ready-for-Takeover* of the *Work*, and
- .2 in accordance with the lien legislation applicable to the *Place of the Work*.

END OF SECTION



1.1 OPERATION AND MAINTENANCE MANUAL

- .1 Prepare a comprehensive operation and maintenance manual, in the language[s] of the *Contract*, using personnel qualified and experienced for this task.
- .2 Submit an initial draft of the operation and maintenance manual for *Consultant's* review. If required by *Consultant's* review comments, revise manual contents and resubmit for *Consultant's* review. If required, repeat this process until *Consultant* accepts the draft manual in writing.
- .3 Submit final version to *Owner* in hard copy and electronic format. Provide two hard copies.

1.2 OPERATION AND MAINTENANCE MANUAL FORMAT

- .1 Organize data in the form of an instructional manual.
- .2 Binders: vinyl, hard covered, three D-rings, loose leaf, 216 x 279 mm, with spine and face pockets.
- .3 When multiple binders are used, correlate data into related consistent groupings. Identify contents of each binder on spine.
- .4 Cover: Identify each binder with typed or printed title "Operation and Maintenance Manual", name of Project or facility, and subject matter of contents.
- .5 Arrange content under Section numbers and sequence of Table of Contents.
- .6 Provide tabbed fly leaf for each separate *Product* or system, with typed description of *Product* and major component parts of equipment.
- .7 Text: Manufacturer's printed data, or typewritten data.
- .8 Drawings: provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.
- .9 Provide electronic copy of manual in PDF format.
- .10 Provide electronic copy of Shop *Drawings* in manual as electronic media acceptable to *Owner*.

1.3 OPERATION AND MAINTENANCE MANUAL – GENERAL CONTENT

- .1 Table of contents for each volume.
- .2 Introductory information including:
  - .1 Date of manual submission.
  - .2 Complete contact information for *Consultant*, subconsultants, other consultants, and *Contractor*, with names of responsible parties.
  - .3 Schedule of *Products* and systems indexed to content of volume.
- .4 For each *Product* or system, include complete contact information for *Subcontractors*, *Suppliers* and manufacturers, including local sources for supplies and replacement parts.

- .5 *Product Data*: mark each sheet to clearly identify specific products, options, and component parts, and data applicable to installation. Delete or strike out inapplicable information. Supplement with additional information as required.
- .6 *Reviewed Shop Drawings*.
- .7 Permits, certificates, letters of assurance and other relevant documents issued by or required by authorities having jurisdiction.
- .8 Warranties.
- .9 Operating and maintenance procedures, incorporating manufacturer's operating and maintenance instructions, in a logical sequence.
- .10 Training materials as specified in Section 01 79 00 - Demonstration and Training].

#### 1.4 OPERATION AND MAINTENANCE MANUAL - EQUIPMENT AND SYSTEMS CONTENT

- .1 *Each Item of Equipment and Each System*: include description of unit or system and component parts. Give function, normal operation characteristics, and limiting conditions. Include performance curves, with engineering data and tests, and complete nomenclature and commercial number of replaceable parts.
- .2 *Panel Board Circuit Directories*: provide electrical service characteristics, controls, and communications.
- .3 Include installed colour coded wiring diagrams.
- .4 *Operating Procedures*: include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include summer, winter, and any special operating instructions.
- .5 *Maintenance Requirements*: include routine procedures and guide for trouble-shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.
- .6 Provide servicing and lubrication schedule, and list of lubricants required.
- .7 Include manufacturer's printed operation and maintenance instructions.
- .8 Include sequence of operation by controls manufacturer.
- .9 Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
- .10 Provide installed control diagrams by controls manufacturer.
- .11 Provide *Contractor's* coordination drawings, with installed colour coded piping diagrams.
- .12 Provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.
- .13 Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.

- .14 Include testing and balancing reports.
- .15 Include additional content as specified in technical *Specifications* sections.
- 1.5 OPERATION AND MAINTENANCE MANUAL - PRODUCTS AND FINISHES CONTENT
  - .1 Include *Product* data, with catalogue number, options selected, size, composition, and colour and texture designations. Provide information for re-ordering custom manufactured *Products*.
  - .2 Instructions for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.
  - .3 Include an outline of requirements for routine and special inspections and for regular maintenance to ensure that on-going performance of the building envelope will meet the initial building envelope criteria.
  - .4 Include additional content as specified in technical *Specifications* sections.
- 1.6 OPERATION AND MAINTENANCE MANUAL - WARRANTIES CONTENT
  - .1 Separate each warranty with index tab sheets keyed to Table of Contents listing.
  - .2 List each warrantor with complete contact information.
  - .3 Verify that documents are in proper form and contain full information. Ensure that warranties are for the correct duration and are in *Owner's* name.
  - .4 [Include maintenance bond(s)].
- 1.7 CONTRACTOR'S AS-BUILT DRAWINGS
  - .1 Submit final as-built drawings in the form specified in Section 01 32 00 – Construction Progress Documentation to *Consultant*.
- 1.8 PROJECT RECORD DRAWINGS
  - .1 Transfer all information marked up on the as-built drawings during the progress of the *Work* to a master set of record drawing files provided by *Consultant*, in electronic format.
  - .2 Mark revised drawings as "RECORD DRAWINGS".
  - .3 Submit completed record drawings in hard copy and electronic form to *Consultant*. Provide two hard copy sets.
- 1.9 SPARE PARTS, MAINTENANCE MATERIALS, AND SPECIAL TOOLS
  - .1 Supply spare parts, maintenance materials, and special tools in quantities specified in technical *Specifications* sections.
  - .2 Ensure spare parts and maintenance materials are new, not damaged nor defective, and of same quality, manufacturer, and batch or production run as installed *Products*.
  - .3 Provide tags for special tools identifying their function and associated *Product*.

- .4 Deliver to and store items at location directed by *Owner* at *Place of the Work*. Store in original packaging with manufacturer's labels intact and in a manner to prevent damage or deterioration.
- .5 Catalogue all items and submit to *Consultant* an inventory listing organized by *Specifications* section. Include *Consultant* reviewed inventory listing in operation and maintenance manual.

END OF SECTION

---

## **PART 1 - GENERAL**

### **1.1. SUMMARY**

1.1.1. Section Includes: Provide selective removal, including but not limited to following:

- 1.1.1.1. Acoustical ceilings including tee bars, suspension and support framing, light fixtures, exit signs and speakers, and diffusers as noted on the demolition plans.
- 1.1.1.2. Flooring as required for the installation of new partitions.
- 1.1.1.3. Wood panels and Hollow metal frame as noted on the demolition plans
- 1.1.1.4. Items for Salvage: as noted on drawings and directed by owner

### **1.2. REFERENCES**

1.2.1. Definitions:

- 1.2.1.1. Hand Demolition: Systematic demolition of finishes and materials by workers using hand-held tools.
- 1.2.1.2. Systematic Demolition: Methodical dismantling of structure piece by piece, usually carried out in reverse order of construction.

### **1.3. ADMINISTRATIVE REQUIREMENTS**

1.3.1. Review Specification for work included under this Section and determine complete understanding of requirements and responsibilities relative to work included, storage and handling of materials, inspection of construction to be demolished, methods to be used, sequence and quality control, Project staffing, restrictions due to environmental protection requirements and other matters affecting demolition, to permit compliance with intent of this Section.

1.3.2. Scheduling:

- 1.3.2.1. Where practicable, remove or neutralize hazardous or toxic materials before demolition begins.
- 1.3.2.2. Phase selective demolition to be coordinated with Owner's on-going occupancy of the school.

### **1.4. QUALITY ASSURANCE**

1.4.1. Comply with National Building Code, Part 8, Construction Safety Measures at Construction and Demolition Sites.

1.4.2. Do work in accordance with CSA S350 and comply with pertinent codes, regulations and insurance carriers providing coverage for this work.

1.4.3. Execute the work in strict accordance with The Occupational Health and Safety Act and Regulations for Construction Projects, latest addition. Keep copy of the Act at the place of the Work at all times.

1.4.4. Restrictions: Restrict demolition activities to hours in accordance with Section 01 10 00 - Project Administrative Requirements.

### **1.5. SITE CONDITIONS**

1.5.1. Demolition performed on this Project in school areas adjacent to occupied areas. Every part of the demolition work must be carefully planned, scheduled, and coordinated with the Project Manager, including:

- 1.5.1.1. Hours of operation
- 1.5.1.2. Dust control, infection prevention and control.

- 1.5.1.3. Disruption to existing mechanical or electrical services, fire alarm, sprinkler, communications systems.
- 1.5.1.4. Noise control.
- 1.5.1.5. Protection to existing building
- 1.5.1.6. Access to the work area including procedures for movement and removal of materials.

## **PART 2 - PRODUCTS**

### **2.1. MATERIALS**

#### **2.1.1. Description:**

##### **2.1.1.1. Regulatory Requirements:**

- 2.1.1.1.1. Conform to The Occupational Health and Safety Act and Regulation for Construction Projects
- 2.1.1.1.2. Conform to OBC, especially Division C, Part 1, Article 1.2.2.3 as applicable.
- 2.1.1.1.3. Conform to Fire Code, Regulation under Fire Marshal Act especially Part 8.

#### **2.1.2. Materials and Products Removed From Existing Building**

- 2.1.2.1. Refer to drawings for existing items that are designated to be carefully removed and reinstalled or relocated.
- 2.1.2.2. Refer to drawings for existing items that are to be carefully removed and handed over to the Owner.
- 2.1.2.3. Materials resulting from demolition and not required to be retained shall be removed promptly from site in accordance with requirements of authorities having jurisdiction and in safe manner to minimize danger at site and during disposal.
- 2.1.2.4. Materials that are to be removed from the site and can be reused should be sent to the appropriate facility.

## **PART 3 - EXECUTION**

### **3.1. EXAMINATION**

#### **3.1.1. Consultant does not guarantee that existing conditions are the same as those indicated in Construction Documents.**

#### **3.1.2. Preliminary Survey:**

- 3.1.2.1. Before commencing demolition operations, examine building to determine type of construction, condition of structure and site conditions. Assess strength and stability of damaged or deteriorated structures.
- 3.1.2.2. Assess potential effect of removal of any part or parts on remainder of structure before such part(s) are removed.
- 3.1.2.3. Investigate for presence of hazardous materials not identified in the construction documents.
- 3.1.2.4. Prepare a complete photographic record of all finishes and equipment to remain. Note any damages, missing items, breaches in fire rated construction, potential hazardous materials, conditions that are different from what is shown in the Construction Documents, and any other items of concern that could impact the construction. Submit report of existing conditions before start of demolition operations, for each work area.

**3.1.3. Existing Services:**

- 3.1.3.1. When unanticipated mechanical, electrical, or structural elements are encountered, investigate and measure the nature and extent of the element.
- 3.1.3.2. Identify all services and systems exposed as part of the demolition.
- 3.1.3.3. Verify services are cut off and properly capped before commencing associated or effected demolition.
- 3.1.3.4. Provide and maintain temporary fire alarm and fire protection services required during demolition to satisfaction of authorities having jurisdiction, fire departments and Project Manager.
- 3.1.3.5. Verify prior to commencement work of this Section that disconnection and capping of electrical and mechanical services have been carried out.
- 3.1.3.6. Verify that dust control hoardings have been completed, inspected and accepted before proceeding.

**3.2. PREPARATION**

**3.2.1. Protection of In-Place Conditions:**

- 3.2.1.1. Post suitable warning signs outside of work area for protection of staff and public. Supervise entrance to work area to prevent entrance by unauthorized persons. If requested, provide lockable doors to prevent public entering danger zone.
- 3.2.1.2. Post warning signs on electrical lines and equipment which must remain energized to serve other portions of the building during period of demolition.
- 3.2.1.3. Provide fire extinguishers acceptable to fire prevention authorities in locations and of type suitable to enable personnel to deal with fire occurring during progress of work.
- 3.2.1.4. Provide suitable protection to existing lockers, doors, walls and finishes to remain. This includes a sealed 6 mil poly cover to prevent dust getting into equipment and fixtures.

**3.2.2. Environmental Protection:**

- 3.2.2.1. Prevent extraneous materials from contaminating air beyond application area, by providing temporary enclosures during demolition work.
- 3.2.2.2. Removal of all demolition materials shall be in sealed containers. Removal of transite panels from work area shall be in approved sealed bags.

**3.2.3. Protection to Existing Services:**

- 3.2.3.1. Provide protection required to enable existing building services, systems and equipment to remain in continuous and normal operations.
- 3.2.3.2. Demolition shall be carried out in a manner to ensure the minimum of disruption to Owner, and other contractors working in the building.

**3.3. DEMOLITION — GENERAL**

- 3.3.1. Execute work in conformance to City of Toronto Standards. Notify Project Manager before disrupting building access or services.
- 3.3.2. Carry out demolition in accordance with CSA S350-M. Demolish structure and remove materials from site. Use hand tools only. Adhere to manufacturer's recommendations in use of hand held tools while conforming to the Occupational Health and Safety Act requirements.
- 3.3.3. Do not demolish spray or trowel-applied friable materials, materials suspected of containing PCBs or other hazardous materials. Where such materials are encountered notify Project Manager immediately. Do not proceed until instructions have been received from Consultant.

- 
- 3.3.4. Remove mechanical and electrical items indicated to be removed. Remove all abandoned services, communication lines, electrical wiring, plumbing, and ductwork.
  - 3.3.5. The use of pneumatic or electrical jack hammers is not permitted.
  - 3.3.6. Report any existing conditions uncovered by the demolition work that require remediation. This includes:
    - 3.3.6.1. Damaged or unsafe services.
    - 3.3.6.2. Unsupported services, structural members or missing hangers.
    - 3.3.6.3. Incomplete insulation, vapour retarder or air barrier.
    - 3.3.6.4. Incomplete or unacceptable fire separation, missing seals, fire dampers, fireproofing or firestopping.
  - 3.3.7. Minimize noise. Avoid use of noisy equipment. Proposed methods for demolition to be reviewed at the pre-construction meetings ahead of the work in each work area.
  - 3.3.8. Firestopping and Smoke Seal: In event work of this Section impacts on integrity of fire separations, ensure trade performing firestopping is notified.
  - 3.3.9. Demolition for new services:
    - 3.3.9.1. Cut openings through existing walls, partitions, roofs and floors. Establish exact location of steel reinforcing and conduits in existing concrete slabs or walls before cutting. Locate using non destructive, non ionizing radio frequency locators, magnetic scanning or X-ray. Scanning procedures and proposed methods and equipment to be reviewed with Project Manager before proceeding. Be responsible for damage to existing steel reinforcing and be liable for structural failure.
    - 3.3.9.2. Neatly cut openings and holes plumb, square and true to dimensions required. Use cutting methods least likely to damage remaining or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping, to minimize disturbance of adjacent surfaces. Temporarily cover openings to remain.
    - 3.3.9.3. Openings to allow passage of ducts shall be closed tight to perimeters of duct at all locations where fire dampers are required.
  - 3.3.10. Where items are to be removed from existing structure or surfaces that are to remain in place, remove those items complete with hangers, brackets and other readily removable supports and fastenings:
  - 3.3.11. Building Services:
    - 3.3.11.1. Arrange with Project Manager to disconnect or interrupt existing building services. Cut-off and cap existing building services under Owner's supervision.
    - 3.3.11.2. Coordinate with Mechanical and Electrical respectively for removal, relocation and reinstallation of mechanical and electrical items.
    - 3.3.11.3. Prevent demolition debris from entering building drains.
  - 3.3.12. Relocation of Salvaged Items:
    - 3.3.12.1. Carefully remove, store, protect and re-install where applicable existing materials and equipment noted on Drawings to be retained and relocated. Relocate items to be retained and store them in areas directed by Consultant. In addition to items indicated on Drawings, Owner still reserves the right to retain any items or materials.

### **3.4. REMOVAL OF CEILINGS**

- 3.4.1. Remove existing ceilings as shown in drawings. Acoustical ceiling panels and electrical light fixtures to be recycled rather than disposed as waste, as much as possible.



- 3.4.2. Support structure for ceiling systems including hangers and framing used for support of light fixtures shall be removed.
- 3.4.3. Carefully remove exit signs, speakers and other ceiling mounted fixtures.
- 3.4.4. Provide temporary support as required for sprinklers, fire alarm bells, smoke and heat detectors, and HVAC ductwork.
- 3.4.5. Take precautions to adequately support structure, provide bracing required for safety and execution of the work. Coordinate with structural requirements.

### **3.5. CUTTING AND PATCHING**

- 3.5.1. Obtain Consultant's approval before cutting, boring or sleeving load-bearing members.
- 3.5.2. Cut and patch as required to make work fit.
- 3.5.3. Make cuts with clean, true, smooth edges.
- 3.5.4. Where new work connects with existing and where existing work is altered, cut, patch and make good to match existing work.
- 3.5.5. Patch openings created where mechanical and electrical services are removed in existing building.
- 3.5.6. Use specialists in affected materials to execute cutting, fitting and remedial work.
- 3.5.7. Make good surfaces exposed or disturbed by work with material and finish to match existing adjoining surfaces.

### **3.6. CLEANING**

- 3.6.1. Waste Management:
  - 3.6.1.1. Clear away dirt, rubbish and loose litter resulting from work of this Section, minimum daily. Keep dust to a minimum. When necessary and practical demolition works shall be sprayed periodically with water to reduce dust. Wet down debris from time to time to control dust.
  - 3.6.1.2. Selling or burning of materials on site is not permitted.
  - 3.6.1.3. Conform to requirements of authorities having jurisdiction regarding disposal of waste materials.
  - 3.6.1.4. Materials prohibited from municipality waste management facilities shall be removed from site and dispose of at recycling companies specializing in recyclable materials.

END OF SECTION

## **PART 1 - GENERAL**

### **1.1. SUMMARY**

#### **1.1.1. This Section includes:**

- 1.1.1.1. Hollow metal doors
- 1.1.1.2. Metal frames.

#### **1.1.2. Related Sections: Following description of work is included for reference only and shall not be presumed complete:**

- 1.1.2.1. Installation of snap-in clips and frames in gypsum board partitions: Section 09 22 16 - Non-Structural Metal Framing.

### **1.2. ADMINISTRATIVE REQUIREMENTS**

#### **1.2.1. Coordination:**

- 1.2.1.1. Cooperate fully with door hardware distributor's representative during preparation of shop drawings and execution of shop fabrication. Be responsible to provide adequate reinforcing, clearances, for door hardware specified and for accurate installation of door and door hardware on site.

#### **1.2.2. Preinstallation Meetings:**

- 1.2.2.1. The following minimum items shall be reviewed at the pre-installation meeting:
  - 1.2.2.1.1. Verify project requirements.
  - 1.2.2.1.2. Review installation conditions under which work is to be performed including possible site concerns.
  - 1.2.2.1.3. Inspection of surfaces to receive the work.
  - 1.2.2.1.4. Coordination requirements with other subtrades.
- 1.2.2.2. Key personnel shall attend the pre-installation meeting including but not limited to:
  - 1.2.2.2.1. Steel door and frame installer subtrade personnel.
  - 1.2.2.2.2. Related work subtrade personnel.

### **1.3. ACTION SUBMITTALS**

#### **1.3.1. Product Data Sheets:**

- 1.3.1.1. Submit manufacturer's product data sheets for products to be used in the work of this section. Manufacturer's product data sheets shall include:
  - 1.3.1.1.1. Material and product physical properties and characteristics including size.
  - 1.3.1.1.2. Performance criteria.
  - 1.3.1.1.3. Limitations of products.

#### **1.3.2. Shop Drawings:**

- 1.3.2.1. Indicate door location using numbering system per door and frame schedule.
- 1.3.2.2. Include size, and hand of each door, elevation of each door type; beveling of door edges, construction type core and edge construction not covered in product data.
- 1.3.2.3. Indicate dimensions and locations of cut-outs including requirements for louver openings.
- 1.3.2.4. Provide details of door hardware locations, anchorage and fastening methods.

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

- 1.4.1. Comply with CSDMA, Guide Specification For Installation and Storage of Hollow Metal Doors and Frames.
- 1.4.2. Inspect materials thoroughly upon receipt and report immediately any discrepancies, deficiencies and damages incurred during shipment on carriers' bill of lading and report immediately, in writing, to Supplier and Consultant.
- 1.4.3. Store materials properly on planks, in a dry area, out of water and covered to protect from damage from adverse weather conditions. Remove wet packaging immediately.
- 1.4.4. Remove wrappings or coverings from doors upon receipt at the Project Site, and store in a vertical position, spaced with blocking to permit air circulation between them.

#### **1.5. WARRANTY**

- 1.5.1. Manufacturer Warranty: Warrant work manufactured from ASTM A653/A653M, A40 galvanized steel, touched up only with zinc-rich rust inhibitive primer where coating was removed during its manufacture for period of 10 years against defects and/or deficiencies in accordance with General Conditions of the Contract. Promptly correct any defects or deficiencies which become apparent within warranty period, to satisfaction of Consultant. Defects include but are not limited to; rust perforation when stored, installed and finish painted in accordance with manufacturer's written instructions.

### **PART 2 - PRODUCTS**

#### **2.1. MANUFACTURERS**

- 2.1.1. Steel door and frames manufacturer list: Products of the following manufacturers are acceptable subject to conformance to requirements of drawings, schedules and specifications:
  - 2.1.1.1. All Steel Doors 2000 Limited; <http://www.allsteeldoors.ca/home.html>
  - 2.1.1.2. Baron Steel Doors & Frames; [www.baronmetal.com](http://www.baronmetal.com)
  - 2.1.1.3. Ceco Door; [www.cecodoor.com](http://www.cecodoor.com)
  - 2.1.1.4. Daybar Industries Limited; [www.daybar.com](http://www.daybar.com)
  - 2.1.1.5. Fleming Doors; [www.flemingdoor.com](http://www.flemingdoor.com)
  - 2.1.1.6. Gensteel Doors, Inc.; [www.gensteeldoors.com](http://www.gensteeldoors.com)
- 2.1.2. Basis of Design:
  - 2.1.2.1. This Specification is based on "Imperial/Versador" by Ceco Door. Comparable Products from manufacturers listed herein will be accepted provided they meet requirements of this Specification.

#### **2.2. PERFORMANCE/DESIGN CRITERIA**

- 2.2.1. Ensure Product is manufactured by a firm experienced in design and production of standard and custom commercial metal door and frame assemblies.
- 2.2.2. Cycle Test Acceptance Criteria: Ensure door and frame assembly is testing in accordance with ANSI/SDI A250.4 for "High Usage" and is certified as Level "A" (1,000,000 cycles).
- 2.2.3. Twist Test Acceptance Criteria: Maximum permanent deflection not to exceed 3 mm (1/8") under a maximum 136 kg (300 lb) load, total deflection not to exceed 32 mm (1-1/4") when tested in accordance with ANSI/SDI A250.4. Ensure tests are conducted by an independent nationally recognized accredited laboratory.

#### **2.3. MATERIALS**

2.3.1. Steel:

- 2.3.1.1. Fabricated from tensioned levelled steel to ASTM A924/A924M-18, galvanized to ASTM A653/A653M, Commercial Steel CS, Type B.
- 2.3.1.2. Steel shall be free of scale, pitting, coil breaks, surface blemishes, buckles, waves, and other defects.
- 2.3.1.3. Minimum sheet thickness; coated sheet steel complying with ASTM A653/A653M in accordance with Appendix 1: Steel Thicknesses and gauges of CSDMA "Recommended Specifications for Commercial Steel Door and Frame Products".
- 2.3.1.4. Galvanneal coating finish, designation ZF120 (A40).

2.3.2. Door Core Materials:

2.3.2.1. Honeycomb:

- 2.3.2.1.1. Structural small cell, 25 mm maximum Kraft paper 'honeycomb', sanded to required thickness.
- 2.3.2.1.2. Minimum weight of 36.3 kg per ream.
- 2.3.2.1.3. Minimum density of 16.5 kg/m<sup>2</sup>.

2.3.2.2. Steel stiffeners:

- 2.3.2.2.1. Continuous vertical formed steel sections, 0.813 mm minimum thickness, spaced not more than 150 mm apart, welded at 150 mm on center maximum to each face sheet.
- 2.3.2.2.2. Fill voids with minimum density of 24 kg/m<sup>3</sup> fibreglass insulation conforming to with ASTM C665.

2.3.3. Primer: Rust inhibitive for touch-up.

2.3.4. Door Silencers (Bumpers): Single stud rubber/neoprene type.

2.3.5. Fasteners for Stops: Cadmium plated steel, counter sunk flat or oval head sheet metal Phillips screws.

2.3.6. Mortar Guard Boxes: Minimum 0.8 mm thick (22 ga) steel.

2.3.7. Frame Anchors:

- 2.3.7.1. Floor Anchors: Minimum 3 mm (1/8") thick adjustable floor anchors with 2 holes for bolting to floor.
- 2.3.7.2. Wall Anchors:
  - 2.3.7.2.1. Masonry T-strap Type Wall Anchors: Minimum 1.2 mm thick (18 ga) steel
  - 2.3.7.2.2. Existing Masonry/Concrete Wall Type Anchors: Minimum 0.912 mm thick (20 ga) steel.
  - 2.3.7.2.3. Masonry Stirrup-strap Type 50 mm x 250 mm (2" x 10"): Minimum 1.519 mm thick (16 ga) steel.
  - 2.3.7.2.4. Steel Stud Type: Minimum 0.912 mm thick (20 ga) steel.
  - 2.3.7.2.5. Steel Stud Tension and Associated Wall Type: Minimum 0.912 mm thick (20 ga) steel.

**2.4. FABRICATION**

2.4.1. Welding: Carry out welding in accordance with CSA W59.

- 2.4.2. Grind exposed welds smooth and flush. Fill open joints, seams and depressions with filler or by continuous brazing or welding. Grind smooth to true sharp arises and profiles and sand down to smooth, true, uniform finish.
- 2.4.3. Hardware Requirements: Blank, mortise, reinforce, drill and tap doors and frames to receive mortised templated hardware. Check hardware list for requirements.
- 2.4.4. Frames - General:
  - 2.4.4.1. Fabricate frames for doors to profiles indicated.
  - 2.4.4.2. Ensure door frames are welded type construction. Knock-down frames are not permitted.
  - 2.4.4.3. Reinforce frame as required for surface mounted hardware.
  - 2.4.4.4. Protect mortise cut outs with mortar guard boxes. Omit for gypsum board applications.
  - 2.4.4.5. Where frames occur in masonry provide strip strap, T-strap or wire type anchors. Where frames occur in gypsum board provide stud type anchors.
  - 2.4.4.6. Locate each wall anchor immediately above or below each hinge reinforcement on hinge jamb and directly opposite on strike jamb. Provide 2 anchors for rebate opening heights up to and including 1500 mm (5') and 1 additional anchor for each additional 760 mm (30") of height or fraction thereof, except as indicated below. For frames in previously placed concrete, masonry or structural steel provide anchors located not more than 150 mm (6") from top and bottom of each jamb and intermediate anchors at 660 mm (26") on centre maximum.
  - 2.4.4.7. Where floor finishes allow, fabricate frames to extend 38 mm (1-1/2") below finished floor level. Where frames are to terminate at finished floor level, provide plates for anchorage to slabs.
  - 2.4.4.8. Prepare each door opening for single stud door silencers: 3 for single door openings placed opposite hinges.
  - 2.4.4.9. Provide 0.912 mm thick (20 ga) steel snap-in or welded-in "Z" type stud anchors for door frames installed in steel stud gypsum board partitions. Ensure snap-in clips are supplied to Section 09 21 16.
  - 2.4.4.10. Factory apply touch-up primer to areas where zinc coating has been removed during fabrication.
- 2.4.5. Hollow Metal Door Frames:
  - 2.4.5.1. Steel:: Minimum 1.519 mm thick (16 ga) steel.
  - 2.4.5.2. Reinforcements:
    - 2.4.5.2.1. Lock and Strike Reinforcements: Minimum 1.519 mm thick (16 ga) steel.
    - 2.4.5.2.2. Hinge Reinforcements: Minimum 3.4 mm thick (10 ga) steel.
    - 2.4.5.2.3. Flush Bolt Reinforcement: Minimum 1.519 mm thick (16 ga) steel.
    - 2.4.5.2.4. Reinforcement for Surface Applied Hardware: Minimum 1.2 mm thick (18 ga) steel.
    - 2.4.5.2.5. Concealed Door Closer or Holder Reinforcements: Minimum 2.6 mm thick (12 ga) steel.
    - 2.4.5.2.6. Top and Bottom End Channels: Minimum 1.2 mm thick (18 ga) steel.
  - 2.4.5.3. Jamb Shipping Bars: Minimum 0.912 mm thick (20 ga) steel.
  - 2.4.5.4. Mitre corners of frames. Cut frame mitres accurately and weld continuously on returns and inside of frame faces.

- 2.4.5.5. When required due to site access or due to shipping limitations, fabricate frame Product for large openings in sections, with splice joints for field assembly. Provide alignment plates or angles at each joint, fabricated of same metal thickness as frame. Indicate joints for field assembly on Shop Drawings.
- 2.4.5.6. Accurately cope and securely weld butt joints of mullions, transom bars, centre rails and sills. Grind welded joints to a smooth, uniform finish.
- 2.4.5.7. Securely attach floor anchors to inside of each jamb profile.
- 2.4.5.8. Weld in 2 temporary jamb shipping bars at each frame to maintain alignment during shipment.
- 2.4.6. Doors - General:
  - 2.4.6.1. Fabricate doors to be swing type flush with 1 continuous face free from joints, tool markings and abrasions and with provisions for glass and/or louvre openings as indicated on Door Schedule and Drawings.
  - 2.4.6.2. Coordinate louvre openings with Mechanical and Consultant.
  - 2.4.6.3. For hollow metal doors, ensure longitudinal edges have continuously welded seams, filled and sanded flush full height of door.
  - 2.4.6.4. Fabricate doors with top and bottom inverted recessed spot welded channels.
  - 2.4.6.5. Reinforce, blank, drill and tap doors for mortised, templated hardware.
  - 2.4.6.6. Reinforce doors for surface mounted hardware.
  - 2.4.6.7. Undercut 19 mm (3/4") for air intake at washrooms.
  - 2.4.6.8. Factory prepare holes 13 mm (1/2") diameter and larger. Factory prepare holes less than 13 mm (1/2") when required for function of device for knob, lever, cylinder, turn pieces or when these holes overlap function holes.
- 2.4.7. Interior Hollow Metal Doors:
  - 2.4.7.1. Face Sheets: 1.519 mm thick (16 ga) minimum galvanized steel sheet.
  - 2.4.7.2. Vertical Stiffeners: 0.912 mm thick (20 ga) minimum unprimed steel sheet.
  - 2.4.7.3. Glazing Stops: 1.519 mm thick (16 ga) minimum unprimed steel sheet, formed, drilled and countersunk for fastenings.
  - 2.4.7.4. Fabricate each face sheet for exterior door using a sheet steel laminated under pressure to polyurethane core. Ensure core completely fills inside hollow of door.
  - 2.4.7.5. Fabricate each face sheet for interior door using a sheet steel laminated under pressure to honeycomb core.
  - 2.4.7.6. Reinforce, stiffen and sound deaden doors with core laminated to inside faces of panels. Ensure core completely fills inside hollow of door.
- 2.4.8. Fabrication Tolerances:
  - 2.4.8.1. Frames:
    - 2.4.8.1.1. Width and Height: +1.6 mm (+1/16"), -0.8 mm (-1/32").
    - 2.4.8.1.2. Face, Stop and Rabbet: +/-0.8 mm (+/-1/32").
    - 2.4.8.1.3. Jamb Depth: +/-1.6 mm (+/-1/16").
  - 2.4.8.2. Doors:
    - 2.4.8.2.1. Width and Height: +/-1.2 mm (+/-3/64").

- 2.4.8.2.2. Thickness: +/-1.6 mm (+/-1/16").
- 2.4.8.2.3. Edge Flatness: 1.6 mm (1/16") maximum.
- 2.4.8.2.4. Surface Flatness: 3 mm (1/8") maximum.
- 2.4.8.2.5. Door Twist: +/-1.6 mm (+/-1/16").
- 2.4.8.3. Hardware:
  - 2.4.8.3.1. Cutouts: Template dimension +0.38 mm (+0.015"), -0 mm (-0").
  - 2.4.8.3.2. Location: +/-0.8 mm (+/-1/32").
  - 2.4.8.3.3. Between Hinge Centrelines: +/-0.4 mm (+/-1/64").
- 2.4.9. Prime Painting: Apply factory touch up primer at areas where zinc coating has been damaged during fabrication.

### **PART 3 - EXECUTION**

#### **3.1. INSTALLATION**

##### **3.1.1. Hollow Metal Doors:**

- 3.1.1.1. Install hollow metal doors in accordance with manufacturer's instructions.

##### **3.1.2. Hollow Metal Frames:**

- 3.1.2.1. Install hollow metal frames in accordance with manufacturer's instructions.
- 3.1.2.2. Set frames plumb, square, level and at correct elevation, maintaining uniform door width and height. Check and correct as necessary opening width, opening height, square, alignment, twist and plumb, in accordance with the CSDMA, "Recommended Dimensional Standards for Commercial Steel Doors and Frames".
- 3.1.2.3. Secure anchorages and connections to adjacent construction.
- 3.1.2.4. Remove temporary steel shipping jamb spreaders prior to setting 1-piece welded frames. Brace frames rigidly in position while being built in. Use precisely-dimensioned installation spreaders at sill and third-points of door opening height to maintain door opening width during building-in. Follow manufacturer's instructions regarding proper use of floor and jamb anchors. Remove installation spreaders only after mortar has set, where applicable.
- 3.1.2.5. Allow for deflection to prevent structural loads from being transmitted to frame.
- 3.1.2.6. Provide batt insulation to completely fill pressed steel frames of exterior doors and adjacent cavities.
- 3.1.2.7. Spot Grouting:
  - 3.1.2.7.1. Coordinate spot grouting with Section 09 22 16 - Non-Structural Metal Framing.
  - 3.1.2.7.2. Provide spot grout to increase rigidity of frame and improve resistance to frame rotation caused by weight of door.
  - 3.1.2.7.3. Comply with manufacturer's recommendations for surface preparation, cleaning, forming, mixing, placement and curing of grout.
  - 3.1.2.7.4. Mix grout in accordance with ASTM C305 requirements.
  - 3.1.2.7.5. Spot grout at strike and hinge side jambs at steel door frames set in gypsum board partitions, walls and other similar locations in accordance with manufacturer's recommendations. Immediately insert gypsum panels

into jamb and attach to framing. Do not terminate gypsum board against trim.

3.1.2.7.6. Do not use pumped slurry method to perform spot grouting.

3.1.2.8. Continuous Grouting:

3.1.2.8.1. Coordinate continuous grouting with Section 04 20 00.

3.1.2.8.2. Comply with manufacturer's recommendations for surface preparation, cleaning, forming, mixing, placement and curing of grout.

3.1.2.8.3. Mix grout in accordance with ASTM C305 requirements.

3.1.2.8.4. Provide grouting employing established procedures recommended by manufacturers. Use minimum water required to produce placement consistency.

END OF SECTION



## **PART 1 - GENERAL**

### **1.1. SUMMARY**

- 1.1.1. Work Included:
  - 1.1.1.1. Supply wood faced doors.
- 1.1.2. Related Work Specified Elsewhere:
  - 1.1.2.1. Installation of wood doors and hardware: Section 06 20 00
  - 1.1.2.2. Supply of hardware: Cash Allowance

### **1.2. QUALITY ASSURANCE**

- 1.2.1. Requirements of Regulatory Agencies: Conform to the latest editions of the following:
  - 1.2.1.1. CSA 0132.2-Series 90, General Requirements for Wood Flush Doors.
  - 1.2.1.2. Architectural Woodwork Manufacturers Association of Canada "Quality Standards for Architectural Woodwork".(AWMAC), Premium Grade and CSA 0132.2-M, except as indicated otherwise. The AWMAC standard governs over the CSA standard.

### **1.3. SUBMITTALS**

- 1.3.1. Shop Drawings: Submit shop drawings under Section 01 30 00.

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

- 1.4.1. Do not deliver doors to Site until work of wet trades is complete and moisture readings of surfaces in proposed storage area are less than 18%.
- 1.4.2. Store doors flat on level surface in dry, well ventilated area inside building.
- 1.4.3. Cover top of pile with waterproof covering, but allow air circulation at sides.

### **1.5. WARRANTY**

- 1.5.1. Warrant the work of this Section against defect for a total of Three Years.
- 1.5.2. Make good defects during warranty period by replacing defective doors in finish to match adjacent similar doors or of original door finish. Defects shall include, but not be limited to bubbling, delamination of faces or edges, warp, twist bow exceeding 6mm, and telegraphing of core. "Replace" as used herein includes installing hardware, finishing, hanging and fitting.

## **PART 2 - PRODUCTS**

### **2.1. MATERIALS**

- 2.1.1. Conform to CSA 0132.2 for materials, except as specified otherwise herein.
- 2.1.2. Doors:
  - 2.1.2.1. Materials - Solid Eastern White Pine or Western Red Cedar conforming to CAN3-0188.1- M, Grade R.
  - 2.1.2.2. Wood Doors Slab Solid Core Doors by Cambridge Door Ltd, Paint Ready Finish or approved equal by JWS Manufacturing or approved alternative from Baillargeon Doors Inc or Lambton Door.

- 2.1.2.3. Wood Doors Fire Rated – Series Fire Door by Cambridge Door Ltd, fire rated architectural wood flush doors by JWS Manufacturing Inc or approved alternative by Lambton

- 2.1.3. Adhesive: CSA 0112 Series M, Type III.

## **2.2. FABRICATION AND MANUFACTURE**

- 2.2.1. General:

- 2.2.1.1. Conform to CSA 0132.2 for solid core flush doors, except as specified otherwise herein.

- 2.2.1.2. Size doors for 2mm clearance of heads and jambs and 10mm at sills.

- 2.2.1.3. **Prepare doors and frames** for (but not limited to) all door hardware including butt hinges, continuous hinges, cylindrical locks, mortise locksets, rim exit devices, surface door closers and concealed overhead stops.

- 2.2.2. Flush Doors:

- 2.2.2.1. Core: Laminated wood framed or unframed core construction comprising narrow kiln dried wood strips not less than 40mm wide, grain running vertically and joints well staggered, electronically glue bonded;

- 2.2.2.2. Edges: 19mm minimum thickness one piece full length Maple.

- 2.2.2.3. Sealing: Seal top and bottom edges with one coat of sealer applied in plant.

- 2.2.2.4. Cutouts: Prepare doors in factory for any openings required. Fit loose stops and tack in place.

## **PART 3 - EXECUTION**

### **3.1. INSTALLATION**

- 3.1.1. Supply wood doors to Section 06 20 00, Finish Carpentry, for installation.

**END OF SECTION**

---

## **PART 1 - GENERAL**

### **1.1. SUMMARY**

- 1.1.1. Section Includes: Provide gypsum board assemblies work including but not limited to following:
  - 1.1.1.1. Interior metal support systems for gypsum board partitions, ceilings, and other assemblies as Indicated on drawings.
  - 1.1.1.2. Supplementary steel supports for ceilings.
  - 1.1.1.3. Reinforcement for suspension systems for lighting fixtures.
  - 1.1.1.4. Concealed sheet steel reinforcing for mounting accessories
- 1.1.2. Related Sections: Following description of work is included for reference only and shall not be presumed complete:
  - 1.1.2.1. Miscellaneous steel sections and/or framing required to provide additional structural support to suit Project requirements: Section 05 50 00 Metal Fabrications.
  - 1.1.2.2. Installation of hollow metal door frames and frame anchors in gypsum board partitions: Section 08 11 13 - Hollow Metal Doors and Frames.
  - 1.1.2.3. Firestopping, smoke seals and penetration firestopping: Section 07 84 00 Firestopping and Smoke Seals.
  - 1.1.2.4. Gypsum board, acoustic insulation: Section 09 29 00 Gypsum Board.

### **1.2. ADMINISTRATIVE REQUIREMENTS**

- 1.2.1. Coordination:
  - 1.2.1.1. Coordinate wall mounted equipment requirements and locations with HWDSB Project Manager. Provide suitable blocking to support equipment and unistruct mounting supports.
- 1.2.2. Sequencing:
  - 1.2.2.1. Coordinate installation and cooperate with mechanical and electrical trades to accommodate mechanical electrical items and any other work required to be incorporated into or coordinated with ceiling systems.
  - 1.2.2.2. Cooperate and coordinate with Sections applying wet trades and trades installing mechanical and electrical services. Coordinate stud layout at partitions accommodating wall mounted fixtures by other trades.

### **1.3. INFORMATIONAL SUBMITTALS**

- 1.3.1. Submit submittals in accordance with Submittal Procedures specified in Section 01 10 00.
- 1.3.2. Product Data Sheets:
  - 1.3.2.1. Submit manufacturer's product data sheets for products to be for used in the work of this section. Manufacturer's product data sheets shall include:
    - 1.3.2.1.1. Material and product physical properties and characteristics including physical size, finish.
    - 1.3.2.1.2. Performance criteria.
    - 1.3.2.1.3. Limitations of products.
- 1.3.3. Shop Drawings:
  - 1.3.3.1. Submit engineered shop drawings prepared, stamped, and signed by Professional Structural Engineer for non-structural metal framing.

- 1.3.3.2. Submit engineered shop drawings prepared, stamped, and signed by Professional Structural Engineer for the seismic design of connections and restraint of the non-structural metal framing.
- 1.3.3.3. Include the manufacturer's load test data and design tables for the metal support system and hanger supports.
- 1.3.3.4. Submit drawings to locate all expansion and control joints in partitions and ceilings.
- 1.3.3.5. Submit drawings to locate all fire rated partitions.

#### **1.4. QUALITY ASSURANCE**

- 1.4.1. Qualifications:
  - 1.4.1.1. Installers: Provide work of this Section executed by competent installers with minimum 5 years experience in the application of Products, systems and assemblies specified and with approval and training of the Product manufacturers.
  - 1.4.1.2. Licensed Professionals: Employ a licensed engineer carrying minimum \$2,000,000.00 professional liability insurance and is registered in the Province of Ontario.

### **PART 2 - PRODUCTS**

#### **2.1. DESIGN / PERFORMANCE REQUIREMENTS**

- 2.1.1. Design Requirements:
  - 2.1.1.1. Design non-structural metal framing to withstand own dead load, super-imposed dead loads, to maximum allowable deflection of L/360, without permanent deformation.
  - 2.1.1.2. Design steel stud reinforcements from hollow structural steel, stud, angle and steel plate sections, galvanized sheet steel minimum 1.214 mm (18 ga) where required to support of manufactured components without limitations items such as washroom accessories, expansion control covers and similar items. Design weld connections ensuring rigid and secure installation capable of offering resistance to minimum 227 kg (500 lb) pull force. Do not design using wood blocking for this purpose.
  - 2.1.1.3. Sound rated construction shall have STC rating tested in accordance with ASTM E90. Coordinate with Section 09 29 00 Gypsum Board.
- 2.1.2. Structural Design:
  - 2.1.2.1. Professional Structural Engineer shall design non-structural metal framing for work of this Section.
  - 2.1.2.2. Professional Structural Engineer shall design seismic connections and restraint of the non-structural metal framing for work of this Section.
  - 2.1.2.3. Ceiling suspension systems:
    - 2.1.2.3.1. Design ceiling suspension system in accordance with manufacturer's printed directions and conforming to ASTM C754 requirements. Do not suspend and items from structural steel deck. Do not support work of this Section from, nor make attachments to, ducts, pipes, conduits or support framing of other trades.
    - 2.1.2.3.2. Design suspended ceiling systems for adequate support of electrical fixtures as required by current bulletin of Electrical Inspection Department of Ontario Hydro.
    - 2.1.2.3.3. Design hanger anchor and entire suspension system static loading not to exceed 25% of their ultimate capacity including lighting fixture dead loads.

- 2.1.2.3.4. Design suspension system to support weight of mechanical and electrical items such as air grilles, lighting fixtures, drapery track, drapes and with adequate support to allow rotation/ relocation of light fixtures.
- 2.1.2.4. Design interior partitions and ceilings using a maximum deflection criteria of L/240 with a minimum lateral load of 0.239 kPa (5 psf) unless otherwise specified herein. Where tile is being applied or height is greater than 3 m (10') use L/360 with a minimum lateral load of 0.239 kPa (5 psf).
- 2.1.2.5. Determine appropriate steel stud size and thickness as required for height and loading.
- 2.1.2.6. Ensure partitions acting as guards, including walls around shafts or where floor elevation on 1 side of a wall is more than 600 mm (23-5/8") higher than elevation of floor or ground on other side complies with OBC, Division B, Part 4, Article 4.1.5.16. Provide Shop Drawings bearing seal of a licensed engineer registered in Province of Ontario confirming this requirement.
- 2.1.2.7. Design sub-framing as necessary to accommodate and circumvent conflicts and interfaces where ducts or other equipment prevent regular spacing of hangers.

## **2.2. PARTITION SUPPORT MATERIALS**

### **2.2.1. General:**

- 2.2.1.1. Metal framing shall comply with ASTM C645 and as specified.
- 2.2.1.2. Metal framing shall be galvanized sheet steel, zinc coating designation Z120 (G40) unless otherwise specified.
- 2.2.1.3. Metal framing in shower rooms, other wet areas shall be galvanized sheet steel, zinc coating designation Z275 (G90) unless otherwise specified.

### **2.2.2. Steel Studs:**

- 2.2.2.1. Steel Studs: CSA S136 and ASTM C645, galvanized sheet steel, minimum 18 mils designation thickness (0.455 mm (0.0179") minimum base steel thickness) (previously 25 ga), minimum Z120 (G40) zinc coating, screw able with crimped web and returned flange, of depth shown in maximum continuous lengths possible. Provide thicker steel where required due to height.
- 2.2.2.2. Heavy Duty Steel Studs at Openings: CSA S136 and ASTM C645, galvanized sheet steel, minimum 54 mils designation thickness 1.367 mm (0.0538") minimum base steel thickness) (previously 16 ga), minimum Z120 (G40) zinc coating, screw able with crimped web and returned flange, of depth shown in maximum continuous lengths possible. Provide thicker steel where required due to height.
- 2.2.2.3. Studs Supporting Cement Boards, Abuse Resistant Gypsum Boards: CSA S136 and ASTM C645, galvanized sheet steel, minimum 33 mils designation thickness (0.836 mm (0.0329") minimum base steel thickness) (previously 20 ga structural). Provide 50 mm (2") deep flanges on ceiling tracks to allow for deflection of structure. Use 92 mm (3-5/8") width unless otherwise noted. Use 0.914 mm (20 ga) solid web members at ceiling and floor tracks.
- 2.2.2.4. Provide knockout openings in web at 460 mm (18") oc to accommodate (if required) horizontal mechanical and electrical service lines and bracing.

### **2.2.3. Floor and Ceiling Partition Track for Gypsum Board:**

- 2.2.3.1. CSA S136 and ASTM C645, galvanized sheet steel, minimum 18 mils designation thickness (0.455 mm (0.0179") minimum base steel thickness) (previously 25 ga), minimum Z120 (G40) zinc coating, with minimum 30 mm (1-1/4") legs, top track having longer legs where required to compensate for deflection of structure above. Width to suit steel studs.

- 2.2.3.2. For openings wider than 914 mm (3'-0"), provide 0.91 mm (0.035") (20 gauge) minimum thickness for header except at heavy duty studs, header shall match metal thickness of heavy duty studs.
- 2.2.4. Runner Fasteners:
  - 2.2.4.1. To concrete and masonry: Use stub nails or power-driven fasteners.
  - 2.2.4.2. To metal concrete inserts: Use 10 mm (0.393") Type S-12 pan head screws.
  - 2.2.4.3. To suspended ceilings: Use prefinished clips to match ceiling grid in accordance with Section 09 51 13 - Acoustical Panel Ceilings
- 2.2.5. Bracing Channels:
  - 2.2.5.1. 19 mm (3/4") x 10 mm (0.393") x 1.22 mm (0.048") cold rolled galvanized steel.
- 2.3. CEILING SUPPORT MATERIALS**
- 2.3.1. General:
  - 2.3.1.1. Metal framing and support materials shall comply with ASTM C645 and as specified.
  - 2.3.1.2. Metal framing shall be galvanized sheet steel, zinc coating designation Z120 (G40) unless otherwise specified.
  - 2.3.1.3. Size ceiling support components to comply with ASTM C754 unless otherwise Indicated on drawings or specified.
- 2.3.2. Main Runners:
  - 2.3.2.1. Steel channels, hot or cold rolled; galvanized where used in shower rooms, other wet areas, with rust inhibitive paint finish where used elsewhere indoors.
- 2.3.3. Hanger Wire:
  - 2.3.3.1. ASTM A641/A641M, soft, Class 1 galvanized, minimum 3.26 mm (0.128") (8 AWG).
- 2.3.4. Hanger Rods and Flats:
  - 2.3.4.1. Galvanized steel.
  - 2.3.4.2. Size devices for 5 times load imposed by completed system as determined in accordance with ASTM E488/E488M.
  - 2.3.4.3. Inserts for Concrete Slabs: Tie wire anchors, "Red Head TW-1614" by ITW Canada Inc., "Parabolt Wire Hanger" distributed by Acrow-Richmond Ltd., "T-14 Eyebolt" by Ramset Ltd. or "Tie Wire Drive TW-932" by Isometric Ltd. Powder actuated fastening systems are not permitted.
  - 2.3.4.4. Screws, clips, bolts, concrete inserts or other devices for ceiling hangers whose suitability for use intended has been proven through standard construction practices or by certified test data.
  - 2.3.4.5. Hangers: Comply with ASTM C754 for maximum ceiling area and loads to be supported.
  - 2.3.4.6. Tie wire: 1.519 mm (16 ga) nominal diameter galvanized, soft annealed steel.
  - 2.3.4.7. Zinc-plated or stainless steel fasteners exposed to condensation, and corrosion.
  - 2.3.4.8. Runner (Carry) Channels:
    - 2.3.4.8.1. Minimum 1.50 mm (16 gauge) thick cold rolled steel, primer painted or zinc coated for interior locations:
    - 2.3.4.8.2. 38 mm (1.5") x 12.7 mm (1/2") where supported at maximum 914 mm (3'-0") on centre.

2.3.4.8.3. 38 mm (1.5") x 19 mm (3/4") where supported at maximum 1,220 mm (4'-0") on centre.

2.3.5. Proprietary Direct Hung Ceiling Framing Suspension System (optional):

2.3.5.1. Fire rated and non-fire rated, provide factory fabricated, proprietary system in lieu of channel and cross furring framing system.

2.3.5.2. Provide interlocking cold-rolled sheet steel grid, ASTM C635/C635M, heavy duty.

## **2.4. FURRING SUPPORT MATERIALS**

2.4.1. General:

2.4.1.1. Metal framing shall comply with ASTM C645 and as specified.

2.4.1.2. Metal framing shall be galvanized sheet steel, zinc coating designation Z120 (G40) unless otherwise specified.

2.4.2. Furring Channels:

2.4.2.1. CSA S136 and ASTM C645, galvanized sheet steel, minimum 33 mils designation thickness (0.836 mm (0.0329") minimum base steel thickness) (previously 20 ga structural) or minimum 18 mils designation thickness (0.455 mm (0.0179") minimum base steel thickness) (previously 25 ga), minimum Z120 (G40) zinc coating, screw channels, 67 mm (2-5/8") wide x 22 mm (7/8") deep.

2.4.3. Carrying Channels for Gypsum Board:

2.4.3.1. CSA S136 and ASTM C645, galvanized sheet steel, minimum 43 mils designation thickness (1.087 mm (0.0428") minimum base steel thickness) (previously 18 ga), minimum Z120 (G40) zinc coating, 38 mm (1-1/2") high with 19 mm (3/4") flanges, for primary carrying member in suspended ceilings and as horizontal stiffeners or bracing in steel stud systems.

2.4.4. Carrying Channels for Cement Board: CSA S136 and ASTM C645, galvanized sheet steel, minimum 54 mils designation thickness (1.367 mm (0.0538") minimum base steel thickness) (previously 16 ga), minimum Z120 (G40) zinc coating, 38 mm (1-1/2") high with 19 mm (3/4") flanges, for primary carrying member in suspended ceilings and as horizontal stiffeners or bracing in steel stud systems.

2.4.5. "Z"-Furring:

2.4.5.1. Manufacturer's standard screw type galvanized steel, z-shaped furring members; ASTM A653/A653M G60, 0.914 mm (0.035") (20 gauge) minimum thickness of base metal, of depth Indicated, designed for mechanical attachment of insulation boards or blankets.

2.4.6. Fasteners:

2.4.6.1. Type and size recommended by furring manufacturer for substrate and application Indicated.

2.4.7. Furring Isolator:

2.4.7.1. Basis of design:

2.4.7.1.1. "Kinetics IsoMax Sound Isolation Clips for Walls and Ceilings" by Kinetics Noise Control.

2.4.7.1.2. Substitutions in accordance with Section 01 25 00 Submittal Procedures.

2.4.8. Furring Anchorages:

2.4.8.1. 1.62 mm (16 AWG) galvanized wire ties, wire type clips, bolts, nails or screws as recommended by furring manufacturer.

## **2.5. ACCESSORIES**

2.5.1. Backer Plates:

- 2.5.1.1. Galvanized steel, 1.214 mm (18 ga) thick minimum, Z275 (G90) zinc coated by hot-dip process, minimum 150 mm (6") wide x 1.50 mm (6") thick x lengths to suit size of items to be attached; fastened to studs for attachment of surface mounted fittings and accessories.
- 2.5.1.2. Elimination of backer plates or direct attachment of accessories or equipment to metal framing will not be permitted.

- 2.5.2. Insulating strip: rubberized, moisture resistant 3 mm thick foam strip, width equal to track width, with self sticking adhesive on one face, lengths as required.

**PART 3 - EXECUTION**

**3.1. INSTALLATION**

3.1.1. General:

- 3.1.1.1. Non-structural metal framing shall comply with ASTM C754 and product manufacturer's written requirements.
- 3.1.1.2. Do not bridge building expansion joints with support system; frame both sides of joints.
- 3.1.1.3. In double stud walls, do not bridge across the studs on the opposite sides of the wall with gypsum board or metal cross bracing.
- 3.1.1.4. Place studs vertically at 400 mm (16") oc unless otherwise specified, not more than 50 mm (2") from abutting walls, and at each side of openings and corners. Position studs in tracks. Cross brace studs as required to provide rigid installation.
- 3.1.1.5. Provide heavy duty double boxed studs at each side of openings to extend in 1 piece from floor to underside of structure above.
- 3.1.1.6. Thermally separate the metal studs from the exterior concrete or masonry.
- 3.1.1.7. Provide sufficient clearances between the work of this section and structural elements to prevent the transference of structural loads.
- 3.1.1.8. Attach backer plates to the framing to support the load of, and to withstand, the withdrawal and shear forces imposed by the items installed upon the work of this section.
- 3.1.1.9. Install insulating strip under stud shoe tracks of partitions on slabs on grade.

3.1.2. Furring:

- 3.1.2.1. Shim furring to achieve the required installation tolerances specified in this section.
- 3.1.2.2. Erect the resilient furring as follows:
  - 3.1.2.2.1. to a maximum of 610 mm (2'-0") on centre;
  - 3.1.2.2.2. not more than 150 mm (6") from a ceiling/wall juncture, unless otherwise specified on the drawings;
  - 3.1.2.2.3. secure to the framing support with 25 mm (1") gypsum board screws;
  - 3.1.2.2.4. with a 150 mm (6") continuous strip of 13 mm (1/2") interior gypsum board along the base of the partitions where resilient furring is installed unless otherwise required by resilient furring manufacturer's written installation requirements.
  - 3.1.2.2.5. with the resilient furring channel transverse to the framing members; and
  - 3.1.2.2.6. with the outer leg of the resilient furring oriented upwards on the partitions.

3.1.3. Suspended and Furred Ceilings:



- 3.1.3.1. Space the hangers at a maximum of 914 mm (3'-0") on centre along the runner channels and not more than 150 mm (6") from the ends unless otherwise required by engineered shop drawings.
- 3.1.3.2. Space the runner channels at a maximum of 1,220 mm (4'-0") on centre and not more than 150 mm (6") from boundary walls, interruptions in the continuity; and changes in direction unless otherwise required by engineered shop drawings
- 3.1.3.3. Run the runner channels transversely to the structural framing members.
- 3.1.3.4. Lap the members by at least 200 mm (8") and wire each end with two loops where there is splicing.
- 3.1.3.5. Stagger the splices throughout the framing system.
- 3.1.3.6. Bend the hanger sharply under the bottom flange of the runner channel and securely wire with a saddle tie to attach to the rod hangers.
- 3.1.3.7. Erect the cross furring channels transversely across the runner channels at a maximum of 400 mm (1-3.75") on centre except at a maximum of 305 mm (12") on centre at fire rated assemblies.
  - 3.1.3.7.1. Erect the cross furring channels not more than 150 mm (6") from boundary wall openings, interruptions in the ceiling continuity, and changes in direction.
- 3.1.3.8. Size GWB acoustic spring hangers to suit design loads in accordance with reviewed shop drawings.
- 3.1.4. Partition Framing Installation
  - 3.1.4.1. Install partition tracks at the floor and underside of the structure.
  - 3.1.4.2. Secure partition tracks to the concrete with screwed or shot fasteners located 50 mm (2") from each end and spaced at a maximum of 610 mm (2'-0") on centre.
  - 3.1.4.3. Extend one (1) runner to the end of the partition corner and butt the other runner to it, minus the clearance for the gypsum board thickness.
  - 3.1.4.4. Place interior studs as follows, unless otherwise Indicated on drawings:
    - 3.1.4.4.1. A minimum of 400 mm (1-3.75") on centre;
    - 3.1.4.4.2. A maximum of 50 mm (2") from abutting walls, abutting openings and each side of corners;
    - 3.1.4.4.3. A minimum of 19 mm (3/4") on centre for the deflection under beams and structural slabs to avoid the transmission of structural loads to the studs, or install 50 mm leg ceiling tracks.
  - 3.1.4.5. Install three studs at the corners and intermediate intersections of the partitions.
  - 3.1.4.6. Extend partition framing above the ceilings to the underside of the structure, unless otherwise Indicated on the drawings.
  - 3.1.4.7. Install chase walls consisting of two parallel steel stud partitions.
  - 3.1.4.8. Install lateral support bracing channels:
    - 3.1.4.8.1. For partitions over 3 m (10'-0") in vertical span;
    - 3.1.4.8.2. At mid-height to a maximum vertical spacing of 2,440 mm (8'-0") on centre;
    - 3.1.4.8.3. With at least one (1) 19 mm (3/4") horizontal bracing channel;
    - 3.1.4.8.4. To extend the full length of the partition; and
    - 3.1.4.8.5. To overlap at least two (2) stud spaces at the ends of the bracing channels.

- 3.1.4.9. Stiffen partitions a maximum of 150 mm (6") from the top and bottom of the openings and across two full stud spaces at each side of the openings with a horizontal bracing channel.
- 3.1.5. Concrete Anchors:
  - 3.1.5.1. Provide anchorage points in reinforced concrete floor slab underside in accordance with gypsum board manufacturer's written suspension requirements.
  - 3.1.5.2. Provide anchors; minimum installation depth, and method of expansion as recommended by the anchor manufacturer's written requirements.
- 3.1.6. Installation Tolerances:
  - 3.1.6.1. Install non-structural metal framing plumb, level, straight, tight and secured, to the following maximum tolerances:
    - 3.1.6.1.1. Plumb and level: 3 mm (1/8") in 3 m (10'-0").
    - 3.1.6.1.2. Variation from Indicated position: 10 mm (3/8").
    - 3.1.6.1.3. Variation between the planes of abutting edges or ends: 1.5 mm (1/16")

END OF SECTION

---

## **PART 1 - GENERAL**

### **1.1. SUMMARY**

- 1.1.1. Section Includes: Provide gypsum board assemblies work including but not limited to following:
- 1.1.1.1. Gypsum board ceilings, partitions and repairs to existing gypsum board.
  - 1.1.1.2. Corner beads, casing beads, trim, control joints and corner reinforcement.
  - 1.1.1.3. Taping and filling.
  - 1.1.1.4. Sound attenuation batts.
  - 1.1.1.5. Installation of access doors, and panels supplied by other Sections in gypsum board walls and ceilings as required.

### **1.2. QUALITY ASSURANCE**

- 1.2.1. Qualifications:
- 1.2.1.1. Installers: Provide work of this Section executed by competent installers with minimum 5 years experience in the application of Products, systems and assemblies specified and with approval and training of the Product manufacturers.

### **1.3. DELIVERY, STORAGE AND HANDLING**

- 1.3.1. Storage and Handling Requirements:
- 1.3.1.1. No outside storage permitted. Store in clean, dry area, off ground. Provide adequate ventilation to avoid excess moisture, surface relative humidity and mould or fungal growth. Remove immediately any board showing signs of mould, mildew or fungal growth.
  - 1.3.1.2. Stack gypsum board flat on level and dry surface without overhanging boards. Prevent sagging and damage to edges, ends and surfaces. Protect bagged Products from moisture or wetting.

### **1.4. SITE CONDITIONS**

- 1.4.1. Ambient Conditions:
- 1.4.1.1. Do not install work of this Section in any area unless satisfied that work in place has dried out and that no further installation of materials requiring wetness, moisture or dampness is contemplated. Ensure relative humidity in area of work of this Section does not exceed 55% for duration of Project.
  - 1.4.1.2. Ensure temperature of surrounding areas is min 13 deg C (55 deg F) and max 21 deg C (70 deg F) for 7 Days before and during application of gypsum board; maintain for 4 Days thereafter. Ensure heat is provided at appropriate time before work has started to bring surrounding and adjacent materials up to required temperature and maintained as specified. Avoid concentrated or irregular heating during drying by means of deflectors or protective screens.
  - 1.4.1.3. Ensure ventilation is provided for proper drying of joint filler and adhesive and to prevent excessive humidity. Do not force dry adhesives and joint treatment.

## **PART 2 - PRODUCTS**

### **2.1. MANUFACTURERS**

- 2.1.1. Manufacturer List: Products of following manufacturers are acceptable subject to conformance to requirements of Drawings, Schedules and Specifications:

- 2.1.1.1. Bailey Metal Products Ltd.; [www.bmp-group.com](http://www.bmp-group.com)
- 2.1.1.2. CertainTeed Corporation; [www.certainteed.com](http://www.certainteed.com)
- 2.1.1.3. CGC Inc; [www.cgcinc.com](http://www.cgcinc.com)
- 2.1.1.4. Georgia-Pacific Canada, Inc.; [www.gpgypsum.com](http://www.gpgypsum.com)
- 2.1.1.5. Johns Manville; [www.jm.com](http://www.jm.com)
- 2.1.1.6. Roll Formed Specialty; [www.rollformed.com](http://www.rollformed.com)
- 2.1.1.7. Trim-Tex Inc.; [www.trim-tex.com](http://www.trim-tex.com)

## **2.2. GYP SUM BOARD**

- 2.2.1. Gypsum Board: Conforming to ASTM C1396/C1396M. Unless indicated otherwise use 1200 mm (4') wide standard facing board in maximum continuous lengths up to 3600 mm (12'), beveled and/or tapered edges to suit design requirements with butted square ends:
  - 2.2.1.1. Gypsum Board (Walls): Provide 15.9 mm (5/8") thick with tapered edges unless otherwise specified as follows:
    - 2.2.1.1.1. Provide 9.5 mm (3/8") thick gypsum board on curved walls.
  - 2.2.1.2. Gypsum Board (Ceiling): Provide 15.9 mm (5/8") thick with tapered edges unless otherwise specified as follows:
    - 2.2.1.2.1. Use anti sag sheets.
- 2.2.2. Moisture Resistant Gypsum Board: ASTM C1658/C1658M, glass mat faced, silicone treated core gypsum board, ASTM D3273 with a rating of 10, no mould growth after 4 weeks exposure, 12.7 mm (1/2") or Type X, 15.9 mm (5/8"). Acceptable products:
  - 2.2.2.1. "DensArmor Plus® High Performance Interior Panel" by Georgia-Pacific Canada, Inc.
  - 2.2.2.2. "CGC Sheetrock® Brand Glass-Mat Panels Mold Tough®" by CGC Inc.
- 2.2.3. Fire Rated Gypsum Board having Testing Agency Fire Rating Identification Stamp on Each Sheet: ASTM C1396/C1396M, Type X, 12.7 mm (1/2") and/or 15.9 mm (5/8") thick gypsum board 1200 mm (4') wide, maximum practical length and tapered edge as required by each fire resistance assembly. Acceptable products:
  - 2.2.3.1. "Gyproc Fireguard Type X or Type C" by Georgia-Pacific Canada, Inc.,
  - 2.2.3.2. "CGC Sheetrock Firecode X or Firecode C" by CGC Inc.
  - 2.2.3.3. "ProRoc Type X or Type C" by CertainTeed Corporation.
- 2.2.4. Gypsum Board Tile Backer Board: ASTM C1178/C1178M, glass mat faced, water-resistant gypsum core board, with a rating of 10 in accordance with ASTM D3273, no mould growth after 4 weeks exposure, 15.9 mm (5/8") thick plain or Type X;. Acceptable products:
  - 2.2.4.1. "DensShield® Tile Backer" by Georgia-Pacific Canada, Inc.
  - 2.2.4.2. "Durock® Glass-Mat Tilebacker" by CGC Inc.
  - 2.2.4.3. "GlasRock® Diamondback® Tile Backer" by CertainTeed Corporation.
- 2.2.5. Abuse Resistant Gypsum Board: Provide 1 of following:
  - 2.2.5.1. Enhanced gypsum core encased in heavy duty paper facers on front and back, 15.9 mm (5/8"), conforming to ASTM C1396/C1396M and attaining a maximum of 0.014" as tested to ASTM D4060 (H-18 abrasion wheel, 500 grams, 200 cycles), a maximum of 0.123" indentation as tested to ASTM D5420 (72 in lbs) and a minimum of (133 ft lbs) as tested to ASTM E695 (50 lb bag) and ASTM C1629/C1629M Type X in fire rated assemblies. Acceptable products:

2.2.5.1.1. "Extreme Abuse with M2Tech" by CertainTeed Corporation

2.2.5.1.2. "CGC Sheetrock® Brand Mold Tough® AR Firecode Core" by CGC Inc.

2.2.5.2. Enhanced gypsum core encased in fibreglass facers on front and back, 15.9 mm (5/8"), conforming to ASTM C1396/C1396M and attaining a maximum of 0.014" as tested to ASTM D4060 (H-18 abrasion wheel, 500 grams, 200 cycles), a maximum of 0.123" indentation as tested to ASTM D5420 (72 in lbs) and a minimum of (133 ft lbs) as tested to ASTM E695 (50 lb bag) and ASTM C1629/C1629M Type X in fire rated assemblies. Acceptable products:

2.2.5.2.1. "DensAmor Plus® Abuse Guard" by Georgia-Pacific Canada, Inc.

2.2.5.2.2. "Sheetrock Mold Tough Glass Mat Abuse Resistant" by CGC Inc.

### **2.3. FASTENERS**

2.3.1. Screws for Sheet Steel Members: ASTM C954, self-drilling, self-tapping gypsum board screws, 25 mm (1") long #6 for single layer application, 41 mm (1-5/8") long #7 for double layer application and as follows:

2.3.1.1. For single layer application over steel framing; self-drilling, self-tapping, case hardened, No. 6 contoured Phillips head or Type S bugle head, sized for minimum 15.9 mm (5/8") penetration into steel framing. Ensure fasteners are corrosion resistant. Use drill point screws for abuse resistant gypsum fibre panels.

2.3.1.2. For double layer application over gypsum backing board and existing gypsum board; 38 mm (1-1/2") Type G bugle head. For each additional layer of board, increase length of fasteners proportionally.

2.3.2. Screws; for exterior sheathing board: in accordance with manufacturer's installation instructions to comply with design wind loads.

2.3.3. Laminating Compound: Asbestos-free, as recommended by manufacturer. Manufacturer's standard, multi-purpose construction adhesive. At fire-rated construction, use adhesive which conforms to that used in applicable fire tests. Acceptable products:

2.3.3.1. "Sheetrock Brand Laminating Compound" by CGC Inc.,

2.3.3.2. "Dehydratine 9T" by Grace Construction Products

2.3.3.3. "Stangard Foamastic" by Standard Chemicals Ltd.

### **2.4. JOINT TREATMENT MATERIALS**

2.4.1. Joint Tape: Conforming to ASTM C475/C475M, provide following:

2.4.1.1. Regular Gypsum Board: Use kraft paper joint tape with feathered edges and minute perforations 50 mm (2") wide.

2.4.1.2. Moisture Resistant Gypsum Board or Cement Board: Use glass fibre tape only, open weave, with pressure sensitive adhesive 1 side. Acceptable products:

2.4.1.2.1. "Durock Cement Board Tape" by CGC Inc.

2.4.2. Joint Fillers and Topping Compound: Either slow or fast setting, low shrinkage type free of asbestos fillers and as recommended by manufacturer. Use "Gyproc 90" by Georgia-Pacific Canada, Inc. or "Durabond 90" by CGC Inc. at exterior soffits.

2.4.3. Finish coat for level 5 finish: vinyl acrylic latex based coating to ASTM C840, spray applied, "Tuff-Hide Primer-Surfacer" by CGC Inc.

### **2.5. ACCESSORIES**

2.5.1. Dust Barrier: Minimum 0.152 mm (6 mil) polyethylene, CAN/CGSB-51.33-M, Type 2.

- 2.5.2. Resilient Sponge Tape: Self-sticking adhesive on 1 side, closed cell neoprene sponge tape.  
Acceptable products:
  - 2.5.2.1. "Rubatex®" by Rubatex Corp.,
  - 2.5.2.2. "Foamflex # 1220" by Jacobs & Thompson Inc.; [www.foamparts.com](http://www.foamparts.com)
  - 2.5.2.3. "Backerseal™ (Greyflex)™" by Emseal LLC; [www.emseal.com](http://www.emseal.com).
- 2.5.3. Sealant for Moisture Resistant Gypsum Board Edges: "Sheetrock Brand W/R Sealant" by CGC Inc., or similar type acceptable to Consultant.
- 2.5.4. Corner Beads: "PG1 Platinum Square Nose Tape-On Trims" by Bailey Metal Products Ltd. "No-Coat®" by CertainTeed or "Fast Edge" paper by Trim-Tex at corners, reveals, or similar. Provide custom shapes of similar materials and design as noted.
- 2.5.5. Trim: "PG4 Platinum Tape-On L-Trims" by Bailey Metal Products Ltd.
- 2.5.6. Flexible Casing Beads: 0.531 mm (25 ga) steel, wipe coated, angle shaped in size to fit over edge of gypsum board, to suit curved applications.
- 2.5.7. Control Joints: Pre-fabricated control joints prepared to suit site conditions. Certified by manufacturer for use at fire resistance rated assemblies. Acceptable products:
  - 2.5.7.1. "No. 093" zinc alloy control joint by CGC Inc.
  - 2.5.7.2. "DRM-50-25 2-PC" by Fry Reglet
  - 2.5.7.3. "093V Expansion Bead" by Trim-Tex Drywall Products Inc.
- 2.5.8. Access Doors and Panels:
  - 2.5.8.1. Supplied as part of Section 08 31 13 and Divisions 21, 22, 23, 26, 27 and 28 for installation as part of this Section.

## **2.6. SOUND CONTROL MATERIALS**

- 2.6.1. Acoustical Insulation: CAN/ULC S702, Type 1, of sufficient thickness to meet required STC rating for sound-rated partitions and of width to suit metal framing spacing
  - 2.6.1.1. Acoustical Insulation Batts in non-fire rated assemblies: glass fibre
    - 2.6.1.1.1. Acceptable Products:
      - 2.6.1.1.1.1. "EcoTouch™ QuietZone® PINK™ FIBERGLAS® Acoustical Insulation" by Owens Corning Canada LP; [www.insulation-owenscorning.ca](http://www.insulation-owenscorning.ca)
- 2.6.2. Strip Impalement Clips: 25 mm (1") wide strip of "Insul-Hold" by Insul-Hold Co., Inc.; [www.insulhold.com](http://www.insulhold.com), fabricated from 0.531 mm (25 ga) galvanized sheet metal in 30 m (100') rolls with punch-out insulation securement arrows. Alternatively, use special studs with punch-out impalement strips.
- 2.6.3. Acoustic Sealant:
  - 2.6.3.1. Concealed locations: Single component, non-hardening, non-skinning synthetic rubber sealant; "Tremco Acoustical Sealant" by Tremco Canada; [www.tremcosealants.com](http://www.tremcosealants.com).
  - 2.6.3.2. Fire resistance locations: Smoke-seal sealant with flame-spread not more than 25 and smoke developed classification not more than 50 to CAN/ULC-S102.
- 2.6.4. Elastomeric Sealant: As recommended by manufacturer of fibre-reinforced gypsum sheathing board.
- 2.6.5. Gaskets: Closed cell neoprene, 3 mm (1/8") thick x 64 mm (2-1/2") wide.

## **PART 3 - EXECUTION**

### **3.1. EXAMINATION**

- 3.1.1. Verification of Conditions: Verify actual site dimensions and location of adjacent materials prior to commencing work. Notify Consultant in writing of any conditions which would be detrimental to the installation.
- 3.1.2. Evaluation and Assessment: Commencement of work implies acceptance of previously completed work.

### **3.2. PREPARATION**

- 3.2.1. Ensure that services, blocking and supports to be installed in partitions have been installed and inspected before closing in with gypsum board.
- 3.2.2. Vacuum clean stud track, suspended support framing, and spaces to be concealed before starting the days installation.

### **3.3. INSTALLATION**

- 3.3.1. Gypsum Board Application:
  - 3.3.1.1. Provide gypsum board in accordance with manufacturer's written installation instructions and finish to requirements of ASTM C840. Install Moisture Resistant Gypsum Board on any wall/partition with a paint finish containing a plumbing fixture (i.e. water closets, sinks, tubs, etc.). Install gypsum board tile backer board on any wall partition or ceiling requiring a tile finish.
  - 3.3.1.2. Provide metal trim casing bead at junctions with dissimilar materials. Provide reveals at junctions with dissimilar materials where indicated.
  - 3.3.1.3. Provide finished work plumb, level and true, free from perceptible waves or ridges and square with adjoining work.
  - 3.3.1.4. Cut and fit gypsum board to accommodate or fit around other parts of the Work. Provide work of this Section accurately and neatly.
  - 3.3.1.5. Butt gypsum board sheets together in moderate contact. Do not force into place. Place tapered or wrapped edges next to 1 another.
  - 3.3.1.6. Provide gypsum board perpendicular to framing and in lengths that will span ceilings and walls without creating end (butt) joints. If butt joints do occur stagger and locate them as far from centre of walls and ceilings as possible. Accurately fit exposed butt joints together and make edges smooth.
  - 3.3.1.7. Support ends and edges on framing.
  - 3.3.1.8. Fasten gypsum board to metal furring and steel studs with screws. Space screws at 200 mm (8") oc at board edges and 300 mm (12") oc on board field.
  - 3.3.1.9. Gypsum Board - Single Layer:
    - 3.3.1.9.1. Ceilings: Apply gypsum board to metal furring with screws. Erect board with long dimension parallel to supports. Locate end joints over supporting members. Space screws at 200 mm (8") oc.
    - 3.3.1.9.2. Partitions: Apply gypsum board to steel studs with screws. Erect board with long dimension parallel to supports. Locate end joints over supporting members. Locate vertical joints at least 300 mm (12") from jamb lines of openings. Space screws at 200 mm (8") oc at board edges and 300 mm (12") oc on board field.
    - 3.3.1.9.3. Ceiling and Partition Fasteners: Ensure perimeter screws are not less than 9 mm (3/8") nor more than 13 mm (1/2") from edges and ends are opposite

screws on adjacent boards. Drive screws with power screw-gun and set with countersunk head slightly below surface of board.

3.3.1.9.4. Joints: Finish all joints unless specified otherwise.

3.3.1.10. Gypsum Board - Double Layer:

3.3.1.10.1. Lay out work to minimize end joints on face layer; to offset parallel joints between face and base layers by at least 250 mm (10") and to apply face layer at right angles to base layer.

3.3.1.10.2. Base Layer: Ensure base layer is same as face layer, or backing board, and applied at right angles to framing members. Secure base layer with screws spaced 300 mm (12") oc to each member. Ensure perimeter screws are not more than 13 mm (1/2") from edges and ends are opposite screws on adjacent boards. Ensure surface of erected base layer is straight, plumb or level and without protrusions before face layer is applied.

3.3.1.10.3. Face Layer: Apply face layer at right angles to base layer with screws.

3.3.1.10.4. Joints: Finish joints in face layers only, unless otherwise required to achieve fire resistant ratings indicated, as hereinafter specified. Ensure setting compound for fire rated construction conforms to requirements of authorities having jurisdiction to obtain fire rating shown on Drawings.

3.3.2. Interior Ceilings:

3.3.2.1. Comply with recommendations of CGC Drywall Steel-Framed Systems Folder 09250-SA 923.

3.3.2.2. Provide hanger wires spaced at maximum 1200 mm (4') oc along carrying channels and within 150 mm (6") of ends of carrying channel runs. Secure hanger wires to inserts in structure above.

3.3.2.3. Provide carrying channels maximum 1200 mm (4') oc and within 150 mm (6") of walls. Secure with hanger wire saddle-tied along channels. Provide 25 mm (1") clearance between runners and walls. Provide splicers behind joints. Level channels to a maximum tolerance of 3 mm (1/8") over 3600 mm (12').

3.3.2.4. Provide metal furring channels at right angles to carrying channels at maximum 600 mm (24") oc and within 150 mm (6") of walls. Provide 25 mm (1") clearance between furring ends and abutting walls. Attach furring channels to carrying channels with saddle-tie of double strand tie wire.

3.3.2.5. Provide additional cross-reinforcing at bulkheads and other openings.

3.3.2.6. Provide ceiling gypsum board, smooth and level. In areas with a high humidity content (ie. Washrooms, janitor closets, etc.) install MRGB.

3.3.3. Metal Trim and Accessories:

3.3.3.1. Provide metal trim casing beads at reveals; at ceiling-wall intersections and partition perimeters; and at intersection of dissimilar constructions such as gypsum board to concrete.

3.3.3.2. Provide metal trim casing beads where gypsum board abutts against a surface having no trim concealing junction.

3.3.3.3. Provide a 13 mm (1/2") separation gasket between metal trim casing beads and window frames or other cold surfaces or provide sponge tape between gypsum board partition or furring framing, where such framing abuts exterior door or window frame, sponge tape between floor and gypsum board partition track. Ensure tape is either full width or 1 strip 9 mm (3/8") wide on each side of framing member.



- 3.3.3.4. Provide casing bead and sponge tape where gypsum board abuts materials other than itself and acoustic tile ceilings including at exterior door and window frames, where juncture is not concealed with trim; or elsewhere where indicated on Drawings. Unless indicated otherwise, use tape 3 mm (1/8") narrower than casing bead to provide recess at exposed side. Compress tape by 25%.
- 3.3.3.5. Provide metal trim casing beads where indicated on Drawings.
- 3.3.3.6. Access Doors and Panels: Install access doors and panels supplied as part of work of Divisions 22, 23 and 26 and where required as part of work of this Section in walls, bulkheads, ceilings and soffits.
- 3.3.4. Control Joints:
  - 3.3.4.1. Provide either manufactured control joint devices or field fabricated control joints from suitable materials to suit site conditions in accordance with manufacturer's instructions and/or ASTM C840.
  - 3.3.4.2. Set in gypsum facing board, supporting control joints with studs or furring channels on both sides of joint. Ensure double studs with discontinuous tracks and double suspended ceiling furring channels have been installed prior to commencing board and bead application at control joints. Provide control joints as required to prevent cracks at following locations:
    - 3.3.4.2.1. Where a partition, wall or ceiling traverses a construction joint (expansion, seismic or building control element) in base building structure
    - 3.3.4.2.2. Where a wall or partition runs in an uninterrupted straight plane exceeding 9.1 m (30') (Note: A full height door frame may be considered a control joint).
    - 3.3.4.2.3. interior ceilings with perimeter relief: installed so linear dimensions between control joints do not exceed 15 m (50') and total area between control joints does not exceed 230 m<sup>2</sup> (2,500 sq ft).
    - 3.3.4.2.4. Interior ceilings without perimeter relief: installed so linear dimensions between control joints do not exceed 9.1 m (30') and total area between control joints does not exceed 84 m<sup>2</sup> (900 sq ft).
    - 3.3.4.2.5. Exterior ceilings and soffits: installed so linear dimensions between control joints do not exceed 15 m (50') and total area between control joints does not exceed 230 m<sup>2</sup> (2,500 sq ft).
    - 3.3.4.2.6. At stress points (ie corners of openings or changes in direction of surfaces).
  - 3.3.4.3. Provide additional control joints at long and narrow surfaces.
  - 3.3.4.4. Provide control joints full height floor to ceiling or door header to ceiling in partitions and furring runs.
  - 3.3.4.5. Provide control joints from wall to wall in ceiling areas.
  - 3.3.4.6. Provide continuous polyethylene dust barrier behind and across control joints.
  - 3.3.4.7. Ensure Consultant reviews exact locations of control joints.
- 3.3.5. Sound Control:
  - 3.3.5.1. Where indicated on Drawings, provide sound rated partitions and ceiling in locations indicated to meet required minimum STC rating. Apply gypsum board on both sides of sound-proofed partitions. Follow manufacturer's details and recommendations.
  - 3.3.5.2. Provide sound attenuation insulation to completely fill height of stud cavities. Tightly butt ends and sides of blankets within cavities. Cut blankets to fit small spaces. Carefully fit blankets behind electrical outlets, bracing, fixture attachments and mechanical and electrical services.

- 3.3.5.3. Mechanically fasten blankets to back of gypsum board as recommended by gypsum board manufacturer.
- 3.3.5.4. At sound attenuating suspended ceiling and enclosures having spring isolator hangers, terminate ceiling or enclosure at adjacent construction by providing continuous isolator strip and sealed joint.
- 3.3.6. Joint Treatment - Gypsum Board:
  - 3.3.6.1. Verify board is firm against framing members and screw heads are properly depressed.
  - 3.3.6.2. Mix joint compound or ready-to-use compounds according to manufacturer's directions. Use pure, unadulterated, clean water for mixing. Permit mixed material to stand 30 minutes before using. Do not mix more material than can be used within 1 hour. Do not use set or hardened compound. Clean tools and equipment after mixing each batch.
  - 3.3.6.3. Tape and fill joints and corners in accordance with gypsum board manufacturer's printed instructions. Fill either manually, using hand tools of trade, or by a mechanical taping and filling machine of proven efficiency.
  - 3.3.6.4. Remove plastic tape from control joints after finishing with joint compound.
  - 3.3.6.5. After final coats of filler have dried at least 24 hours, sand surface lightly with No. 00 sandpaper to leave it smooth, ready for decoration.
  - 3.3.6.6. Provide finished work smooth, seamless, plumb and true, flush and with square plumb neat corners.
  - 3.3.6.7. Levels of Finish: Provide Level 4 finish in accordance with ASTM C840.
- 3.3.7. Cutting and Patching: Cooperate and coordinate with other Sections to obtain satisfactory gypsum board finish work. Do cutting, patching and Make Good as required by installation of work of other Sections.
- 3.4. CLEANING**
  - 3.4.1. Clean off beads, casings, joint cement droppings and similar items and remove surplus materials and rubbish on completion and as directed.
- 3.5. PROTECTION**
  - 3.5.1. Provide protection of materials and work of this Section from damage by weather and other causes. Perform work in areas closed and protected from damage due to weather. Protect work of other trades from damage resulting from work of this Section. Make Good such damage immediately.

END OF SECTION

---

## **PART 1 - GENERAL**

### **1.1. SUMMARY**

- 1.1.1. Section Includes: Provide acoustical panel ceilings including but not limited to following:
  - 1.1.1.1. Ceiling suspension systems.
  - 1.1.1.2. Lay-in acoustical ceiling panels.
- 1.1.2. Related Sections: Following description of work is included for reference only and shall not be presumed complete:
  - 1.1.2.1. Provision of suspended support framing: - Section 09 22 16 Non-Structural Metal Framing.
  - 1.1.2.2. Provision of mechanical fixtures: refer to mechanical.
  - 1.1.2.3. Provision of electrical, communication and security fixtures: refer to electrical.

### **1.2. ADMINISTRATIVE REQUIREMENTS**

- 1.2.1. Coordination:
  - 1.2.1.1. Do not begin installation of ceiling suspension system until work above ceiling has been completed and inspected.
  - 1.2.1.2. Coordinate ceiling work to accommodate components of other Sections built into acoustical ceilings.
- 1.2.2. Preinstallation Meetings:
  - 1.2.2.1. Arrange preinstallation meeting 1 week prior to commencing work with all parties associated with trade as designated in Contract Documents or as requested by Consultant. Presided over by Contractor include Consultant who may attend, Subcontractor performing work of this trade, Owner's representative.
  - 1.2.2.2. Purpose of meeting:
    - 1.2.2.2.1. Verify Project requirements,
    - 1.2.2.2.2. Discuss coordination with work of other Sections,
    - 1.2.2.2.3. Review manufacturer's installation instructions [and warranty conditions],
    - 1.2.2.2.4. Discuss and coordinate exact locations of ceiling-mounted components,
    - 1.2.2.2.5. Discuss accepted shop drawings for special installation details, and
    - 1.2.2.2.6. Review existing substrate conditions.
- 1.2.3. **ACTION AND INFORMATIONAL SUBMITTALS**
- 1.2.4. Product Data: Submit Product data on ceiling grid system, acoustical panels; clearly indicate specific items proposed for use if manufacturer's catalogues are submitted.
- 1.2.5. Shop Drawings: Submit Shop Drawings for work of this Section. In addition to minimum requirements indicate following:
  - 1.2.5.1. Reflected plans of ceilings, joint pattern, position of suspension grids, seismic requirements, methods of suspension and termination at walls, partitions, bulkheads, lighting fixtures and mechanical fixtures.
  - 1.2.5.2. Indicate insert and hanger spacing and fastening details, splicing method for main and cross runners, location of access splines, change in level details, access door dimensions and locations, lateral bracing and accessories.

- 1.2.5.3. Submit reflected ceiling plans detailed in measurement system (e.g. imperial or metric) to match Drawings.
- 1.2.5.4. Ensure a licensed engineer specified herein is responsible for:
  - 1.2.5.4.1. Production and review of Shop Drawings.
  - 1.2.5.4.2. Sealing and signing each Shop Drawing and any associated calculations performed.
- 1.2.6. Samples: Submit following samples in sizes indicated:
  - 1.2.6.1. Submit 300 mm (12") long samples of suspension system parts, including trim and seismic items.
  - 1.2.6.2. Submit 300 mm x 300 mm (12" x 12") samples of acoustical panels.
- 1.2.7. Delegated Design Submittals:
  - 1.2.7.1. Submit delegated design shop drawings stamped and signed by professional engineer registered or licensed in Ontario, Canada.
  - 1.2.7.2. Indicate that components and installation methods conform to specified seismic design and construction requirements of Contract Documents and in accordance with ASTM E580/E580M.
  - 1.2.7.3. Include supporting details, treatment of cross runners, main runners, and wall closures at terminal ends, suspension wire, lateral force bracing, light fixtures, services within the ceiling, seismic isolation joints, and partition bracing.

### **1.3. CLOSEOUT SUBMITTALS**

- 1.3.1. Operational and Maintenance Data: Submit maintenance instructions to Owner for recommended cleaning materials and methods for panels and trim. Include precautions for use of and composition of cleaning materials detrimental to acoustic materials and trim.

### **1.4. QUALITY ASSURANCE**

- 1.4.1. Qualifications:
  - 1.4.1.1. Installers: Provide work of this Section executed by competent installers with minimum 5 years experience in the application of Products, systems and assemblies specified and with approval and training of the Product manufacturers.
  - 1.4.1.2. Licensed Professionals: Employ a licensed engineer carrying minimum \$2,000,000.00 professional liability insurance and is registered in the Province of Ontario.
- 1.4.2. Mock-Ups:
  - 1.4.2.1. Construct mock-up a minimum 10 m<sup>2</sup> of each type of acoustical ceiling assembly including one inside corner and one outside corner. Ceiling system mock-up to show basic construction and assembly, treatment at walls, splicing, interlocking, finishes, acoustical unit installation, seismic reinforcing, one recessed light fixture, and one sprinkler head.
  - 1.4.2.2. Construct mock-up at Project site where directed by Consultant.
  - 1.4.2.3. Allow minimum 48 hours for review of the mock-up.
  - 1.4.2.4. Mock-up may remain as part of the finished work and serve as standard of workmanship for the balance of the work.

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

- 1.5.1. Delivery and Acceptance Requirements: Deliver materials in original packages, containers and bundles, bearing brand and manufacturer's name and ULC or cUL labels.

**1.5.2. Storage and Handling Requirements:**

- 1.5.2.1. Store materials in a covered area, off ground, on flat, smooth, dry surfaces. Protect from moisture. Remove damaged or deteriorated materials from site.
- 1.5.2.2. Comply with ceiling panel manufacturer's recommendations regarding temperature and humidity conditions before, during and after ceiling installation.

**1.6. WARRANTY**

- 1.6.1. Manufacturer Warranty: Warrant work of this Section for period of 3 years against defects and/or deficiencies in accordance with General Conditions of the Contract. Promptly correct any defects or deficiencies which become apparent within warranty period, to satisfaction of Consultant and at no expense to Owner.

**PART 2 - PRODUCTS**

**2.1. MANUFACTURERS**

- 2.1.1. Manufacturer List: Products of following manufacturers are acceptable subject to conformance to requirements of Drawings, Schedules and Specifications:

- 2.1.1.1. Armstrong World Industries Canada Ltd.; [www.armstrongceilings.com](http://www.armstrongceilings.com)
- 2.1.1.2. Bailey Metal Products Ltd.: [www.bmp-group.com](http://www.bmp-group.com)
- 2.1.1.3. CertainTeed Ceilings; [www.certainteed.com](http://www.certainteed.com)
- 2.1.1.4. CGC Inc.; [www.cgcinc.com](http://www.cgcinc.com)
- 2.1.1.5. Rockfon; [www.rockfon.com](http://www.rockfon.com)

- 2.1.2. Substitution Limitations: Comparable Products from manufacturers listed herein will be accepted provided they meet requirements of this Specification.

**2.2. MATERIALS**

- 2.2.1. Description:

- 2.2.1.1. Regulatory Requirements: Ensure complete ceiling assemblies including panel and suspension system are fire rated and labelled in accordance with ULC Design number noted on Drawings.

- 2.2.2. Performance/Design Criteria:

- 2.2.2.1. Design suspension system to support safely and without distortion, superimposed loads of:
  - 2.2.2.1.1. Lighting fixtures.
  - 2.2.2.1.2. Air supply diffusers, boots, fire alarm grilles and exhaust and return air grilles.
  - 2.2.2.1.3. Curtain tracks and window blinds.
  - 2.2.2.1.4. Power grid system, where indicated.
  - 2.2.2.1.5. Suspended equipment where indicated.
- 2.2.2.2. Design suspension system to support lighting fixtures according to Hydro One regulations and submit certification in accordance with ESA Rule 30-302 (1).
- 2.2.2.3. Design suspension system to accommodate movement caused by thermal expansion or contraction.
- 2.2.2.4. Design and space hangers and carrying members to support entire ceiling system, including lighting fixtures, diffusers and equipment openings in locations indicated on Drawings.

- 2.2.2.5. Maximum Deflection: Limit deflection to L/360 in accordance with ASTM C635/C635M deflection test.
- 2.2.2.6. Prepare panels for sprinkler head penetrations and suspension members of curtain tracks.
- 2.2.2.7. Coordinate installation and cooperate with Mechanical and Electrical Subcontractors, to accommodate mechanical and electrical items, or any other Work required to be incorporated in or coordinated with the ceiling system.
- 2.2.2.8. Structural Design: Employ a licensed engineer specified herein to:
  - 2.2.2.8.1. Design components for work of this Section requiring structural performance.
  - 2.2.2.8.2. Be responsible for determining sizes, yield strengths, gauge thicknesses and joint spacing to allow thermal movement and loading of components in accordance with applicable codes and regulations.
  - 2.2.2.8.3. Seismic Restraints: Design system to withstand seismic forces in accordance with CSA S832 and as outlined in Ontario Building Code for post-disaster Importance Category facilities based on a full uniform ceiling load acceleration in accordance with ASTM A580/A580M. Ceiling areas less than 13.4 m<sup>2</sup> and surrounded by walls connected to structure above do not require seismic restraints.

## **2.3. MATERIALS**

- 2.3.1. Unless otherwise indicated, manufacture ceiling suspension Products to minimum requirements of ASTM C635/C635M, for Medium Duty, modified as required to suit grid design shown.

## **2.4. ACOUSTICAL CEILING SUSPENSION**

- 2.4.1. Exposed Grid System:
  - 2.4.1.1. Factory finished satin white on Z90 (G30) hot dipped galvanized cold rolled steel. Ensure system provides lock joint intersections of cross and main tees
  - 2.4.1.2. 15/16" exposed face
  - 2.4.1.3. Acceptable products:
    - 2.4.1.3.1. "DONN DX/DXL® Suspension System" by CGC Inc.,
    - 2.4.1.3.2. "Exposed Tee System" by Armstrong World Industries,
    - 2.4.1.3.3. "Chicago Metallic 1200 Seismic" by Rockfon
    - 2.4.1.3.4. "15/16" Classic Stab Systems" by CertainTeed Ceilings.
- 2.4.2. Basic Steel Material and Finish: Commercial quality cold rolled steel 0.455 mm (26 ga) minimum thickness, galvanized to zinc coating designation Z90 (G30) for normal interior spaces, Z180 (G60) for high humidity spaces and Z275 (G90) for exterior spaces. Ensure exposed surfaces of metal products are factory finished in non-yellowing, low sheen satin white enamel to Consultant's acceptance to match whiteness in panels. Provide paint formulation of grid system to lighting fixture, speaker grille, sprinkler and diffuser manufacturers to ensure consistency of colour, sheen and texture of all exposed metal components in the ceiling assemblies. Provide slip-on trim mouldings or metal mouldings with baked enamel finish, as standard with grid manufacturer, to trim around light fixtures.
- 2.4.3. Accessories for Suspension System: Complete with splices, clips and perimeter moulding of manufacturer's standard and aluminum types to suit the applicable conditions unless special conditions and access areas are shown or specified. In washroom area provide galvanized suspension system.
- 2.4.4. Hanger Wire: Minimum 2.642 mm (12 ga) overall thickness galvanized steel wire to zinc coating designation Z275 (G90), meeting "Heavy-duty" classification of ASTM C635/C635M.

- 2.4.4.1. Access Panel Ceilings: Minimum 3.6 -mm diameter
- 2.4.4.2. Fire-Rated Assemblies: To ULC design requirements,
- 2.4.4.3. Seismic assemblies. To seismic Design Category
- 2.4.4.4. Other Ceilings: Minimum 2.642 mm (12 ga) diameter
- 2.4.5. Main Tees: 3.66 m (12') long, 23.8 mm (15/16") face width double web design, rectangular bulb at top of web, 38 mm (1-1/2") web height. Expansion cut-outs in main tees controlling buckling caused by heat expansion.
- 2.4.6. Main Tee Splices: Designed to lock lengths of main tees together so joined lengths of tee function structurally as single unit with tee faces at joint perfectly aligned and presenting tight seam.
- 2.4.7. Cross Tees: 1220 mm (4') long, 25 mm (1") web height structural cross-section, design same as main tees, designed to connect at main tees forming positive lock without play, loss or gain in grid dimensions with offset over-ride of face flange over main tee flange to provide flush joint. Provide 38 mm (1-1/2") web height of cross-tee for fire rated assemblies.
- 2.4.8. Edge Moulding Around Ceiling Perimeters: Materials and finish to match tees.
- 2.4.9. Panel Hold-Down Clips: As recommended by lay-in panel manufacturer. Purpose made clips to secure panel to suspension system approved for use in fire-rated systems, and to resist wind uplift near exterior doors.
- 2.4.10. Inserts for Concrete Slabs: Certified type for setting in concrete or self drilling expansion inserts for placing afterwards. Tie wire anchors:
  - 2.4.10.1. Red Head TW-1614 by ITW Canada, Inc.,
  - 2.4.10.2. Parabolt Wire Anchor by Acrow Richmond
  - 2.4.10.3. T-14 Eyebolt by Ramset Ltd., or Tire Wire Drive TW-932 by Isometric Ltd.
- 2.4.11. Fasteners: Galvanized and of size suited to loading conditions.
- 2.4.12. Metal Closures and Trim: Bonderized and with factory-applied white baked enamel finish. Provide anchors as standard with manufacturer.
- 2.4.13. Supplementary Steel Supports: Steel conforming to Section 05 50 00 - Metal Fabrications.

## **2.5. ACOUSTICAL CEILING PANELS – HIGH NRC**

- 2.5.1. Acoustical Lay-in Panels: CAN/CGSB-92.1-M, acoustical units, prefabricated, with white painted textured and/or smooth face, qualified for use in fire rated ceiling assembly; ULC or cUL labelled and meeting following performance criteria as determined by CAN/ULC-S101 and as specified:
  - 2.5.1.1. Flame Spread Rating: 25 or under to CAN/ULC S102.
  - 2.5.1.2. Smoke Developed: 50 or under to CAN/ULC S102.
  - 2.5.1.3. Fire Rating: Class A
  - 2.5.1.4. Acoustical Lay-In Panels:
    - 2.5.1.4.1. Basis of Design: "USG Mars High-NRC/High-CAC Acoustical Panels", by CGC:
    - 2.5.1.4.2. Item no. 88281
    - 2.5.1.4.3. Size: 24" x 24" x 3/4" thick
    - 2.5.1.4.4. Edge: Square
    - 2.5.1.4.5. Suspension grid: 15/16 in
    - 2.5.1.4.6. Colour: 050 Flat White

- 2.5.1.4.7. Light Reflectance: 0.90
- 2.5.1.4.8. Ceiling Attenuation Class (CAC): 40
- 2.5.1.4.9. Noise Reduction Coefficient (NRC): Noise Absorption 0.90
- 2.5.1.4.10. Minimum Recycled Content: 70%

### **PART 3 - EXECUTION**

#### **3.1. EXAMINATION**

- 3.1.1. Verification of Conditions: Verify actual site dimensions and location of adjacent materials prior to commencing work. Notify Consultant in writing of any conditions which would be detrimental to the installation.
- 3.1.2. Do not start installation until exterior glazing has been completed and exterior openings are closed in. Ensure wet work is completed and dried out to a degree acceptable to panel manufacturer before installation is commenced. Maintain uniform temperatures of at least 21 deg C (72 deg F) for 72 hours prior to commencement of work and maintain temperature until 72 hours after completion.
- 3.1.3. Install ceiling panels and metal suspension system in accordance with applicable requirements of ASTM C636/C636M, seismic design and manufacturer's directions. Where manufacturer's directions are at variance with Contract Documents, notify Consultant before proceeding with work.
- 3.1.4. Do not commence installation until all work above suspended ceiling has been completed, inspected and accepted.
- 3.1.5. Evaluation and Assessment: Commencement of work implies acceptance of previously completed work.

#### **3.2. INSTALLATION - SUSPENSION SYSTEM**

- 3.2.1. Comply with manufacturer's installation instructions and recommendations, including product technical bulletins, installation instructions, and data sheets.
- 3.2.2. Install suspension system in accordance with accepted shop drawings, and ASTM C636/C636M except where specified otherwise.
- 3.2.3. Install suspension system by suspending ceiling hangers from building's structural members, and as follows:
  - 3.2.3.1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structure or of ceiling suspension system.
  - 3.2.3.2. Attach hangers to structural members or intermediate structural supports.
  - 3.2.3.3. Exposed Concrete Slab: Use anchors, cast-in hanger wires or inserts, specifically designed for hanger use. Do not use powder activated fasteners.
  - 3.2.3.4. Suspension to Metal Floor Deck: Punch lower part of metal deck with special puncher at required distances. Put hanger wire through holes, turn down, make a loop and securely wrap 3 times.
  - 3.2.3.5. Steel Beams: Use beam clips.
  - 3.2.3.6. Steel Joists: Wrap hanger wire around lower chord member.
  - 3.2.3.7. Permanent Metal Forms and Cellular Floor Deck: Tabs, holes or slots specifically provided for hanger attachment. Prevent hanger twisting or turning by cross tying.
- 3.2.4. If ductwork or equipment located in ceiling plenum area interferes with hanger spacing, provide a trapeze or other arrangement reviewed by Consultant to support main beams at proper spacing.



- 3.2.5. Do not secure hangers to metal roof deck, ductwork, conduit, piping, equipment or support system for any of these.
- 3.2.6. Provide an additional hanger at each corner of each opening to receive a recessed lighting fixture and each opening that has been framed by main beam members. Provide additional hangers at each diffuser, grille and other points of extra loading.
- 3.2.7. 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.
- 3.2.8. Space hangers for suspended ceilings to support grillage independent of walls, columns, pipes and ducts at maximum 1220 mm (4') centres along support grillage and not more than 150 mm (6") from ends. Provide additional hangers at light fixtures and diffusers.
- 3.2.9. Run main tees at right angles to length of light fixtures.
- 3.2.10. Space main tees 1220 mm (4') oc in 1 direction and securely tie to hangers.
- 3.2.11. Space cross tees 610 mm (2') oc at right angles to main tees and properly lock at intersections.
- 3.2.12. Use longest practical lengths of tees, furring and running channels to minimize joints. Make joints square, tight, flush and reinforced with concealed splines. Assemble framework to form a rigid and interlocking system.
- 3.2.13. Use edge moulding where ceiling abutts vertical surface.
- 3.2.14. Use corner moulding along external edges at ceiling steps.
- 3.2.15. Level suspended systems with a maximum tolerance of 3 mm (1/8") over 3.66 m (12').
- 3.2.16. Expansion Joints:
  - 3.2.16.1. Provide Z-shaped metal trim pieces at each side of expansion joint. Design to accommodate plus or minus 25-mm movement and maintain visual closure. Finish metal components to match adjacent exposed metal trim. Provide backing plates behind butt joints.
- 3.2.17. Fire-Resistance Rated Ceilings: Provide fire-resistance rated ceilings where required, including proper construction of framing and furring and proper thickness of acoustical units, to produce hourly fire-resistance ratings called for. Requirements for materials, methods of erection and application specified under appropriate headings of this Section apply, except where more stringent requirements are defined for particular fire-resistance rating by ULC.

### **3.3. INSTALLATION - ACOUSTICAL CEILING PANEL SYSTEM**

- 3.3.1. Install lay-in acoustical panels in ceiling suspension system in accordance with manufacturer's instructions and as indicated.
- 3.3.2. Install panels with edges fully hidden from view by flanges of suspension system runners and mouldings.
- 3.3.3. In fire-rated ceiling systems, secure lay-in panels with hold-down clips and protect over light fixtures, diffusers, air return grilles and other appurtenances according to Certification Organizations design requirements.

### **3.4. SITE QUALITY CONTROL**

- 3.4.1. Site Test and Inspection:
  - 3.4.1.1. After interior finishing work has been substantially completed, or when directed by Consultant, inspect acoustical treatment work.
  - 3.4.1.2. Structural Inspection: Ensure a licensed engineer specified herein inspects work of this Section during erection/installation and submits sealed and signed Field Review Report within 5 Days of site visit.

- 3.4.2. Manufacturer Services: Arrange for periodic site visits by manufacturer's representative to review installed work for conformity to manufacturer's installation instructions and recommendations.
  - 3.4.2.1. Submit written site reports within three days of visit.
- 3.4.3. Non-Conforming Work:
  - 3.4.3.1. Do not support ceilings directly from permanent metal forms, floor deck, or other non-structural framing.
  - 3.4.3.2. Do not attach hangers to steel roof deck or steel deck tabs.
  - 3.4.3.3. Do not level ceilings by putting kinks in suspension wires. Kinks in suspension wires are not acceptable.
  - 3.4.3.4. Conceal fasteners including pop rivets on mouldings and trims.
- 3.4.4. Replace damaged work which cannot be satisfactorily repaired, restored or cleaned, to satisfaction of Consultant at no cost to Owner.
- 3.5. CLEANING**
  - 3.5.1. Clean exposed surfaces of acoustical panel ceilings, including trim and edge mouldings. Comply with manufacturer's written instructions for cleaning and touch-up of minor finish damage. Remove and replace tiles and other ceiling components that cannot be successfully cleaned or repaired to permanently eliminate evidence of damage.

END OF SECTION

## **PART 1 - GENERAL**

### **1.1. SUMMARY**

- 1.1.1. Section Includes: painting new and existing surfaces as indicated on the drawings and specifications. Work under this contract shall also include, but not necessarily be limited to following:
- 1.1.1.1. Surface preparation of substrate: cleaning and preparation of surfaces for application of paint systems.
  - 1.1.1.2. Priming except where pre-primed with an approved primer under other Sections of work and painting of structural steel, miscellaneous metal, ornamental metal and primed steel equipment.
  - 1.1.1.3. Priming and back-priming of wood materials as noted herein.
  - 1.1.1.4. Painting of all semi-concealed areas e.g. inside of light troughs and valances, behind grilles, and projecting edges above and below sight lines.
  - 1.1.1.5. Painting and finishing of all door frames.
  - 1.1.1.6. Provision of safe and adequate ventilation as required over and above temporary ventilation supplied by others, where toxic and/or volatile / flammable materials are being used.

### **1.2. REFERENCES**

- 1.2.1. Definitions:
- 1.2.1.1. Exposed: Visible in completed work. In case of closets, cabinets and drawers, it includes their interiors.
  - 1.2.1.2. Gloss or Sheen: Capacity of a finish on a surface to reflect light at specific angles as tested in accordance with ASTM D523.
  - 1.2.1.3. Hazardous Waste: Construction and demolition materials that are regulated for disposal by local, city, county, province or federal authorities having jurisdiction.
  - 1.2.1.4. Painting: In this Section refers to application of various types of paint, stain, varnishes and lacquers, etc.
  - 1.2.1.5. Surface Preparation: Cleaning or treating of surface to be painted to ensure best possible bond between surface and painting to be applied to surface; remove surface contaminants that will affect performance of painting, without limitations such as oil, grease, salts, dust, dirt, rust, rust scale, mill scale and old coatings where applicable; remove surface imperfections without limitation including but not limited to such as weld spatter, sharp edges, burrs, slivers, laminations, pits, porosities and crevices; prepare surfaces to provide anchor profile or surface profile which improve mechanical bonding of coating to prepared surface by increasing surface area.

### **1.3. SUBMITTALS**

- 1.3.1. Product Data:
- 1.3.1.1. Submit Product data and a Schedule of Finishes listing manufacturer's Product name, colour, textures, MSDS and test reports requested for each paint system. Submit test reports for odourless, low or zero VOC Products when requested.
  - 1.3.1.2. Painting Subcontractor to receive written confirmation of specific surface preparation procedures and primers used for fabricated steel items from fabricator/supplier to ensure appropriate and manufacturer compatible finish coat materials prior to commencement of painting.
  - 1.3.1.3. Submit Product data for concrete and concrete block primers.

1.3.2. Samples: Submit samples 30 Days before materials are required.

1.3.2.1. Submit following samples in sizes indicated:

1.3.2.1.1. 2 copies of brushouts minimum 200 mm x 250 mm (8" x 10") of each finish including colour, sheen and texture. Identify each sample with job, finish, colour name, number, sheen and gloss values, substrate to be applied to, date and name of Subcontractor.

## **1.4. SITE CONDITIONS**

1.4.1. Ambient Conditions:

1.4.1.1. Paint and finish in clean, dust-free, properly ventilated and adequately lit areas minimum 323 Lx (30 ft candles) on surfaces to be painted or decorated.

1.4.1.2. Provide each paint materials in accordance with manufacturer's recommended tolerances for:

1.4.1.2.1. Substrate Moisture Content: Perform tests with a properly calibrated electronic moisture meter to ensure compliance with manufacturer's recommendations. Without limitation, maximum moisture content as follows:

1.4.1.2.1.1. Concrete and Concrete Unit Masonry: Maximum 12 - 14% for solvent coatings and as recommended by manufacturer for each water based system.

1.4.1.2.1.2. Gypsum Based Board and Plaster: Maximum 12 - 14%.

1.4.1.2.1.3. Wood: Maximum 15%.

## **PART 2 - PRODUCTS**

### **2.1. MANUFACTURERS**

2.1.1. Manufacturer List: Products of following manufacturers are acceptable subject to conformance to requirements of Drawings, Schedules and Specifications

2.1.1.1. Benjamin-Moore [www.benjaminmoore.com](http://www.benjaminmoore.com)

2.1.1.2. Dulux Paints [www.dulux.ca](http://www.dulux.ca)

2.1.1.3. Sherwin Williams [www.sherwin-williams.com](http://www.sherwin-williams.com)

2.1.2. Basis of Design: for interior latex applications (PT-1): "Promar 200 HP Zero VOC" by Sherwin Williams

2.1.3. Substitution Limitations: Substitution Limitations: Comparable Products from other manufacturers not listed herein will be considered provided:

2.1.3.1. They are submitted in accordance with Substitution Procedures specified in Division 01

2.1.3.2. Meet requirements of this Specification.

2.1.3.3. Acceptance by Consultant.

### **2.2. MATERIALS**

2.2.1. General: paint systems for existing surfaces shall be same finish system as for new work as specified below, but primer for existing painted or wallpapered surfaces: 1 coat X-Pert Gripper 250 by PPG, or as otherwise recommended by the finish paint manufacturer.

2.2.2. Finishes:

2.2.2.1. Colours: to be selected by Consultant

2.2.2.2. Gloss Values Definition, as determined by ASTM D523:

		Light Reflection Unit
G1	Gloss Level 1 – Traditional matte finish, Flat	< 5
G2	Gloss Level 2 – High side sheen Flat, “Velvet-like” finish	< 10
G3	Gloss Level 3 – Traditional “Eggshell-like” finish	10 - 25
G4	Gloss Level 4 – “Satin-like” finish	20 - 35
G5	Gloss Level 5 – Traditional Semi-Gloss	35 - 70
G6	Gloss Level 6 – Traditional Gloss	70 - 85
G7	Gloss Level 7 – High Gloss	> 85

2.2.2.3. Gloss Values unless otherwise specified:

- 2.2.2.3.1. Walls: G4
- 2.2.2.3.2. Floors: G5 or G6
- 2.2.2.3.3. Ceilings: G1
- 2.2.2.3.4. Trim and Doors: G5
- 2.2.2.3.5. Signage: G1

2.2.3. Mixing and Tinting:

- 2.2.3.1. Unless otherwise specified herein or pre-approved, all paint shall be ready-mixed and pre-tinted. Re-mix all paint in containers prior to and during application to ensure break-up of lumps, complete dispersion of settled pigment, and color and gloss uniformity.

**2.3. INTERIOR FINISH SCHEDULE:**

2.3.1. Concrete Vertical Surfaces:

- 2.3.1.1. 1 coat primer alkali resistant water based: Dulux Gripper Universal Acrylic Primer/ Sealer code 60000A
- 2.3.1.2. 2 coats latex: Dulux Lifemaster code 59311
- 2.3.1.3. Finish: G3 -Eggshell.

2.3.2. Concrete Masonry Units (CMU's): (concrete block and concrete brick):

- 2.3.2.1. 1 coat latex block filler: Dulux X-Pert Acryluc
- 2.3.2.2. 2 coats latex: Dulux Lifemaster code 59311
- 2.3.2.3. Finish: G3 -Eggshell.

2.3.3. Structural Steel and Metal Fabrications: (with existing shop coat primer):

- 2.3.3.1. Unexposed: No further finishing required except for touch-up of damaged surfaces.
- 2.3.3.2. Exposed:
  - 2.3.3.2.1. 1 coat quick dry metal primer: PPG Pitt-Tech Plus EP WB Acrylic Primer

- 2.3.3.2.2. 2 coats quick dry enamel: PPG HPC Alkyd Industrial Semi-Gloss Enamel code 4336H
  - 2.3.3.2.3. Finish: G5 - Semi-Gloss.
- 2.3.4. Galvanized Metal (Not Chromate Passivated): (High contact/high traffic areas (doors, frames, railings, pipes, etc.) low contact/low traffic areas (overhead decking, pipes, ducts, etc.):
  - 2.3.4.1. 1 coat waterborne primer: PPG Pitt-Tech Plus EP WB Acrylic Primer
  - 2.3.4.2. 2 coats latex: Dulux acrylic eggshell code 14220
  - 2.3.4.3. Finish: G3 - Eggshell
- 2.3.5. Gypsum Board:
  - 2.3.5.1. 1 coat latex primer sealer: Dulux X-Pert code 11000
  - 2.3.5.2. 2 coats latex:
    - 2.3.5.2.1. Walls: Dulux Lifemaster code 59311
    - 2.3.5.2.1.1. Finish: G3 - Eggshell
    - 2.3.5.2.2. Ceilings: Dulux Lifemaster code 59111
    - 2.3.5.2.2.1. Finish: G1 - Flat.
- 2.3.6. Plywood Backer Panels:
  - 2.3.6.1. 2 coats Albi Cote FRL-X
  - 2.3.6.2. Finish: G1 – Flat

### **PART 3 - EXECUTION**

#### **3.1. EXAMINATION**

- 3.1.1. Verification of Conditions:
  - 3.1.1.1. Do work only when surfaces and conditions are satisfactory for production of quality work. Report to Consultant in writing any surfaces which are found to be unsatisfactory.
  - 3.1.1.2. Ensure temperature of surfaces to be finished are as required for application of finish. Refer to "Temperature and Ventilation" article specified herein. Ensure surfaces are dry and free of dirt, grease or other contaminants that may affect applied finish.
  - 3.1.1.3. Verify moisture content of surfaces with electronic moisture meter. Do not proceed without written directions if moisture reading is higher than as required for application. Refer to "Ambient Conditions" article specified herein for substrate moisture content requirements.
  - 3.1.1.4. If substrate is masonry, allow to cure for 30 to 90 Days. Ensure moisture content is between 12% and 14% and test for alkalinity and neutralize (pH 6.5 - 7.5) before proceeding with priming.
  - 3.1.1.5. If substrate is gypsum board, inspect to ensure joints are completely filled and sanded smooth. Inspect surfaces for "nail popping", screw heads not recessed and taped, breaks in surface or other imperfections and have repaired as required.

#### **3.2. PREPARATION**

- 3.2.1. Protection of In-Place Conditions:
  - 3.2.1.1. Provide scaffolding, staging, platforms and ladders, as required for execution of work. Erect scaffolding to avoid interference with work of other trades. Comply with Occupational Health and Safety Act.

- 3.2.1.2. During work of this Section, provide drop cloths, plastic, plywood or metal sheets to protect floors in areas assigned for storage and mixing of paints. Cover finished floors, walls, ceilings and other work in vicinity and protect from paint and damage.
- 3.2.1.3. Protect work of other trades against paint splattering and Make Good at own expense any such damage.
- 3.2.1.4. Vacuum clean floors in areas to be painted.
- 3.2.1.5. Remove and securely store miscellaneous and finish hardware and surface fittings, electrical switch and outlet covers, receptacle plates, louvres, fittings and fastenings, to protect from paint splatter. Mask items not removable. Use sufficient drop cloths and protective coverings for full protection of floors, furnishings, mechanical, electrical and special equipment, other components of building which do not require painting or to be removed, from paint spotting and other soiling. Carefully clean and re-install items when paint is dry. Clean any components that are paint spotted or soiled. Do not use solvent or reactive cleaning agents on items that will mar or remove finishes (e.g. lacquer finishes).
- 3.2.1.6. Prohibit traffic, where possible, from areas where painting is being carried out and until paint is cured. Post "wet paint" or other warning signage during and on completion of work. Provide also warning signs at points of entry to areas where painting is applied and drying.
- 3.2.2. Surface Preparation:
  - 3.2.2.1. Prepare defective surfaces to obtain a satisfactory substrate and in accordance with paint manufacturer's instructions.
  - 3.2.2.2. Prior to painting, wipe down wall surfaces, vacuum clean floors, ensure all surfaces are dust-free.
  - 3.2.2.3. Clean soiled surfaces to be painted. Wash existing surfaces with a biodegradable detergent, and bleach where applicable, and clean warm water using a stiff bristle brush to remove dirt, oil and other surface contaminants. Rinse scrubbed surfaces with clean water until foreign matter is flushed from surface. Allow surfaces to drain completely and allow to dry thoroughly.
  - 3.2.2.4. Remove efflorescence, chalk, dust, dirt, oil, grease, rust, form oil, release agents, loose mill scale and other extraneous matter from surfaces.
  - 3.2.2.5. Remove mildew by scrubbing affected area with solution of 150 g (5.3 oz) TSP and 125 g (4.4 oz) bleach in 3.5 l (0.92 gal) water. Rinse well with clean water and allow to dry. If condition is serious, source out finishes with extra mildew resistance.
  - 3.2.2.6. Be responsible for surface preparation to suit surface condition and conform to level of cleaning based on SSPC, recommended metal cleaning procedures most commonly used to suit site conditions.
  - 3.2.2.7. Existing surfaces - general: Remove or set screws, nails, hooks, tacks, and fasteners. Make repairs to damaged surfaces.
    - 3.2.2.7.1. Existing gypsum board: Repair cracks and fissures by cutting away broken, damaged or loose material to expose substrate. Fill crack or damaged area with suitable new material in accordance with Section 09 29 00 – Gypsum Board.
  - 3.2.2.8. Concrete and Masonry:
    - 3.2.2.8.1. Form Oil Removal: Remove with Xylol or TSP.
    - 3.2.2.8.2. Efflorescence Removal: Remove by dry brushing or washing with 1 part commercial muriatic acid to 20 parts water by volume and thoroughly rinse with clean water.

- 3.2.2.8.3. Mildew Removal: Remove by scrubbing affected area with 1 part sodium hypochlorite to 3 parts water. Where dirt is also evident, add 1.36 kg (3 lbs) TSP to 6.8 l (1.5 gal) of above solution.
- 3.2.2.8.4. Concrete Vertical Surfaces: Use sand blasting, high pressure water blasting, high pressure water blasting with abrasives, vacuum blasting with abrasives or alternatively, needle guns or power grinders equipped with suitable grinding stone, to remove concrete, loose mortar, fins, projections and surface contaminants. Vacuum or blow down and remove dust and loose particles from surface. Fill large cracks and/or voids in consultation with design engineer using either polyester, epoxy or acrylic resin, block filler or cement sand mixture in accordance with design engineer's written instructions. Fill only flush to surface and allow to set.
- 3.2.2.8.5. Concrete Block Masonry: Fill voids and cracks in masonry block wall to provide uniform surface for subsequent coats.
- 3.2.2.9. Metals:
  - 3.2.2.9.1. Ensure application of paint and coatings occurs within appropriate time frame after cleaning when environmental conditions encourage flash-rusting, rusting, contamination or manufacturer's paint specifications require earlier applications.
  - 3.2.2.9.2. SSPC-SP 3 (Power Tool Cleaning): Use of power sanders and wire brushes, impact tools, grinders and power chipping hammers to remove loose mill scale, loose rust, paint or other foreign matter. Do not employ power tool cleaning excessively causing burnished mill scale preventing primers to adhere properly.
  - 3.2.2.9.3. Ferrous Metal: Clean to SSPC-SP 1/2/3, to suit site conditions. Remove loose rust and prime bare metal with rust inhibitive steel primer. Touch-up damaged shop applied primer using compatible Product. Provide full coat primer only if damage is extensive. Treat weld areas with phosphoric acid (5% solution).
  - 3.2.2.9.4. Structural Steel/Miscellaneous Steel (previously painted and exposed by alterations work): Remove oil, grease, dirt, rust scale, loose mill scale, loose paint or coating by brush-off blast cleaning to SSPC-SP 7.
  - 3.2.2.9.5. Hot Dipped Galvanized Steel (Unweathered): Allow to weather minimum of 26 weeks and Xylene clean to SSPC-SP 1 specified herein prior to coating to remove dust, dirt, grease, oxides and other foreign material. Remove silicates or similar surface treatments or any deposits of white rust by sanding or similar abrasive methods (bronze wool). Use of acetic acid to prepare galvanized surfaces is not acceptable.
  - 3.2.2.9.6. Galvanized Steel (Weathered): Remove dust, dirt, grease, oxides and other foreign material and clean to SSPC-SP 1 specified herein prior to coating.
  - 3.2.2.9.7. Galvanized Steel (Pre-Treated)(Non-Crystal Appearance): Follow manufacturer's recommendations for preparation, priming and coating of pre-treated galvanized steel.
  - 3.2.2.9.8. Light Zinc Coated or Satin Coated Products (ZF075) mostly found in environmentally controlled areas. Follow manufacturer's recommendations for preparation, priming and coating.
  - 3.2.2.9.9. Heavy Coated Zinc Z275 (G90) for high humidity areas and as specified. Follow manufacturer's recommendations for preparation, priming and coating.
  - 3.2.2.9.10. Metal Doors: Remove doors before painting to paint bottom and top edges and re-hang once dry. Do not paint stainless steel or bronze door butts. Paint or



finish top and bottom edges of doors. Touch-up or refinish tops and edges after fitting.

3.2.2.10. Previously Finished Surfaces:

- 3.2.2.10.1. Clean existing interior and exterior surfaces to be repainted or varnished to provide bond. Remove rust, scale, oil, grease, mildew, chemicals and other foreign matter. Remove loose paint and fill flush with suitable patching material. Clean off bubbled, cracked, peeling or otherwise defective paint by stripping with suitable environmental strippers or by burning. Do not burn off paints suspected of having lead content. Treat residue from stripping as Hazardous Waste.
- 3.2.2.10.2. Flatten gloss paint and varnish with sandpaper and wipe off dust. If previous coatings have failed so as to affect proper performance or appearance of coatings to be applied, remove previous coatings completely and prepare substrates properly and refinish as specified for new work.
- 3.2.2.10.3. Remove or set screws, nails, hooks, tacks, and fasteners. Make repairs to damaged surfaces.
- 3.2.2.10.4. Existing gypsum board: Repair cracks and fissures by cutting away broken, damaged or loose material to expose substrate. Fill crack or damaged area with suitable new material in accordance with Section 09 29 00 – Gypsum Board.
- 3.2.2.10.5. Leave entire surface suitable to receive designated finishes and in accordance with finish manufacturer's instructions.

3.2.2.11. Woodwork:

- 3.2.2.11.1. Verify and determine wood species, grain direction and structure, properties of finish, application method and exposure to elements. Check moisture content to avoid movement of wood caused by expansion and contraction due to changes in moisture content. Verify grain cut as it may interfere with adhesion of paint.
- 3.2.2.11.2. Apply wood finishing Product in following order and as needed for specific appearance and application specified herein. Sanding sealer to control penetration of subsequent coats to create more uniform finish. Stain to colour wood and highlight grain for final finish. Filler to fill pores of wood and control penetration of subsequent coats. Apply filler across grain forcing it into pores followed with rubbing and sanding when dried. For staining requirements mix stain with filler before applying for uniform finish. Finish coats to provide protection to wood.
- 3.2.2.11.3. Wood work for Opaque Coating: Seal knots and sapwood in surfaces to receive paint with alcohol-based primer-sealer. Seal door edges. Sand smooth rough surfaces of woodwork to be finished using No. 150 grit paper followed by a second sanding using No. 220 grit paper. Sand in direction of grain. Clean surfaces free of dust before applying first coat using brush, compressed air or tack rags. Fill nail holes, splits and scratches with non-shrinking filler after first coat is dry.
- 3.2.2.11.4. Prepare plywood surface by removing dirt and debris. Fill screw and nail holes or minor imperfections with recommended filler and sand properly to receive finish coating. Ensure plywood requiring stained or painted finish is primed with top quality alkyd primer. Use only penetrating quality stain over plywood.
- 3.2.2.11.5. Woodwork for Clear Finish or Stain: Sand smooth woodwork to be finished using No. 150 grit paper followed by a second sanding using No. 220 grit paper and clean surfaces free of dust using brush, compressed air or tack rags before applying first coat. Abrade surfaces with stiff brush to remove loose fibres and splinters. Fill nail holes, splits and scratches with non-shrinking filler tinted to

match local grain condition after first coat is dry. Sand lightly between coats with No. 220 grit sandpaper and remove dust.

- 3.2.2.11.6. Remove salt deposits that may appear on wood surfaces treated with fire retarder.
- 3.2.2.11.7. Obtain inspection of glue laminated beams by assigned painting inspector to ensure shop sealer has been applied. Where non-specified shop sealer has been applied to beams or columns, remove and refinish in accordance with manufacturer's written instructions.
- 3.2.2.11.8. Wood Doors: Remove doors before painting to paint bottom and top edges and re-hang once dry. Paint or finish top and bottom edges of doors to be painted or stained. Touch-up or refinish tops and edges after fitting.

3.2.2.12. Gypsum Board:

- 3.2.2.12.1. Examine and ensure gypsum board surfaces are without defects or deficiencies and suit able to receive painting applications. Commencement implies acceptance of gypsum board work. Examine surfaces after for imperfections showing through and fill small nicks or holes with patching compound and sand smooth. Examine surfaces after priming for imperfections showing through.
- 3.2.2.12.2. Clean surfaces dry, free of dust, dirt, powdery residue, grease, oil, wax or any other contaminants.

### **3.3. APPLICATION**

- 3.3.1. Safety Precautions: When handling solvent coating materials, wear approved vapour/particulate respirator as protection from vapours. Dust respirators do not provide protection from vapours.
- 3.3.2. Material Compatibility: Provide primers and finish coat materials compatible with each other and substrate including fillers.
- 3.3.3. Obtain colour chart giving colour schemes and gloss value for various areas from Consultant. Ensure colour chart gives final selection of colours and surface textures of finishes and whether finishes are transparent (natural) or opaque (paint).
- 3.3.4. Provide finish uniform in sheen, colour and texture, free from streaks, shiners and brush or roller marks or other defects.
- 3.3.5. Apply materials in accordance with manufacturer's directions and specifications paying particular attention to appropriate time frame after cleaning when environmental conditions encourage flash-rusting, rusting, contamination or manufacturer's paint specifications require earlier applications. Do not use adulterants. Do any reduction of coating's viscosity in accordance with manufacturer's directions.
- 3.3.6. Use up paints within period of shelf life recommended by paint manufacturer.
- 3.3.7. Ensure successive coatings are harmonious chemical compositions and materials of same manufacturer.
- 3.3.8. Apply primer coat soon after surface preparation is completed to prevent contamination of substrate.
- 3.3.9. Primer/Sealers: Apply primer-sealer coats by brush or roller. Permit to dry in accordance with manufacturer's recommendations before applying succeeding coats. Touch up suction spots and sand between coats with No. 120 sandpaper.
- 3.3.10. Sand and dust between each coat to provide an anchor for next coat and to remove defects visible from a distance up to 1 m (39").
- 3.3.11. Ensure each coat is dry and hard before a following coat is applied.
- 3.3.12. Continue through paint finish behind wall-mounted items (e.g. chalk and tack boards).

- 3.3.13. Finish listed surfaces indicated on Room Finish Schedule(s) and/or noted on Drawing(s) and as specified. Refer to Finish Room Schedule for type, location and extent of finishes required and include touch-ups and field painting necessary to complete work shown, scheduled or specified.
- 3.3.14. Finishes and number of coats specified in Room Finish Schedule are intended as minimum requirements guide only. Refer to manufacturer's recommendations for exact instructions for thickness of coating to obtain optimum coverage and appearance. Some materials and colours may require additional coats and deeper colours may require use of manufacturers' special tinted primers. Apply additional paint coats, beyond number of coats specified for any surface, to completely cover and hide substrate and to produce a solid, uniform appearance
- 3.3.15. Painting previously painted surfaces:
  - 3.3.15.1. Paint entire plane of wall or ceiling.
  - 3.3.15.2. Where there has been patching or repair work – paint entire plane of wall or ceiling. Patching is not acceptable.
- 3.3.16. Do not paint baked paint surface, chrome plated, stainless steel, aluminum or other surfaces finished with final finish in factory. Finish paint primed surfaces.
- 3.3.17. Metals:
  - 3.3.17.1. Apply primer coat to unprimed ferrous metal surfaces. Where sandblast preparation is specified, apply specified primer immediately after blast cleaning.
- 3.3.18. Woodwork:
  - 3.3.18.1. Fill open grain woods with filler tinted to match wood and work well into grain. Wipe excess from surface before filler sets.
  - 3.3.18.2. Sand smooth paint and varnish undercoats prior to recoating.
  - 3.3.18.3. Prime woodwork designated for painting as soon as possible after delivery to site and before installation. Prime cut surfaces, whether exposed or not, i.e. 6 edges of wood doors, before installation. Prime cut surfaces of woodwork to receive transparent finish with 1 coat of transparent finish reduced 25% or as directed by manufacturer.
  - 3.3.18.4. Apply final coats on smooth surfaces by roller or brush. Hand brush wood trim surfaces.
- 3.3.19. Allow each coat of paint to cure and become dry and hard before application of succeeding coats (unless manufacturer's directions require otherwise).
- 3.3.20. Before finishing paint coats are applied, inspect and touch-up shop coats of primers previously applied by other trades or fabricators.
- 3.3.21. Provide paint coating thicknesses indicated, measured as minimum DFT.
- 3.3.22. Apply a minimum of 4 coats of paint where deep or bright colours are used to achieve satisfactory results.
- 3.3.23. Ledges: Finish projecting ledges, both above and below sight lines, as specified for adjacent surfaces.
- 3.3.24. Light Coves: Paint light coves white whether a light lens is installed or not, unless otherwise indicated.
- 3.3.25. Interior Columns: Finish interior columns same as walls of room unless otherwise indicated.
- 3.3.26. Mechanical and Electrical Services:
  - 3.3.26.1. Co-ordinate painting of mechanical and electrical equipment, piping, conduit, system Identification with appropriate Mechanical and Electrical Specification Sections. Unless otherwise specified or noted, paint "unfinished" conduits, piping, hangers, ductwork and other mechanical and electrical equipment with colour and texture to match adjacent surfaces, where exposed-to-view in exterior and interior areas.

- 3.3.26.2. Prime and paint exposed, unfinished electrical raceways, fittings, outlet boxes, junction boxes, pull boxes and similar items.
- 3.3.26.3. Take steps to protect gauges, identification plates and similar items from being painted over or paint splattered.
- 3.3.26.4. Remove grilles, covers, access panels for mechanical and electrical systems from installed location and paint separately, if these items are not factory finished. Paint adjacent surfaces after removal and reinstall when surfaces are dry.
- 3.3.26.5. Paint work to match surfaces they are seen against unless directed otherwise.
- 3.3.26.6. Paint interior surfaces of air ducts visible through grilles and louvres, with 1 coat of flat black metal paint to limit of sight line.
- 3.3.26.7. In unfinished areas leave exposed conduits, piping, hangers, ductwork and other mechanical and electrical equipment in original finish and touch up scratches and marks.
- 3.3.26.8. Touch up scratches and marks on factory painted finishes and equipment with paint as supplied by manufacturer of equipment.
- 3.3.26.9. Do not paint over nameplates.
- 3.3.26.10. Paint behind louvres grilles and diffusers for minimum of 460 mm (18") or beyond sight line, whichever is greater, to be painted with primer and 1 coat of matt black (non-reflecting) paint.
- 3.3.26.11. Paint each surface inside of light valances.
- 3.3.26.12. Paint disconnect switches for fire alarm system and exit light systems in red enamel.
- 3.3.26.13. Paint or band fire protection piping and sprinkler lines in accordance with mechanical requirements. Keep sprinkler heads free of paint.
- 3.3.26.14. Paint yellow or band natural gas piping in accordance with mechanical requirements.
- 3.3.26.15. Back prime and paint face and edges of plywood service panels for telephone and electrical equipment before installation to match adjacent wall surface. Leave equipment in original finish except for touch-up as required and paint conduits, mounting accessories and other unfinished items.

### **3.4. SITE QUALITY CONTROL**

#### **3.4.1. Non-Conforming Work:**

- 3.4.1.1. Replace damaged work which cannot be satisfactorily repaired, restored or cleaned, to satisfaction to Consultant at no cost to Owner. Touch up small affected areas, repaint large affected areas or areas without sufficient DFT of paint. Remove runs, sags of damaged paint by scraper or by sanding prior to application of paint.
- 3.4.1.2. Following are considered non-conforming qualities:
  - 3.4.1.2.1. Lack of Uniformity:
    - 3.4.1.2.1.1. Brush/roller marks, streaks, laps, runs, sags, drips, heavy stippling, hiding or shadowing by inefficient application methods, skipped or missed areas and foreign materials in paint coatings.
    - 3.4.1.2.1.2. Evidence of poor coverage at rivet heads, plate edges, lap joints, crevices, pockets, corners and re-entrant angles.
    - 3.4.1.2.1.3. Damage due to touching before paint is sufficiently dry or any other contributory cause.

- 3.4.1.2.1.4. Damage due to application on moist surfaces or caused by inadequate protection from weather.
- 3.4.1.2.1.5. Damage and/or contamination of paint due to blown contaminants (dust, spray paint, etc.).
- 3.4.1.2.2. Aesthetic Problems: If following are evident under final lighting source (including daylight) for interior surfaces:
  - 3.4.1.2.2.1. Visible defects are evident on vertical surfaces when viewed at normal viewing angles from a distance of not less than 1 m (39").
  - 3.4.1.2.2.2. Visible defects are evident on horizontal surfaces when viewed at normal viewing angles from a distance of not less than 1 m (39").
  - 3.4.1.2.2.3. Visible defects are evident on ceiling, soffit and other overhead surfaces when viewed at normal viewing angles.
  - 3.4.1.2.2.4. When final coat on any surface exhibits a lack of uniformity of colour, sheen, texture and hiding across full surface area.

### **3.5. CLEANING**

- 3.5.1. Keep waste rags in covered metal drums containing water and remove from building at end of each Day. Remove other combustible rubbish materials and empty paint cans each Day from site and safely dispose of same in accordance with requirements of authorities having jurisdiction.
- 3.5.2. Clean equipment and dispose of wash water/solvents as well as other cleaning and protective materials (e.g. rags, drop cloths, masking papers, etc.), paints, thinners, paint removers/strippers in accordance with safety requirements of authorities having jurisdiction.
- 3.5.3. Clean containers used for storage, mixing and application of materials free of foreign materials and residue.
- 3.5.4. Keep work area free from an unnecessary accumulation of tools, equipment, surplus materials and debris.
- 3.5.5. Clean adjacent surfaces which have been painted, soiled or otherwise marred. Remove spilled, splashed, splattered or sprayed paint as work progresses using means and materials that are not detrimental to affected surfaces.
- 3.5.6. Remove masking and other protection provided under this Section.
- 3.5.7. Remove temporary protective wrappings provided by others for protection of work after completion of painting operations unless instructed otherwise.
- 3.5.8. Painting work will not be considered complete until spatters, drippings, smears and overspray have been cleaned and removed to satisfaction of Consultant.
- 3.5.9. Make Good any damage to structure building surfaces or furnishings resulting from painting operations at no cost to Owner.
- 3.5.10. Waste Management:
  - 3.5.10.1. Dispose paint waste in accordance with local regulations.
  - 3.5.10.2. Set aside and protect surplus and uncontaminated finish materials not required by Owner and deliver or arrange collection for verifiable re-use or re-manufacturing.

END OF SECTION

# Appendix A

## Door Schedule



City Of Toronto  
4330 Duffryn Rd 2nd Floor PSU Office Renovation

Lock-Up Services Inc.  
2977A Lake Shore Blvd W  
Toronto Ontario M8V 1J8  
Christopher Wright  
[cwright@lockupservices.ca](mailto:cwright@lockupservices.ca)  
tel 416-255-3500  
cel 416-553-0570

Office Door 1

Schlage	1 SC-L9050L 06B X 626	Office Function Mortise Lock
Dorex	3 179C15454NRP	4 1/2 x 4" Hinges
Ives	1 FS13 X 26D	Floor Stop
Medeco	1 100200 x 26	Mortise Cylinder

Office Door 2

Schlage	1 SC-L9050L 06B X 626	Office Function Mortise Lock
Dorex	3 179C15454NRP	4 1/2 x 4" Hinges
Ives	1 FS13 X 26D	Floor Stop
Medeco	1 100200 x 26	Mortise Cylinder

ADO Existing Door

Besam	1 SW200i	Barrier Free Operator
Camden	2 CM-60	6" Stainless Steel Push Buttons
Camden	2 CM-69S	Mounting Boxes
HES	1 HE-1006CLB X 32D	Electric Strike
Camden	1 CX-33	Module
Camden	1 CX-PS13V	Power Supply
Camden	1 CX-TRX 40VA	Transformer



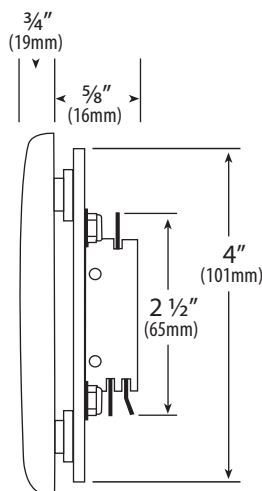
CM-60/2



CM-60/3



CM-60/4



CM-60

## CM-60

### 6" ROUND ALL-ACTIVE SWITCHES

#### FEATURES

- LARGE, EASY TO OPERATE SWITCHES
- 6" ROUND
- ALL-ACTIVE DESIGN REQUIRES MINIMAL ACTUATION FORCE
- DURABLE STAINLESS STEEL OR SOLID BRASS CONSTRUCTION
- MEETS ADA REQUIREMENTS
- FLUSH MOUNT OR SURFACE MOUNT
- UL/CSA APPROVED SPDT MOMENTARY SWITCH, RATED 15 AMPS @ 30V DC
- VARIOUS LOGOS & MESSAGES
- ARCHITECTURAL FINISHES

#### DESCRIPTION

Camden Door Controls CM-60 Series all-active switches are heavy-duty, ADA-compliant door controls. The 6" round faceplates are stainless steel or solid brass, and the assembly is designed for easy installation in single-gang electrical boxes, or, with included adapter plate – double-gang and 4x4 boxes. The SPDT and optional DPDT switches are UL/CSA approved, and rated 15 amps @ 30 VDC.

#### APPLICATION

Camden all-active switches are designed for areas where an easy-to-activate, high-visibility switch is desired. Ideal for high-traffic areas, hospitals, wheelchair access, seniors' residences, etc. They can be surface or flush mounted.

Camden all-active switches are designed to control electric strikes, electromagnetic locks and automatic doors. They may also be used for shunting, bypassing alarms, request to exit, timed functions and many other applications.

The switches are made for high frequency usage, for both indoor and outdoor environments. Camden switches are versatile, and can be supplied in various configurations and finishes, to suit any commercial, industrial or residential application.

#### ARCHITECTS / ENGINEERS SPECIFICATIONS

The switches to be used throughout the complex shall be Camden Door Controls CM-60 all-active switches.

The switches shall be easy-to-activate, ADA compliant and 6" round in diameter. Switches shall be all-active, whereby pressing any part of the faceplate will activate the device. Faceplates shall be constructed of 18-gauge stainless steel or solid brass, and have concealed mounting screws for tamper resistance. Switches shall use plastic spacers and rubber dampers for noise reduction. Switches shall be rated at a minimum of 15 amps @ 30 VDC.

Their design shall allow mounting in single-gang electrical boxes, or, with included adapter plate – double-gang and 4x4 boxes.



# 6" ROUND ALL-ACTIVE SWITCHES

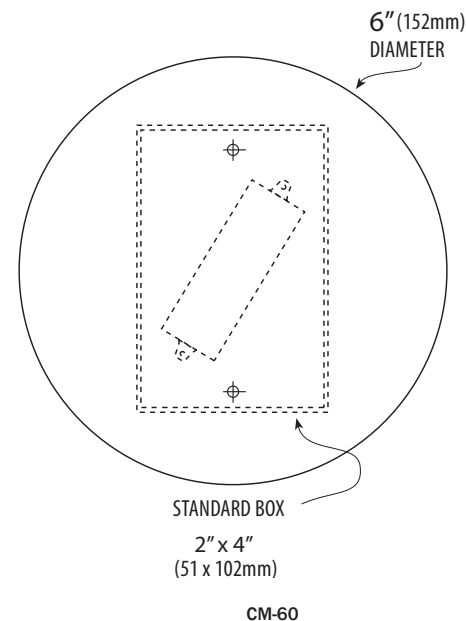
## SPECIFICATIONS

VOLTAGE:	12/24V AC/DC
CONTACT TYPE:	SPDT FORM 'C'
CONTACT RATING:	15A @ 30VDC
SWITCH TYPE:	MOMENTARY
DIMENSIONS:	6"DIA. x 1 1/8"D (1152mm x 29mm)
STD. FINISH:	US32 / 630

## ORDERING INFORMATION

All CM-60 series all-active switches are complete ready-to-install assemblies. They are supplied with stainless steel Allen screws and Allen wrench for mounting.

MODEL	DESCRIPTION
CM-60	6" ROUND PUSH PLATE SWITCH



## OPTIONS

(Add suffix to model above)

### FACEPLATE GRAPHIC OPTIONS

CM-XX/1	CM-XX/2	CM-XX/2AL	CM-XX/2AR	CM-XX/3
CM-XX/3F	CM-XX/4	CM-XX/4AL	CM-XX/4AR	CM-XX/4F
CM-XX/8	CM-XX/8B	CM-XX/8D	CM-XX/8F	

### Graphic Colors:

Blue: /2, /2AL, /2AR, /4, /4AL, /4AR; /4F  
Black: /3, /3F, /8, /8D; /8F; /8B

### ARCHITECTURAL FINISHES:

CM-XXX-AB	ADD 'AB' TO PRODUCT # FOR ANTIQUE BRASS FINISH (BHMA 609, US5)
CM-XXX-SB	ADD 'SB' TO PRODUCT # FOR SATIN BRASS FINISH (BHMA 606, US4)
CM-XXX-OB	ADD 'OB' TO PRODUCT # FOR OIL RUB BRONZE FINISH (BHMA 640, US10B) (NOT COLOR MATCHED) (CANNOT BE CUSTOM LASER ETCHED)
CM-XXX-PB	ADD 'PB' TO PRODUCT # FOR POLISHED BRASS (BHMA 605, US3)

### WEATHERPROOF OPTIONS:

CM-XXX-WT	ADD 'WT' TO PRODUCT # FOR BOOT AND WATER TIGHT COATING
-----------	--

### CONTACT OPTIONS:

DP	ADD DP TO PRODUCT # TO ORDER DPDT SWITCH INSTEAD OF SPDT SWITCH (USE SPECIAL MOUNTING PLATE/TEMPLATE)
----	--

# SW200i™

Intelligent Innovation

Put the most intelligent and adaptive swing  
door operator in motion

besam 

**ASSA ABLOY**

ASSA ABLOY, the global leader  
in door opening solutions





#### AIR PRESSURE MANAGEMENT

Stack Pressure Compensation  
Intelligent Trajectory Control  
Extended Closing Torque (ECT)

#### ENERGY EFFICIENT

Separate Time Delay  
Power Surge Protection  
Brown Out Performance

#### SECURE LATCH

Latch Retry  
Electric Lock Management  
Security Integration  
Astragal Coordination

#### EASY OPEN

Manual Push Forces  
of 5–15 lbf  
Power Assist

#### MAXIMUM STRENGTH

700 Pounds Max Door Weight

The Besam SW200i™ is a new generation, intelligent door operator featuring advanced technology that ensures a smooth, gentle operation across a wide range of conditions.

If you design or manage facilities with automatic swing doors, you know the challenges they can create. In addition to having difficulty closing when faced with wind or stack pressure, they often fail to fully latch or close, and can be hard to open manually. Say hello to the Besam SW200i. Designed to seamlessly handle the many unforeseen conditions that exist in buildings, this field-adaptable, low profile operator can be easily installed in new construction or retrofitted to most swing doors.

#### A simple solution to complex swing door operator applications

By creating a single operator with the flexibility to perform well in full or low energy conditions, Besam has engineered a product that can be used throughout any facility, making the spec and design process easier. And because the SW200i can be easily adapted for a number of different swing door configurations, it provides facilities with more solutions and greater flexibility. Our responsive operator lets you precisely control door speed at all times, regardless of wind or stack pressures. How? The intelligent SW200i control monitors the door position – and then governs the torque according to conditions it encounters.

#### Fits where you need it

The SW200i provides remarkable performance for a variety of configurations. From hospital corridors and attractive building entrances, to pedestrian applications and low energy, there are practically no limitations where you can use this versatile operator. And our service upgrade kits allow you the flexibility to upgrade to the SW200i level of performance on all Besam and most competitive door operators.



**AIR PRESSURE  
MANAGEMENT**  
Stack Pressure Compensation  
Intelligent Trajectory Control  
Extended Closing Torque (ECT)

**ENERGY  
EFFICIENT**  
Separate Time Delay  
Power Surge Protection  
Brown Out Performance

**SECURE LATCH**  
Latch Retry  
Electric Lock Management  
Security Integration  
Astragal Coordination

**EASY OPEN**  
Manual Push Forces  
of 5-15 lbf  
Power Assist

**MAXIMUM  
STRENGTH**  
700 Pounds Max Door Weight

Challenging Settings Center™ (CSC) Lock  
Control for Managing Many Settings in One Place

The SW200i is  
designed to be  
easy to install  
in the most  
challenging  
environments.

**AIR PRESSURE MANAGEMENT**  
Stack Pressure Compensation  
Allows for door to adjust to changes in variable pressures by utilizing intelligent trajectory control and Extended Closing Torque (ECT)  
Intelligent Trajectory Control  
The SW200i knows where the door should be at all times and adjusts torque accordingly through dynamic braking which helps cushion the door during the opening or closing cycles.  
Extended Closing Torque (ECT)  
The last 10 degrees of the closing cycle is the most challenging for a swing door operator. Beam's exclusive Extended Closing Torque (ECT) allows the door to remain closed longer and latch the door. Speed remains constant so the door stays within ANSI standards.

**EASY OPEN**  
Manual Push Forces of 5-15 lbf  
Easy to work with manually, yet strong enough to close and latch despite wind or air pressure.  
Power Assist  
Makes a heavy door (or spring) feel light.

**MAXIMUM STRENGTH**  
700 Pounds Max Door Weight  
The SW200i can handle door weights of up to 700 pounds per operation.  
**SECURE LATCH**  
Latch Retry  
If the door does not latch when closing, the SW200i will detect this condition and immediately open the door 10 degrees and execute two attempts to latch the door.  
Electric Lock Management  
Closes before it opens to insure lock release or attempt to open the door. Locks are monitored by software. Monitor locks if equipped with that functionality.

**Security Integration**  
The SW200i can be configured to provide a signal when the door is closed and can provide a signal for security monitoring.  
**Astragal Coordination**  
Operator can choose to always close in right order and can therefore be properly locked. Coordinator allows door with astragal to open first, close last. If in hard open, door without astragal will not proceed with attempt.



A clear advantage  
in the  
competition.

**FLEXIBILITY AND VALUE**  
On-Board Functionality  
SW200i has on-board capabilities such as timing sequencing, Torque (ECT)  
Adaptable for Multiple Uses  
One operator can handle all of the facility needs—wind conditions, pedestrian usage, low energy, manual use, etc.  
Battery Backup  
The SW200i has a battery backup system allows for continued operation after power fails.  
**ENERGY EFFICIENT**  
Separate Time Delay  
SW200i includes two time delays for separate devices (i.e., standard door closer, door lock, etc.) so that the door can be closed, locked, and opened at different times can be set to best maximize operation, enhance security and reduce air infiltration.  
Power Surge Protection  
The Beam SW200i operator can handle variances in power without damage to the unit or impact to performance.  
Brown Out Performance  
The operator can adjust to dips in power and continue to operate from 15V – 264V.

**Low Energy Consumption**  
Four operators can run on one 20 amp line – saving per amp  
Directional Sensors  
Lines equipped with directional sensors reduce air infiltration by allowing less time with the door open.  
**SERVICE SAVINGS**  
Adapting to Changing Needs  
Air flow can change in a building as configurations evolve (renewables, rooms HVAC systems, etc.). Other operators (e.g., door closers, etc.) require a service call for adjustment. The Beam SW200i adapts to changing environments, thereby saving you the cost of service calls for their necessary adjustments.  
Non-volatile Memory  
When the power goes out, other operators can go through a series of steps to reprogram the device. The Beam SW200i stores power loss, providing you with more consistent performance and consistent opening and closing.  
Fusion in Technology  
No lines to replace allows for consistent performance and reduces service call requirements and costs.

Attribute	SW200i	Others
MAX WEIGHT OF DOOR	700 lbs	200-350 lbs
MANUAL PUSH FORCES OF 5 TO 15 LBF	•	
AUTOMATICALLY COMPENSATES FOR STACK PRESSURE	•	
ON-BOARD EXTENDED CLOSING TORQUE (ECT)	•	
ON-BOARD BATTERY BACKUP	•	
ON-BOARD TRAILING SEQUENCE	•	
AUTOMATICALLY MEASURES INERTIA AND WEIGHT OF DOOR DURING SET-UP	•	

# ASSA ABLOY Entrance Systems

## Pedestrian Door Solutions



Automatic swing, sliding, and revolving doors are sold under the Besam brand.



**ASSA ABLOY**

## Industrial Door & Docking Solutions



Vertical lifting fabric doors for hangars and other large door openings are sold under the Megadoor brand.



**ASSA ABLOY**

## High Performance Door Solutions



High performance doors, including fabric, metal, and rubber high speed industrial doors for special applications are sold under the Albany brand.



**ASSA ABLOY**

## Partnership with ASSA ABLOY Entrance Systems

ASSA ABLOY Entrance Systems is a world-leading provider of a wide range of safe, convenient, reliable and energy-efficient automatic entrance solutions, which means our customers can be confident that they have chosen a professional partner.

## ASSA ABLOY Performance Services

Choosing ASSA ABLOY Entrance Systems to service and maintain your automatic entrance in an energy-conscious way means you can be confident of efficient and reliable operation of your doors, as well as optimum convenience and safety for those using them.



## ASSA ABLOY Entrance Systems - Sustainability

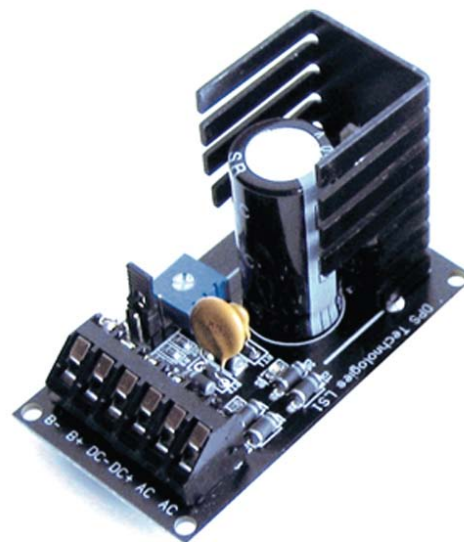
ASSA ABLOY Entrance Systems designs, manufactures, sells and services automatic entrance solutions that help our customers reach their own sustainability goals while minimizing the impact on the environment over the product life cycle.

ASSA ABLOY Entrance Systems  
Pedestrian Door Solutions  
1900 Airport Road  
Monroe, NC 28110 USA  
US: 1-877-237-2687  
Canada: 1-888-608-9242  
[www.besam-usa.com](http://www.besam-usa.com)  
[www.besam.ca](http://www.besam.ca)  
[www.assaabloyentrance.com](http://www.assaabloyentrance.com)

**ASSA ABLOY**

ASSA ABLOY is the global leader in door opening solutions, dedicated to satisfying end-user needs for security, safety and convenience.

Camden CX-PS13V3 is a cost effective variable output linear power supply. This unit provides 1 Amp of current with output voltages ranging from 2 – 24 VDC. 12" battery leads are provided for connection to a GELL CELL battery. The CX-PS13V3 will charge the battery and automatically switch over in case of an AC power failure. Easily mounted with the supplied adhesive tape the CX-PS13V3 is suitable for electric strikes and other electrified devices. For Mag Locks, where UL/ULC Listed power supply is required, we suggest our CX-PS10UL/30UL/60UL models.



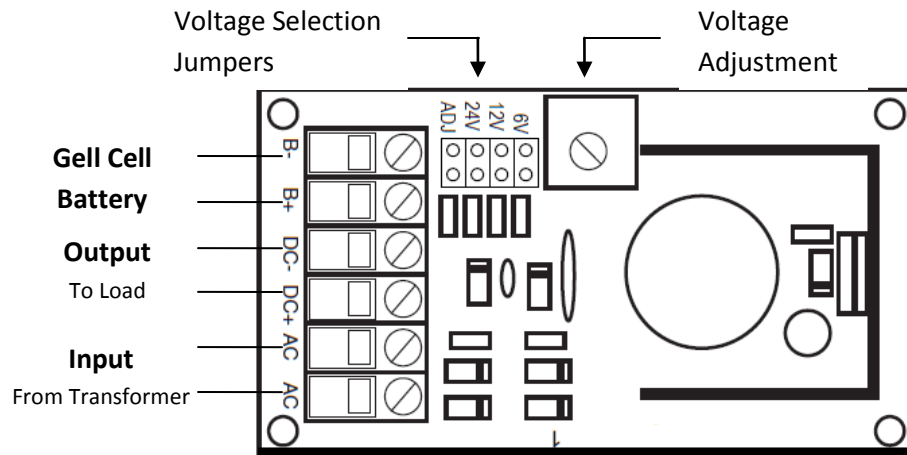
## Specifications

<b>Input Voltage**</b>	6 – 24 VAC depending Output voltage selected
<b>Output Voltage</b>	6, 12, 24 VDC Selectable or 2- 24 VDC if ADJ is selected
<b>Output Protection</b>	PPTC Resettable fuse
<b>Output Power</b>	800mA., 200mA charging current
<b>Ripple</b>	< 40mV.
<b>Efficiency</b>	12VDC = 85%, 24VDC = 90%
<b>Dimensions</b>	2.70" (68.6mm) <b>L</b> x 1.50" (38.1mm) <b>W</b> x H 1.750" (45.5mm) <b>H</b>

\*\* See table on back of page.



# Wiring Diagram



## Transformer Selection

Required Output Voltage	Transformer	
	Volts	VA
6 VDC	6 – 9 VAC	20
9 VDC	9 – 12 VAC	20
12 VDC	12 – 14 VAC	30
13.8 VDC	14 – 16 VAC	30
18 VDC	18 – 20 VAC	30
24 VDC	24 – 26 VAC	40

# IMPORTANT

**Input transformer required.**  
**DO NOT connect circuit to the 120 VAC line.**



Push Buttons



Key Pads



Strikes



Magnetic Locks



Key Switches



Relays &amp; Timers



Access Control



CCTV



INPUT 120V 60Hz  
OUTPUT 12V 20VA  
CLASS 3 MET CLASS 2 NOT MET



4707





- Standard weight, full mortise
- 5 knuckles, 2 ball bearings
- Steel or stainless steel hinge and pin
- Conforms to ANSI A156.1
- ANSI A156.7 template hole pattern

- Non-handed
- Flat tips with knock-out bottom
- Wood and undercut machine screws included

### OPTIONS

NRP: Non-removable pin

-A: NRP, radius corners: 1/4" (6.4 mm)

-B: NRP, radius corners: 5/32" (4 mm)

179	C32D	454	NRP
MODEL	FINISH	SIZE	OPTION

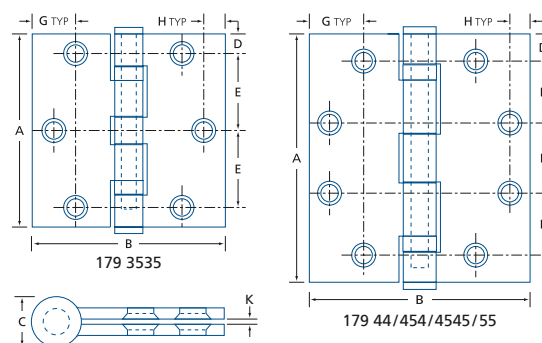
SIZE	INCHES	MM	GAUGE	HOLES	SCREWS INCLUDED		QTY <sup>1</sup>
					MACHINE	WOOD	
3535	3 1/2 x 3 1/2	88.9 x 88.9	0.123	6	#10-24 x 1/2	#9 x 1	3/60
44	4 x 4	101.6 x 101.6	0.130	8	#12-24 x 1/2	#12 x 1 1/4	3/60
454	4 1/2 x 4	114.3 x 101.6	0.134	8	#12-24 x 1/2	#12 x 1 1/4	3/60
4545	4 1/2 x 4 1/2	114.3 x 114.3	0.134	8	#12-24 x 1/2	#12 x 1 1/4	3/60

(1) 3/60 : QUANTITY PER BOX / QUANTITY PER CASE. HINGES NOT SOLD INDIVIDUALLY.

BLR	CP	C1D	C15	C2G	C26	C26D	C3	C32D <sup>1</sup>	C5
DARK BRONZE	PRIME COATED	MATTE BLACK	SATIN NICKEL	ZINC PLATED	POLISHED CHROME	SATIN CHROME	POLISHED BRASS	SATIN STAINLESS STEEL	ANTIQUE BRASS

OTHER SIZES AND FINISHES AVAILABLE BY SPECIAL ORDER, PLEASE CONTACT FOR DETAILS.

(1) ALL SATIN STAINLESS STEEL HINGES (C32D) ARE 18-8 STAINLESS STEEL AND ARE NRP BY DEFAULT.



MODEL	A	B	C	D	E	F	G	H	K
179 3535	3 1/2 (88.9)	3 1/2 (88.9)	1/2 (12.7)	23/64 (9.1)	1 25/64 (35.4)	—	1 1/16 (17.5)	23/64 (9.1)	1/16 (1.6)
179 44	4 (101.6)	4 (101.6)	9/16 (14)	1/2 (12.7)	1 (25.5)	3 1/32 (24.6)	3/4 (19.1)	3/8 (9.5)	1/16 (1.6)
179 454	4 1/2 (114.3)	4 (101.6)	19/32 (15.2)	1/2 (12.7)	1 1/8 (28.6)	1 15/64 (31)	1 (25.4)	3/8 (9.5)	1/16 (1.6)
179 4545	4 1/2 (114.3)	4 1/2 (114.3)	19/32 (15.2)	1/2 (12.7)	1 1/8 (28.6)	1 15/64 (31)	1 (25.4)	3/8 (9.5)	1/16 (1.6)
179 55	5 (127)	5 (127)	5/8 (15.9)	1/2 (12.7)	1 1/4 (31.8)	1 31/64 (37.7)	1 (25.4)	3/8 (9.5)	1/16 (1.6)

DIMENSIONS IN INCHES (MILLIMETRES) AS PER ANSI A156.7

# 1006 Series Electric Strike



Experience a safer  
and more open world

The 1006 series is the strongest and most versatile electric strike available. The dual interlocking plunger design and heavy duty stainless steel construction, enables it to exceed every standard developed for electric strikes.

## *Unsurpassed Flexibility*

- Accommodates every cylindrical and mortise locksets with or without a 1" deadbolt
- Available as a separate strike body and interchangeable faceplate or a Complete Pac
- Non-handed, dual voltage
- Available in fail safe or fail secure (standard)

## *Tested for Durability*

- UL 10C, 3 hour fire-rated
- ANSI A250.13-2003 windstorm listed
- UL 1034 burglary-resistant listed
- Suitable for outdoor use

## *Robust Design*

- ANSI/BHMA A156.31, Grade 1
- Endurance 1 million cycles
- Tamper resistant, stainless steel construction
- Dynamic strength 350 ft-lbs (fail secure)



Burglary  
Rated



SecuriCare  
Warranty



Mortise Locks  
with Deadbolt



Mortise Locks  
without  
Deadbolt



Cylindrical  
Locksets



SecuriCare  
Warranty



Dual Voltage  
12/24



Fire Rated



Windstorm  
Resistant



Outdoor  
Rated



Burglary  
Rated

## Features

- Stainless steel construction
- Tamper resistant
- Static strength 2,500 lbs. (fail secure)
- Dynamic strength 350 ft-lbs. (fail secure)
- Endurance 1,000,000 cycles
- Fail secure (standard)
- Non-handed
- Accommodates up to 1" deadbolt
- Plug-in connector
- Full keeper shims for horizontal adjustment
- Trim enhancer
- Dual voltage 12 or 24 VDC continuous duty
- Internally mounted solenoid
- Suitable for Outdoor Use

## Certifications

- ASTM E152 Fire Door Compliant
- ANSI/ASTM E330
- ANSI/BHMA A156.31, Grade 1
- ANSI/SDI 250.13 Windstorm Resistant
- NFPA-252 fire door Compliant
- RoHS Compliant
- Florida Building Code Approved TAS 201, 202, 203 (old)
- Environmental Product Declaration (EPD)
- Health Product Declaration (HPD)
- UL 1034 Burglary-Resistant Listed
- UL 10C Fire-Rated, 1-1/2 Hour Double Door [Fail Secure only]
- UL 10C Fire-Rated, 3 Hour Single Door [Fail Secure Only]
- UL 294 Listed

## Specifications

### Frame Application

- Metal
- Wood

### Electrical

- .24 Amps at 12 VDC/VAC
- .12 Amps at 24 VDC/VAC
- DC continuous duty/AC intermittent duty only

## Options

- Fail Safe
- LBM - Latchbolt monitor
- LBSM - Latchbolt strike monitor
- 27 interchangeable faceplate options (monitor switches may not work with all faceplate options)

## Accessories

- 157 Torx® screws
- 1000-102 Rain guard
- 1006-103 Full Keeper Shims
- 1000-104 Lip Extension Trim Adapter
- 1006-105 Trim Enhancer
- 1000-110 Replacement Strike Plate
- 1000-130 KD Filler Plate
- 150 Strike Latch Guard
- HES-CUT-MTK Metal Template Kit
- 2005M3 SMART Pac® III

## Dimensions

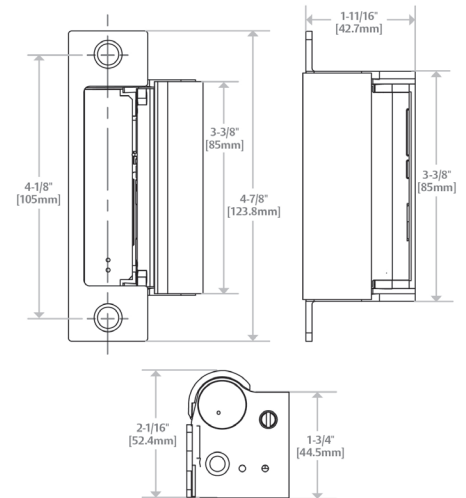


Diagram shown with DB faceplate

## How to Order

SERIES	MODEL	FAIL SECURE / SAFE	FINISH*	OPTION (S)
<b>1006</b>	<b>—</b>	<b>— F</b>	<b>— 630</b>	<b>— LBM</b>
<b>1006</b> Universal Electric Strike	<b>(blank)</b> Electric strike body only, faceplates ordered separately	<b>(blank)</b> Fail Secure (standard)	<b>605</b> Bright Brass	<b>(blank)</b> No Monitor
	<b>CS*</b> Complete Electric Strike; includes the SMART Pac III and J, KD, KM, HM, ND faceplates and brackets	<b>F</b> Fail Safe	<b>606</b> Satin Brass	<b>LBM</b> Latchbolt Monitor**
	<b>CLB*</b> Complete Electric Strike for latchbolt locks; includes J, K, KD and KM faceplates		<b>612</b> Satin Bronze	<b>LBSM</b> Latchbolt Strike Monitor**
	<b>CDB*</b> Complete Electric Strike for Deadbolt Locks; includes the ND and HM faceplates		<b>613</b> Bronze Toned	
	<b>CAS*</b> Complete Electric Strike for Deadbolt Locks; includes the N, ND and NM faceplates		<b>629</b> Bright Stainless Steel	
			<b>630</b> Satin Stainless Steel	
			<b>BLK</b> Black	

\*Complete Pacs are only available in the 630 finish. \*\* Not available with CS, CDB, or CAS

## Door stops, holders and silencers

## Floor stops and holders

## FS13

## Dome stop

- Standard FS13 for use where no threshold is used
- Heavy-duty cast dome stops constructed of brass
- Unique riser design of R14 (below) allows easy conversion to threshold application
- Units are packed with fasteners sufficient for mounting in all types of floor construction, including concrete
- Replaceable - grey rubber bumper

## Specifications

Material substrate	Made from cast brass
Certifications	Meets ANSI/BHMA A156.16, L12141

## Dimensions

Overall height	Base height	Base diameter
1"	$\frac{3}{16}$ "	1 $\frac{3}{4}$ " round

## Available accessories

- Security pin screws
- Grey rubber bumper



## R14

## Dome stop rise

- Adapts the FS13 Dome stop to threshold use

## Specifications

Material substrate	Made from cast brass
--------------------	----------------------

## Dimensions

Riser height	Base diameter
$\frac{5}{16}$ "	1 $\frac{3}{4}$ " round



## FS17

## Dome stop

- One piece dome stop for use with thresholds
- Heavy-duty cast dome stops constructed of brass
- Units are packed with fasteners sufficient for mounting in all types of floor construction, including concrete
- Grey rubber bumper

## Specifications

Material substrate	Made from cast brass
Certifications	Meets ANSI/BHMA A156.16, L12161

## Dimensions

Overall height	Base height	Base diameter
1 $\frac{11}{32}$ "	$\frac{1}{2}$ "	1 $\frac{3}{4}$ " round

## Available accessories

- Security pin screws
- Grey rubber bumper



## FS13, R14 and FS17 Finishes

BHMA	Description	Substrate	Finish
605	Bright Brass	Brass	US3
606	Satin Brass	Brass	US4
612	Satin Bronze	Brass	US10
613	Oil Rubbed Bronze	Brass	US10B
625	Bright Chrome	Brass	US26
626	Satin Chrome	Brass	US26D

For other colors, consult factory.

# Rim & Mortise Cylinders

Medeco® Rim and Mortise cylinders provide patented key control and the Medeco<sup>3</sup> version provides UL437 Physical Security in adaptable retrofit cylinder formats. Medeco® Mortise cylinders have threads on the outside of the shell and are designed to be screwed into other manufacturer's mortise lock cases. A cam on the back of the cylinder operates the lock mechanism and a set screw holds the mortise cylinder in place. Medeco® Rim cylinders are used with auxiliary rim locks such as: surface mounted deadbolts, night latches, panic devices and jimmyproof locks (also know as vertical dropbolts or interlocking deadbolts). Rim cylinders are held in place with a back plate and two mounting screws. 10 series, rim and mortise cylinders, are UL437 Listed for drill and pick resistance, and the those that incorporate the Medeco<sup>3</sup>, BiLevel, or Medeco X4 design, offer utility patented key control.



## Features:

- Utility patented key control provides protection against the unauthorized duplication of keys
- A special elevating and rotating pin tumbler design, along with false slots on the bottom pins, mushroom top pins and a sidebar mechanism, work together, to provide superior pick resistance
- Angled cuts on the keys, along with fore and aft positioning, and the reciprocal slider of the Medeco<sup>3</sup> design, provide added dimensions that dramatically increases key combinations and enables Medeco® to produce some of the largest master key systems in the industry
- Hardened steel inserts, positioned in critical areas of the cylinder, provide a high degree of drill resistance
- Solid brass construction provides high quality and long cylinder life
- Set screw pin chamber caps allow quick and easy pinning and re-keying without the need to take the cylinder apart
- Large variety of cylinder lengths and cam/tailpiece configurations provide excellent retrofit capability and reduce the need to replace the entire locking device

## Applications

Flexible options designed to retrofit various manufacturers of Mortise and Rim locks

## Warranty:

Warranted for two (2) years against manufacturer's defects. See the Medeco® limited warranty for full details

## Technical Information:

- UL437 Listing assures superior pick and drill resistance
- BHMA A156.30 Certification assures patent protected key control and physical strength
- BHMA A156.5 Grade 1 Certification assures consistent quality for heavy use applications
- Available in all standard finishes to match existing hardware

## Available Key Technologies:

### Mechanical:

- Medeco<sup>3</sup>
- Medeco<sup>3</sup> BiLevel\*
- Medeco X4\*

### eCylinder:

- Medeco3 Logic
- Medeco Logic
- Medeco XT
- Aperio

### \*Product Nomenclature Changes:

Original Keymark = Medeco KM; Keymark x4 = Medeco X4; Nexgen XT = Medeco XT, Classic Logic = Medeco Logic; Vertical Logic = Medeco3 Logic; G = Medeco XT.



# L Series

## Grade 1, Mortise Locks

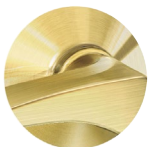
### OVERVIEW

The Schlage® L Series has long been the benchmark for Grade 1 mortise locks. Beyond strength and security—it offers flexibility to meet most needs. Sixty-one mechanical functions include ten non-levered small- and large-case deadbolt functions and nine electrified functions that are regularly used as part of electronic access control systems. L Series locks have the ability to suite across electronic, tubular, exit trim, and multi-point locks to integrate seamlessly into any environment. The series features an array of security options including patented, 180-degree high visibility lock status indication trim, key override of a thumbturn being held, and support for multiple keyway families and cylinder types including Primus® XP high-security cylinders.

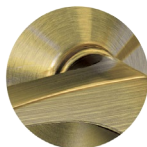
### FINISHES



605  
Bright Brass



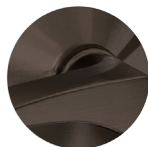
606  
Satin Brass



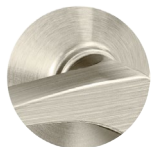
609  
Antique Bronze



612<sup>1</sup>  
Satin Bronze



613<sup>1</sup>  
Oil Rubbed  
Bronze



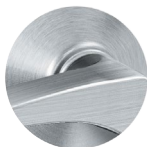
619  
Satin Nickel



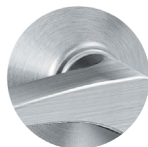
622  
Matte Black



625  
Bright Chrome



626  
Satin Chrome



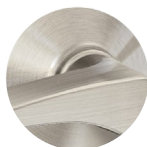
626AM  
Satin Chrome  
Antimicrobial



629<sup>2</sup>  
Bright Stainless  
Steel



630<sup>2</sup>  
Satin Stainless  
Steel



630AM<sup>2</sup>  
Satin  
Stainless Steel  
Antimicrobial



643e  
Aged Bronze



1. Available on standard levers only, not available on Latitude, Longitude, Accent, Asti, or Merano.

2. Not available on Accent, Asti, or Merano.