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PWGSC Ontario  
Region Project  
Number R.063337.001

SPECIFICATION  
TITLE SHEET

Section 00 00 00  
Page 1  
2013-04-24

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PROJECT TITLE BURLINGTON, ONTARIO  
C.C.I.W. FISHERIES PROTECTION PROGRAM  
867 LAKESHORE ROAD  
  
RENOVATIONS

PROJECT NUMBER R.063337.001

PROJECT DATE 2013-04-24

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PART 1 - GENERAL

- 1.1 SECTION INCLUDES .1 Title and description of Work.  
.2 Work sequence.  
.3 Contractor use of premises.  
.4 Alterations to existing building.
- 1.2 PRECEDENCE .1 For Federal Government projects, Division 01 Sections take precedence over technical specification sections in other Divisions of this Project Manual.
- 1.3 WORK COVERED BY CONTRACT DOCUMENTS .1 Work of this Contract comprises renovation of Burlington CCIW Fisheries Protection Program, located at 867 Lakeshore Road, Burlington; and further identified as PWGSC Project Number R.063337.001.
- 1.4 CONTRACT METHOD .1 Construct work under lump sum contract.
- 1.5 COST BREAKDOWN .1 Within 48 hours of notification of acceptance of bid furnish a cost breakdown by Section aggregating contract amount.  
.2 Within 48 hours of acceptance of bid submit a list of subcontractors.
- 1.6 WORK SEQUENCE .1 Do not close off public usage of facilities until use of one stage of Work will provide alternate usage.  
.2 Maintain fire access/control.
- 1.7 CONTRACTOR USE OF PREMISES .1 Coordinate use of premises under direction of Departmental Representative.
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1.7 CONTRACTOR USE OF PREMISES (Cont'd) .2 Obtain and pay for use of additional storage or work areas needed for operations under this Contract.

1.8 ALTERATIONS TO EXISTING BUILDING .1 Remove and recycle, compost, anaerobic digest, sell material for reuse or dispose of items as indicated.

.2 Remove in good order, turn over to Department, and store within building where designated by Departmental Representative, items as indicated.

.3 Remove, temporarily store, clean, alter to suit and reinstall items as indicated.

.4 Remove, temporarily store and turn over to other sections for building in stud type demountable partitions and other items as indicated.

.5 Provide new openings required in existing construction.

.6 Block in openings where items removed with material and finish to match existing adjoining construction.

PART 2 - PRODUCTS

2.1 NOT USED .1 Not used.

PART 3 - EXECUTION

3.1 NOT USED .1 Not used.

PART 1 - GENERAL

- 1.1 ACCESS AND EGRESS .1 Design, construct and maintain temporary "access to" and "egress from" work areas, including stairs, runways, ramps or ladders and scaffolding, independent of finished surfaces and in accordance with relevant municipal, provincial and other regulations.
- 1.2 USE OF SITE AND FACILITIES .1 Execute work with least possible interference or disturbance to normal use of premises. Make arrangements with Departmental Representative to facilitate work as stated.
- .2 Maintain existing services to building and provide for personnel and vehicle access.
- .3 Where security is reduced by work provide temporary means to maintain security.
- .4 Departmental Representative will assign sanitary facilities for use by Contractor's personnel. Keep facilities clean.
- .5 Use only designated elevator existing in building for moving workers and material.  
.1 Protect walls of passenger elevator, to approval of Departmental Representative prior to use.  
.2 Accept liability for damage, safety of equipment and overloading of existing equipment.
- .6 Closures: protect work temporarily until permanent enclosures are completed.
- 1.3 ALTERATIONS, ADDITIONS OR REPAIRS TO EXISTING BUILDING .1 Execute work with least possible interference or disturbance to building operations, occupants, public and normal use of premises. Arrange with Departmental Representative to facilitate execution of work.
- 1.4 EXISTING SERVICES .1 Notify, Departmental Representative utility companies of intended interruption of services and obtain required permission.
- .2 Where Work involves breaking into or connecting to existing services, give Departmental
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- 1.6 SECURITY .1 Where security has been reduced by Work of Contract, provide temporary means to maintain security.
- .2 Security clearances:  
.1 Personnel employed on this project will be subject to security check. Obtain clearance, as instructed, for each individual who will require to enter premises.  
.2 Personnel will be checked daily at start of work shift and provided with pass which must be worn at all times. Pass must be returned at end of work shift and personnel checked out.  
.3 Contractor's personnel will require satisfactory RCMP initiated security screening in order to complete Work in premises and on site.
- .3 Security escort:  
.1 Personnel employed on this project must be escorted when executing work in non-public areas during normal working hours. Personnel must be escorted in all areas after normal working hours.  
.1 All personnel to check in at reception.  
.2 Submit an escort request to Departmental Representative at least 14 days before service is needed. For requests submitted within time noted above, costs of security escort will be paid for by Departmental Representative. Cost incurred by late request will be Contractor's responsibility.  
.3 Any escort request may be cancelled free of charge if notification of cancellation is given at least 48 hours before scheduled time of escort. Cost incurred by late request will be Contractor's responsibility.  
.4 Calculation of costs will be based on average hourly rate of security officer for minimum of 8 hours per day for late service request and of 8 hours for late cancellations.
- 1.7 BUILDING SMOKING ENVIRONMENT .1 Comply with smoking restrictions. Smoking is not permitted.
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PART 2 - PRODUCTS

2.1 NOT USED .1 Not Used.

PART 3 - EXECUTION

3.1 NOT USED .1 Not Used.

PART 1 - GENERAL

- 1.1 ADMINISTRATIVE
- .1 Schedule and administer project meetings throughout the progress of the work at the call of Departmental Representative.
  - .2 Prepare agenda for meetings.
  - .3 Distribute written notice of each meeting 5 days in advance of meeting date to Departmental Representative.
  - .4 Provide physical space and make arrangements for meetings.
  - .5 Preside at meetings.
  - .6 Record the meeting minutes. Include significant proceedings and decisions. Identify actions by parties.
  - .7 Reproduce and distribute copies of minutes within three days after meetings and transmit to Departmental Representative, meeting participants and affected parties not in attendance.
  - .8 Representative of Contractor, Subcontractor and suppliers attending meetings will be qualified and authorized to act on behalf of party each represents.
- 1.2 PRECONSTRUCTION MEETING
- .1 Within 10 days after award of Contract, request a meeting of parties in contract to discuss and resolve administrative procedures and responsibilities.
  - .2 Departmental Representative, Contractor, major Subcontractors, field inspectors and supervisors will be in attendance.
  - .3 Establish time and location of meeting and notify parties concerned minimum 5 days before meeting.
  - .4 Incorporate mutually agreed variations to Contract Documents into Agreement, prior to signing.
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1.2 PRECONSTRUCTION .5  
MEETING  
(Cont'd)

- Agenda to include:
- .1 Appointment of official representative of participants in the Work.
  - .2 Schedule of Work: in accordance with Section 01 32 16.
  - .3 Schedule of submission of shop drawings, samples, mock-ups, colour chips. Submit submittals in accordance with Section 01 33 00.
  - .4 Requirements for temporary facilities, site sign, offices, storage sheds, utilities, fences in accordance with Section 01 52 00.
  - .5 Site security in accordance with Section 01 56 00.
  - .6 Health and safety in accordance with Section 01 35 29.
  - .7 Proposed changes, change orders, procedures, approvals required, mark-up percentages permitted, time extensions, overtime, administrative requirements.
  - .8 Owner provided products.
  - .9 Record drawings and specifications in accordance with Sections 01 33 00 and 01 78 00.
  - .10 Maintenance manuals in accordance with Section 01 78 00.
  - .11 Take-over procedures, acceptance, warranties in accordance with Section 01 78 00.
  - .12 Monthly progress claims, administrative procedures, photographs, hold backs.
  - .13 Appointment of inspection and testing agencies or firms.
  - .14 Insurances, transcript of policies.

1.3 PROGRESS  
MEETINGS

- .1 During course of Work and 2 weeks prior to project completion, schedule progress meetings bi-weekly.
  - .2 Contractor, major Subcontractors involved in Work and Departmental Representative are to be in attendance.
  - .3 Notify parties minimum 5 days prior to meetings.
  - .4 Record minutes of meetings and circulate to attending parties and affected parties not in attendance within 3 days after meeting.
  - .5 Agenda to include the following:
    - .1 Review, approval of minutes of previous meeting.
    - .2 Review of Work progress since previous meeting.
    - .3 Field observations, problems, conflicts.
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1.3 PROGRESS  
MEETINGS  
(Cont'd)

- .5 Agenda to include the following:(Cont'd)
- .4 Problems which impede construction schedule.
  - .5 Review of off-site fabrication delivery schedules.
  - .6 Corrective measures and procedures to regain projected schedule.
  - .7 Revision to construction schedule.
  - .8 Progress schedule, during succeeding work period.
  - .9 Review submittal schedules: expedite as required.
  - .10 Maintenance of quality standards.
  - .11 Review proposed changes for affect on construction schedule and on completion date.
  - .12 Other business.

PART 2 - PRODUCTS

2.1 NOT USED .1 Not Used.

PART 3 - EXECUTION

3.1 NOT USED .1 Not Used.

PART 1 - GENERAL

- 1.1 DEFINITIONS
- .1 Activity: element of Work performed during course of Project. Activity normally has expected duration, and expected cost and expected resource requirements. Activities can be subdivided into tasks.
  - .2 Bar Chart (GANTT Chart): graphic display of schedule-related information. In typical bar chart, activities or other Project elements are listed down left side of chart, dates are shown across top, and activity durations are shown as date-placed horizontal bars. Generally Bar Chart should be derived from commercially available computerized project management system.
  - .3 Baseline: original approved plan (for project, work package, or activity), plus or minus approved scope changes.
  - .4 Construction Work Week: Monday to Friday, inclusive, will provide five day work week and define schedule calendar working days as part of Bar (GANTT) Chart submission.
  - .5 Duration: number of work periods (not including holidays or other nonworking periods) required to complete activity or other project element. Usually expressed as workdays or workweeks.
  - .6 Master Plan: summary-level schedule that identifies major activities and key milestones.
  - .7 Milestone: significant event in project, usually completion of major deliverable.
  - .8 Project Schedule: planned dates for performing activities and the planned dates for meeting milestones. Dynamic, detailed record of tasks or activities that must be accomplished to satisfy Project objectives. Monitoring and control process involves using Project Schedule in executing and controlling activities and is used as basis for decision making throughout project life cycle.
  - .9 Project Planning, Monitoring and Control System: overall system operated by Departmental Representative to enable monitoring of project work in relation to established milestones.
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- 1.2 REQUIREMENTS
- .1 Ensure Master Plan and Detail Schedules are practical and remain within specified Contract duration.
  - .2 Plan to complete Work in accordance with prescribed milestones and time frame.
  - .3 Limit activity durations to maximum of approximately 10 working days, to allow for progress reporting.
  - .4 Ensure that it is understood that Award of Contract or time of beginning, rate of progress, Certificate of Substantial Performance and Certificate of Completion as defined times of completion are of essence of this contract.
- 1.3 SUBMITTALS
- .1 Provide submittals in accordance with Section 01 33 00.
  - .2 Submit to Departmental Representative within 5 working days of Award of Contract Bar (GANTT) Chart as Master Plan for planning, monitoring and reporting of project progress.
  - .3 Submit Project Schedule to Departmental Representative within 5 working days of receipt of acceptance of Master Plan.
- 1.4 PROJECT MILESTONES
- .1 Project milestones form interim targets for Project Schedule.
    - .1 Submit submittal list for review within 2 weeks of award of contract.
    - .2 Submit product data sheets within 3 weeks of award of contract date.
    - .3 Submit shop drawings within 3 weeks of award of contract date.
    - .4 Interior finishing and fitting, mechanical, and electrical work completed 2 weeks prior to project completion date.
    - .5 Certificate of Substantial Performance within 2 weeks prior to project completion date.
- 1.5 MASTER PLAN
- .1 Structure schedule to allow orderly planning, organizing and execution of Work as Bar Chart (GANTT).
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- 1.5 MASTER PLAN (Cont'd)
- .2 Departmental Representative will review and return revised schedules within 7 working days.
  - .3 Revise impractical schedule and resubmit within 5 working days.
  - .4 Accepted revised schedule will become Master Plan and be used as baseline for updates.
- 1.6 PROJECT SCHEDULE
- .1 Develop detailed Project Schedule derived from Master Plan.
  - .2 Ensure detailed Project Schedule includes as minimum milestone and activity types as follows:
    - .1 Award.
    - .2 Shop Drawings, Samples.
    - .3 Permits.
    - .4 Mobilization.
    - .5 Interior Architecture (Walls, Floors and Ceiling).
    - .6 Dust partition and hoarding installation.
    - .7 Door and lock delivery.
    - .8 Coring.
    - .9 Fabrication and installation.
    - .10 Painting and finishing.
    - .11 Deconstruction and demolition.
    - .12 Equipment long delivery items.
    - .13 Plumbing.
    - .14 Lighting.
    - .15 Electrical.
    - .16 Piping.
    - .17 Controls.
    - .18 Heating, Ventilating, and Air Conditioning.
    - .19 Millwork.
    - .20 Fire Systems.
    - .21 Testing and Commissioning.
- 1.7 PROJECT SCHEDULE REPORTING
- .1 Update Project Schedule on bi-weekly basis reflecting activity changes and completions, as well as activities in progress.
  - .2 Include as part of Project Schedule, narrative report identifying Work status to date, comparing current progress to baseline, presenting current forecasts, defining problem areas, anticipated delays and impact with possible mitigation.
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1.8 PROJECT MEETINGS .1 Discuss Project Schedule at regular site meetings specified in Section 01 31 19, identify activities that are behind schedule and provide measures to regain slippage. Activities considered behind schedule are those with projected start or completion dates later than current approved dates shown on baseline schedule.

PART 2 - PRODUCTS

2.1 NOT USED .1 Not used.

PART 3 - EXECUTION

3.1 NOT USED .1 Not used.

PART 1 - GENERAL

- 1.1 ADMINISTRATIVE
- .1 Submit to Departmental Representative submittals listed for review. Submit promptly and in orderly sequence to not cause delay in Work. Failure to submit in ample time is not considered sufficient reason for extension of Contract Time and no claim for extension by reason of such default will be allowed.
  - .2 Do not proceed with Work affected by submittal until review is complete.
  - .3 Present shop drawings, product data, samples and mock-ups in SI Metric units.
  - .4 Where items or information is not produced in SI Metric units converted values are acceptable.
  - .5 Review submittals prior to submission to Departmental Representative. This review represents that necessary requirements have been determined and verified, or will be, and that each submittal has been checked and co-ordinated with requirements of Work and Contract Documents. Submittals not stamped, signed, dated and identified as to specific project will be returned without being examined and considered rejected.
  - .6 Notify Departmental Representative, in writing at time of submission, identifying deviations from requirements of Contract Documents stating reasons for deviations.
  - .7 Verify field measurements and affected adjacent Work are co-ordinated.
  - .8 Contractor's responsibility for errors and omissions in submission is not relieved by Departmental Representative's review of submittals.
  - .9 Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Departmental Representative review.
  - .10 Keep one reviewed copy of each submission on site.
  - .11 Submit number of hard copies specified for each type and format of submittal and also submit in
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- 1.1 ADMINISTRATIVE (Cont'd) .11 (Cont'd)  
(Cont'd) electronic format as pdf files. Forward pdf, NMSEdit Professional spp, MS Word, MS Excel, and Autocad dwg files on USB compatible with PWGSC encryption requirements or through email or alternate electronic file sharing service such as ftp, as directed by Departmental Representative.
- 1.2 SHOP DRAWINGS .1 The term "shop drawings" means drawings, diagrams, illustrations, schedules, performance charts, brochures and other data which are to be provided by Contractor to illustrate details of a portion of Work.  
AND PRODUCT DATA
- .2 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Ontario of Canada.
- .3 Indicate materials, methods of construction and attachment or anchorage, erection diagrams, connections, explanatory notes and other information necessary for completion of Work. Where articles or equipment attach or connect to other articles or equipment, indicate that such items have been co-ordinated, regardless of Section under which adjacent items will be supplied and installed. Indicate cross references to design drawings and specifications.
- .4 Allow 10 working days for Departmental Representative's review of each submission.
- .5 Adjustments made on shop drawings by Departmental Representative are not intended to change Contract Amount. If adjustments affect value of Work, state such in writing to Departmental Representative prior to proceeding with Work.
- .6 Make changes in shop drawings as Departmental Representative may require, consistent with Contract Documents. When resubmitting, notify Departmental Representative in writing of revisions other than those requested.
- .7 Accompany submissions with transmittal letter, in duplicate, containing:  
.1 Date.  
.2 Project title and number.  
.3 Contractor's name and address.
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- 1.2 SHOP DRAWINGS AND PRODUCT DATA (Cont'd)
- .7 (Cont'd)
- .4 Identification and quantity of each shop drawing, product data and sample.
- .5 Other pertinent data.
- .8 Submissions 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, signed by Contractor's authorized representative certifying approval of submissions, verification of field measurements and compliance with Contract Documents.
- .5 Details of appropriate portions of 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 Load calculations.
- .7 Standards.
- .8 Operating weight.
- .9 Wiring diagrams.
- .10 Single line and schematic diagrams.
- .11 Relationship to adjacent work.
- .12 Equipment identification.
- .9 After Departmental Representative's review, distribute copies.
- .10 Submit one transparency on plastic film three hard copies and one electronic copy of shop drawings for each requirement requested in specification Sections and as Departmental Representative may reasonably request.
- .11 Submit three hard copies and one electronic copy of product data sheets or brochures for requirements requested in specification Sections and as requested by Departmental Representative where shop drawings will not be prepared due to standardized manufacture of product.
- .12 Submit three hard copies and one electronic copy of test reports for requirements requested in specification Sections and as requested by Departmental Representative.
- .1 Report signed by authorized official of testing laboratory that material, product or
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- 1.2 SHOP DRAWINGS AND PRODUCT DATA  
(Cont'd)
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- .12 (Cont'd)  
.1 (Cont'd)  
system identical to material, product or system to be provided has been tested in accord with specified requirements.  
.2 Testing must have been within 3 years of date of contract award for project.
- .13 Submit three hard copies and one electronic copy of certificates for requirements requested in specification Sections and as requested by Departmental Representative.  
.1 Statements printed on manufacturer's letterhead and signed by responsible officials of manufacturer of product, system or material attesting that product, system or material meets specification requirements.  
.2 Certificates must be dated after award of project contract complete with project name.
- .14 Submit three hard copies and one electronic copy of manufacturers instructions for requirements requested in specification Sections and as requested by Departmental Representative.  
.1 Pre-printed material describing installation of product, system or material, including special notices and Material Safety Data Sheets concerning impedances, hazards and safety precautions.
- .15 Submit three hard copies and one electronic copy of Manufacturer's Field Reports for requirements requested in specification Sections and as requested by Departmental Representative.
- .16 Documentation of the testing and verification actions taken by manufacturer's representative to confirm compliance with manufacturer's standards or instructions.
- .17 Submit three hard copies and one electronic copy of Operation and Maintenance Data for requirements requested in specification Sections and as requested by Departmental Representative.
- .18 Delete information not applicable to project.
- .19 Supplement standard information to provide details applicable to project.
- .20 If upon review by Departmental Representative, no errors or omissions are discovered or if only minor corrections are made, copies will be returned and fabrication and installation of Work may proceed. If shop drawings are rejected,
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1.2 SHOP DRAWINGS  
AND PRODUCT DATA  
(Cont'd)

- .20 (Cont'd)  
noted copy will be returned and resubmission of corrected shop drawings, through same procedure indicated above, must be performed before fabrication and installation of Work may proceed.
- .21 The review of shop drawings by Public Works and Government Services Canada (PWGSC) is for sole purpose of ascertaining conformance with general concept.  
.1 This review shall not mean that PWGSC approves detail design inherent in shop drawings, responsibility for which shall remain with Contractor submitting same, and such review shall not relieve Contractor of responsibility for errors or omissions in shop drawings or of responsibility for meeting requirements of construction and Contract Documents.  
.2 Without restricting generality of foregoing, Contractor is responsible for dimensions to be confirmed and correlated at job site, for information that pertains solely to fabrication processes or to techniques of construction and installation and for co-ordination of Work of sub-trades.

1.3 SAMPLES

- .1 Submit for review samples in duplicate as requested in respective specification Sections. Label samples with origin and intended use.
- .2 Deliver samples prepaid to Departmental Representative's business address.
- .3 Notify Departmental Representative in writing, at time of submission of deviations in samples from requirements of Contract Documents.
- .4 Where colour, pattern or texture is criterion, submit full range of samples.
- .5 Adjustments made on samples by Departmental Representative are not intended to change Contract Amount. If adjustments affect value of Work, state such in writing to Departmental Representative prior to proceeding with Work.
- .6 Make changes in samples which Departmental Representative may require, consistent with Contract Documents.

- 1.3 SAMPLES  
(Cont'd) .7 Reviewed and accepted samples will become standard of workmanship and material against which installed Work will be verified.
- 1.4 MOCK-UPS .1 Erect mock-ups in accordance with Section 01 45 00.
- 1.5 PHOTOGRAPHIC DOCUMENTATION .1 Submit electronic and hard copy of colour digital photography in jpg format, standard resolution as directed by Departmental Representative.
- .2 Project identification: name and number of project and date of exposure indicated.
- .3 Number of viewpoints 50 and their location as determined by Departmental Representative.
- .4 Frequency of photographic documentation: start, bi-weekly and at completion of work as directed by Departmental Representative.
- 1.6 FEES, PERMITS AND CERTIFICATES .1 Provide authorities having jurisdiction with information requested.
- .2 Pay fees and obtain certificates and permits required.
- .3 Furnish certificates and permits.
- .4 Submit acceptable certificate stating that suspended ceiling systems provide adequate support for electrical fixtures, as required by current bulletin of Electrical Inspection Department of Ontario Hydro.
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PART 2 - PRODUCTS

2.1 NOT USED .1 Not Used.

PART 3 - EXECUTION

3.1 NOT USED .1 Not Used.

PART 1 - GENERAL

1.1 REFERENCES

- .1 Canadian Standards Association (CSA): Canada
  - .1 CSA S350-M1980(R2003), Code of Practice for Safety in Demolition of Structures.
- .2 National Building Code 2010 (NBC):
  - .1 NBC 2010, Division B, Part 8 Safety Measures at Construction and Demolition Sites.
- .3 National Fire Code 2010 (NFC):
  - .1 NFC 2010, Division B, Part 5 Hazardous Processes and Operations, subsection 5.6.1.3 Fire Safety Plan.
- .4 Province of Ontario:
  - .1 Occupational Health and Safety Act Revised Statutes of Ontario 1990, Chapter O.1 as amended, and Regulations for Construction Projects, O. Reg. 213/91 as amended.
  - .2 O. Reg. 490/09, Designated Substances.
  - .3 Workplace Safety and Insurance Act, 1997.
  - .4 Municipal statutes and authorities.
- .5 Treasury Board of Canada Secretariat (TBS):
  - .1 Treasury Board, Fire Protection Standard April 1, 2010 [www.tbs-sct.gc.ca/pol/doc-eng.aspx?id=17316&section=text](http://www.tbs-sct.gc.ca/pol/doc-eng.aspx?id=17316&section=text).
- .6 Fire Commissioner of Canada (FCC):
  - .1 FC-301 Standard for Construction Operations, June 1982.
  - .2 FC-302 Standard for Welding and Cutting, June 1982.

Human Resources and Social Development Canada  
Labour Program  
Fire Protection Engineering Services  
4900 Yonge Street 8th Floor  
North York, Ontario M2N 6A8

and copies may be obtained from:

Human Resources and Social Development Canada  
Labour Program  
Fire Protection Engineering Services  
Ottawa, Ontario K1A 0J2

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- 1.2 SUBMITTALS
- .1 Make submittals in accordance with Section 01 33 00.
  - .2 Submit site-specific Health and Safety Plan: Within 7 days after date of Notice to Proceed and prior to commencement of Work. Health and Safety Plan must include:
    - .1 Results of site specific safety hazard assessment.
    - .2 Results of safety and health risk or hazard analysis for site tasks and operations found in work plan.
    - .3 Measures and controls to be implemented to address identified safety hazards and risks.
    - .4 Provide a Fire Safety Plan, specific to the work location, in accordance with NBC, Division B, Article 8.1.1.3 prior to commencement of work. The plan shall be coordinated with, and integrated into, the existing Emergency Procedures and Evacuation Plan in place at the site. Deliver two copies of the Fire Safety Plan to the Departmental Representative not later than 14 days before commencing work.
    - .5 Contractor's and Sub-contractors' Safety Communication Plan.
    - .6 Contingency and Emergency Response Plan addressing standard operating procedures specific to the project site to be implemented during emergency situations. Coordinate plan with existing Emergency Response requirements and procedures provided by Departmental Representative.
  - .3 Departmental Representative will review Contractor's site-specific Health and Safety Plan and provide comments to Contractor within 5 days after receipt of plan. Revise plan as appropriate and resubmit plan to Departmental Representative within 3 days after receipt of comments from Departmental Representative.
  - .4 Departmental Representative's review of Contractor's final Health and Safety plan should not be construed as approval and does not reduce the Contractor's overall responsibility for construction Health and Safety.
  - .5 Submit names of personnel and alternates responsible for site safety and health.
  - .6 Submit records of Contractor's Health and Safety meetings when requested.
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- 1.2 SUBMITTALS  
(Cont'd)
- .7 Submit 2 copies of Contractor's authorized representative's work site health and safety inspection reports to Departmental Representative, weekly.
  - .8 Submit copies of orders, directions or reports issued by health and safety inspectors of the authorities having jurisdiction.
  - .9 Submit copies of incident and accident reports.
  - .10 Submit Material Safety Data Sheets (MSDS).
  - .11 Submit Workplace Safety and Insurance Board (WSIB)- Experience Rating Report.
  - .12 Medical Surveillance: where prescribed by legislation, regulation or safety program, submit certification of medical surveillance for site personnel, in accordance with O. Reg. 490, prior to commencement of Work, and submit additional certifications for any new site personnel to Departmental Representative.
- 1.3 FILING OF NOTICE
- .1 File Notice of Project with Provincial authorities prior to commencement of Work.
- 1.4 WORK PERMIT
- .1 Obtain building permits related to project prior to commencement of Work.
  - .2 Obtain hot work permit from Chief Plant Maintenances.
- 1.5 SAFETY ASSESSMENT
- .1 Perform site specific safety hazard assessment related to project.
- 1.6 MEETINGS
- .1 Schedule and administer Health and Safety meeting with Departmental Representative prior to commencement of Work.
- 1.7 REGULATORY REQUIREMENTS
- .1 Comply with the Acts and regulations of the Province of Ontario.
  - .2 Comply with specified standards and regulations to ensure safe operations at site.
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- 1.8 PROJECT/SITE CONDITIONS .1 Work at site will involve contact with:  
.1 Silica in concrete and concrete block.  
.2 Mercury in switches, fluorescent light tubes and thermostats.  
.3 Asbestos in pipe covering, vinyl composition tiles, transite panels, gypsum board and joint compound.  
.4 Lead in paint, solder in electronic equipment, solder caulking in ball fittings of cast iron pipes, lead acid batteries, vent and pipe flashings and solder used on domestic water lines.  
.5 Benzene in paints and adhesives.  
.6 PCBs in ballasts.  
.7 Arsenic and acrylonitrile in paints and adhesives.  
.8 Vinyl chloride in pipes, conduits and interior finishes.
- .2 Confined spaces in crawl space, mechanical penthouse, maintenance holes and valve chambers.
- 1.9 GENERAL REQUIREMENTS .1 Develop written site-specific Health and Safety Plan based on hazard assessment prior to beginning site Work and continue to implement, maintain, and enforce plan until final demobilization from site. Health and Safety Plan must address project specifications.
- .2 Departmental Representative may respond in writing, where deficiencies or concerns are noted and may request re-submission with correction of deficiencies or concerns either accepting or requesting improvements.
- .3 Relief from or substitution for any portion or provision of minimum Health and Safety standards specified herein or reviewed site-specific Health and Safety Plan shall be submitted to Departmental Representative in writing.
- 1.10 COMPLIANCE REQUIREMENTS .1 Comply with Ontario Occupational Health and Safety Act, R.S.O. 1990 Chapter O.1, as amended.
- 1.11 RESPONSIBILITY .1 Be responsible for health and safety of persons on site, safety of property on site and for protection of persons adjacent to site and environment to extent that they may be affected by conduct of Work.
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- 1.11 RESPONSIBILITY (Cont'd) .2 Comply with and enforce compliance by employees with safety requirements of Contract Documents, applicable federal, provincial, territorial and local statutes, regulations, and ordinances, and with site-specific Health and Safety Plan.
- .3 Where applicable the Contractor shall be designated "Constructor", as defined by Occupational Health and Safety Act for the Province of Ontario.
- 1.12 UNFORSEEN HAZARDS .1 Should any unforeseen or peculiar safety-related factor, hazard, or condition become evident during performance of Work, immediately stop work and advise Departmental Representative verbally and in writing.
- .2 Follow procedures in place for Employees Right to Refuse Work as specified in the Occupational Health and Safety Act for the Province of Ontario.
- 1.13 HEALTH AND SAFETY CO-ORDINATOR .1 Employ and assign to Work, competent and authorized representative as Health and Safety Co-ordinator. Health and Safety Co-ordinator must:
- .1 Have site-related working experience specific to activities associated with abatement of lead and asbestos containing materials.
- .2 Have working knowledge of occupational safety and health regulations.
- .3 Be responsible for completing Contractor's Health and Safety Training Sessions and ensuring that personnel not successfully completing required training are not permitted to enter site to perform Work.
- .4 Be responsible for implementing, enforcing daily and monitoring site-specific Contractor's Health and Safety Plan.
- .5 Be on site during execution of Work and report directly to and be under direction of Registered Occupational Hygienist, Certified Industrial Hygienist and or site supervisor.
- 1.14 POSTING OF DOCUMENTS .1 Ensure applicable items, articles, notices and orders are posted in conspicuous location on site in accordance with Acts and Regulations of Province of Ontario, and in consultation with Departmental Representative.
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- 1.14 POSTING OF DOCUMENTS  
(Cont'd)
- .1 (Cont'd)
- .1 Contractor's Safety Policy.
  - .2 Constructor's Name.
  - .3 Notice of Project.
  - .4 Name, trade, and employer of Health and Safety Representative or Joint Health and Safety Committee members (if applicable).
  - .5 Ministry of Labour Orders and reports.
  - .6 Occupational Health and Safety Act and Regulations for Construction Projects for Province of Ontario.
  - .7 Address and phone number of nearest Ministry of Labour office.
  - .8 Material Safety Data Sheets.
  - .9 Written Emergency Response Plan.
  - .10 Site Specific Safety Plan.
  - .11 Valid certificate of first aider on duty.
  - .12 WSIB "In Case of Injury At Work" poster.
  - .13 Location of toilet and cleanup facilities.
- 1.15 CORRECTION OF NON-COMPLIANCE
- .1 Immediately address health and safety non-compliance issues identified by authority having jurisdiction or by Departmental Representative.
- .2 Provide Departmental Representative with written report of action taken to correct non-compliance of health and safety issues identified.
- .3 Departmental Representative may stop Work if non-compliance of health and safety regulations is not corrected.
- 1.16 BLASTING
- .1 Blasting or other use of explosives is not permitted.
- 1.17 POWDER ACTUATED DEVICES
- .1 Use powder actuated devices only after receipt of written permission from Departmental Representative.
- 1.18 WORK STOPPAGE
- .1 Give precedence to safety and health of public and site personnel and protection of environment over cost and schedule considerations for Work.
- .2 Assign responsibility and obligation to Competent Supervisor to stop or start Work when,
-

1.18 WORK STOPPAGE .2 (Cont'd)  
(Cont'd) at Competent Supervisor's discretion, it is necessary or advisable for reasons of health or safety. Departmental Representative may also stop Work for health and safety considerations.

PART 2 - PRODUCTS

2.1 NOT USED .1 Not used.

PART 3 - EXECUTION

3.1 NOT USED .1 Not used.

PART 1 - GENERAL

- 1.1 DEFINITIONS .1 Environmental Pollution and Damage: presence of chemical, physical, biological elements or agents which adversely affect human health and welfare; unfavourably alter ecological balances of importance to human life; affect other species of importance to humans; or degrade environment aesthetically, culturally and/or historically.
- .2 Environmental Protection: prevention/control of pollution and habitat or environment disruption during construction.
- 1.2 ACTION AND INFORMATIONAL SUBMITTALS .1 Submit in accordance with Section 01 33 00.
- .2 Product Data:  
.1 Submit manufacturer's instructions, printed product literature, data sheets and include product characteristics, performance criteria, physical size, finish and limitations.  
.2 Submit 2 copies of WHMIS MSDS.
- .3 Before commencing construction activities or delivery of materials to site, submit Environmental Protection Plan for review by Departmental Representative.
- .4 Environmental Protection Plan must include comprehensive overview of known or potential environmental issues to be addressed during construction.
- .5 Address topics at level of detail commensurate with environmental issue and required construction tasks.
- .6 Include in Environmental Protection Plan:  
.1 Names of persons responsible for ensuring adherence to Environmental Protection Plan.  
.2 Names and qualifications of persons responsible for manifesting hazardous waste to be removed from site.  
.3 Names and qualifications of persons responsible for training site personnel.  
.4 Descriptions of environmental protection personnel training program.  
.5 Spill Control Plan to include procedures, instructions, and reports to be used in event of unforeseen spill of regulated substance.
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1.2 ACTION AND INFORMATIONAL SUBMITTALS <u>(Cont'd)</u>	.6	(Cont'd) .6 Non-Hazardous solid waste disposal plan identifying methods and locations for solid waste disposal including clearing debris. .7 Air pollution control plan detailing provisions to assure that dust, debris, materials, and trash, are contained on project site. .8 Contaminant Prevention Plan identifying potentially hazardous substances to be used on job site; intended actions to prevent introduction of such materials into air, water, or ground; and detailing provisions for compliance with Federal, Provincial, and Municipal laws and regulations for storage and handling of these materials. .9 Waste Water Management Plan identifying methods and procedures for management and discharge of waste waters which are directly derived from construction activities, such as clean-up water, disinfection water and water used in flushing of lines.
<u>1.3 FIRES</u>	.1	Fires and burning of rubbish on site is not permitted.
<u>1.4 SITE CLEARING AND PLANT PROTECTION</u>	.1	Protect trees and plants on site and adjacent properties.
	.2	Protect trees and shrubs adjacent to storage areas and trucking lanes.
<u>1.5 POLLUTION CONTROL</u>	.1	Maintain temporary erosion and pollution control features installed under this Contract.
	.2	Control emissions from equipment and plant in accordance with local authorities' emission requirements.
	.3	Cover or wet down dry materials and rubbish to prevent blowing dust and debris.
<u>1.6 NOTIFICATION</u>	.1	Departmental Representative will notify Contractor in writing of observed noncompliance with Federal, Provincial or Municipal environmental laws or regulations, permits, and

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- 1.6 NOTIFICATION (Cont'd)
- .1 (Cont'd)  
other elements of Contractor's Environmental Protection plan.
  - .2 Contractor: after receipt of such notice, inform Departmental Representative of proposed corrective action and take such action for approval by Departmental Representative.
    - .1 Take action only after receipt of written approval by Departmental Representative.
  - .3 Departmental Representative will issue stop order of work until satisfactory corrective action has been taken.
  - .4 No time extensions granted or equitable adjustments allowed to Contractor for such suspensions.

PART 2 - PRODUCTS

- 2.1 NOT USED
- .1 Not Used.

PART 3 - EXECUTION

- 3.1 CLEANING
- .1 Progress Cleaning: clean in accordance with Section 01 74 11.
    - .1 Leave Work area clean at end of each day.
  - .2 Ensure public waterways, storm and sanitary sewers remain free of waste and volatile materials disposal.
  - .3 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11.
  - .4 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 20.
    - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

PART 1 - GENERAL

- 1.1 REFERENCES AND CODES .1 Perform Work in accordance with National Building Code of Canada (NBC) 2010, National Fire Code of Canada (NFC) 2010 and Ontario Building Code (OBC) 2012, including all amendments up to bid closing date and other codes of provincial or local application provided that in case of conflict or discrepancy, more stringent requirements apply.
- .2 Meet or exceed requirements of:  
.1 Contract documents.  
.2 Specified standards, codes and referenced documents.
- 1.2 HAZARDOUS MATERIAL DISCOVERY .1 Stop work immediately and notify Departmental Representative if materials which may contain designated substances or PCB's, other than those identified in Section 01 35 29 are discovered in course of work.
- 1.3 BUILDING SMOKING ENVIRONMENT .1 Comply with smoking restrictions.
- 1.4 IAQ - INDOOR AIR QUALITY .1 Comply with CSA-Z204-94(R1999), Guideline for Managing Indoor Air Quality in Office Buildings and CSA B651-12.
- 1.5 ACCESSIBLE DESIGN .1 Comply with CSA B651-12, Accessible Design for the Built Environment, unless specified otherwise. In any case of conflict or discrepancy between the building codes and CSA B651, the requirements of CSA B651 shall apply.
- 1.6 TAXES .1 Pay applicable Federal, Provincial and Municipal taxes.
-

- 1.7 EXAMINATION .1 Examine existing conditions and determine conditions affecting work.
- .2 Conduct concrete floor moisture testing using Calcium Chloride moisture tests.  
.1 Submit test results to Departmental Representative for approval prior to installing any flooring. Conduct one test per 100 m<sup>2</sup> of area being covered.

PART 2 - PRODUCTS

- 2.1 NOT USED .1 Not Used.

PART 3 - EXECUTION

- 3.1 NOT USED .1 Not Used.

PART 1 - GENERAL

<u>1.1 ABBREVIATIONS AND ACRONYMS</u>	.1	The abbreviations and acronyms are commonly found in the Project Manual and represent the associated organizations or terms.
<u>1.2 MATERIALS, EQUIPMENT AND METHODS</u>	.1	A: .1 AC: acoustic. .2 AC PAN: acoustic panel. .3 ACU: acoustic unit ceiling. .4 AFF: above finished floor. .5 AC PLAS: acoustic plaster. .6 ACT: acoustic tile. .7 ACR CU LVR: acrylic cube louvre. .8 ADH: adhesive. .9 ADJ: adjustable. .10 A/C: air conditioner. .11 AL: aluminum. .12 AB: anchor bolt. .13 ANOD: anodized. .14 ARCH: architecture. .15 ARCH BLK: architectural block. .16 AVB: air vapour barrier.
	.2	B: .1 B: base. .2 BEAST: benthic assessment of sediment. .3 BH: bore hole. .4 BL: bottom layer. .5 BLK: block. .6 BLKD: bulkhead. .7 BM: beam. .8 BOT: bottom. .9 BMP: best management practice. .10 B PL: base plate. .11 BRG: bearing. .12 BRK: brick. .13 BSMT: basement. .14 BTEX: benzene, toluene, ethylbenzene and xylenes. .15 BUR: built-up roof.
	.3	C: .1 CAL: caliper. .2 CANTIL: cantilever. .3 CB: catch basin. .4 CC: centre to centre. .5 CCN: contemplated change notice. .6 CDF: controlled density fill. .7 CEC: Canadian Electrical Code. .8 CF: chair fabric.

1.2 MATERIALS,  
EQUIPMENT AND  
METHODS  
(Cont'd)

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- .3 C:(Cont'd)
- .9 CHAN: channel.
  - .10 CHS: Canadian hydrographic service.
  - .11 CJ: construction joint.
  - .12 CL: centreline.
  - .13 CK: cork.
  - .14 CLG: ceiling.
  - .15 CLR: clear.
  - .16 COL: column.
  - .17 CONC: concrete.
  - .18 CONC BLK: concrete block.
  - .19 CONC BRK: concrete brick.
  - .20 CONT: continuous.
  - .21 CONT J: control joint.
  - .22 COMPL: complete.
  - .23 CM: centimetre. (Nursery stock).
  - .24 CPL: cement plaster.
  - .25 CPM: critical path method.
  - .26 CPT: carpet.
  - .27 CPTT: carpet tile.
  - .28 CT: ceramic tile.
  - .29 CVT: conductive vinyl tile.
  - .30 C/W: complete with.
- .4 D:
- .1 D: deep.
  - .2 DD: dutch door.
  - .3 DEG: degree.
  - .4 DF: drinking fountain.
  - .5 DIA: diameter.
  - .6 DIM: dimension.
  - .7 DL: dead load.
  - .8 DMNT: demountable.
  - .9 DP: dampproofing.
  - .10 DR: door.
  - .11 DRP: drapery.
  - .12 DWL: dowel.
- .5 E:
- .1 EA: each.
  - .2 EC: epoxy coating.
  - .3 ECF: engineered containment facility.
  - .4 EE: each end.
  - .5 EF: each face.
  - .6 EL: elevation.
  - .7 ELEC: electric.
  - .8 ELEV: elevator.
  - .9 EM: expanded metal.
  - .10 ENCL: enclosure.
  - .11 EQ: equal.
  - .12 EXH: exhaust.
  - .13 EXIST: existing.
  - .14 EXPJ: expansion joint.
  - .15 EXP STRUCT: exposed structure.
  - .16 EXT: exterior.
-

1.2 MATERIALS, EQUIPMENT AND METHODS <u>(Cont'd)</u>	.5	E:(Cont'd)
	.17	EW: each way.
	.6	F:
	.1	FC: fuel contributed.
	.2	FD: floor drain.
	.3	FDN: foundation.
	.4	FEAT W: feature wall.
	.5	FEXT: fire extinguisher.
	.6	FH: fire hose.
	.7	FHC: fire hose cabinet.
	.8	FHR: fire hose rack.
	.9	FIN: finish.
	.10	FIP: federal identity program.
	.11	FL: floor.
	.12	FLD: field.
	.13	FLUOR: fluorescent.
	.14	FR: frame.
	.15	FRR: fire resistance rating.
	.16	FTG: footing.
	.7	G:
	.1	GALV: galvanized steel.
	.2	GB: grab bar.
	.3	GBD: gypsum board.
	.4	GC: General Conditions.
	.5	GF: ground floor.
	.6	GFCI: ground fault circuit interrupter.
	.7	GL: glass or glazing.
	.8	GL BLK: glass block.
	.9	GPC: gypsum plaster ceiling.
	.10	GPW: gypsum plaster wall.
	.11	GT: glass tile.
	.8	H:
	.1	HB: hose bib.
	.2	HC: hollow core.
	.3	HCWD: hollow core wood door.
	.4	HD: hand dryer.
	.5	HDW: hardware.
	.6	HDWD: hardwood.
	.7	HM: hollow metal.
	.8	HOR: horizontal.
	.9	HOR EF: horizontal each face.
	.10	HP: hydro pole.
	.11	HPA: Hamilton Port Authority.
	.12	HR: hour.
	.13	HRV: heat recovery ventilator.
	.14	HT: height.
	.15	HTR: heater.
	.16	HWT: hot water tank.
	.17	HYD: hydrant.

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1.2 MATERIALS,  
EQUIPMENT AND  
METHODS  
(Cont'd)

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- .9 I:  
.1 ICF: insulated concrete formwork.  
.2 ID: inside diameter.  
.3 INS: insulation.  
.4 INTLK: interlock.
- .10 J:  
.1 JT: joint.
- .11 K:  
.1 KPL: kick plate.
- .12 L:  
.1 LAV: lavatory.  
.2 LDG: landing.  
.3 LG: long.  
.4 LINO: linoleum.  
.5 LL: live load.  
.6 LT: light.
- .13 M:  
.1 MAS: masonry.  
.2 MAS FL: masonry flashing.  
.3 MAX: maximum.  
.4 MBG: metal bar grating.  
.5 MCL: metal cube louvre.  
.6 MECH: mechanical.  
.7 MET: metal.  
.8 MET DK: metal deck.  
.9 MET FL: metal flashing.  
.10 MET GRID CLG: metal grid ceiling.  
.11 MET GRTG: metal grating.  
.12 MET LIN CLG: metal linear ceiling.  
.13 MET T PTN: metal toilet partition.  
.14 MH: maintenance hole.  
.15 MIN: minimum.  
.16 MLP: metal lath and plaster.  
.17 MO: masonry opening.  
.18 MR: marble.  
.19 MT: metal threshold.  
.20 MWP: membrane waterproofing.
- .14 N:  
.1 NBC: national building code.  
.2 NF: near face.  
.3 NFC: national fire code.  
.4 NIC: not in contract.  
.5 NO: number.  
.6 NRC: noise reduction coefficient.  
.7 NRP: non removable pin.  
.8 NTS: not to scale.
- .15 O:  
.1 OBC: Ontario building code.  
.2 OC: on centre.
-

1.2 MATERIALS,  
EQUIPMENT AND  
METHODS  
(Cont'd)

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- .15 O:(Cont'd)
- .3 OD: outside diameter.
  - .4 OPNG: opening.
  - .5 OPR: operator.
  - .6 OVHD: overhead.
  - .7 OWSJ: open web steel joist.
- .16 P:
- .1 P: prefinished.
  - .2 PAH: polynuclear aromatic hydrocarbons.
  - .3 PARG: parging.
  - .4 PCC: precast concrete.
  - .5 PCT: porcelain ceramic tile.
  - .6 PED ACS FLG: pedestal access flooring.
  - .7 PF: panel fabric.
  - .8 PL: plate.
  - .9 PLAM: plastic laminate.
  - .10 PLAS: plaster.
  - .11 PLYWD: plywood.
  - .12 PR: pair.
  - .13 PREFAB: prefabricated.
  - .14 PREFIN: prefinished.
  - .15 PRFL: profile.
  - .16 PT: paint.
  - .17 PTD: paper towel dispenser.
  - .18 PTN: partition.
  - .19 PVC: polyvinyl chloride.
- .17 Q:
- .1 QTB: quarry tile base.
  - .2 QTF: quarry tile floor.
  - .3 QTR: quarry tile roof.
- .18 R:
- .1 R: radius.
  - .2 RA: return air.
  - .3 RB: resilient base.
  - .4 RC: reinforced concrete.
  - .5 RCPT: receptacle.
  - .6 RD: roof drain.
  - .7 REINF: reinforced/reinforcing.
  - .8 REQD: required.
  - .9 REQT: requirement.
  - .10 RFT: rubber floor tile.
  - .11 RM: room.
  - .12 RO: rough opening.
  - .13 RP: radiant panel.
  - .14 RRS: recycled rubber sheet.
  - .15 RRT: recycled rubber tile.
  - .16 RSD: rolling steel door.
  - .17 RSF: rubber sheet flooring.
  - .18 RTU: roof top unit.
  - .19 RWL: rain water leader.
-

1.2 MATERIALS,  
EQUIPMENT AND  
METHODS  
(Cont'd)

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- .19 S:  
.1 SAN SEW: sanitary sewer.  
.2 SCHED: schedule.  
.3 SC: solic core.  
.4 SCRN: screen.  
.5 SCWD: solid core wood door.  
.6 SD: smoke developed.  
.7 SDT: static dissipative tile.  
.8 SECT: section.  
.9 SH: sill height.  
.10 SIM: similar.  
.11 SL: sliding.  
.12 SLR: sealer.  
.13 SPEC: specification.  
.14 SS: stainless steel.  
.15 STD: standard.  
.16 STL: steel.  
.17 STL BM: steel beam.  
.18 STC: sound tranmission class.  
.19 STL FL DK: steel floor deck.  
.20 STL PL: steel plate.  
.21 STN: stone.  
.22 STR: structure or structural.  
.23 ST SEW: storm sewer.  
.24 S&U: stain and urethane.  
.25 S&V: stain and varnish.  
.26 SVT: solid vinyl tile.
- .20 T:  
.1 T: top.  
.2 T&B: top and bottom.  
.3 TCB: turbidity control plan.  
.4 TEL: telephone.  
.5 TER: terrazzo.  
.6 TERT: terrazzo tile.  
.7 THKNS: thickness.  
.8 THR: threshold.  
.9 TMPD: tempered.  
.10 TOPG: topping.  
.11 TRANSV: transverse.  
.12 TYP: typical.
- .21 U:  
.1 U: urethane.  
.2 UCUT: undercut.  
.3 UGRD: underground.  
.4 UNO: unless noted otherwise.  
.5 UOS: unless otherwise specified.  
.6 U/S: underside.  
.7 UR: urinal.
- .22 V:  
.1 VCF: vinyl coated fabric.  
.2 VCT: vinyl compositition tile.  
.3 VERT: vertical.
-



1.3 STANDARDS  
ORGANIZATIONS  
(Cont'd)

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- .1 (Cont'd)
- .18 CSDMA - Canadian Steel Door Manufacturers Association.
  - .19 CSI - Construction Specifications Institute.
  - .20 CSSBI - Canadian Sheet Steel Building Institute.
  - .21 CRCA - Canadian Roofing Contractors Association.
  - .22 DHI - Door and Hardware Insitute.
  - .23 EEMAC - Electrical and Electronic Manufacturer's Association of Canada.
  - .24 ESA - Electrical Safety Authority.
  - .25 FCC - Fire Commissioner of Canada.
  - .26 FSC - Forest Stewardship Council.
  - .27 GANA - Glass Association of North America.
  - .28 HMMA - Hollow Metal Manufacturers Association.
  - .29 IEEE - Institute of Electrical and Electronics Engineers Inc.
  - .30 ISO - International Organization for Standardization.
  - .31 IWFA - International Window Film Association.
  - .32 LEED - LEED Canada, Leadership in Energy and Environmental Design.
  - .33 MPI - Master Painters Insitute.
  - .34 NAAMM - National Association of Architectural Metal Manufacturers.
  - .35 NCPI - National Clay Pipe Institute.
  - .36 NEMA - National Electrical Manufacturers Association.
  - .37 NFPA - National Fire Protection Association.
  - .38 OPSD - Ontario Provincial Standard Drawings.
  - .39 OPSS - Ontario Provincial Standard Specifications.
  - .40 PPI - Plasctics Pipe Institute.
  - .41 SDI - Steel Door Intitute.
  - .42 SCAQMD - South Coast Air Quality Management District.
  - .43 TIA - Telecommunications Industry Association.
  - .44 TIAC - Thermal Insulation Association of Canada.
  - .45 TTMAC - Terrazzo Tile and Marble Association of Canada.
  - .46 UL - Underwriters Laboratories.
  - .47 ULC - Underwriters Laboratories of Canada.
  - .48 US EPA - United States Environmental Protection Agency.
  - .49 WH - Warnock Hersey.
-

1.4 FEDERAL  
GOVERNMENT DEPART-  
MENTS AND AGENCIES

- .1 Departments, agencies and crown corporations.
  - .1 CEAA - Canadian Environmental Assessment Agency.
  - .2 CSC - Correctional Service Canada.
  - .3 CRA - Canada Revenue Agency.
  - .4 DND - Department of National Defence.
  - .5 EC - Environment Canada.
  - .6 FHBRO - Federal Heritage Buildings Review Office.
  - .7 HC - Health Canada.
  - .8 HCD - Heritage Conservation Directorate.
  - .9 LC - Labour Canada.
  - .10 PC - Parks Canada.
  - .11 PWGSC - Public Works and Government Services Canada.
  - .12 RCMP - Royal Canadian Mounted Police.
  - .13 TBS - Treasury Board Secretariat.
  - .14 TC - Transport Canada.

1.5 PROVINCIAL  
GOVERNMENT DEPART-  
MENTS AND AGENCIES

- .1 MOEE - Ontario Ministry of Environment and Energy.
- .2 MOL - Ontario Ministry of Labour.
- .3 MTO and MOT - Ontario Ministry of Transportation.
- .4 TSSA - Technical Standards and Safety Authority.

1.6 INTERNATIONAL  
GOVERNMENT DEPART-  
MENTS AND AGENCIES

- .1 DOHMH - New York City Department of Health and Mental Hygiene, USA.
- .2 GSA - Government Services Administration, USA.

1.7 UNITS OF  
MEASURE METRIC

- .1 The following abbreviations of units of measure are commonly found in the Project Manual:
    - .1 C: Celsius.
    - .2 cm: centimetre.
    - .3 kg: kilogram.
    - .4 kg/m<sup>3</sup>: kilogram per cubic metre.
    - .5 kN: kilonewton.
    - .6 kPa: kilopascals.
    - .7 kw: kilowatts.
    - .8 l/s: litre per second.
    - .9 m: metre.
    - .10 m<sup>3</sup>: cubic metre.
    - .11 mg/kg: milligrams per kilogram.
    - .12 mg/L: milligrams per litre.
-

1.7 UNITS OF  
MEASURE METRIC  
(Cont'd)

- .1 (Cont'd)  
.13 mm: millimetres.  
.14 MPa: megapascal.  
.15 NTU: nephelometric turbidity unit.  
.16 ppm: parts per million.  
.17 ug/L: micrograms per litre.  
.18 ug/m<sup>3</sup>: micrograms per cubic metre.

1.8 UNITS OF  
MEASURE IMPERIAL

- .1 The following abbreviations of units of measure  
are commonly found in the Project Manual:  
.1 F: Fahrenheit.  
.2 ft: foot/feet.  
.3 ga: guage.  
.4 gpm: gallons per minute.  
.5 in: inches.  
.6 lbs: pounds.  
.7 NTU: nephelometric turbidity unit.  
.8 psi: pounds-force per square inch.  
.9 ppm: parts per million.

PART 2 - PRODUCTS

2.1 NOT USED .1 Not Used.

PART 3 - EXECUTION

3.1 NOT USED .1 Not Used.

PART 1 - GENERAL

1.1 SECTION  
INCLUDES

- .1 Inspection and testing, administrative and enforcement requirements.
- .2 Tests and mix designs.
- .3 Mock-ups.
- .4 Mill tests.
- .5 Equipment and system adjust and balance.

1.2 INSPECTION

- .1 Allow Departmental Representative access to Work. If part of Work is in preparation at locations other than Place of Work, allow access to such Work whenever it is in progress.
- .2 Give timely notice requesting inspection if Work is designated for special tests, inspections or approvals by Departmental Representative instructions, or law of Place of Work.
- .3 If Contractor covers or permits to be covered Work that has been designated for special tests, inspections or approvals before such is made, uncover such Work, have inspections or tests satisfactorily completed and make good such Work.
- .4 Departmental Representative may order any part of Work to be examined if Work is suspected to be not in accordance with Contract Documents. If, upon examination such work is found not in accordance with Contract Documents, correct such Work and pay cost of examination and correction. If such Work is found in accordance with Contract Documents, Departmental Representative shall pay cost of examination and replacement.

1.3 INDEPENDENT  
INSPECTION AGENCIES

- .1 Independent Inspection/Testing Agencies will be engaged by Departmental Representative for purpose of inspecting and/or testing portions of Work, above and beyond those required of the Contractor. Cost of such services will be borne by Departmental Representative.
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- 1.3 INDEPENDENT INSPECTION AGENCIES (Cont'd)
- .2 Provide equipment required for executing inspection and testing by appointed agencies.
  - .3 Employment of inspection/testing agencies does not relax responsibility to perform Work in accordance with Contract Documents.
  - .4 If defects are revealed during inspection and/or testing, appointed agency will request additional inspection and/or testing to ascertain full degree of defect. Correct defect and irregularities as advised by Departmental Representative at no cost to Departmental Representative. Pay costs for retesting and reinspection.
- 1.4 ACCESS TO WORK
- .1 Allow inspection/testing agencies access to Work, off site manufacturing and fabrication plants.
  - .2 Co-operate to provide reasonable facilities for such access.
- 1.5 PROCEDURES
- .1 Notify appropriate agency and Departmental Representative in advance of requirement for tests, in order that attendance arrangements can be made.
  - .2 Submit samples and/or materials required for testing, as specifically requested in specifications. Submit with reasonable promptness and in an orderly sequence so as not to cause delay in Work.
  - .3 Provide labour and facilities to obtain and handle samples and materials on site. Provide sufficient space to store and cure test samples.
- 1.6 REJECTED WORK
- .1 Remove defective Work, whether result of poor workmanship, use of defective products or damage and whether incorporated in Work or not, which has been rejected by Departmental Representative as failing to conform to Contract Documents. Replace or re-execute in accordance with Contract Documents.
  - .2 Make good other Contractor's work damaged by such removals or replacements promptly.
-



1.10 MILL TESTS .1 Submit mill test certificates as required of  
specification Sections.

1.11 EQUIPMENT AND .1 Submit testing, adjusting and balancing reports  
SYSTEMS for mechanical, electrical and building  
equipment systems.

PART 2 - PRODUCTS

2.1 NOT USED .1 Not Used.

PART 3 - EXECUTION

3.1 NOT USED .1 Not Used.

PART 1 - GENERAL

- 1.1 SUBMITTALS .1 Provide submittals in accordance with Section 01 33 00.
- 1.2 INSTALLATION AND REMOVAL .1 Provide temporary utilities controls in order to execute work expeditiously.  
.2 Remove from site all such work after use.
- 1.3 WATER SUPPLY .1 Departmental Representative will provide continuous supply of potable water for construction use.
- 1.4 TEMPORARY HEATING AND VENTILATION .1 Provide temporary ventilation required during construction period, including attendance, maintenance and fuel.  
.2 Provide temporary ventilation in enclosed areas as required to:  
.1 Facilitate progress of Work.  
.2 Provide adequate ventilation to meet health regulations for safe working environment.  
.3 Ventilating:  
.1 Prevent accumulations of dust, fumes, mists, vapours or gases in areas occupied during construction.  
.2 Provide local exhaust ventilation to prevent harmful accumulation of hazardous substances into atmosphere of occupied areas.  
.3 Dispose of exhaust materials in manner that will not result in harmful exposure to persons.  
.4 Ventilate storage spaces containing hazardous or volatile materials.  
.5 Ventilate temporary sanitary facilities.  
.6 Continue operation of ventilation and exhaust system for time after cessation of work process to assure removal of harmful contaminants.  
.4 Maintain strict supervision of operation of temporary ventilating equipment to:  
.1 Conform with applicable codes and standards.  
.2 Enforce safe practices.
-



PART 2 - PRODUCTS

2.1 NOT USED .1 Not Used.

PART 3 - EXECUTION

3.1 NOT USED .1 Not Used.

PART 1 - GENERAL

- 1.1 SECTION INCLUDES
- .1 Construction aids.
  - .2 Office and sheds.
  - .3 Parking.
- 1.2 REFERENCES
- .1 Canadian General Standards Board (CGSB)
    - .1 CAN/CGSB-1.189-2000, Exterior Alkyd Primer for Wood.
    - .2 CAN/CGSB-1.59-97, Alkyd Exterior Gloss Enamel.
  - .2 Canadian Standards Association (CSA International)
    - .1 CSA A23.1-09/A23.2-09, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
    - .2 CSA 0121-08, Douglas Fir Plywood.
    - .3 CSA Z797-09, Code of practice for Access Scaffold.
    - .4 CAN/CSA-Z321-96(R2006), Signs and Symbols for the Occupational Environment, withdrawn but still available from CSA, CCOHS and Techstreet.
- 1.3 SUBMITTALS
- .1 Provide submittals in accordance with Section 01 33 00.
- 1.4 INSTALLATION AND REMOVAL
- .1 Prepare site plan indicating proposed location and dimensions of area to be fenced and/or used by Contractor, number of trailers to be used, avenues of ingress/egress to fenced area and details of fence installation.
  - .2 Indicate use of supplemental or other staging area.
  - .3 Provide construction facilities in order to execute work expeditiously.
  - .4 Remove from site all such work after use.
-

- 1.5 SCAFFOLDING .1 Scaffolding in accordance with CSA Z797.
- .2 Provide and maintain scaffolding, ramps, ladders and platforms
- 1.6 HOISTING .1 Provide, operate and maintain hoists/cranes required for moving of workers, materials and equipment. Make financial arrangements with Subcontractors for use thereof.
- .2 Hoists/cranes shall be operated by qualified operator.
- 1.7 ELEVATORS .1 Designated freight elevator may be used by construction personnel and transporting of materials. Co-ordinate use with Departmental Representative.
- .2 Provide protective coverings for finish surfaces of cars and entrances.
- 1.8 SITE STORAGE/LOADING .1 Confine work and operations of employees to areas defined by Contract Documents. Do not unreasonably encumber premises with products.
- .2 Do not load or permit to load any part of Work with a weight or force that will endanger the Work.
- 1.9 CONSTRUCTION PARKING .1 Limited parking of 20 installs will be permitted on site provided it does not disrupt performance of Work. Contractor parking shall not disrupt public and building employee parking.
- .2 Provide and maintain adequate access to project site.
- .3 Use existing roads for access to project site, maintain such roads for duration of Contract and make good damage resulting from Contractors use of roads.
- .4 Clean roads and construction areas where used by Contractor's equipment.
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- 1.10 SECURITY .1 Pay for responsible security personnel to guard site and contents of site after working hours, during weekends and holidays, directed by Departmental Representative.
- 1.11 EQUIPMENT, TOOL AND MATERIALS STORAGE .1 Provide and maintain, in a clean and orderly condition, lockable weatherproof sheds for storage of tools, equipment and materials.
- .2 Locate materials not required to be stored in weatherproof sheds on site in a manner to cause least interference with work activities.
- 1.12 SANITARY FACILITIES .1 Use existing sanitary facilities for work force in accordance with governing regulations and ordinances.
- .2 Post notices and take such precautions as required by local health authorities. Keep area and premises in sanitary condition.
- 1.13 CONSTRUCTION SIGNAGE .1 No other signs or advertisements, other than warning signs, are permitted on site.
- .2 Signs and notices for safety and instruction shall be in both official languages. Graphic symbols shall conform to CAN/CSA-Z321.
- .3 Maintain approved signs and notices in good condition for duration of project, and dispose of off site on completion of project or earlier if directed by Departmental Representative.
- 1.14 CLEAN-UP .1 Remove construction debris, waste materials, packaging material from work site daily.
- .2 Clean dirt or mud tracked onto paved or surfaced roadways.
- .3 Store materials resulting from demolition activities that are salvageable.
- .4 Stack stored new or salvaged material.
-

PART 2 - PRODUCTS

2.1 NOT USED .1 Not Used.

PART 3 - EXECUTION

3.1 NOT USED .1 Not Used.

PART 1 - GENERAL

- 1.1 SECTION INCLUDES
- .1 Barriers.
  - .2 Environmental Controls.
  - .3 Traffic Controls.
  - .4 Fire Routes.
- 1.2 REFERENCES
- .1 Canadian General Standards Board (CGSB):
    - .1 CAN/CGSB-1.189-2000, Exterior Alkyd Primer for Wood.
    - .2 CAN/CGSB-1.59-97, Alkyd Exterior Gloss Enamel.
  - .2 Canadian Standards Association (CSA):
    - .1 CSA-0121-08, Douglas Fir Plywood.
- 1.3 INSTALLATION AND REMOVAL
- .1 Provide temporary controls in order to execute Work expeditiously.
  - .2 Remove from site all such work after use.
- 1.4 GUARD RAILS AND BARRICADES
- .1 Provide as required by governing authorities.
- 1.5 DUST TIGHT SCREENS
- .1 Provide dust tight screens or partitions to localize dust generating activities, and for protection of workers, finished areas of Work and public.
  - .2 Maintain and relocate protection until such work is complete.
  - .3 Provide dust tight enclosure of fire alarm system components during dust generating work.
  - .4 Coordinate with building operator on by-passing fire alarm system.
-

- 1.6 PUBLIC TRAFFIC FLOW .1 Provide and maintain competent signal flag operators, traffic signals, barricades and flares, lights, or lanterns as required to perform Work and protect the public.
- 1.7 FIRE ROUTES .1 Maintain access to property including overhead clearances for use by emergency response vehicles.
- 1.8 PROTECTION FOR OFF-SITE AND PUBLIC PROPERTY .1 Protect surrounding private and public property from damage during performance of Work.  
.2 Be responsible for damage incurred.
- 1.9 PROTECTION OF BUILDING FINISHES .1 Provide protection for finished and partially finished building finishes and equipment during performance of Work.  
.2 Provide necessary screens, covers, and hoardings.  
.3 Confirm with Departmental Representative locations and installation schedule 7 days prior to installation.  
.4 Be responsible for damage incurred due to lack of or improper protection.

PART 2 - PRODUCTS

- 2.1 NOT USED .1 Not Used.
-

PART 3 - EXECUTION

3.1 NOT USED .1 Not Used.

PART 1 - GENERAL

1.1 SECTION  
INCLUDES

- .1 Product quality, availability, storage, handling, protection, and transportation.
- .2 Manufacturer's instructions.
- .3 Quality of Work, coordination and fastenings.
- .4 Existing facilities.

1.2 REFERENCES

- .1 Within text of specifications, reference may be made to reference standards.
- .2 Conform to these standards, in whole or in part as specifically requested in specifications.
- .3 If there is question as to whether any product or system is in conformance with applicable standards, Departmental Representative reserves right to have such products or systems tested to prove or disprove conformance.
- .4 The cost for such testing will be born by Departmental Representative in event of conformance with Contract Documents or by Contractor in event of non-conformance.
- .5 Conform to latest date of issue of referenced standards in effect on date of submission of Bids, except where specific date or issue is specifically noted.

1.3 QUALITY

- .1 Products, materials, equipment and articles (referred to as products throughout specifications) incorporated in Work shall be new, not damaged or defective, and of best quality (compatible with specifications) for purpose intended. If requested, furnish evidence as to type, source and quality of Products provided.
  - .2 Defective products, whenever identified prior to completion of Work, will be rejected, regardless of previous inspections. Inspection does not relieve responsibility, but is precaution against oversight or error. Remove and replace defective products at own expense
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- 1.3 QUALITY  
(Cont'd)
- .2 (Cont'd)  
and be responsible for delays and expenses  
caused by rejection.
- .3 Should any dispute arise as to quality or  
fitness of products, decision rests strictly  
with Departmental Representative based upon  
requirements of Contract Documents.
- .4 Unless otherwise indicated in specifications,  
maintain uniformity of manufacture for any  
particular or like item throughout building.
- .5 Permanent labels, trademarks and nameplates on  
products are not acceptable in prominent  
locations, except where required for operating  
instructions, or when located in mechanical or  
electrical rooms.
- 1.4 AVAILABILITY
- .1 Immediately upon signing Contract, review  
product delivery requirements and anticipate  
foreseeable supply delays for any items. If  
delays in supply of products are foreseeable,  
notify Departmental Representative of such, in  
order that substitutions or other remedial  
action may be authorized in ample time to  
prevent delay in performance of Work.
- .2 In event of failure to notify Departmental  
Representative at commencement of Work and  
should it subsequently appear that Work may be  
delayed for such reason, Departmental  
Representative reserves right to substitute more  
readily available products of similar character,  
at no increase in Contract Amount or Contract  
Time.
- 1.5 METRIC SIZED  
MATERIALS
- .1 SI metric units of measurement are used  
exclusively on the drawings and in the  
specifications for this project.
- .2 The Contractor is required to provide metric  
products in the sizes called for in the Contract  
Documents except where a valid claim can be made  
that a particular product is not available on  
the Canadian market.
- .3 Claims for exemptions from use of metric sized  
products shall be in writing and fully  
substantiated with supportive documentation.  
Promptly submit application to Departmental
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- 1.5 METRIC SIZED MATERIALS  
(Cont'd)
- .3 (Cont'd)  
Representative for consideration and ruling.  
Non-metric sized products may not be used unless Contractor's application has been approved in writing by the Departmental Representative.
- .4 Difficulties caused by the Contractor's lack of planning and effort to obtain modular metric sized products which are available on the Canadian market will not be considered sufficient reasons for claiming that they cannot be provided.
- .5 Claims for additional costs due to provision of specified modular metric sized products will not be considered.
- 1.6 STORAGE, HANDLING AND PROTECTION
- .1 Handle and store products in manner to prevent damage, adulteration, deterioration and soiling and in accordance with manufacturer's instructions when applicable.
- .2 Store packaged or bundled products in original and undamaged condition with manufacturer's seal and labels intact. Do not remove from packaging or bundling until required in Work.
- .3 Store products subject to damage from weather in weatherproof enclosures.
- .4 Store cementitious products clear of earth or concrete floors, and away from walls.
- .5 Keep sand, when used for grout or mortar materials, clean and dry. Store sand on wooden platforms and cover with waterproof tarpaulins during inclement weather.
- .6 Store sheet materials and lumber on flat, solid supports and keep clear of ground. Slope to shed moisture.
- .7 Store and mix paints in heated and ventilated room. Remove oily rags and other combustible debris from site daily. Take every precaution necessary to prevent spontaneous combustion.
- .8 Remove and replace damaged products at own expense and to satisfaction of Departmental Representative.
- .9 Touch-up damaged factory finished surfaces to Departmental Representative's satisfaction. Use
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- 1.6 STORAGE, .9 (Cont'd)  
HANDLING AND touch-up materials to match original. Do not  
PROTECTION paint over name plates.  
(Cont'd)
- 
- 1.7 TRANSPORTATION .1 Pay costs of transportation of products  
required in performance of Work.
- 1.8 MANUFACTURER'S .1 Unless otherwise indicated in specifications,  
INSTRUCTIONS install or erect products in accordance with  
manufacturer's instructions. Do not rely on  
labels or enclosures provided with products.  
Obtain written instructions directly from  
manufacturers.
- .2 Notify Departmental Representative in writing,  
of conflicts between specifications and  
manufacturer's instructions, so that  
Departmental Representative may establish course  
of action.
- .3 Improper installation or erection of products,  
due to failure in complying with these  
requirements, authorizes Departmental  
Representative to require removal and  
re-installation at no increase in Contract  
Amount or Contract Time.
- 1.9 QUALITY OF .1 Ensure Quality of Work is of highest standard,  
WORK executed by workers experienced and skilled in  
respective duties for which they are employed.  
Immediately notify Departmental Representative  
if required Work is such as to make it  
impractical to produce required results.
- .2 Do not employ anyone unskilled in their  
required duties. Departmental Representative  
reserves right to require dismissal from site,  
workers deemed incompetent or careless.
- .3 Decisions as to standard or fitness of Quality  
of Work in cases of dispute rest solely with  
Departmental Representative, whose decision is  
final.
-

- 1.10 CO-ORDINATION .1 Ensure cooperation of workers in laying out Work. Maintain efficient and continuous supervision.
- .2 Be responsible for coordination and placement of openings, sleeves and accessories.
- 1.11 CONCEALMENT .1 In finished areas, conceal pipes, ducts and wiring in floors, walls and ceilings, except where indicated otherwise.
- .2 Before installation, inform Departmental Representative if there is interference. Install as directed by Departmental Representative.
- 1.12 REMEDIAL WORK .1 Perform remedial work required to repair or replace parts or portions of Work identified as defective or unacceptable. Coordinate adjacent affected Work as required.
- .2 Perform remedial work by specialists familiar with materials affected. Perform in a manner to neither damage nor put at risk any portion of Work.
- 1.13 LOCATION OF FIXTURES .1 Consider location of fixtures, outlets, and mechanical and electrical items indicated as approximate.
- .2 Inform Departmental Representative of conflicting installation. Install as directed.
- 1.14 FASTENINGS .1 Provide metal fastenings and accessories in same texture, colour and finish as adjacent materials, unless indicated otherwise.
- .2 Prevent electrolytic action between dissimilar metals and materials.
- .3 Use non-corrosive hot dip galvanized steel fasteners and anchors for securing exterior work, unless stainless steel or other material is specifically requested in affected specification Section.
- .4 Space anchors within individual load limit or shear capacity and ensure they provide positive
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- 1.14 FASTENINGS  
(Cont'd)
- .4 (Cont'd)  
permanent anchorage. Wood, or any other organic material plugs are not acceptable.
  - .5 Keep exposed fastenings to a minimum, space evenly and install neatly.
  - .6 Fastenings which cause spalling or cracking of material to which anchorage is made are not acceptable.
- 1.15 FASTENINGS - EQUIPMENT
- .1 Use fastenings of standard commercial sizes and patterns with material and finish suitable for service.
  - .2 Use heavy hexagon heads, semi-finished unless otherwise specified. Use No.304 stainless steel for exterior areas.
  - .3 Bolts may not project more than one diameter beyond nuts.
  - .4 Use plain type washers on equipment, sheet metal and soft gasket lock type washers where vibrations occur. Use resilient washers with stainless steel.
- 1.16 PROTECTION OF WORK IN PROGRESS
- .1 Prevent overloading of any part of building. Do not cut, drill or sleeve any load bearing structural member, unless specifically indicated without written approval of Departmental Representative.
- 1.17 EXISTING UTILITIES
- .1 When breaking into or connecting to existing services or utilities, execute Work at times directed by local governing authorities, with minimum of disturbance to Work, and/or building occupants and pedestrian and vehicular traffic.
-

PART 2 - PRODUCTS

2.1 NOT USED .1 Not Used.

PART 3 - EXECUTION

3.1 NOT USED .1 Not Used.

PART 1 - GENERAL

- 1.1 EXISTING SERVICES .1 Before commencing work, establish location and extent of service lines in area of Work and notify Departmental Representative of findings.
- 1.2 LOCATION OF EQUIPMENT AND FIXTURES .1 Location of equipment, fixtures and outlets indicated or specified are to be considered as approximate.
- .2 Locate equipment, fixtures and distribution systems to provide minimum interference and maximum usable space and in accordance with manufacturer's recommendations for safety, access and maintenance.
- .3 Inform Departmental Representative of impending installation and obtain approval for actual location.
- .4 Submit field drawings to indicate relative position of various services and equipment when required by Departmental Representative.
- 1.3 RECORDS .1 Record locations of maintained, re-routed and abandoned service lines.

PART 2 - PRODUCTS

- 2.1 NOT USED .1 Not Used.

PART 3 - EXECUTION

- 3.1 NOT USED .1 Not Used.

PART 1 - GENERAL

- 1.1 SUBMITTALS
- .1 Submittals: in accordance with Section 01 33 00.
  - .2 Submit written request in advance of cutting or alteration which affects:
    - .1 Structural integrity of elements of project.
    - .2 Integrity of weather-exposed or moisture-resistant elements.
    - .3 Efficiency, maintenance, or safety of operational elements.
    - .4 Visual qualities of sight-exposed elements.
    - .5 Work of Owner or separate contractor.
  - .3 Include in request:
    - .1 Identification of project.
    - .2 Location and description of affected Work.
    - .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 separate contractor.
    - .7 Written permission of affected separate contractor.
    - .8 Date and time work will be executed.
- 1.2 MATERIALS
- .1 Required for original installation.
  - .2 Change in Materials: Submit request for substitution in accordance with Section 01 33 00.
- 1.3 PREPARATION
- .1 Inspect existing conditions, including elements subject to damage or movement during cutting and patching.
  - .2 After uncovering, inspect conditions affecting performance of Work.
  - .3 Beginning of cutting or patching means acceptance of existing conditions.
-

1.3 PREPARATION  
(Cont'd)

- .4 Provide supports to assure structural integrity of surroundings; provide devices and methods to protect other portions of project from damage.
- .5 Provide protection from elements for areas which are to be exposed by uncovering work; maintain excavations free of water.

1.4 EXECUTION

- .1 Execute cutting, fitting, and patching to complete Work.
- .2 Fit several parts together, to integrate with other Work.
- .3 Uncover Work to install ill-timed Work.
- .4 Remove and replace defective and non-conforming Work.
- .5 Remove samples of installed Work for testing.
- .6 Provide openings in non-structural elements of Work for penetrations of mechanical and electrical Work.
- .7 Execute Work by methods to avoid damage to other Work, and which will provide proper surfaces to receive patching and finishing.
- .8 Employ original installer to perform cutting and patching for weather-exposed and moisture-resistant elements, and sight-exposed surfaces.
- .9 Cut rigid materials using masonry saw or core drill. Pneumatic or impact tools not allowed on masonry work without prior approval.
- .10 Restore work with new products in accordance with requirements of Contract Documents.
- .11 Submit proposed materials, finishes and installation method for patching to Departmental Representative for approval, prior to patching.
- .12 Refinish surfaces to match adjacent finishes: Refinish continuous surfaces to nearest intersection. Refinish assemblies by refinishing entire unit.
- .13 Fit Work airtight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.

1.4 EXECUTION .14 Conceal pipes, ducts and wiring in floor, wall  
(Cont'd) and ceiling construction of finished areas  
except where indicated otherwise.

1.5 WASTE .1 Separate waste materials for reuse, recycling,  
MANAGEMENT AND composting and anaerobic digestion in accordance  
DISPOSAL with Section 01 74 20.

PART 2 - PRODUCTS

2.1 NOT USED .1 Not Used.

PART 3 - EXECUTION

3.1 NOT USED .1 Not Used.

PART 1 - GENERAL

1.1 SECTION  
INCLUDES

- .1 Progressive cleaning.
- .2 Final cleaning.

1.2 PROJECT  
CLEANLINESS

- .1 Maintain Work in tidy condition, free from accumulation of waste products and debris, other than that caused by Owner or other Contractors.
  - .2 Remove waste materials from site at regularly scheduled times or dispose of as directed by Departmental Representative. Do not burn waste materials on site.
  - .3 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
  - .4 Provide on-site containers for collection of waste materials and debris.
  - .5 Provide and use clearly marked separate bins for recycling. Refer to Section 01 74 20.
  - .6 Remove waste material and debris from site at end of each working day.
  - .7 Dispose of waste materials and debris off site.
  - .8 Clean interior areas prior to start of finish work, and maintain areas free of dust and other contaminants during finishing operations.
  - .9 Store volatile waste in covered metal containers, and remove from premises at end of each working day.
  - .10 Provide adequate ventilation during use of volatile or noxious substances. Use of building ventilation systems is not permitted for this purpose.
  - .11 Use only cleaning materials recommended by manufacturer of surface to be cleaned, and as recommended by cleaning material manufacturer.
  - .12 Schedule cleaning operations so that resulting dust, debris and other contaminants will not fall on wet, newly painted surfaces nor contaminate building systems.
-

- 1.3 FINAL CLEANING
- .1 When Work is Substantially Performed, remove surplus products, tools, construction machinery and equipment not required for performance of remaining Work.
  - .2 Remove waste products and debris other than that caused by others, and leave Work clean and suitable for occupancy.
  - .3 Prior to final review, remove surplus products, tools, construction machinery and equipment.
  - .4 Remove waste products and debris other than that caused by Owner or other Contractors.
  - .5 Remove waste materials from site at regularly scheduled times or dispose of as directed by Departmental Representative. Do not burn waste materials on site.
  - .6 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
  - .7 Clean and polish glass, mirrors, hardware, wall tile, stainless steel, chrome, porcelain enamel, baked enamel, plastic laminate, and mechanical and electrical fixtures. Replace broken, scratched or disfigured glass.
  - .8 Remove stains, spots, marks and dirt from decorative work, electrical and mechanical fixtures, furniture fitments, walls and floors.
  - .9 Clean lighting reflectors, lenses, and other lighting surfaces.
  - .10 HEPA vacuum clean and dust building interiors, behind grilles, louvres and screens.
  - .11 Wax, seal, shampoo or prepare floor finishes, as recommended by manufacturer.
  - .12 Inspect finishes, fitments and equipment and ensure specified workmanship and operation.
  - .13 Clean equipment and fixtures to a sanitary condition; clean or replace filters of mechanical equipment.
  - .14 Remove debris and surplus materials from crawl areas and other accessible concealed spaces.
-

PART 2 - PRODUCTS

2.1 NOT USED .1 Not Used.

PART 3 - EXECUTION

3.1 NOT USED .1 Not Used.

PART 1 - GENERAL

- 1.1 CONSTRUCTION & DEMOLITION WASTE
- .1 Carefully deconstruct and source separate materials/equipment and divert, from D&C waste destined for landfill to maximum extent possible. Target for this project is 60% diversion from landfill. Reuse, recycle, compost, anaerobic digest or sell material for reuse except where indicated otherwise. On site sales are not permitted.
  - .2 Source separate waste and maintain waste audits in accordance with the Environmental Protection Act, Ontario Regulation 102/94 and Ontario Regulation 103/94.
    - .1 Provide facilities for collection, handling and storage of source separated wastes.
    - .2 Source separate the following waste:
      - .1 Portland cement concrete.
      - .2 Corrugated cardboard.
      - .3 Wood, not including painted or treated wood or laminated wood.
      - .4 Gypsum board, unpainted.
      - .5 Steel.
      - .6 Items indicated in Section 02 42 93, Deconstruction and Waste Products Workplan Summary.
  - .3 Submit a waste reduction workplan indicating the materials and quantities of material that will be recycled and diverted from landfill.
    - .1 Indicate how material being removed from the site will be reused, recycled, composted or anaerobically digested using Section 02 42 93, Deconstruction and Waste Products Workplan Summary.
  - .4 Submit proof that all waste is being disposed of at a licensed land fill site or waste transfer site. A copy of the disposal/waste transfer site's license and a letter verifying that said landfill site will accept the waste must be supplied to Departmental Representative prior to removal of waste from the demolition site.
- 1.2 WASTE PROCESSING SITES
- .1 Province of: Ontario.
    - .1 Ministry of Environment and Energy, 135 St. Clair Avenue West, Toronto, ON, M4V 1P5.
    - .2 Telephone: 800-565-4923 or 416-323-4321.
    - .3 Fax: 416-323-4682.
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1.2 WASTE PROCESSING SITES (Cont'd)

.2 Recycling Council of Ontario: 215 Spadina Avenue, #225, Toronto, ON, M5T 2C7.

.1 Telephone: 416-657-2797

.2 Fax: 416-960-8053

.3 Email: rco@rco.on.ca.

.4 Internet: <http://www.rco.on.ca/>.

PART 2 - PRODUCTS

2.1 NOT USED .1 Not Used.

PART 3 - EXECUTION

3.1 CANADIAN GOVERNMENTAL DEPARTMENTS CHIEF RESPONSIBILITY FOR THE ENVIRONMENT

.1 Government Chief Responsibility for the Environment.

Province	Address	General Inquiries	Fax
Ontario	Ministry of Environment and Energy 135 St Clair Avenue West Toronto, ON M4V 1P5	(416) 323-4321 (800) 565-4923	(416) 323-4682
	Environment Canada Toronto, ON	(416) 734-4494	

PART 1 - GENERAL

- 1.1 INSPECTION AND DECLARATION
- .1 Contractor's Inspection: Contractor and all Subcontractors shall conduct an inspection of Work, identify deficiencies and defects, and repair as required to conform to Contract Documents.
    - .1 Notify Departmental Representative in writing of satisfactory completion of Contractor's Inspection and that corrections have been made.
    - .2 Request Departmental Representative's Inspection.
  - .2 Departmental Representative's Inspection: Departmental Representative and Contractor will perform inspection of Work to identify obvious defects or deficiencies. Contractor to correct Work accordingly.
  - .3 Completion: submit written certificate that following have been performed:
    - .1 Work has been completed and inspected for compliance with Contract Documents.
    - .2 Defects have been corrected and deficiencies have been completed.
    - .3 Equipment and systems have been tested, adjusted and balanced and are fully operational.
    - .4 Certificates required by Boiler Inspection Branch, Fire Commissioner and Utility companies have been submitted.
    - .5 Operation of systems have been demonstrated to Owner's personnel.
    - .6 Work is complete and ready for final inspection.
  - .4 Final Inspection: when items noted above are completed, request final inspection of Work by Departmental Representative and Contractor. If Work is deemed incomplete by Departmental Representative, complete outstanding items and request reinspection.
- 1.2 CLEANING
- .1 In accordance with Section 01 74 11.
  - .2 Remove waste and surplus materials, rubbish and construction facilities from the site in accordance with Section 01 74 20.
-

PART 2 - PRODUCTS

2.1 NOT USED .1 Not Used.

PART 3 - EXECUTION

3.1 NOT USED .1 Not Used.

PART 1 - GENERAL

1.1 SECTION  
INCLUDES

- .1 As-built, samples, and specifications.
- .2 Equipment and systems.
- .3 Product data, materials and finishes, and related information.
- .4 Operation and maintenance data.
- .5 Spare parts, special tools and maintenance materials.
- .6 Warranties and bonds.
- .7 Final site survey.

1.2 SUBMISSION

- .1 Prepare instructions and data using personnel experienced in maintenance and operation of described products.
  - .2 Copy will be returned after final inspection, with Departmental Representative's comments.
  - .3 Revise content of documents as required prior to final submittal.
  - .4 Two weeks prior to Substantial Performance of the Work, submit to the Departmental Representative, four final copies of maintenance manuals and commissioning documentation in English.
  - .5 Ensure spare parts, maintenance materials and special tools provided are new, undamaged or defective, and of same quality and manufacture as products provided in Work.
  - .6 If requested, furnish evidence as to type, source and quality of products provided.
  - .7 Defective products will be rejected, regardless of previous inspections. Replace products at own expense.
  - .8 Pay costs of transportation.
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- 1.3 FORMAT
- .1 Organize data in the form of an instructional manual.
  - .2 Binders: vinyl, hard covered, 3 'D' ring, loose leaf 219 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 type or printed title 'Project Record Documents'; list title of project and identify subject matter of contents.
  - .5 Arrange content by systems, process flow, under Section numbers and sequence of Table of Contents.
  - .6 Provide tabbed fly leaf for each separate product and 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 1:1 scaled CAD files in dwg format. Forward pdf, NMSEdit Professional spp, MS Word, MS Excel, and Autocad dwg files on USB compatible with PWGSC encryption requirements or through email or alternate electronic file sharing service such as ftp, as directed by Departmental Representative.
- 1.4 CONTENTS - EACH VOLUME
- .1 Table of Contents: provide title of project;
    - .1 Date of submission; names,
    - .2 Addresses, and telephone numbers of Contractor with name of responsible parties;
    - .3 Schedule of products and systems, indexed to content of volume.
  - .2 For each product or system:
    - .1 List names, addresses and telephone numbers of subcontractors and suppliers, including local source of supplies and replacement parts.
  - .3 Product Data: mark each sheet to clearly identify specific products and component parts,
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- 1.4 CONTENTS - EACH .3 Product Data:(Cont'd)  
VOLUME and data applicable to installation; delete  
(Cont'd) inapplicable information.
- .4 Drawings: supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams.
- .5 Typewritten Text: as required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions specified in Section 01 45 00.
- 1.5 AS-BUILTS AND .1 In addition to requirements in General  
SAMPLES Conditions, maintain at the site for Departmental Representative one record copy of:
- .1 Contract Drawings.
- .2 Specifications.
- .3 Amendments and addenda.
- .4 Change Orders and other modifications to the Contract.
- .5 Reviewed shop drawings, product data, and samples.
- .6 Field test records.
- .7 Inspection certificates.
- .8 Manufacturer's certificates.
- .2 Store record documents and samples in field office apart from documents used for construction. Provide files, racks, and secure storage.
- .3 Label record documents and file in accordance with Section number listings in List of Contents of this Project Manual. Label each document "PROJECT RECORD" in neat, large, printed letters.
- .4 Maintain record documents in clean, dry and legible condition. Do not use record documents for construction purposes.
- .5 Keep record documents and samples available for inspection by Departmental Representative.
- .6 Turn one set, paper copy and electronic copy, of AS-BUILT drawings and specifications over to Departmental Representative on completion of work. Submit files on USB compatible with PWGSC encryption requirements or through email or alternate electronic file sharing service such
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- 1.5 AS-BUILTS AND SAMPLES  
(Cont'd)
- .6 (Cont'd)  
as ftp, as directed by Departmental Representative.
- .7 If project is completed without significant deviations from Contract drawings and specifications submit to Departmental Representative one set of drawings and specifications marked "AS-BUILT".
- 1.6 RECORDING ACTUAL SITE CONDITIONS
- .1 Record information on set of black line opaque drawings, and in copy of Project Manual, provided by Departmental Representative.
- .2 Provide felt tip marking pens, maintaining separate colours for each major system, for recording information.
- .3 Record information concurrently with construction progress. Do not conceal Work until required information is recorded.
- .4 Contract Drawings and shop drawings: legibly mark each item to record actual construction, including:
- .1 Measured depths of elements in relation to finish floor.
  - .2 Measured horizontal and vertical locations of utilities and appurtenances, referenced to permanent surface improvements.
  - .3 Measured locations of internal utilities and appurtenances, referenced to visible and accessible features of construction.
  - .4 Field changes of dimension and detail.
  - .5 Changes made by change orders.
  - .6 Details not on original Contract Drawings.
  - .7 References to related shop drawings and modifications.
- .5 Specifications: legibly mark each item to record actual construction, including:
- .1 Manufacturer, trade name, and catalogue number of each product actually installed, particularly optional items and substitute items.
  - .2 Changes made by Amendments and change orders.
- .6 Other Documents: maintain manufacturer's certifications, inspection certifications and field test records as required by individual specifications sections.
-

1.7 EQUIPMENT AND  
SYSTEMS

- .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.
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- 1.7 EQUIPMENT AND SYSTEMS  
(Cont'd)
- .14 Include test and balancing reports as specified in Section 01 45 00.
- .15 Additional requirements: As specified in individual specification sections.
- 1.8 MATERIALS AND FINISHES  
FINISHES
- .1 Building Products, Applied Materials, and Finishes: include product data, with catalogue number, 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 Moisture-protection and Weather-exposed Products: include manufacturer's recommendations for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.
- .4 Additional Requirements: as specified in individual specifications sections.
- 1.9 SPARE PARTS  
SPARE PARTS
- .1 Provide spare parts, in quantities specified in individual specification sections.
- .2 Provide items of same manufacture and quality as items in Work.
- .3 Deliver to site, place and store.
- .4 Receive and catalogue all items. Submit inventory listing to Departmental Representative. Include approved listings in Maintenance Manual.
- .5 Obtain receipt for delivered products and submit prior to final payment.
- 1.10 MAINTENANCE MATERIALS  
MATERIALS
- .1 Provide maintenance and extra materials, in quantities specified in individual specification sections.
- .2 Provide items of same manufacture and quality as items in Work.
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- 1.10 MAINTENANCE MATERIALS  
(Cont'd)
- .3 Deliver to site, place and store.
  - .4 Receive and catalogue all items. Submit inventory listing to Departmental Representative. Include approved listings in Maintenance Manual.
  - .5 Obtain receipt for delivered products and submit prior to final payment.
- 1.11 SPECIAL TOOLS
- .1 Provide special tools, in quantities specified in individual specification section.
  - .2 Provide items with tags identifying their associated function and equipment.
  - .3 Deliver to site, place and store.
  - .4 Receive and catalogue all items. Submit inventory listing to Departmental Representative. Include approved listings in Maintenance Manual.
- 1.12 STORAGE, HANDLING AND PROTECTION
- .1 Store spare parts, maintenance materials, and special tools in manner to prevent damage or deterioration.
  - .2 Store in original and undamaged condition with manufacturer's seal and labels intact.
  - .3 Store components subject to damage from weather in weatherproof enclosures.
  - .4 Store paints and freezable materials in a heated and ventilated room.
  - .5 Remove and replace damaged products at own expense and to satisfaction of Departmental Representative.
- 1.13 WARRANTIES AND BONDS
- .1 Separate each warranty or bond with index tab sheets keyed to Table of Contents listing.
  - .2 List subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.
  - .3 Obtain warranties and bonds, executed in duplicate by subcontractors, suppliers, and
-

- 1.13 WARRANTIES AND BONDS  
(Cont'd) .3 (Cont'd)  
manufacturers, within ten days after completion  
of the applicable item of work.
- .4 Except for items put into use with Owner's  
permission, leave date of beginning of time of  
warranty until the Date of Certificate of  
Substantial Performance is determined.
- .5 Verify that documents are in proper form,  
contain full information, and are notarized.
- .6 Co-execute submittals when required.
- .7 Retain warranties and bonds until time  
specified for submittal.

PART 2 - PRODUCTS

- 2.1 NOT USED .1 Not Used.

PART 3 - EXECUTION

- 3.1 NOT USED .1 Not Used.

PART 1 - GENERAL

- 1.1 REFERENCES
- .1 American National Standards Institute/National Particleboard Association/National Electrical Manufacturers Association (ANSI/NPA/NEMA):
    - .1 ANSI/BHMA A156.9-2010, Cabinet Hardware.
  - .2 ASTM International:
    - .1 ASTM C920-11, Standard Specification for Elastomeric Joint Sealants.
    - .2 ASTM D570-98(2010)e1, Standard Test Method for Water Absorption of Plastics.
    - .3 ASTM D638-10, Standard Test Method for Tensile Properties of Plastics.
    - .4 ASTM D648-07, Standard Test Method for Deflection Temperature of Plastics Under Flexural Load in the Edgewise Position.
    - .5 ASTM D696-08, Standard Test Method for Coefficient of Linear Thermal Expansion of Plastics Between -30°C and 30°C With a Vitreous Silica Dilatometer.
    - .6 ASTM D785-08, Standard Test Method for Rockwell Hardness of Plastics and Electrical Insulating Materials.
    - .7 ASTM D790-10, Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.
    - .8 ASTM D792-08, Standard Test Methods for Density and Specific Gravity (Relative Density) of Plastics by Displacement.
    - .9 ASTM D2583-07, Standard Test Method for Indentation Hardness of Rigid Plastics by Means of a Barcol Impressor.
    - .10 ASTM F433-02(2009), Standard Practice for Evaluating Thermal Conductivity of Gasket Materials.
    - .11 ASTM G21-09, Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi.
  - .3 Architectural Woodwork Manufacturers Association of Canada (AWMAC):
    - .1 AWI/AWMAC/WI AWS-2009.
  - .4 Canadian General Standards Board (CGSB):
    - .1 CAN/CGSB-11.3-M87, Hardboard.
    - .2 CAN/CGSB-71.20-M88, Adhesive, Contact, Brushable.
  - .5 Canadian Standards Association (CSA):
    - .1 CSA B651-12, Accessible Design for the Built Environment.
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1.1 REFERENCES (Cont'd)	.5	(Cont'd)
	.2	CSA 0121-08, Douglas Fir Plywood.
	.3	CSA 0153-M1980(R2008), Poplar Plywood.
	.4	CSA Z204-94(R1999), Guideline for Managing Indoor Air Quality in Office Buildings.
	.5	CAN/CSA-Z809-08, Sustainable Forest Management.
	.6	National Electrical Manufacturers Association (NEMA)
	.1	NEMA LD 3-2005, High-Pressure Decorative Laminates.
	.7	National Particleboard Association (NPA)
	.1	NPA A208.2-2009, Medium Density Fiberboard (MDF) for Interior Applications.
1.2 IAQ - INDOOR AIR QUALITY	.1	Comply with CSA Z204, Guideline for Managing Indoor Air Quality in Office Buildings and CSA B651.
1.3 ENVIRONMENTAL REQUIREMENTS	.1	Wood products: CAN/CSA-Z809, Sustainable Forestry Initiative (SFI) or Forestry Stewardship Council (FSC) certified.
	.2	Panel products: to CSA B651.
	.1	SCAQMD Rule 1168, Adhesives and Sealants Applications.
	.2	CAN/CSA-Z809, Sustainable Forestry Initiative (SFI) or Forestry Stewardship Council (FSC) certified.
	.3	Care and storage: AWS Section 2.
1.4 ACTION AND INFORMATIONAL SUBMITTALS	.1	Submit in accordance with Section 01 33 00 and AWS Section 1.
	.2	Product Data:
	.1	Submit manufacturer's instructions, printed product literature and data sheets for architectural woodwork and include product characteristics, performance criteria, physical size, finish and limitations.
	.2	Submit two copies of WHMIS MSDS.
	.3	Shop Drawings:
	.1	Submit two copies of drawings stamped and signed by professional engineer registered or licensed in Province of Ontario, Canada.

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1.4 ACTION AND  
INFORMATIONAL  
SUBMITTALS  
(Cont'd)

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- .3 Shop Drawings:(Cont'd)
  - .2 Indicate details of construction, profiles, jointing, fastening and other related details.
    - .1 Scales: profiles full size, details half full size.
    - .3 Indicate materials, thicknesses, finishes and hardware.
    - .4 Indicate locations of service outlets in casework, typical and special installation conditions, and connections, attachments, anchorage and location of exposed fastenings.
- .4 Samples:
  - .1 Submit for review and acceptance of each unit.
  - .2 Samples will be returned for inclusion into work.
  - .3 Submit duplicate samples of HDPL panel cores: sample size 300 x 300 mm.
  - .4 Submit duplicate samples of laminated plastic for colour selection.
  - .5 Submit duplicate samples of laminated plastic joints, edging, cutouts and postformed profiles.
- .5 Certifications: submit AWMAC GIS certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
  - .1 Architectural woodwork shall be manufactured and/or installed to the current AWMAC Architectural Woodwork Standards and shall be subject to an inspection at the plant and/or site by an appointed AWMAC Certified Inspector.
  - .2 Inspection costs shall be included in the bid price for this project. Contact your local AWMAC Chapter for details of inspection costs.
  - .3 Shop drawings shall be submitted to the AWMAC Chapter office for review before work commences.
  - .4 Work that does not meet the AWMAC Architectural Woodwork Standards, as specified, shall be replaced, reworked and/or refinished by the architectural woodwork contractor, to the approval of AWMAC, at no additional cost to the Departmental Representative.
  - .5 If the woodwork contractor is an AWMAC Manufacturer member in good standing, a two (2) year AWMAC Guarantee Certificate will be issued.
  - .6 The AWMAC Guarantee shall cover replacing, reworking and/or refinishing any deficient architectural woodwork due to faulty workmanship or defective materials supplied by the woodwork

1.4 ACTION AND  
INFORMATIONAL  
SUBMITTALS  
(Cont'd)

- .5 Certifications:(Cont'd)  
.6 (Cont'd)  
contractor, which may appear during a two (2)  
year period following the date of issuance.  
.7 If the woodwork contractor is not an AWMAC  
Manufacturer member they shall provide the  
Departmental Representative with a two (2) year  
maintenance bond, in lieu of the AWMAC Guarantee  
Certificate, to the full value of the  
architectural woodwork contract.

1.5 ACCESSIBILITY

- .1 Comply with CSA B651, Accessible Design for the  
Built Environment.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Concealed blocking and framing: S-DRY, graded  
and stamped to National Lumber Grades Authority,  
Standard Grading Rules for Canadian Lumber,  
December 2010, SPF, 121c. "STUD" and 101d. "D"  
FINISH.
- .2 Concealed plywood: douglas fir to CSA 0121,  
Good One Side, urea formaldehyde free  
alternative adhesive.
- .3 High pressure decorative laminate (HDPL): to  
AWI/AWMAC/WI AWS, Section 4, Grade Horizontal,  
Vertical and Post-Forming Type S standard, matt  
finish.
- .4 HDPL and LDPL panel core: to AWI/AWMAC/WI AWS  
Section 4, 1.2.31 and 4.2c.  
.1 Lumber core for counter tops: poplar  
plywood to CSA 0153, Standard Construction,  
Interior Bond, BB Grade, urea formaldehyde free.  
.2 Composite core other than counter tops:  
formaldehyde free MDF medium density fibreboard,  
minimum 20% recycled content and NPA A208.2,  
769 kg/m<sup>3</sup>.
- .5 Panel adhesive: to AWI/AWMAC/WI AWS Section 4,  
Ecologo certified.
- .6 Hardboard: to CAN/CGSB-11.3, Type 2 tempered or  
to AWI/AWMAC/WI AWS Section 4, tempered.
- .7 Sealant: 1 component, silicone base, solvent  
curing to ASTM C920-08, primerless, Type S,

2.1 MATERIALS  
(Cont'd)

- .7 Sealant:(Cont'd)  
Grade NS, Class 50, SWRI validated, Ecologo certified, mould and mildew resistant.
- .8 Bituminous paint: acid and alkali resistant to CAN/CGSB-1.108, Type 2, Ecologo certified.
- .9 Construction adhesive: to CSA 0112 Series, cartridge loaded.
  - .1 Maximum allowable VOC limit 140 g/L.
  - .2 SCAQMD Rule 1168, Adhesives and Sealants Applications.

2.2 HARDWARE

- .1 Cabinet hinge: to ANSI/BHMA-A156.9, type B81602 for frame style cabinets and type B81612 for frameless cabinets.
- .2 Magnetic catch: to ANSI/BHMA-A156.9, type B13171, heavy duty.
- .3 Cabinet pull: to ANSI/BHMA-A156.9, type B32011, finish 628, and CSA B651, satin aluminum, 102 mm centres, back mounted.
- .4 Adjustable shelf standard: to ANSI/BHMA-A156.9, type B84061, surface application, open shelf rest type B84091.
- .5 Drawer slide set: heavy duty to ANSI/BHMA-A156.9, type B05051, with zinc plate finish and AWI/AWMAC/WI AWS Section 10 and Appendix B Section 10-Casework, Drawer Slide Selection Guide, full extension, positive stop, self closing. AWS Commercial Quality and ANSI/BHMA Grade 1: Static load capacity: 34.019 kg (75 lbs.) Commercial; Dynamic (initial) load capacity: 22.680 kg (50 lbs.) 50,000 cycles.
- .6 Draw bolts: type recommended by laminated plastic manufacturer.

2.3 FABRICATION

- .1 Casework: to AWI/AWMAC/WI Architectural Woodwork Standards, Section 10, Type: High Pressure Decorative Laminate, Custom Grade: Section 10 and CSA B651.
  - .1 Door and applied drawer front profiles: to 1.2.16.1.1 square edge with thin applied band.
  - .2 Construction Type: Type A Frameless.
  - .3 Interface Style 1, Type A, Flush Overlay.
  - .4 Layout: flush panel doors and drawer fronts, custom grade.

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- 2.3 FABRICATION (Cont'd)
- .1 Casework:(Cont'd)
    - .5 Cabinet design series (CDS):
      - .1 Base cabinets without drawers: 100 Series No. 254.
      - .2 Base cabinets with drawers: 200 Series No. 101 and 102, two adjustable shelves per unit.
      - .3 Wall hung cabinets: 300 Series No. 302, two adjustable shelves per unit, one adjustable shelf over sink.
      - .6 Adjustable shelf loading and deflection: 22.7 kg/sq cm (50 lbs/sq ft) to Section 10, 1.2.21.
      - .7 Cabinet hardware: Grade 1.
      - .8 Dadoed drawer joints to AWI/AWMAC/WI details in Appendix A, Joinery Details.
    - .2 Countertops: to AWI/AWMAC/WI Architectural Woodwork Standards, Section 11 and Appendix B Section 11, Custom Grade, HDPL Option 1 self-edged, no splash and CSA B651.
      - .1 Sink cutouts: to 4.3.6 and radius corners to Appendix B.
    - .3 Shop assemble units in size to allow passage to installed location.
    - .4 Cover exposed faces and edges with laminated plastic where indicated.
    - .5 Shop apply laminated plastic with hairline joints, chamfer exposed edges.
    - .6 Apply bituminous paint to edge of cutouts in laminated plastic tops at sinks.
    - .7 HDPL covered shelves and shelf gables.
    - .8 Seal all surfaces for site finishing to WDI/AWMAC/WI AWS Section 5.
- 2.4 SHOP FINISHING
- .1 Shop finish exposed hardwood with water based polyurethane to WDI/AWMAC/WI AWS Section 5, System 12.
-

PART 3 - EXECUTION

3.1 HARDWARE  
SCHEDULE

- .1 Swinging doors:
  - .1 1 pair cabinet hinges.
  - .2 1 cabinet pull.
  - .3 1 magnetic catch.
- .2 Drawers:
  - .1 1 drawer slide set.
  - .2 1 cabinet pull.
- .3 Adjustable shelves:
  - .1 4 shelf standards.
  - .2 4 rests per shelf.

3.2 INSTALLATION

- .1 Set items in place, plumb, straight and level to a tolerance of 1:400 and rigidly secure in place in accordance with AWI/AWMAC/WI Architectural Woodwork Standards.
- .2 Completely assemble units.
- .3 Join abutting laminated plastic tops with draw bolts.
- .4 Apply sealant to junction of backsplash and adjacent wall finish.
- .5 Adjust hardware after cabinets installed for smooth effortless operation.

PART 1 - GENERAL

- 1.1 WARRANTY .1 For wood doors specified in this Section 08 14 11 the 12 month warranty period prescribed in General Conditions GC3.13 is extended to three years.
- 1.2 REFERENCES .1 American Society for Testing and Materials International (ASTM):  
.1 ASTM E90-09, Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements.  
.2 Canadian Standards Association (CSA):  
.1 CAN/CSA-O132.2 SERIES-90(R2003,) Wood Flush Doors.  
.3 Forest Stewardship Council Canada (FSC):  
.1 FSC-STD-40-006(V1-0)EN, FSC Chain of Custody Standard for Project Certification 2006. <http://fscscanada.org/docs/270FFDB8B4D168CF.pdf>  
.2 FSC-GUI-20-002EN, Implementation of FSC-STD-40-006 FSC Chain of Custody Standard for Project Certification 2006.  
.4 South Coast Air Quality Management District (SCAQMD) <http://www.aqmd.gov/Default.htm>:  
.1 Rule 1168 Adhesive and Sealant Applications Amended Jan. 07, 2005.
- 1.3 GREEN GLOBES & LEED .1 Wood products: CAN/CSA-Z809-08, Sustainable Forestry Initiative (SFI) or Forestry Stewardship Council (FSC) certified.  
.2 Panel products: LEED Indoor Environmental Quality Credit EQ - 4.4 Low - Emitting Materials: Composite Wood and Laminates Adhesives.  
.1 SCAQMD Rule 1168, Adhesives and Sealants Applications.  
.2 CAN/CSA-Z809-08, Sustainable Forestry Initiative (SFI) or Forestry Stewardship Council (FSC) certified. <http://fscscanada.org/docs/woodproductslisting.pdf>
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1.4 PRODUCT DATA SHEETS .1 Submit product data sheets in accordance with Sections 01 33 00.

PART 2 - PRODUCTS

2.1 MATERIALS AND FABRICATION .1 Wood doors to CAN/CSA-0132.2 Series, flush: Interior Type II bond adhesive plywood faced, birch, Grade II Good, solid, mat-formed wood particleboard core, 35 mm hardwood stiles including 19 mm hardwood edge, 35 mm wood rails, solid wood lock reinforcing. Glass mouldings: birch.

.2 Door bumpers: to ANSI A156.16, type L03011.

PART 3 - EXECUTION

3.1 INSTALLATION .1 Install doors and hardware in accordance with CAN/CSA-0132.2 Series 90, Appendix A.

.2 Provide even margins between doors and jambs and doors and flooring as follows:

.1 Hinge side: 1.0 mm.

.2 Latch side and head: 1.5 mm.

.3 Flooring: 13 mm.

.3 Install hardware in accordance with CAN/CSA-0132.2.4 Series 90. Adjust hardware after doors installed for smooth effortless operation.

PART 1 - GENERAL

- 1.1 RELATED SECTIONS .1 Section 06 40 01: Hardware for cabinets.
- 1.2 PRODUCT DATA SHEETS .1 Submit one copy of product data sheets in accordance with Section 01 33 00.
- .2 Product data sheets shall consist of catalogue cuts, manufacturer's name and number, finish and reference identification to specified standard.
- 1.3 REFERENCES .1 Standard hardware location dimensions in accordance with Canadian Metric Guide for Steel Doors and Frames (Modular Construction) prepared by CSDMA - Canadian Steel Door Manufacturers' Association and CSA B651-12, Accessible Design for the Built Environment.
- .2 Use abbreviations and symbols recommended in "Abbreviations and Symbols as used in Architectural Door and Hardware Schedules and Specifications", 1983, published by the Door and Hardware Institute.
- .3 Use hardware schedule format recommended in "Sequence and Format for the Hardware Schedule", June, 1984, published by the Door and Hardware Institute.
- 1.4 DEFINITIONS .1 Master Key (MK):
- .1 A key which operates all the master keyed locks or cylinders in a group, each lock or cylinder usually operated by its own change key.
- .2 To combine a group of locks or cylinders such that each is operated by its own key as well as by a master key for the entire group.
- .2 Master Key System:
- .1 Any keying arrangement which has two or more levels of keying.
- .2 A keying arrangement which has exactly two levels of keying.
- .3 Grand Master Key (GMK): The key which operates two or more separate groups of locks, each operated by a different master key.
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- 1.4 DEFINITIONS (Cont'd)
- .4 Grand Master Key System: A master key system which has exactly three levels of keying.
  - .5 Great Grand Master Key (GGMK): The key which operates two or more separate groups of locks, which are each operated by a different grand master key.
  - .6 Great Grand Master Key System: A master key system which has exactly four levels of keying.
  - .7 Top Master Key (TMK): The highest level master key in a master key system.

- 1.5 REGULATORY REQUIREMENTS
- .1 Use UL 437 listed cylinders in locking devices to high security rating indicated.

- 1.6 HARDWARE LIST
- .1 Submit hardware schedule in accordance with Section 01 33 00.
  - .2 Submit literature cuts, indicating hardware proposed, including make, model, base material, function, ANSI Function where ANSI used in this specification, Grade, Type, Series, BHMA finish, trim, UL listing, manufacturer and other pertinent information. Indicate which model or accessory is being provided where more than one model or accessory appears on a page.

PART 2 - PRODUCTS

- 2.1 KEYING, ACCESSORIES AND FINISH
- .1 Each lock different key under existing [master key MK].
    - .1 Keying systems: to ANSI/BHMA-A156.28-2007.
  - .2 Provide accessories with hardware.
  - .3 626 finish (satin chrome plated on brass or bronze) unless noted otherwise.
  - .4 Finish fasteners to match the exposed surface on which they appear.
  - .5 Provide temporary construction keying.
  - .6 Final keying: to ANSI/BHMA-A156.5-2010, Grade 1.
-

2.1 KEYING,  
ACCESSORIES AND  
FINISH  
(Cont'd)

- .7 Use lock and latch sets with solid metal, U shape, lever handles meeting requirements of CSA B651-12, Accessible Design for the Built Environment, clause 5.2.7 Door Hardware and Figure 20, unless specified otherwise.
- .8 Provide lever handles of same style for bored and mortise locksets.
- .9 Door prep: to ANSI/BHMA-A156.115-W-2006 for wood doors and frames.

2.2 MATERIALS

- .1 Hinge: to ANSI/BHMA-A156.1-2006, Grade indicated, 626 satin chrome, use anti-friction (ball) bearing hinges with closers, one hinge for each 750 mm of door height, 115 mm hinges on 45 mm doors, button tips, non-rising removable pins unless indicated NRP on hardware schedule.
  - .1 Interior Grade 2: A8112 - standard weight, steel, 2 ball bearing.
- .2 Door closer: to ANSI/BHMA-A156.4-2008, Grade 1, surface closer, modern type with cover, sprayed enamel finish, metallic 689 aluminum, size to suit door width and mass. Closers will have been tested to 10,000,000 cycles without failure where required by hardware schedule. Disabled access doors: to operate at a minimum pressure not exceeding 38 N for exterior doors, 22 N for interior doors and close in not less than 5 seconds from an open position of 90°.
- .3 Lock and latch set (mortised): to ANSI/BHMA-A156.13-2012, Operational Grade 1, Security Grade 1, lock trim lever and rose with cylinder on exterior, lock trim lever and rose trim with thumbturn on interior, anti-friction latch bolt, function indicated on Drawing A-02, UL 437 listed cylinder.
- .4 Normal strikes: box type, lip projection not beyond jamb, ASA dimensions.
- .5 Strike bucket: strike bucket accepting a 25 mm throw deadlock. Grouted or wedged in the area of the strike bucket to prevent spreading.
- .6 Floor door stop: to ANSI/BHMA-A156.16-2008, dome type, cushion secured by concealed fasteners, anti-rotation stud, type L22141 finish 626 for doors without threshold.
- .7 Removable mullion: as indicated on drawings.

PART 3 - EXECUTION

3.1 HARDWARE  
SCHEDULE

- .1 Indicated hardware quantities are for one door or 1 pair of doors only; provide this quantity for each door or pair of doors listed on Drawing A-02.

PART 1 - GENERAL

- 1.1 SUBMITTALS
- .1 Submit one representative sample each pattern and type of glazing film in accordance with Section 01 33 00.
  - .2 Approved sample may be installed as part of completed Work.
  - .3 Submit maintenance data for glazing film to Departmental Representative in accordance with Section 01 78 00.
- 1.2 QUALITY ASSURANCE
- .1 Qualifications of glazing film applicator: trained, approved and certified by glazing film manufacturer. Submit proof of certification in writing to Departmental Representative in accordance with Section 01 33 00.
  - .2 Glazing film inspection: manufacturer's representative shall view the film at a distance of 3 m (10 feet) at angles up to 45 degrees from either side of the glass during regular daylight conditions (not in direct sunlight). To be accepted the film itself shall not appear distorted. Submit manufacturer's written inspection report to Departmental Representative in accordance with Section 01 33 00.

PART 2 - PRODUCTS

- 2.1 MATERIALS
- .1 Tempered safety glass (GL-1): to CAN/CGSB-12.1-M90, Type 2-tempered, Class B of thickness indicated. Category I impact resistance. Transparent.
  - .2 Gasket: black neoprene to ASTM C542-05(2011), "U" cavity type with lock strip.
  - .3 Decorative glazing film: frosted as selected by Departmental Representative.
-

PART 3 - EXECUTION

- 3.1 INSTALLATION .1 Glass:
- .1 Clean and dry surfaces.
  - .2 Install glass in wood doors and aluminum screens with neoprene gasket.

PART 1 - GENERAL

1.1 REFERENCE  
STANDARDS

- .1 American National Standards (ANSI) for the Installation of Ceramic Tile/ Ceramic Tile Institute of America (CTIOA):
    - .1 ANSI A108/A118/A136.1-2011, Installation of Ceramic Tile.
      - .1 ANSI A108.1A, Installation of Ceramic Tile in Wet-Set Method, with Portland Cement Mortar.
      - .2 ANSI A108.5, Installation of Ceramic Tile with Dry-Set Portland Cement Mortar or Latex-Portland Cement Mortar.
      - .3 ANSI A118.1, Dry-Set Portland Cement Mortar.
      - .4 ANSI A118.4, Latex Portland Cement Mortar.
      - .5 ANSI A118.6, Ceramic Tile Grouts.
      - .6 ANSI A118.9, Cementitious Backer Units.
  - .2 International Standards Organization (ISO):
    - .1 ISO 13007- Part 1:2010: Ceramic tiles -- Grouts and adhesives; performance requirements for tile adhesives.
    - .2 ISO 13007- Part 2:2010: Ceramic tiles -- Grouts and adhesives; test methods for adhesives.
    - .3 ISO 13007- Part 3:2010: Ceramic tiles -- Grouts and adhesives; terms, definitions and specifications for grouts.
    - .4 ISO 13007- Part 4:2010: Ceramic tiles -- Grouts and adhesives; Test methods for grouts.
    - .5 ISO 10545 Series:
      - .1 ISO 10545-2:1995/Cor 1:1997, Ceramic Tiles -- Part 2: Determination of Dimensions and Surface Quality.
      - .2 ISO 10545-3:1995/Cor 1:1997, Ceramic Tiles -- Part 3: Determination of Water Absorption, Apparent Porosity, Apparent Relative Density and Bulk Density.
      - .3 ISO 10545-4:2004, Ceramic Tiles - Part 4: Determination of Modulus of Rupture and Breaking Strength.
      - .4 ISO 10545-6:1995, Ceramic Tiles -- Part 6: Determination of Resistance to Deep Abrasion for Unglazed Tiles.
      - .5 ISO 10545-7:1996, Ceramic Tiles -- Part 7: Determination of resistance to surface abrasion for glazed tiles.
      - .6 ISO 10545-9:1996, Ceramic Tiles - Part 9: Determination of Resistance to Thermal Shock.
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- 1.1 REFERENCE STANDARDS (Cont'd)
- .2 (Cont'd)
- .5 ISO 10545 Series:(Cont'd)
- .7 ISO 10545-13:1995, Ceramic Tiles -- Part 13: Determination of Chemical Resistance.
- .3 American Society for Testing and Materials International (ASTM)
- .1 ASTM C373-88(2006), Standard Test Method for Water Absorption, Bulk Density, Apparent Porosity, and Apparent Specific Gravity of Fired Whiteware Products.
- .2 ASTM C1028-07e1, Test Method for Determining the Static Coefficient of Friction of Ceramic Tile and Other Like Surfaces by the Horizontal Dynamometer Pull-Meter Method.
- .4 Canadian Standards Association (CSA International)
- .1 CSA B651-12, Accessible Design for the Built Environment.
- .5 Terrazzo Tile and Marble Association of Canada (TTMAC) 1-800-201-8599, 905-660-9640, www.ttmac.com.
- .1 Hard Surface Maintenance Guide.
- .2 TTMAC Specification Guide 09 30 00 - Tile Installation Manual 2009/2010.
- .6 Tile Council of North America (TCNA), 1-864-646-8453, www.tileusa.com.
- .1 Handbook for Ceramic, Glass and Stone Tile Installation, 2011.
- 1.2 SUBMITTALS
- .1 Submit TTMAC Installation Detail No. or Tile Council of America Installation Detail No. or shop drawing showing installation for each tile specified.
- .2 Submit list of materials suitable for sealing and finishing each tile specified.
- .3 Submit proof of each non-slip tile's conformance to CSA B651-12.
- 1.3 QUALIFICATIONS
- .1 Use installation and grouting materials produced by a manufacturer that has been regularly engaged in producing these materials for a minimum of 10 years and has completed a minimum of 5 successful installations of this type, each at least five years old.
-

- 1.3 QUALIFICATIONS (Cont'd)
- .2 Employ workmen with previous experience of more than 5 years in each different assembly specified.
  - .3 Provide references of 3 installations of similar type and size more than 3 years old for each assembly.

PART 2 - PRODUCTS

- 2.1 MATERIAL
- .1 Porcelain tile: to ISO 10545 Series, unglazed tile, matte, polished.
    - .1 Slip resistance for floor tile: to ASTM C1028, wet and dry surface greater than 0.60.
    - .2 Surface flatness: to ISO 10545-2, maximum  $\pm 0.4\%$  and CSA B651.
    - .3 Moisture resistance: to ASTM C373, MR-1.
    - .4 Water absorption: to ISO 10545-3, 0.06%.
    - .5 Breaking strength: to ISO 10545-4,  $>40 \text{ N/mm}^2$ .
    - .6 Abrasion resistance: to ISO 10545-7, PEI II-IV.
    - .7 Deep abrasive wear: to ISO 10545-6, avg.  $>120/\text{mm}^3$ .
    - .8 Chemical resistance: to ISO 10545-13, resistant.
    - .9 Recycled content: Minimum 5% post-consumer recycled content, or minimum 5% pre-consumer recycled content.
    - .10 Trims: bullnose.
  - .2 Tile backer units: cementitious backer units to ANSI A118.9.
  - .3 Water: potable.
  - .4 Dry set mortar: to ANSI A118.1 and ISO 13007  
Classification: Type 1.
  - .5 Thin set bond coat (interior): dry set mortar, pre-mixed, thin set mortar formulated with Portland cement, sand and latex additive.  
Complying with ANSI A118.4 and ISO 13007.
  - .6 Wall grout (thin set system): pre-mixed, dry set grout. Colour to match tile colour.
  - .7 Finish: as recommended by tile manufacturer.

PART 3 - EXECUTION

- 3.1 SURFACE PREPARATION
- .1 Do not proceed with installation unless substrate is structurally sound, solid and well fastened.
  - .2 New concrete: properly cured and designed with proper expansion and control joints.
  - .3 Surfaces must be clean and free from dust, dirt, oil, grease, paint, wax, sealers, curing compounds or any other substances which may reduce or prevent adhesion.
- 3.2 SYSTEM REQUIREMENTS
- .1 Provide assemblies composed of compatible materials from the same manufacturer.
- 3.3 MIXING
- .1 To ANSI A108.1A.
  - .2 Thin set bond coat and grout: dry set mortar; mix to manufacturer's instructions.
- 3.4 WORKMANSHIP
- .1 Minimum surface and air temperature 12°C, before and during application and during curing period.
  - .2 Provide back-buttering in addition to the usual notch-trowel-applied bond coat in the following applications:
    - .1 With rib-backed tiles and heavy lug-backed tiles.
    - .2 In hot, dry or windy weather or where motched mortar bed was prepared too far in advance.
  - .3 Backbuttering: remove residual dust, wipe the back of the tile with a damp cloth or sponge, apply a full coverage 2 mm thick coat of mortar, apply no more than 10-15 minutes before tiles are set so that both back-butter and mortar are wet at time of setting.
  - .4 Use Box Screed jig with large sized tiles which are not of uniform thickness.
  - .5 Trowel in one direction and press the tile into the mortar with a sliding motion perpendicular

- 3.4 WORKMANSHIP  
(Cont'd)
- .5 (Cont'd)  
to the trowel ridges. Twist, vibrate or beat the tiles to compress the trowel ridges to comply with requirements of ANSI A108.5.
  - .6 Perimeter tile minimum 1/2 size.
  - .7 Cut tile around corners and built-in objects smooth, even, chip and split free.
  - .8 Accurately form intersections, corners and returns.
  - .9 Joints uniform: Walls 1.5-3.0 mm wide.
  - .10 Surfaces plumb, straight, true, even and flush to a tolerance of 1:1000.
  - .11 Replace broken or hollow sounding tile.
  - .12 Allow 24 hours before grouting.
  - .13 Fill joints solid with grout, free of voids, cracks, excess mortar or grout.
  - .14 Clean surfaces after curing.
  - .15 Seal and finish in accordance with manufacturer's recommendations.
- 3.5 SETTING  
BACK-BUTTERED TILE
- .1 Firmly push, twist and immediately beat or vibrate the tiles or stone units.
- 3.6 WALL TILE
- .1 Install in accordance with:
    - .1 TTMAC detail 305W-2009/2010 Detail A Interior Wet/Dry Areas and Exterior Use, Tile Installed on Cementitious Backer Unit (CBU) Thin Set Method/Walls.
    - .2 Bond coat and grout to manufacturer's written instructions.

PART 1 - GENERAL

- 1.1 SAMPLE .1 Submit sample of grid and tile to Departmental Representative for approval.
- 1.2 CERTIFICATES .1 Submit certificate stating that suspended ceiling systems provide adequate support for electrical fixtures, as required by current bulletin of Electrical Inspection Department of Ontario Hydro.

PART 2 - PRODUCTS

- 2.1 MATERIALS .1 Intermediate duty system to ASTM C635/C635M-07.
- .2 Acoustic units (ACU): mineral fibre 610 x 1219 x 16 mm thick, flat, square edge, white colour, fissured pattern, maximum flame spread rating 25 to CAN/ULC-S102-10, STC minimum 35, butt edge detail, to match existing in all respects.
- .3 Suspension system: non-fire rated, two way directional exposed tee bar grid, including wall moulding.
- .4 Exposed tee bar grid components for ACU: cold rolled steel, zinc coated, shop painted, satin sheen, white, interlocking, main and cross tee of double web with rectangular bulb, depth governed by span, 25 mm exposed face, to match existing in all respects.
- .5 Hangers: 3.6 mm galvanized soft annealed steel wire.
- .6 Accessories: splices, clips, wire ties, retainers and wall moulding flush, to complement suspension system components, as recommended by system manufacturer.
- .7 Retroclip: 0.9 mm thick (20 gauge) steel clip for attaching cross Tees to main tees after the cross tee tongue has been removed.
-

PART 3 - EXECUTION

- 3.1 INSTALLATION
- .1 Install in accordance with ASTM C636/C636M-08 except where specified otherwise.
  - .2 Co-ordinate suspension system with related components.
  - .3 Cut acoustic units to fit adjacent work. Butt joints tight, terminate edges with moulding.
  - .4 Support suspension system main runners at 1200 mm oc maximum with hangers from structure. Assembly shall support super-imposed loads. Maximum permissible deflection, 1/360th of span to ASTM C635/C635M-07 deflection test.
  - .5 Attach cross member to main runner to provide rigid assembly.
  - .6 Install suspension assembly to manufacturer's written instructions.
  - .7 Install flush edge moulding at junction of acoustic unit ceiling and other materials around entire length of joint.

PART 1 - GENERAL

- 1.1 REFERENCES
- .1 ASTM International.
    - .1 ASTM F1514-03(2008), Standard Test Method for Measuring Heat Stability of Resilient Flooring by Color Change.
    - .2 ASTM F1700-13, Standard Specification for Solid Vinyl Floor Tile.
  - .2 Underwriter Laboratories of Canada (ULC)
    - .1 CAN/ULC-S102.2-10, Standard Method of Test for Surface Burning Characteristics of Flooring, Floor Coverings and Miscellaneous Materials and Assemblies.
  - .3 International Code Council/American National Standards Institute (ICC/ANSI)
    - .1 ICC/ANSI A117.1-2003, Accessible and Usable Buildings and Facilities.
  - .4 CSA Group
    - .1 CSA B651-12, Accessible Design for the Built Environment.
  - .5 Scientific Certification Systems (SCS)
    - .1 SCS-EC10.2-2007, Indoor Air Quality Performance.
- 1.2 WHMIS
- .1 Submit WHMIS MSDS - Material Safety Data Sheets acceptable to Labour Canada and Health Canada for primer, cement and adhesive. Indicate VOC content.
  - .2 Submit WHMIS MSDS in accordance with Section 01 33 00.
- 1.3 MAINTENANCE DATA
- .1 Provide maintenance data for resilient flooring for incorporation into operation and maintenance manual specified in Section 01 78 00.
- 1.4 SUBMITALS
- .1 Submit a list of 6 projects (with contact people and phone numbers) completed within the previous 12 months which use the same systems specified here in accordance with Section 01 33 00.
-

- 1.4 SUBMITALS  
(Cont'd)
- .2 Submit copy of flooring manufacturer's installation procedures in accordance with Section 01 33 00.
  - .3 Submit copy of installer's certificate of competence granted by the linoleum manufacturer in accordance with Section 01 33 00.
- 1.5 SAMPLES
- .1 Submit samples in accordance with Section 01 33 00.
  - .2 Submit duplicate 300 x 300 mm samples.
- 1.6 ENVIRONMENTAL CHOICE PROGRAM
- .1 Provide adhesive products bearing the 'Ecologo' of the Environmental Choice Program, Department of the Environment, Canadian Environmental Protection Act, Environmental Choice Product Guidelines ECP/PCE-44-92 for Adhesives.
  - .2 Submit one copy of the licensing criteria statements and the verification of compliance with Sections 3(a) and 3(b) of the ECP to the Departmental Representative.
- 1.7 AIR QUALITY
- .1 Select materials and off gas flooring products off site in accordance with CSA B651, including Annex A Environmental Considerations, A.5 Indoor Air Quality and FloorScore certified to SCS-EC10.2-2007.
  - .2 No detectable odour after installation from flooring, adhesive or accessories.
-

PART 2 - PRODUCTS

- 2.1 MATERIALS
- .1 Vinyl plank: solid vinyl to ASTM F1700, Class 3 printed film, Type B embossed surface, size as indicated, 2.5 mm thick, wear layer 0.51 mm thick.
    - .1 Heat stability: to ASTM F1514, pass.
    - .2 Stain and chemical stability: to ASTM F925, pass.
    - .3 Static coefficient of friction: to ADA Guidelines and CSA B651.
  - .2 Vinyl plank adhesive: zero VOC, low odour, no alcohol, glycol or amonia, Ecologo certified.
  - .3 Self-levelling compound: modified cement based material forming a roller-castor-chair and moisture-resistant layer.
  - .4 Sub-floor filler: premixed latex modified cement mixed with water to produce cementitious paste.
  - .5 Concrete floor sealer: to CAN/CGSB-25.20-95, Type 1.
  - .6 Wax and sealer: type recommended by flooring manufacturer.
  - .7 Reducing strip: same material as flooring.

PART 3 - EXECUTION

- 3.1 SUB-FLOOR TREATMENT
- .1 Remove ridges and bumps.
  - .2 Apply sub-floor filler to low spots and cracks to achieve floor level to a tolerance of 1:500, allow to cure.
  - .3 Prepare and seal porous and powdery concrete surfaces in accordance with flooring manufacturer's written instructions.
  - .4 Remove dust, old adhesive, paint, dirt, wax, sealer and foreign matter from existing surfaces.
-

- 3.2 PREPARATION AND INSTALLATION
- .1 Maintain room and material temperature at approximately 20°C for 3 days before laying, and minimum 2 days after laying.
  - .2 Do not proceed with work until results of moisture condition tests are acceptable.
  - .3 Prepare floor and install flooring in accordance with flooring manufacturer's instructions.
  - .4 Roll surface with 45 kg roller.
  - .5 Install reducing strip at exposed edges, centre under doors at doorways.
- 3.3 CLEANING AND WAXING
- .1 Clean, seal and wax to manufacturer's instructions.

PART 1 - GENERAL

1.1 REFERENCES

- .1 Contract Carpet Manual, Canadian Carpet Institute, (613) 232-7183.
- .2 Carpet and Rug Institute [www.carpet-rug.org](http://www.carpet-rug.org) and Canadian Carpet Institute, [www.canadiancarpet.org](http://www.canadiancarpet.org).
  - .1 CRI Carpet Installation Standard 2011.
  - .2 CRI Green Label Indoor Air Quality Testing Program.
- .3 Electrostatic Propensity of Carpets, AATCC 134-2006, AATCC, P.O. Box 12215, Research Triangle Park, North Carolina, 27709, U.S.A.
- .4 Colorfastness to Light, AATCC 16-2004, AATCC, P.O. Box 12215, Research Triangle Park, North Carolina, 27709, U.S.A.
- .5 ASTM D1335-05, Test Method for Tuft Bind of Pile Floor Coverings.
- .6 CAN/CGSB-25.20-95, Surface Sealer Floors.
- .7 CAN/CGSB-4.129-93, Carpet for Commercial Use.
- .8 CAN/ULC-S102-10, Standard Method of Test for Surface Burning Characteristics of Materials.
- .9 CSA B651-12, Accessible Design for the Built Environment.

1.2 DEMOLITION

- .1 Arrange and pay for return of removed carpet and carpet tile to manufacturer for recycling.

1.3 PRODUCT DATA

- .1 Submit product data sheet for each carpet, carpet tile, undercushion, adhesive, concrete floor sealer and Ecologo products in accordance with Sections 01 33 00 and 01 78 00.
    - .1 Indicate recycled/reclaimed content of each component of carpet, carpet tile, undercushion.
    - .2 Indicate which recycling program (supplying mill or fibre producer) the carpet is eligible for and provide program parameters.
  - .2 For adhesives, indicate VOC in g/L during application and curing.
-

- 1.4 SHOP DRAWINGS .1 Submit shop drawings in accordance with Sections 01 33 00 and 01 78 00.
- .2 Indicate nap, open edges and other details required by Departmental Representative to clarify work.
- 1.5 SAMPLES .1 Submit for Departmental Representative's review, duplicate carpet tile samples in each colour selected in accordance with Sections 01 33 00 and 01 78 00.
- 1.6 DESIGN DATA, TEST REPORTS, CERTIFICATES, MANUFACTURER'S INSTRUCTIONS AND FIELD REPORTS .1 Submit evidence of prequalification compliance.
- .2 Submit a report by an independent testing laboratory verifying tuft bind meets requirements specified when tested to ASTM D1335.
- .3 Submit WHMIS MSDS - Material Safety Data Sheets acceptable to Labour Canada and Health Canada for carpet adhesive and seam cement. Indicate VOC content.
- 1.7 MAINTENANCE DATA .1 Provide maintenance data for carpet tile for incorporation into Operation and Maintenance Manual specified in Section 01 78 00.
- .2 Include information on recycling of carpet or carpet tile including manufacturer's reprocessing program. Indicate which portions of materials are recyclable.
- 1.8 SUSTAINABILITY .1 Remove existing carpet tile and deliver to manufacturer's recycling facility in accordance with Sections 01 33 00 and 01 78 00.
- .2 Submit sample of carpet tile and deliver to manufacturer's recycling facility for analysis of asbestos content. Only certified asbestos free material can be recycled.
- .3 Submit receipts from recycling facility indicating existing removed carpet has been diverted from waste stream in accordance with Section 01 33 00. Submit program parameters.
-

- 1.9 AIR QUALITY .1 Off gas carpet products off site in accordance with CSA B651 including Annex A.
- 1.10 QUALIFICATIONS .1 Applied by installer trained and certified by carpet tile manufacturer for application of its products.
- .2 Manufacturer's representative:  
.1 Inspect substrate prior to commencement of work, during application of materials and upon completion of work.  
.2 Provide technical assistance to the installer and assist where required in correct installation of carpet tile.
- 1.11 GUARANTEE .1 Provide a manufacturer's written material guarantee stating that the carpet will remain free of manufacturing defects and deterioration for a period of twenty years. Non-pro-rated guarantee.
- .2 Provide a manufacturer's written material guarantee stating that the carpet tile will remain free of manufacturing defects and deterioration for a period of fifteen years. Non-pro-rated guarantee.

PART 2 - PRODUCTS

- 2.1 MATERIALS .1 Carpet tile: to CAN/CGSB-4.129, except as noted. Carpet base of same material, colour, pattern and texture as adjoining carpet or carpet tile. Vinyl cap strip to accommodate carpet base thickness, colour to match carpet tile.
- .1 Prequalification: compliance with Health Canada regulations under "Hazardous Products (Carpet) Regulations", Part II of the Schedule.  
.2 Indoor Air Quality Certification: certified to CRI Green Label Plus IAQ requirements.
- .2 Carpet tile characteristics: minimum 55% recycled content.  
.1 Size and type: to match existing.  
.2 Face yarn fibre type: 100% first quality, BCF branded Nylon 6,6, permanent antistatic and permanent soil hiding properties, part of a

- 
- 2.1 MATERIALS (Cont'd)
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- .2 Carpet tile characteristics:(Cont'd)
- .2 Face yarn fibre type:(Cont'd) construction and performance certification program from the fibre manufacturer.
  - .3 Colour fastness: AATCC - 16E, minimum L5.
  - .4 Yarn weight: 678 g/m<sup>2</sup>.
  - .5 Gauge: 1/10 = 39.5/10 cm.
  - .6 Density: 10.5 kilotex/cm<sup>2</sup> minimum.
  - .7 Tuft bind: 5.9 kg.
  - .8 Dimensional stability: Aachener Test - Pass.
  - .9 Backing: vinyl composite.
    - .1 Recycled content: minimum 30%.
  - .10 Permanent static control: to AATCC #134, 2500 at 20%RH and 22°C.
  - .11 Flame spread: maximum 300 to CAN/ULC-S102.
  - .12 Smoke developed: maximum 500 to CAN/ULC-S102.
  - .13 Toxicity: pass CRI IAQ Testing Program Green Label.
  - .14 Soil Resistance: protective anti-soil treatment heat applied by carpet mill.
- .3 Carpet base: unbacked roll good material, bound on on exposed edge, 100 mm high, colour pattern and texture to match carpet tile.
- .4 Binder bars: aluminium type recommended by carpet manufacturer. Colour to match carpet.
- 
- .5 Carpet tile installation connectors: approved by carpet tile manufacturer for wall to wall installation as indicated.
- .1 75 mm x 75 mm square or round.
  - .2 Compounded acrylic adhesive on PET polyester squares with colored print, on white PET polyester release liner, in rolls or sheets.
  - .3 Clear polyester squares with small quantity of a pressure sensitive adhesive applied on one side of the polyester film.
  - .4 Connectors shall contain no liquid components and shall have "zero" calculated VOC's.
- .6 Concrete floor sealer: to CAN/CGSB-25.20, Type 1.
- .7 Sub-floor filler: premixed latex mixed with water to produce cementitious paste.
-

PART 3 - EXECUTION

- 3.1 SUB-FLOOR TREATMENT
- .1 Remove ridges and bumps.
  - .2 Apply sub-floor filler to low spots and cracks to achieve floor level to a tolerance of 1:500; allow to cure.
  - .3 Seal porous and powdery surfaces with concrete floor sealer.
  - .4 Remove dust, old adhesive, dirt, sealer and wax from existing surfaces.
- 3.2 INSTALLATION
- .1 Prepare floor surfaces in accordance with CRI Carpet Installation Standard.
  - .2 Commence work after finishing work is completed.
  - .3 Ensure toeless type resilient base is installed before proceeding with carpet or carpet tile.
  - .4 Install to CRI Carpet Installation Standard.
  - .5 Cut and fit around projections through floor.
  - .6 Finish installation to present smooth wearing surface free from burring or embedded foreign matter.
  - .7 HEPA Vacuum finished area with commercial grade vacuum with a beater bar head.
  - .8 Ensure colour, pattern and texture match within any one area.
  - .9 Install binder bars at doorways centered under doors and at exposed edges of carpet tile.
  - .10 Fit carpet tile tight to abutting vertical surfaces.
- 3.3 CARPET TILE
- .1 Apply adhesive connectors and install carpet tile in accordance with manufacturer's written instructions.
  - .2 Lay tiles with seams within manufacturer's tolerances.
-

- 3.4 CARPET BASE .1 Install carpet base to match adjacent carpet  
tile flooring.
- .2 Bind exposed carpet base edge.
- .3 Attach carpet base to wall with adhesive.  
Neatly fit against floor carpet tile.
-

PART 1 - GENERAL

- 1.1 REFERENCES
- .1 Green Seal Environmental Standards (GS)
    - .1 GS-11-2008, 2nd Edition, Paints and Coatings.
  - .2 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
    - .1 Material Safety Data Sheets (MSDS).
  - .3 The Master Painters Institute (MPI)
    - .1 Architectural Painting Specification Manual.
    - .2 Maintenance Repainting Manual.
  - .4 South Coast Air Quality Management District (SCAQMD), California State, Regulation XI. Source Specific Standards
    - .1 SCAQMD Rule 1113-A2007, Architectural Coatings.
- 1.2 ACTION AND INFORMATIONAL SUBMITTALS
- .1 Submit in accordance with Sections 01 33 00 and 01 78 00.
  - .2 Product Data:
    - .1 Submit manufacturer's instructions, printed product literature and data sheets for paint and coating products and include product characteristics, performance criteria, physical size, finish and limitations.
    - .2 Submit 2 copies of WHMIS MSDS.
  - .3 Samples:
    - .1 Submit for review and acceptance of each unit.
    - .2 Samples will be returned for inclusion into work.
    - .3 Submit duplicate, 200 x 300 mm sample panels of each paint with specified paint or coating in colours, gloss/sheen and textures required to MPI Painting Specification Manual standards.
  - .4 Certificates: submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
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- 1.2 ACTION AND INFORMATIONAL SUBMITTALS (Cont'd)
- .5 Low-Emitting Materials:  
.1 Submit listing of paints and coatings used in building, comply with VOC and chemical component limits or restriction requirements.
- 1.3 DELIVERY, STORAGE AND HANDLING
- .1 Deliver, store and handle materials in accordance with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:  
.1 Provide and maintain dry, temperature controlled, secure storage.  
.2 Store painting materials and supplies away from heat generating devices.  
.3 Store materials and equipment in well ventilated area within temperature as recommended by manufacturer.
- .4 Fire Safety Requirements:  
.1 Supply one 9 kg Type ABC fire extinguisher adjacent to storage area.  
.2 Store oily rags, waste products, empty containers and materials subject to spontaneous combustion in ULC approved, sealed containers and remove from site on a daily basis.  
.3 Handle, store, use and dispose of flammable and combustible materials in accordance with National Fire Code of Canada requirements.
- .5 Packaging Waste Management: remove for reuse and return by manufacturer of pallets, crates, padding and packaging materials as specified in accordance with Section 01 74 11.
- 1.4 SITE CONDITIONS
- .1 Heating, Ventilation and Lighting:  
.1 Ventilate enclosed spaces in accordance with Section 01 51 00.  
.2 Co-ordinate use of existing ventilation system with Departmental Representative and ensure its operation during and after application of paint as required.  
.3 Provide minimum lighting level of 323 Lux on surfaces to be painted.
-

1.4 SITE CONDITIONS .2  
(Cont'd)

Temperature, Humidity and Substrate Moisture  
Content Levels:

.1 Apply paint finishes when ambient air and  
substrate temperatures at location of  
installation can be satisfactorily maintained  
during application and drying process, within  
MPI and paint manufacturer's prescribed limits.

.2 Test concrete, masonry and plaster  
surfaces for alkalinity as required.

.3 Apply paint to adequately prepared  
surfaces, when moisture content is below paint  
manufacturer's prescribed limits.

.3 Additional application requirements:

.1 Apply paint finish in areas where dust is  
no longer being generated by related  
construction operations or when wind or  
ventilation conditions are such that airborne  
particles will not affect quality of finished  
surface.

.2 Apply paint in occupied facilities during  
silent hours only. Schedule operations to  
approval of Departmental Representative such  
that painted surfaces will have dried and cured  
sufficiently before occupants are affected.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Supply paint materials for paint systems from  
single manufacturer.

.2 Conform to latest MPI requirements for painting  
work including preparation and priming.

.3 Materials in accordance with MPI -  
Architectural Painting Specification Manual and  
MPI - Maintenance Repainting Manual "Approved  
Product" listing.

.1 Use MPI listed materials having E3 rating  
where indoor air quality requirements exist.

.2 Primer: VOC limit 100 g/L maximum to GS-11  
or SCAQMD Rule 1113.

.3 Paint: VOC limit 100 g/L maximum to GS-11  
or SCAQMD Rule 1113.

.4 Colours: Submit proposed Colour Schedule to  
Departmental Representative for review.

.5 Mixing and tinting:

.1 Perform colour tinting operations prior to  
delivery of paint to site, in accordance with  
manufacturer's written recommendations. Obtain

2.1 MATERIALS  
(Cont'd)

- .5 Mixing and tinting:(Cont'd)
- .1 (Cont'd)  
written approval from Departmental Representative for tinting of painting materials.
- .2 Use and add thinner in accordance with paint manufacturer's recommendations.
- .1 Do not use kerosene or similar organic solvents to thin water-based paints.
- .3 Thin paint for spraying in accordance with paint manufacturer's written recommendations.
- .4 Re-mix paint in containers prior to and during application to ensure break-up of lumps, complete dispersion of settled pigment, and colour and gloss uniformity.
- .6 Gloss/sheen ratings:
- .1 Paint gloss is defined as sheen rating of applied paint, in accordance with following values:
- | Gloss Level-Categor<br>y           | Gloss @ 60<br>degrees | Sheen @ 85<br>degrees |
|------------------------------------|-----------------------|-----------------------|
| Gloss Level 1<br>- Matte<br>Finish | Max. 5                | Max. 10               |
| Gloss Level 2<br>- Velvet          | Max.10                | 10 to 35              |
| Gloss Level 3<br>- Eggshell        | 10 to 25              | 10 to 35              |
| Gloss Level 4<br>- Satin           | 20 to 35              | min. 35               |
| Gloss Level 5<br>- Semi-Gloss      | 35 to 70              |                       |
| Gloss Level 6<br>- Gloss           | 70 to 85              |                       |
| Gloss Level 7<br>- High Gloss      | More than 85          |                       |
- .2 Gloss level ratings of painted surfaces as indicated and as noted on Finish Schedule.
- .7 Exterior painting:
- .1 Galvanized Metal: high contact/high traffic areas (doors, frames, railings and handrails, etc.).
- .1 EXT 5.3B - Alkyd, gloss level selected by Departmental Representative.
- .8 Interior painting:
- .1 Concrete Masonry Units: smooth and split face block and brick
- .1 INT 4.2A Latex, gloss level selected by Departmental Representative.

- 
- 2.1 MATERIALS (Cont'd)
- .8 Interior painting:(Cont'd)
    - .2 Galvanized Metal: high contact/high traffic areas (doors, frames, railings and handrails, etc.).
      - .1 INT 5.3C - Alkyd, gloss level selected by Departmental Representative (over cementitious primer).
      - .3 Dressed Lumber: doors, door and window frames, casings, mouldings, etc.:
        - .1 INT 6.3A - Latex, gloss level selected by Departmental Representative.

PART 3 - EXECUTION

- 3.1 GENERAL
- .1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and data sheets.
  - .2 Perform preparation and operations for interior painting in accordance with MPI - Architectural Painting Specifications Manual and MPI - Maintenance Repainting Manual except where specified otherwise.
- 3.2 EXAMINATION
- .1 Investigate existing substrates for problems related to proper and complete preparation of surfaces to be painted. Report to Departmental Representative damages, defects, unsatisfactory or unfavourable conditions before proceeding with work.
  - .2 Conduct moisture testing of surfaces to be painted using properly calibrated electronic moisture meter, except test concrete floors for moisture using simple "cover patch test". Do not proceed with work until conditions fall within acceptable range as recommended by manufacturer.
- 3.3 PREPARATION
- .1 Protection of in-place conditions:
    - .1 Protect existing building surfaces and adjacent structures from paint spatters, markings and other damage by suitable non-staining covers or masking. If damaged, clean and restore surfaces as directed by Departmental Representative.
-

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- 3.3 PREPARATION (Cont'd)
- .1 (Cont'd)
- .2 Protect items that are permanently attached such as Fire Labels on doors and frames.
- .3 Protect factory finished products and equipment.
- .2 Surface Preparation:
- .1 Remove electrical cover plates, light fixtures, surface hardware on doors, bath accessories and other surface mounted equipment, fittings and fastenings prior to undertaking painting operations. Identify and store items in secure location and re-installed after painting is completed.
- .2 Move and cover furniture and portable equipment as necessary to carry out painting operations. Replace as painting operations progress.
- .3 Place "WET PAINT" signs in occupied areas as painting operations progress. Signs to approval of Departmental Representative.
- .4 Clean and prepare surfaces in accordance with MPI - Architectural Painting Specification Manual and MPI - Maintenance Repainting Manual specific requirements and coating manufacturer's recommendations.
- .5 Prevent contamination of cleaned surfaces by salts, acids, alkalis, other corrosive chemicals, grease, oil and solvents before prime coat is applied and between applications of remaining coats. Apply primer, paint, or pretreatment as soon as possible after cleaning and before deterioration occurs.
- .6 Where possible, prime non-exposed surfaces of new wood surfaces before installation. Use same primers as specified for exposed surfaces.
- .1 Apply vinyl sealer to MPI #36 over knots, pitch, sap and resinous areas.
- .2 Apply wood filler to nail holes and cracks.
- .3 Tint filler to match stains for stained woodwork.
- .7 Sand and dust between coats as required to provide adequate adhesion for next coat and to remove defects visible from a distance up to 1000 mm.
- .8 Clean metal surfaces to be painted by removing rust, loose mill scale, welding slag, dirt, oil, grease and other foreign substances in accordance with MPI requirements.
- .9 Touch up of shop primers with primer as specified.
-

- 3.4 APPLICATION
- .1 Paint only after prepared surfaces have been accepted by Departmental Representative.
  - .2 Use method of application approved by Departmental Representative.
    - .1 Conform to manufacturer's application recommendations.
  - .3 Apply coats of paint in continuous film of uniform thickness.
    - .1 Repaint thin spots or bare areas before next coat of paint is applied.
  - .4 Allow surfaces to dry and properly cure after cleaning and between subsequent coats for minimum time period as recommended by manufacturer.
  - .5 Sand and dust between coats to remove visible defects.
  - .6 Finish surfaces both above and below sight lines as specified for surrounding surfaces, including such surfaces as tops of interior cupboards and cabinets and projecting ledges.
  - .7 Finish top, bottom, edges and cutouts of doors after fitting as specified for door surfaces.
  - .8 Mechanical/Electrical Equipment:
    - .1 Paint conduits, piping, hangers, ductwork and other mechanical and electrical equipment exposed in finished areas, to match adjacent surfaces, except as indicated.
    - .2 Do not paint over nameplates.
    - .3 Keep sprinkler heads free of paint.
    - .4 Paint fire protection piping red.
    - .5 Paint disconnect switches for fire alarm system and exit light systems in red enamel.
    - .6 Paint natural gas piping yellow.
    - .7 Paint both sides and edges of backboards for telephone and electrical equipment before installation.
      - .1 Leave equipment in original finish except for touch-up as required, and paint conduits, mounting accessories and other unfinished items.
- 3.5 CLEANING
- .1 Progress Cleaning: clean in accordance with Section 01 74 11.
    - .1 Leave Work area clean at end of each day.
-

3.5 CLEANING  
(Cont'd)

- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11.
- .3 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 20.
  - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.
- .4 Place paint and primer defined as hazardous or toxic waste, including tubes and containers, in containers or areas designated for hazardous waste.

PART 1 - GENERAL

- 1.1 REFERENCES
- .1 Aluminum Association (AA)
    - .1 AA DAF45-2003(R2009), Designation System for Aluminum Finishes, 9th Edition.
  - .2 ASTM International
    - .1 ASTM A653/A653M-11, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
    - .2 ASTM C1396/C1396M-13, Standard Specification for Gypsum Board.
    - .3 ASTM C645-11a, Standard Specification for Nonstructural Steel Framing Members.
    - .4 ASTM E90-09, Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements.
  - .3 CSA International
    - .1 CAN/CSA-Z809-08, Sustainable Forest Management.
  - .4 Forest Stewardship Council (FSC)
    - .1 FSC-STD-01-001-2004, FSC Principle and Criteria for Forest Stewardship.
  - .5 Sustainable Forestry Initiative (SFI)
    - .1 SFI-2010-2014 Standard.
  - .6 The Master Painters Institute (MPI)
    - .1 Architectural Painting Specification Manual.
  - .7 Underwriters Laboratories of Canada (ULC)
    - .1 CAN/ULC-S102-10, Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies.
  - .8 United Nations Environment Programme (UNEP)/UNEP World Conservation Monitoring Centre (WCMC) - 2000.
    - .1 Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) - 1973-(A1979).
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- 1.2 ACTION AND INFORMATIONAL SUBMITTALS
- .1 Submit in accordance with Section 01 33 00.
  - .2 Product Data:
    - .1 Submit manufacturer's printed product literature and data sheets for demountable partitions and include product characteristics, performance criteria, physical size, finish and limitations.
  - .3 Samples:
    - .1 Submit one representative model of each type partition.
      - .1 Indicate basic construction, glazed sections, door frames, trim, and finishes.
      - .2 Submit duplicate 200 x 300 mm samples of panel colours, textures and finishes and 300 mm long samples of trim options for colour selection by Departmental Representative.
      - .3 Submit sample of ceiling fixing device.
  - .4 Test Reports:
    - .1 Submit test reports in accordance with Section 01 45 00, from approved independent testing laboratory, certifying partition system complies with sound transmission rating, as specified.
  - .5 Shop Drawings: of fixed and sliding glazed privacy wall.
    - .1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Ontario, Canada.
    - .2 Indicate materials, core thicknesses, finishes, connections, joints, method of anchorage, number of anchors, supports, reinforcement, details, and accessories.
- 1.3 QUALITY ASSURANCE
- .1 Sustainable Standards Certification:
    - .1 Certified Wood: submit listing of wood products and materials used in accordance with CAN/CSA-Z809 or FSC or SFI.
  - .2 Mock-ups:
    - .1 Construct mock-ups in accordance with Section 01 45 00.
    - .2 Erect on site where directed by Departmental Representative.
    - .3 Allow 24 hours for inspection of each mock-up by Departmental Representative before proceeding with Work.
    - .4 When accepted, mock-up will demonstrate minimum standard for this Work. Mock-ups may remain as part of finished Work.
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1.4 DELIVERY,  
STORAGE AND  
HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 and with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
  - .1 Store materials indoors in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  - .2 Store and protect stud type demountable partitions from nicks, scratches, and blemishes.
  - .3 Replace defective or damaged materials with new.
- .4 Packaging Waste Management: remove for reuse and return by manufacturer pallets, crates, padding and packaging materials as specified in accordance with Section 01 74 20.

PART 2 - PRODUCTS

2.1 SYSTEM  
DESCRIPTION

- .1 Basic system to be ceiling height partitions, from single manufacturer, of metal stud type framing faced with removable vinyl faced gypsum board panels both sides. Drawings are based on 1220 mm wide panels.
- .2 Glazed wall with sliding glass panels: aluminum floor and ceiling track, glazed fixed panels and glazed sliding panels and decorative glazing film.

2.2 DESIGN  
REQUIREMENTS

- .1 Partition assembly: non-combustible construction, fully demountable and relocatable, non-progressive, extend in four directions without disturbing other panels, accommodate floor/ceiling height variations of 25 mm.
- .2 Components: distortion free, uniform in dimension, construction and appearance, made to suit specific function and have been proven in use.
- .3 Partition heights: as indicated.
- .4 Partition module: to match existing.

2.2 DESIGN REQUIREMENTS (Cont'd) .5 Minimum sound transmission rating of installed panel partition: STC 30, tested to ASTM E90.

- 2.3 MATERIALS
- .1 Stud type demountable partition.
  - .2 Stud framing: to ASTM C645 mm stud size as indicated on drawings, designed and prepared for removable attachment of facing sheets.
  - .3 Vinyl-faced gypsum board: to ASTM C1396/C1396M, standard, covered with minimum 0.15 mm thick vinyl wall covering having maximum flame spread: 25, fuel contributed: 35, smoke developed: 50 when tested to CAN/ULC-S102; texture, pattern and colour selected by Departmental Representative.
  - .4 Tile backer units behind backsplash: to Section 09 30 14.
  - .5 Acoustical insulation and sealant: type recommended by partition manufacturer to achieve STC rating specified.
  - .6 Light seal: self adhesive closed cell, inorganic, permanently elastic, sponge type stripping, 12 x 12 mm size, black.
  - .7 Tempered glass and glazing materials: to Section 08 80 00.
  - .8 Accessories: miscellaneous trim, bracing, fasteners, clips, and other accessories for installation as recommended by partition manufacturer.
  - .9 Aluminum extrusions: Aluminum Association alloy AA 6063-T5.
  - .10 Galvanized steel sheet: furniture grade to ASTM A653/A653M with Z275 zinc coating.

2.4 COMPONENTS .1 Glazing frames: extruded aluminum to match existing, for single glazing.

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- 2.4 COMPONENTS  
(Cont'd)
- .2 Door frames: extruded aluminum for doors as indicated on schedule, 45 mm thick, with fixed stops.
- .1 Prepare for hardware specified in Section 08 71 11, with cutouts and 5 mm aluminum reinforcing, extruded aluminum continuous filler strips on jambs and head, cutout to receive hardware.
- .2 Include 3 resilient buttons on strike side or continuous vinyl seal on door stop.
- .3 Partition head/top rail: extruded aluminum cap, to match existing.
- .4 Partition base: to match existing.
- .5 Joint battens: to match existing.
- 2.5 FINISHES
- .1 Aluminum surfaces:
- .1 Finish exposed surfaces of aluminum components to AA DAF45 to match existing.

PART 3 - EXECUTION

- 3.1 EXAMINATION
- .1 Verification of Conditions: verify conditions of substrates and surfaces to receive stud type demountable partitions previously installed under other Sections or Contracts are acceptable for product installation in accordance with manufacturer's instructions.
- .1 Visually inspect substrate in presence of Departmental Representative.
- 3.2 ERECTION
- .1 Install partition after floor finishes, in accordance with manufacturer's instructions.
- .2 Fasten runners to floors, ceiling and abutting vertical surfaces at 600 mm on centre.
- .1 At ceilings use fasteners that rigidly support partition without damaging or defacing ceiling panels or grid system members.
- .3 Erect partitions, plumb, square and level.
- .1 Accurately fit and fasten to abutting surfaces.
- .2 Shim under partitions at uneven floors to ensure level installation.
-

3.2 ERECTION  
(Cont'd)

- .4 Brace studs at 1200 mm on centre horizontally.
- .5 Install continuous light seal at junction of ceiling height partitions with floors, ceilings and vertical surfaces.
- .6 Install acoustical insulation and sealant in sound rated partitions to correspond with tested assembly.
  - .1 Install panels in accordance with manufacturer's printed instructions. Apply panels full height floor to ceiling.

3.3 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11.
  - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11.
- .3 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 20.

PART 1 - GENERAL

- 1.1 MINIMUM STANDARDS .1 Conform to the following standards:  
.1 FC 403(M)-1985, Sprinkler Systems.  
.2 NFPA 10-2010, Standard for Portable Fire Extinguishers.  
.3 National Building Code of Canada 2010.  
.4 National Fire Code of Canada 2010.
- 1.2 FIRE COMMISSIONER'S INSPECTION AND TEST .1 Notify the Departmental Representative that the installation of fire protection system is complete. Provide certificate that components are compatible and the systems conform to the requirements of the specifications, applicable codes and standards. A copy of the contractor's Material and Test Certificate shall be submitted prior to the final inspection.  
.2 Fire protection systems shall be subject to the final inspection and test of the Federal Fire Commissioner or their authorized representative. Work shall not be considered complete until a satisfactory inspection report from the Federal Fire Commissioner is obtained.
- 1.3 SHOP DRAWINGS AND PRODUCT DATA SHEETS .1 Submit shop drawings and product data sheets in accordance with Sections 01 11 01 and 23 05 00 for review before commencing work.  
.2 Shop drawings and product data sheets shall include the following equipment:  
.1 Portable fire extinguishers.

PART 2 - PRODUCTS

- 2.1 PORTABLE FIRE EXTINGUISHERS .1 Extinguishers shall be ULC listed and labelled.  
.2 Provide water expellant-gas operated extinguishers of 9 L capacity in office storage areas, and as indicated on drawings.  
.3 Provide carbon dioxide extinguishers of 5 kg capacity in kitchenette and as indicated on drawings.
-

2.1 PORTABLE FIRE .4 Provide wall brackets and mount extinguishers  
EXTINGUISHERS 1 to 1.5 m above floor.  
(Cont'd)

PART 3 - EXECUTION

3.1 INSTALLATION .1 Install material and fixtures in accordance  
with referenced standards and manufacturer's  
written instructions.

3.2 TESTS .1 Conform to Section 23 05 00 for tests.  
.2 Conduct tests in the presence of the  
Departmental Representative and the  
Representative of Federal Fire Commissioner.  
.3 Refer to other Sections for requirements of  
commissioning.

PART 1 - GENERAL

- 1.1 MINIMUM STANDARDS
- .1 Conform to or exceed:
    - .1 Ontario Plumbing Code.
    - .2 Canadian Standards Association Standards.
    - .3 Local Municipal By-laws and Regulations.
    - .4 National Building Code of Canada (NBC) 2010.
    - .5 Ontario Building Code (OBC) 2012.
    - .6 CSA B651-12, Accessible Design for the Built Environment.

- 1.2 REFERENCES
- .1 Material standards:
    - .1 ASME A112.18.1-[2005]/CSA-B125.1-[05], Plumbing Supply Fittings.
    - .2 ASME A112.18.2-[2005]/CSA-B125.2-[05], Plumbing Waste Fittings.
    - .3 ASME B16.22-[2001(R2010)], Wrought Copper and Copper Alloy Solder Joint Pressure Fittings.
    - .4 ASTM B88M-[05], Standard Specification for Seamless Copper Water Tube (Metric).
    - .5 ASTM B209-[10], Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
    - .6 ASTM B306-[09], Standard Specification for Copper Drainage Tube (DWV).
    - .7 ASTM D2564-[04(2009)e1], Standard Specification for Solvent Cements for Poly(Vinyl Chloride) (PVC) Plastic Piping Systems.
    - .8 CAN/CSA-B125.3-[05], Plumbing Fittings.
    - .9 CAN/CSA-B181.2-[M90], PVC Drain, Waste and Vent Pipe and Fittings.

SPEC NOTE: December 1, 2005 B181 series no longer in CSA catalogue.

.10 Thermal Insulation Association of Canada (TIAC): National Insulation Standards.

SPEC NOTE: CGSB insulation standards withdrawn. Refer to ASTM C547-07e1 and F683-03a and [www.astm.org](http://www.astm.org) and ULC [www.ulc.ca/standards/index.asp](http://www.ulc.ca/standards/index.asp) for replacement standards.

- 1.3 SHOP DRAWINGS AND PRODUCT DATA SHEETS
- .1 Submit shop drawings and product data sheets in accordance with Sections 01 11 01 and 23 05 00 for the following:
    - .1 Plumbing fixtures.
    - .2 Water hammer arrestors.
    - .3 Cleanouts.

PART 2 - PRODUCTS

2.1 SOIL, STORM,  
WASTE AND VENT  
PIPE AND FITTINGS .1 Piping inside building above ground: copper  
tube type DWV to ASTM B306 with drainage pattern  
wrought copper or cast brass solder joint  
fittings to CAN/CSA-B125.[3].

2.2 WATER PIPE  
AND FITTINGS .1 Above ground water piping size 50 mm and  
smaller: copper tube type [L] to ASTM B88M with  
sweat wrought copper fittings to ASME B16.22.  
.2 Make joints with 95:5 antimonial tin solder.

2.3 VALVES .1 Gate valve size 50 mm and smaller: bronze,  
rising stem, wedge disc, solder joint ends, ANSI  
Class 125, 1.4 MPa cold working pressure  
non-shock.  
.2 Provide gate valves at each piece of plumbing  
equipment and at each branch line take-off, and  
globe valves where balancing is required.

SPEC NOTE: For plumbing fixtures, select either  
manual flush valve or electronic flush valve.

2.4 PLUMBING  
FIXTURES .1 Single compartment stainless steel counter  
sink:  
.1 Sink: type 302 SS, 1.0 mm thick, self-  
rimming, with ledge back, single compartment,  
undercoated, countertop installation with  
clamps.  
.2 Supplies: ledge type with swing spout,  
aerator, single lever handle for hot and cold  
water. Provide accessories to limit maximum flow  
rate to 8.35 litres/minute at 413 kPa.  
.3 Waste: integral SS 90 mm nominal basket  
strainer with stopper, 40 mm nominal satin  
finish tailpiece and 40 mm nominal brass P trap  
with CO.  
.4 Size: OD 500 x 510 x 175 mm (or larger).  
.2 All exposed plumbing brass and metal work shall  
be heavy triple chromium-plated.

2.5 FIXTURE  
CONNECTIONS

- .1 Fixtures shall be serviced as follows:

Fixture	Waste (mm)	Vent (mm)	C.W. (mm)	H.W. (mm)
Counter Sink	40	32	12	12

.2 Insulate waste outlet and hot water supply pipes connected to barrier-free, accessible lavatories to CSA B651.

2.6 WATER HAMMER  
ARRESTORS  
(SHOCK ABSORBERS)

- .1 Provide arrestors sized and located on branch water supplies to each group of fixtures in accordance with Plumbing and Drainage Institute Standard PD1 - WH201.
- .2 Construction: stainless steel with welded nested bellows.

2.7 CLEANOUTS

- .1 Provide cleanouts to conform to National Plumbing Code and where shown on drawings.
- .2 Type: heavy CI male ferrule with bronze bolted plug.
- .3 Make each cleanout accessible and wherever necessary, extend branch connections to finished surfaces of wall, etc, and provide access covers or plates.

2.8 PIPE  
INSULATION

- .1 Insulate hot water piping with 25 mm thick rigid mineral fibre sleeving to CAN/CGSB-51.9 and factory applied all service jacket to CGSB 51-GP-52Ma.
- .2 Insulate cold water piping with 25 mm thick rigid mineral fibre sleeving to CAN/CGSB-51.9 and vapour barrier jacket to CGSB 51-GP-52Ma.

SPEC NOTE: CGSB standards withdrawn. Refer to ASTM C547-07e1 and F683-03a and [www.astm.org](http://www.astm.org) and ULC [www.ulc.ca/standards/index.asp](http://www.ulc.ca/standards/index.asp) for replacement standards.

- .3 Provide polyvinyl chloride (PVC) cover over insulated piping in exposed areas:
- .1 One-piece moulded type [and sheet] to CAN/CGSB-51.53 with pre-formed shapes as required.

- 2.8 PIPE INSULATION (Cont'd) .3 (Cont'd)
- .2 Colours: [to match adjacent finish paint] [by Departmental Representative].
  - .3 Minimum service temperatures: -20°C.
  - .4 Maximum service temperature: 65°C.
  - .5 Moisture vapour transmission: 0.02 perm.
  - .6 Fastenings:
    - .1 Use solvent weld adhesive compatible with insulation to seal laps and joints.
    - .2 Tacks.
    - .3 Pressure sensitive vinyl tape of matching colour.
  - .4 Fastenings:
    - .1 Use self-adhesive tape rated under 25 for flame spread and under 50 for smoke development.
    - .2 Use quick-setting adhesive for joints and lap sealing of vapour barriers. Flame spread 10, smoke development 0.

PART 3 - EXECUTION

- 3.1 INSTALLATION .1 Install material and fixtures in accordance with referenced standards and manufacturer's written instructions.
- 3.2 ADJUSTING .1 Conform to water conservation requirements specified this section.
- .2 Adjustments:
    - .1 Adjust water flow rate to design flow rates.
    - .2 Adjust pressure to fixtures to ensure no splashing at maximum pressures.
  - .3 Refer to other Sections for requirements of commissioning.

PART 1 - GENERAL

- 1.1 GENERAL
- .1 This Section covers items common to more than one section of the Mechanical Divisions 21, 22, and 23.
  - .2 "Provide" shall mean "supply, install and connect".
  - .3 Provide new materials, equipment and plant of proven design and quality, and of current models with published ratings for which replacement parts are readily available.
- 1.2 CO-ORDINATION
- .1 Locate distribution systems, equipment and materials to provide minimum interference and maximum useable space.
  - .2 Where interference occurs, Departmental Representative shall approve relocation of equipment and materials.
- 1.3 DRAWINGS
- .1 Working drawings, except where dimensioned, indicate general mechanical layouts only. Do not scale.
  - .2 Existing equipment and services shown on the drawings:
    - .1 The information shown on the drawings is incomplete and is for reference only. Some of the existing equipment, ducts, pipes and other services are not shown on the drawings.
    - .2 The Contractor shall make arrangements to examine existing conditions, determine conditions affecting the work, and verify sizes and location of existing equipment, ducts, pipes and any other services.
    - .3 Unless the discrepancies are noted and reported to the Departmental Representative prior to close of the bid, the Contractor shall be responsible for the work to relocate existing equipment and to reroute existing ducts, pipes and any other services required for the installation of new work at no extra cost to the contract.
  - .3 If required by Departmental Representative, provide field drawings to show relative
-

- 1.3 DRAWINGS (Cont'd) .3 (Cont'd)  
positions of various services. Obtain approval before beginning work.
- 1.4 SHOP DRAWINGS AND PRODUCT DATA SHEETS .1 Submit shop drawings and product data sheets for major equipment listed in each section.
- .2 Submit early enough to permit Project Schedules to be met.
- .3 Show materials; sizes, dimensions, performance ratings, curves and operating characteristics, compliance with codes and standards, wiring, controls, piping diagrams, installation instructions, fabrication, assembly and installation details.
- .4 For additional requirements pertaining to shop drawings and product data refer to Section 01 33 00.
- 1.5 OPERATION AND MAINTENANCE DATA .1 Supply operating and maintenance instructions complete with names and addresses of spare parts suppliers in accordance with requirements of Section 01 78 00.
- 1.6 EQUIPMENT DESIGN AND INSTALLATION .1 Uniformity:  
.1 For equipment or material of same type or classification, use product of one manufacturer.
- .2 Installation:  
.1 Install equipment to manufacturer's recommendations with adequate and easy access for inspection, servicing and lubrication.  
.2 Install equipment to permit maintenance and disassembly with minimum disturbance to connecting piping and duct systems and without interference with building structure or equipment.  
.3 Provide screwdriver stops on supplies to plumbing fixtures.  
.4 Provide support brackets, bases, and all necessary fastenings.
-

1.7 ELECTRIC  
MOTORS AND CONTROLS

- .1 Electrical equipment shall bear CSA label. Obtain inspection labels required by Provincial authority having jurisdiction.
- .2 Use high efficiency motors. Minimum acceptable motor efficiency levels shall be based on the latest table of motor efficiency levels in accordance with CSA C390-10, Test methods, marking requirements, and energy efficiency levels for three-phase induction motors.
- .3 Unless otherwise specified or indicated, motors ½ HP and larger shall be 3 phase.
- .4 Refer to Electrical Division 26 regarding specifications of power wiring (i.e. wiring carrying the full load current), conduits, starters, disconnect switches, etc., for mechanical equipment specified in Mechanical Divisions. Unless noted and specified in Electrical Division to be provided by Electrical Division, all field installed power wiring, conduit, starters, disconnect switches, etc., shall be provided by Mechanical Divisions.
- .5 Provide motors, control wiring and controls together with associated relays, signalling devices, thermostats, control transformers, firestats, pressure switches, electric-pneumatic switches, required to form a complete control system for the equipment specified in Mechanical Divisions.

1.8 SLEEVES,  
ESCUTCHEONS AND  
PLATES

- .1 Escutcheons and plates:
  - .1 Provide on pipes passing through finished walls, partitions, floors and ceilings.
  - .2 Use chrome or nickel plated brass, solid type, with set screws for ceiling or wall mounting.

1.9 TESTS

- .1 Give written 48 hours notice of date when tests will be made.
- .2 Conduct tests in presence of Departmental Representative and representatives of agencies having jurisdiction.
- .3 Bear all costs in connection with all tests.
- .4 Obtain acceptance certificates from authorities having jurisdiction. Work shall not be

- 
- 1.9 TESTS  
(Cont'd)
- .4 (Cont'd)  
considered complete until certificates are delivered to the Departmental Representative.
- .5 Piping pressure tests:  
.1 Fill water piping with water and test at 1-1/2 times system operating pressure or at 860 kPa, whichever is greater.  
.2 Repair leaks and defects. Retest until approved by Departmental Representative.
- .6 Testing plumbing systems:  
.1 Conform to requirements of National Building Code, Ontario Plumbing Code, and Municipal regulations.  
.2 Test in presence of Departmental Representative and Municipal Plumbing Inspector.
- .7 Testing and balancing of heating, ventilating, and air-conditioning systems:  
.1 Use qualified personnel approved by the Departmental Representative to test and balance systems and keep records of operating results.  
.2 After systems balanced and tests concluded, submit test and balance report showing relevant operating data of equipment and systems.  
.3 Report shall certify compliance with requirements of drawings and specifications.
- 1.10 ACCESS DOORS
- .1 Supply access doors to concealed mechanical equipment for operating, inspecting, adjusting and servicing.
- .2 Flush mounted 600 x 600 mm for body entry and 300 x 300 mm for hand entry unless otherwise noted. Doors to open 180°, have rounded safety corners, concealed hinges, screwdriver latches and anchor straps.
- .3 Material:  
.1 Special areas such as tiled or marble surfaces: use stainless steel with brushed satin or polished finish as directed by Departmental Representative.  
.2 Remaining areas: use prime coated steel.
- .4 Installation:  
.1 Locate so that concealed items are accessible.  
.2 Locate so that hand or body entry (as applicable) is achieved.
-

- 1.11 DRAIN VALVES .1 Minimum NPS 3/4 unless otherwise specified:  
bronze, with hose end male thread and complete  
with cap and chain.
- 1.12 IDENTIFICATION .1 Existing identification systems:  
.1 Apply existing identification system to  
new work.  
.2 Where existing identification system does  
not cover for new work, use identification  
system specified this section.  
.3 Before starting work, obtain written  
approval of identification system from  
Departmental Representative.
- .2 Identification ductwork systems:  
.1 50 mm high stencilled letters and  
directional arrows 150 mm long x 50 mm high.  
.2 Colours: black, or co-ordinated with base  
colour to ensure strong contrast.
- 1.13 INSTRUCTION OF OPERATING STAFF .1 Furnish competent instructors to fully instruct  
operating staff in care, adjustment and  
operation of mechanical systems. Use factory  
trained instructors.
- .2 Instruct during regular work hours before  
systems accepted and turned over to operating  
staff for regular operation.
- .3 Where significant changes or modifications in  
equipment are made under terms of guarantee,  
instruct operating staff about changes or  
modifications.

PART 2 - PRODUCTS

- 2.1 NOT USED .1 Not used.
-

PART 3 - EXECUTION

3.1 NOT USED .1 Not used.

PART 1 - GENERAL

- 1.1 MINIMUM STANDARDS .1 Conform to or exceed:
- .1 CSA Standards.
  - .2 ASHRAE Standards.
  - .3 SMACNA Standards.
  - .4 Provincial Codes, Local Municipal By-Laws, all codes of utility authorities having jurisdiction.
- 1.2 REFERENCES .1 Material and installation standards:
- .1 SMACNA HVAC Duct Construction Standards, Metal and Flexible, 2006.
  - .2 SMACNA Duct Leakage Test Manual 1985.
  - .3 NFPA 90A-2012, Installation of Air Conditioning and Ventilating Systems.
  - .4 CAN/ULC-S110-07, Standard Methods of Test for Air Ducts.
  - .5 CGSB 51-GP-52Ma-89, Vapour Barrier Jacket and Facing Material.
  - .6 ASTM A653-10/A653M-10, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy Coated (Galvanealed) by the Hot-Dip Process.
  - .7 ASTM C612-10, Standard Specification for Mineral Fiber Block and Board Thermal Insulation.
- 1.3 SHOP DRAWINGS AND PRODUCT DATA SHEETS .1 Submit shop drawings and product data sheets in accordance with Sections 01 11 01 and 23 05 00 for the following:
- .1 Grilles, registers and diffusers.
  - .2 Ceiling-mounted exhaust fans.
  - .3 Ceiling-mounted transfer fans.
-

PART 2 - PRODUCTS

2.1 LOW PRESSURE  
DUCTWORK

- .1 Material: forming steel FS Type A steel with Z275 designation zinc coating to ASTM A653/A653M, minimum 30% recycled content.
- .2 Gauge and construction of ducts and fittings shall be in accordance with SMACNA HVAC Duct Construction Standards for rectangular ducts for positive and negative static pressure up to 500 Pa with leakage rate of 5% maximum.
- .3 Seal classification: to SMACNA seal class C with transverse joints and connections made airtight with sealant.
- .4 Hangers:
  - .1 Ducts up to size 900 mm shall be supported with 25 mm x 1.6 mm thick galvanized strap hangers spaced at not over 3 m centres.
  - .2 Ducts over 900 mm shall be supported with 10 mm steel rods and 50 x 50 x 6 mm angles. Maximum spacing of hangers to be 2.5 m.
  - .3 Hanger attachments: manufactured concrete inserts, expansion shields and bolted steel clamps. Do not weld rods to steel deck or use powder actuated fasteners.
- .5 Radius of duct elbow shall be at least equal to the width of the elbow. Use square elbow with double thickness turning vanes when space is limited.
- .6 Provide balancing dampers at all branch ducts and as indicated. Each damper shall be fitted with locking type quadrant operator.
- .7 Duct leakage: in accordance with SMACNA HVAC Duct Leakage Test Manual.
- .8 Applications: supply air ducting downstream of VAV boxes, all exhaust air ducting, and all return air ducting.

2.2 MEDIUM PRESSURE  
RIGID ROUND DUCTS

- .1 Material: lock-forming quality steel with Z275 designation zinc coating to ASTM A653/A653M, minimum 30% recycled content.
  - .2 Gauge and construction of ducts and fittings shall be in accordance with SMACNA HVAC Duct Construction Standards for round ducts for a
-

2.2 MEDIUM PRESSURE .2  
RIGID ROUND DUCTS  
(Cont'd)

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(Cont'd)  
positive static pressure up to 2.5 kPa with  
leakage rate of 1.5% maximum.

- .3 Round ducts, fittings and specialties shall be fabricated by one manufacturer. Use conical tees at branch takeoffs. Do not use straight 90° tee.
- .4 Seal classification: spiral wound round ducting up to 900 mm to SMACNA seal class A with transverse joints, duct wall penetrations and connections made airtight with sealant.
- .5 Hangers:
  - .1 Ducts with diameter up through 450 mm shall be supported with 40 x 1.6 mm thick galvanized steel straps and 40 x 1.6 mm thick hanger rings spaced at not over 3 m centres.
  - .2 Hanger attachments: manufactured concrete inserts, expansion shields and bolted steel clamps. Do not weld rods to steel deck or use powder actuated fasteners.
- .6 Provide round butterfly dampers with locking quadrants at all branch ducts and as indicated.
- .7 Duct Leakage: in accordance with SMACNA HVAC Duct Leakage Test Manual.
- .8 Applications: all rigid round ducts unless noted otherwise.

2.3 FLEXIBLE  
DUCTWORK

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- .1 Factory fabricated Class 1 air duct to CAN/ULC-S110. Flame spread rating not to exceed 25 and smoke developed rating not to exceed 50.
  - .2 Duct must withstand 2.5 kPa internal pressure.
  - .3 Material: spiral wound flexible aluminum.
  - .4 Support flexible ducts at 1.2 m centres. Do not lay ducts across any lighting fixtures or hot surfaces.
  - .5 Maximum length of flexible duct connections: 4 m.
  - .6 Make connections between flexible duct and terminal devices airtight with duct tape.
-

- 2.4 DUCT SEALANTS AND TAPES
- .1 Sealant: oil resistant, polymer type flame resistant duct sealant. Temperature range of -30°C to +93°C.
  - .2 Tape: polyvinyl treated, open weave fiberglass tape, 50 mm wide.
- 2.5 DUCT ACCESS DOORS
- .1 Provide for access to fire or other dampers and for service or inspection, and for cleanouts where required, panel type access doors, 300 x 300 mm unless otherwise stated, complete with two sash locks.
- 2.6 BALANCING DAMPERS
- .1 Approved units of thicknesses and type of construction in accordance with SMACNA HVAC Duct Construction Standards.
  - .2 Single blade butterfly dampers: where indicated with locking quadrant.
    - .1 Round butterfly dampers to be 1.6 mm thick in medium pressure ducts and 0.8 mm in low pressure ducts.
- 2.7 FACTORY-MADE ROOF AIR INTAKES AND RELIEF VENTS
- .1 Galvanized steel complete with integral aluminum birdscreen.
    - .1 Maximum throat velocity: 3.3 m/s.
    - .2 Maximum loss through unit: 15 Pa static pressure.
    - .3 Maximum intake velocity of air intake hoods: 2.5 m/s.
    - .4 Provide backdraft dampers on relief vents for opening not exceed 0.08 m<sup>2</sup>. Provide motorized dampers on relief vents for opening exceed 0.08 m<sup>2</sup>.
- 2.8 GRILLES, REGISTERS AND DIFFUSERS
- .1 General:
    - .1 Sizes indicated are nominal. Provide correct standard product nearest to nominal.
    - .2 Construction: steel with baked enamel.
  - .2 Return, exhaust grilles and registers, Type C:
    - .1 For lay-in 'T'-bar ceiling installation: 12 x 12 x 12 mm egg crate with removable key-operated volume damper.
    - .2 For surface-mount installation: single deflection, air foil shape, horizontal bar type
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2.8 GRILLES,  
REGISTERS AND  
DIFFUSERS  
(Cont'd)

- .2 (Cont'd)
  - .2 For surface-mount installation:(Cont'd) with 45° deflection, opposed blade damper with concealed operator and rubber sealing strips.
- .3 Square ceiling diffusers:
  - .1 For lay-in 'T'-bar ceiling installation, Type A: square type, size and capacity indicated for neck diameter indicated, having adjustable pattern and volume control dampers with flow straightening devices and blank-off quadrants. Diffuser face to be 600 x 600 mm unless otherwise noted.
  - .2 For surface-mount installation, Type B: circular or square type, size and capacity indicated for neck diameter indicated, having adjustable pattern and volume control dampers with flow-straightening devices and blank-off quadrants.

2.9 CEILING  
MOUNTED TRANSFER  
FAN OR EXHAUST FANS

- .1 Provide CSA approved and labelled ceiling-mounted transfer fans or exhaust fans of capacities and performance as indicated on the drawings.
- .2 Fans shall be cabinet type, complete with centrifugal blower wheel, acoustic lined cabinet, and bear AMCA seal for air and sound performance. Maximum loudness 5 sones.
- .3 Provide each exhaust fan with backdraft damper and intake grille.
- .4 Provide each fan with a wall-mounted solid state speed controller with "OFF" switch, integral timer and up to 50% speed reduction.

2.10 THERMAL  
INSULATION AND  
JACKETING

- .1 Insulate all supply air ducting supply air ducting, downstream of VAV terminal units.
- .2 Material:
  - .1 On round and flexible ducting: 25 mm thick glass fiber blanket to CAN/ULS-S702 and vapour barrier jacket to CGSB 51-GP-52Ma.
- .3 Fastenings on round ducts: Use 100% coverage of insulation adhesive of flame spread 15, smoke development 0, and 100 mm wide self-adhesive tape rated under 25 for flame spread and under 50 for smoke development.

2.10 THERMAL  
INSULATION AND  
JACKETING  
(Cont'd)

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- .4 Vapour barriers: Use quick-setting adhesive for joints and lap sealing of vapour barriers. Flame spread 10, smoke development 0.
- .5 Vapour barriers and insulation to be complete over the full length of duct or surface, without penetration for hangers, standing duct seams and without interruption at sleeves.
- .6 Provide canvas cover over all insulated ducts in exposed areas. Canvas cover to be compact, firm, ULC listed heavy plain weave, cotton fabric at 272 g/m<sup>2</sup>. Provide two coats of diluted fire retardant lagging adhesive over canvas covering.

PART 3 - EXECUTION

3.1 EXISTING AND  
REUSED CONTROLS

- .1 Recalibrate and test existing and reused control devices shown on the drawings.
- .2 Report any inoperative control device to Departmental Representative immediately and obtain Departmental Representative 's instructions.

3.2 INSTALLATION

- .1 Install material and equipment in accordance with referenced standards and manufacturer's written instructions.
- .2 Make good all existing insulation where previously damaged by others or damaged by work under this contract.

3.3 AIR BALANCING

- .1 Use qualified personnel and approved instruments to balance each air system to air flow rates specified on the drawings.
  - .2 Standard: Testing, Adjusting and Balancing (TAB) to be to most stringent of this section or TAB standards of AABC, NEBB, SMACNA or ASHRAE.
  - .3 Do TAB of all air systems.
  - .4 Qualifications: personnel performing TAB to be current member in good standing of AABC, NEBB or NBCTA.
-

- 3.3 AIR BALANCING  
(Cont'd)
- .5 Quality assurance: Perform TAB under direction of supervisor qualified by AABC, NEBB, or NBCTA.
  - .6 Measurements: to include, but not limited to, following as appropriate for systems, equipment, components, controls: air velocity, static pressure, flow rate, pressure drop (or loss), temperatures (dry bulb, wet bulb, dewpoint), duct cross-sectional area, RPM, electrical power, voltage, noise, vibration.
  - .7 Locations of equipment measurements: To include, but not be limited to, following as appropriate:
    - .1 Inlet and outlet of each damper, filter, coil, humidifier, fan, other equipment causing changes in conditions.
    - .2 At each controller, controlled device.
  - .8 Locations of systems measurements to include, but not be limited to, following as appropriate: Each main duct, main branch, sub-branch, run-out (or grille, register or diffuser).
  - .9 Permissible deviation from design air quantities shall be 5%.
  - .10 Permanently mark settings of all splitters, dampers and other adjustment devices.
  - .11 For additional requirements refer to Sections 23 05 00.

PART 1 - GENERAL

- 1.1 REFERENCES
- .1 Canadian Standards Association (CSA)
    - .1 CSA C22.1-2012, Canadian Electrical Code, Part 1 (21st Edition), Safety Standard for Electrical Installations.
    - .2 CAN3-C235-83(R2006), Preferred Voltage Levels for AC Systems, 0 to 50,000 V.
  - .2 Health Canada / Workplace Hazardous Materials Information System (WHMIS)
    - .1 Material Safety Data Sheets (MSDS).
  - .3 The Ontario Electrical Safety Code 2012, and all bulletins (Ontario).
  - .4 Hydro requirements and local applicable codes and regulations.
- 1.2 DESIGN REQUIREMENTS
- .1 Operating voltages: to CAN3-C235.
  - .2 Motors, electric heating, control and distribution devices and equipment to operate satisfactorily at 60 Hz within normal operating limits established by above standard.
    - .1 Equipment to operate in extreme operating conditions established in above standard without damage to equipment.
  - .3 Language operating requirements: provide identification nameplates and labels for control items in English.
- 1.3 SUBMITTALS
- .1 Product Data: submit WHMIS MSDS.
  - .2 Shop drawings:
    - .1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Ontario within 3 weeks of Award of Contract.
    - .2 If changes are required, notify Departmental Representative of these changes before they are made.
  - .3 Quality Control: in accordance with Section 01 45 00.
    - .1 Provide CSA certified equipment and material.
-

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- 1.3 SUBMITTALS (Cont'd)
- .3 Quality Control:(Cont'd)
- .2 Where CSA certified equipment and material is not available, submit such equipment and material to authority having jurisdiction for special approval before delivery to site.
- .3 Submit test results of installed electrical systems and instrumentation.
- .4 Permits and fees: in accordance with General Conditions of contract. Pay associated fees. Departmental Representative will provide drawings and specifications required by Electrical Inspection Department and Supply Authority at no cost.
- .5 Submit, upon completion of Work, load balance report as described in PART 3 - Load Balance.
- .6 Submit certificate of acceptance from Electrical Inspection Department authority having jurisdiction upon completion of Work to Departmental Representative.
- .4 Manufacturer's Field Reports: submit to Departmental Representative, manufacturer's written report, within 3 days of review, verifying compliance of Work and electrical system and instrumentation testing, as described in PART 3 - FIELD QUALITY CONTROL.
- 1.4 QUALITY ASSURANCE
- .1 Quality Assurance: in accordance with Section 01 45 00.
- .2 Qualifications: electrical Work to be carried out by qualified, licensed electricians who hold valid Master Electrical Contractor license or apprentices as per the conditions of Provincial Act respecting manpower vocational training and qualification.
- .1 Employees registered in provincial apprentices program: permitted, under direct supervision of qualified licensed electrician, to perform specific tasks.
- .2 Permitted activities: determined based on training level attained and demonstration of ability to perform specific duties.
- .3 Site Meetings: as part of Manufacturer's Field Services described in Part 3 - FIELD QUALITY CONTROL, schedule site visits, to review Work, at stages listed.
- .1 After delivery and storage of products, and when preparatory Work is complete but before installation begins.
- .2 Twice during progress of Work at 25% and 60% complete.
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- 1.4 QUALITY ASSURANCE (Cont'd)
- .2 Qualifications:(Cont'd)
  - .3 Site Meetings:(Cont'd)
    - .3 Upon completion of Work, after cleaning is carried out.
  - .3 Health and Safety Requirements: do construction occupational health and safety in accordance with Section 01 35 29.
- 1.5 DELIVERY, STORAGE AND HANDLING
- .1 Material Delivery Schedule: provide Departmental Representative with schedule within weeks after award of Contract.
  - .2 Construction/Demolition Waste Management and Disposal: separate waste materials for reuse and recycling in accordance with Section 01 74 20.
- 1.6 SYSTEM STARTUP
- .1 Instruct Departmental Representative and operating personnel in operation, care and maintenance of systems, system equipment and components.
  - .2 Arrange and pay for services of manufacturer's factory service engineer to supervise start-up of installation, check, adjust, balance and calibrate components and instruct operating personnel.
  - .3 Provide these services for such period, and for as many visits as necessary to put equipment in operation, and ensure that operating personnel are conversant with aspects of its care and operation.

PART 2 - PRODUCTS

- 2.1 MATERIALS AND EQUIPMENT
- .1 Provide material and equipment in accordance with Section 01 61 00.
  - .2 Material and equipment to be CSA certified. Where CSA certified material and equipment are not available, obtain special approval from authority having jurisdiction before delivery to site and submit such approval as described in PART 1 - Submittals.
  - .3 Factory assemble control panels and component assemblies.
-

- 2.2 WARNING SIGNS .1 Warning Signs: in accordance with requirements of authority having jurisdiction, inspection authorities and Departmental Representative.
- .2 Porcelain enamel signs, minimum size 175 x 250 mm.

- 2.3 WIRING TERMINATIONS .1 Ensure lugs, terminals, screws used for termination of wiring are suitable for either copper or aluminum conductors.

- 2.4 WIRING IDENTIFICATION .1 Identify wiring with permanent indelible identifying markings, numbered plastic tapes, on both ends of phase conductors of feeders and branch circuit wiring.
- .2 Maintain phase sequence and colour coding throughout.
- .3 Colour coding: to CSA-C22.1.
- .4 Use colour coded wires in communication cables, matched throughout system.

- 2.5 CONDUIT AND CABLE IDENTIFICATION .1 Colour code conduits, boxes and metallic sheathed cables.
- .2 Code with plastic tape or paint at points where conduit or cable enters wall, ceiling, or floor, and at 15 m intervals.
- .3 Colours: 25 mm wide prime colour and 20mm wide auxiliary colour.

	Prime	Auxiliary
up to 250 V	Yellow	
up to 600 V	Yellow	Green
up to 5 kV	Yellow	Blue
up to 15 kV	Yellow	Red
Telephone	Green	
Other Communication Systems	Green	Blue
Fire Alarm	Red	
Emergency Voice	Red	Blue
Other Security Systems	Red	Yellow

PART 3 - EXECUTION

- 3.1 INSTALLATION .1 Do complete installation in accordance with CSA-C22.1 except where specified otherwise.
- .2 Do overhead and underground systems in accordance with CAN/CSA-C22.3 No.1 except where specified otherwise.
- 3.2 NAMEPLATES AND LABELS .1 Ensure manufacturer's nameplates, CSA labels and identification nameplates are visible and legible after equipment is installed.
- 3.3 CONDUIT AND CABLE INSTALLATION .1 Install cables, conduits and fittings to be embedded or plastered over, neatly and close to building structure so furring can be kept to minimum.
- 3.4 LOCATION OF OUTLETS .1 Locate outlets in accordance with Section 26 05 32.
- .2 Do not install outlets back-to-back in wall; allow minimum 150 mm horizontal clearance between boxes.
- .3 Change location of outlets at no extra cost or credit, providing distance does not exceed 3000 mm, and information is given before installation.
- .4 Locate light switches on latch side of doors.  
.1 Locate disconnect devices in mechanical and elevator machine rooms on latch side of floor.
- 3.5 MOUNTING HEIGHTS .1 Mounting height of equipment is from finished floor to centreline of equipment unless specified or indicated otherwise.
- .2 If mounting height of equipment is not specified or indicated, verify before proceeding with installation.
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- 3.5 MOUNTING HEIGHTS  
(Cont'd)
- .3 Install electrical equipment at following heights unless indicated otherwise.
- .1 Local switches: 1400 mm, maximum 1200 mm for accessible space.
  - .2 Wall receptacles:
    - .1 General: 300 mm, minimum 400 mm for accessible space.
    - .2 Above top of continuous baseboard heater: 200 mm.
    - .3 Above top of counters or counter splash backs: 175 mm.
    - .4 In mechanical rooms: 1400 mm.
  - .3 Panelboards: as required by Code or as indicated.
  - .4 Telephone and interphone outlets: 300 mm.
  - .5 Wall mounted telephone and interphone outlets for non-accessible locations: 1500 mm.
  - .6 Fire alarm stations: 1500 mm maximum 1200 mm for accessible space.
  - .7 Fire alarm bells: 2100 mm.
- 3.6 CO-ORDINATION OF PROTECTIVE DEVICES
- .1 Ensure circuit protective devices such as overcurrent trips, relays and fuses are installed to required values and settings.
- 3.7 FIELD QUALITY CONTROL
- .1 Load Balance:
- .1 Measure phase current to panelboards with normal loads (lighting) operating at time of acceptance; adjust branch circuit connections as required to obtain best balance of current between phases and record changes.
  - .2 Provide upon completion of work, load balance report as directed in PART 1 - Submittals: phase and neutral currents on panelboards, operating under normal load, as well as hour and date on which each load was measured, and voltage at time of test.
- .2 Conduct following tests:
- .1 Power distribution system including phasing, voltage, grounding and load balancing.
  - .2 Circuits originating from branch distribution panels.
  - .3 Lighting and its control.
  - .4 Motors, heaters and associated control equipment including sequenced operation of systems where applicable.
  - .5 Systems: fire alarm system, communications.
-

- 3.7 FIELD QUALITY CONTROL  
(Cont'd)
- 
- .2 Conduct following tests:(Cont'd)
- .6 Insulation resistance testing:
- .1 Megger circuits, feeders and equipment up to 350 V with a 500 V instrument.
- .2 Megger 350-600 V circuits, feeders and equipment with a 1000 V instrument.
- .3 Check resistance to ground before energizing.
- .3 Carry out tests in presence of Departmental Representative.
- .4 Provide instruments, meters, equipment and personnel required to conduct tests during and at conclusion of project.

PART 1 - GENERAL

- 1.1 REFERENCES
- .1 CSA International
    - .1 CAN/CSA-C22.2 No.18-98(R2003), Outlet Boxes, Conduit Boxes and Fittings.
    - .2 CAN/CSA-C22.2 No.65-03(R2008), Wire Connectors (Tri-National Standard with UL 486A-486B and NMX-J-543-ANCE-03).
  - .2 Electrical and Electronic Manufacturers' Association of Canada (EEMAC)
    - .1 EEMAC 1Y-2-1961, Bushing Stud Connectors and Aluminum Adapters (1200 Ampere Maximum Rating).
  - .3 National Electrical Manufacturers Association (NEMA)
  - .4 Sustainable Design Submittals:
    - .1 Construction Waste Management: Submit project Waste Management Plan highlighting recycling and salvage requirements.
- 1.2 CLOSEOUT SUBMITTALS
- .1 Submit in accordance with Section 01 78 00.
  - .2 Operation and Maintenance Data: submit operation and maintenance data for wire and box connectors for incorporation into manual.
- 1.3 DELIVERY, STORAGE AND HANDLING
- .1 Deliver, store and handle materials in accordance with Section 01 61 00 and with manufacturer's written instructions.
  - .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
  - .3 Storage and Handling Requirements:
    - .1 Store materials indoors in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
    - .2 Store and protect wire and box connectors from nicks, scratches, and blemishes.
    - .3 Replace defective or damaged materials with new.
  - .4 Packaging Waste Management: remove for reuse and return by manufacturer of pallets, crates,
-

1.3 DELIVERY,  
STORAGE AND  
HANDLING  
(Cont'd)  
PART 2 - PRODUCTS

- .4 Packaging Waste Management:(Cont'd)  
padding and packaging materials as specified in  
Construction Waste Management Plan Reduction  
Workplan in accordance with Section 01 74 20.

2.1 MATERIALS

- .1 Pressure type wire connectors to: CAN/CSA-C22.2  
No.65, with current carrying parts of copper  
sized to fit copper conductors as required.
- .2 Fixture type splicing connectors to:  
CAN/CSA-C22.2 No.65, with current carrying parts  
of copper sized to fit copper conductors 10 AWG  
or less.
- .3 Clamps or connectors for cable as required to:  
CAN/CSA-C22.2 No.18.

PART 3 - EXECUTION

3.1 EXAMINATION

- .1 Verification of Conditions: verify that  
conditions of substrate previously installed  
under other Sections or Contracts are acceptable  
for wire and box connectors installation in  
accordance with manufacturer's written  
instructions.
- .1 Visually inspect substrate in presence of  
Departmental Representative.
- .2 Inform Departmental Representative of  
unacceptable conditions immediately upon  
discovery.
- .3 Proceed with installation only after  
unacceptable conditions have been remedied and  
after receipt of written approval to proceed  
from Departmental Representative.

3.2 INSTALLATION

- .1 Remove insulation carefully from ends of  
conductors and cables and:
- .1 Install mechanical pressure type  
connectors and tighten screws with appropriate  
compression tool recommended by manufacturer.  
Installation shall meet secureness tests in  
accordance with CAN/CSA-C22.2 No.65.
- .2 Install fixture type connectors and  
tighten to CAN/CSA-C22.2 No.65. Replace  
insulating cap.
-

3.3 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11.
  - .1 Leave Work area clean at end of each day.
- .2 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 20.
  - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

PART 1 - GENERAL

- 1.1 SUBMITTALS .1 Submit product data sheets in accordance with  
Section 01 33 00.

PART 2 - PRODUCTS

- 2.1 BUILDING WIRES .1 Conductors: stranded for 10 AWG and larger.  
Minimum size: 12 AWG.
- .2 Copper conductors: size as indicated, with 600  
V insulation of cross-linked thermosetting  
polyethylene material rated RW90 XLPE,  
Jacketted.
- .3 Neutral supported cable: 1 phase insulated  
conductors of Copper and one neutral conductor  
of Copper steel reinforced, size as indicated.  
Type: Insulation: Type NSF-2 flame retardant  
rated 600 V.
- 2.2 ARMOURED CABLES .1 Conductors: insulated, copper, size as  
indicated.
- .2 Type: AC90.
- .3 Armour: interlocking type fabricated from  
galvanized steel strip.
- .4 Connectors: anti short connectors.
- 2.3 CONTROL CABLES .1 Type: low energy 300 V control cable: solid  
annealed copper conductors sized as indicated  
LVT: 2 soft annealed copper conductors, sized as  
indicated:
- .1 Insulation: TW 40 degrees C.
- .2 Shielding: tape coated with paramagnetic  
material over conductors.
- .3 Overall covering: PVC jackets
-

PART 3 - EXECUTION

- 3.1 FIELD QUALITY CONTROL
- .1 Perform tests in accordance with Section 26 05 00.
  - .2 Perform tests before energizing electrical system.
- 3.2 GENERAL CABLE INSTALLATION
- .1 Terminate cables in accordance with Section 26 05 20.
  - .2 Cable Colour Coding: to Section 26 05 00.
  - .3 Conductor length for parallel feeders to be identical.
  - .4 Lace or clip groups of feeder cables at distribution centres, pull boxes, and termination points.
  - .5 Wiring in walls: typically drop or loop vertically from above to better facilitate future renovations. Generally wiring from below and horizontal wiring in walls to be avoided unless indicated.
  - .6 Branch circuit wiring for surge suppression receptacles and permanently wired computer and electronic equipment to be 2-wire circuits only, i.e. common neutrals not permitted.
  - .7 Provide numbered wire collars for control wiring. Numbers to correspond to control shop drawing legend. Obtain wiring diagram for control wiring.
- 3.3 INSTALLATION OF BUILDING WIRES
- .1 Install wiring as follows:
    - .1 In conduit systems in accordance with Section 26 05 32.
- 3.4 INSTALLATION OF ARMOURED CABLES
- .1 Group cables wherever possible on channels.
-

3.5 INSTALLATION OF CONTROL CABLES .1 Install control cables in conduit burial.  
.2 Ground control cable shield.

PART 1 - GENERAL

- 1.1 WASTE MANAGEMENT AND DISPOSAL
- .1 Separate and recycle waste materials in accordance with Section 01 74 20.
  - .2 Remove from site and dispose of all packaging materials at appropriate recycling facilities.
  - .3 Divert unused metal materials from landfill to metal recycling facility as approved by Departmental Representative.
  - .4 Fold up metal banding, flatten and place in designated area for recycling.

PART 2 - PRODUCTS

- 2.1 SUPPORT CHANNELS
- .1 U shape, size 41 x 41 mm, 2.5 mm thick, surface mounted.

PART 3 - EXECUTION

- 3.1 INSTALLATION
- .1 Secure equipment to solid masonry, tile and plaster surfaces with lead anchors or nylon shields.
  - .2 Secure surface mounted equipment with twist clip fasteners to inverted T bar ceilings. Ensure that T bars are adequately supported to carry weight of equipment specified before installation.
  - .3 Support equipment, conduit or cables using clips, spring loaded bolts, cable clamps designed as accessories to basic channel members.
  - .4 Fasten exposed conduit or cables to building construction or support system using straps.
    - .1 One-hole malleable iron straps to secure surface conduits and cables 50 mm and smaller.
    - .2 Two-hole steel straps for conduits and cables larger than 50 mm.
    - .3 Beam clamps to secure conduit to exposed steel work.
-

3.1 INSTALLATION  
(Cont'd)

- .5 Provide metal brackets, frames, hangers, clamps and related types of support structures where indicated or as required to support conduit and cable runs.
- .6 Ensure adequate support for raceways and cables dropped vertically to equipment where there is no wall support.
- .7 Do not use wire lashing or perforated strap to support or secure raceways or cables.
- .8 Do not use supports or equipment installed for other trades for conduit or cable support except with permission of other trade and approval of Departmental Representative.
- .9 Install fastenings and supports as required for each type of equipment cables and conduits, and in accordance with manufacturer's installation recommendations.

PART 1 - GENERAL

- 1.1 REFERENCES .1 Canadian Standards Association (CSA International)  
.1 CSA C22.1-12, Canadian Electrical Code, Part 1, 21st Edition.
- 1.2 DELIVERY, STORAGE AND HANDLING .1 Deliver, store and handle materials in accordance with Section 01 61 00.  
.2 Waste Management and Disposal: Separate waste materials for reuse and recycling in accordance with Section 01 74 20.

PART 2 - PRODUCTS

- 2.1 OUTLET AND CONDUIT BOXES GENERAL .1 Size boxes in accordance with CSA C22.1.  
.2 102 mm square or larger outlet boxes as required.  
.3 Gang boxes where wiring devices are grouped.  
.4 Blank cover plates for boxes without wiring devices.  
.5 Combination boxes with barriers where outlets for more than one system are grouped.
- 2.2 GALVANIZED STEEL OUTLET BOXES .1 One-piece electro-galvanized construction.  
.2 Single and multi gang flush device boxes for flush installation, minimum size 76 x 50 x 38 mm or as indicated. 102 mm square outlet boxes when more than one conduit enters one side with extension and plaster rings as required.  
.3 Utility boxes for outlets connected to surface-mounted EMT conduit, minimum size 102 x 54 x 48 mm.  
.4 102 mm square or octagonal outlet boxes for lighting fixture outlets.  
.5 Extension and plaster rings for flush mounting devices in finished tile walls.
-

- 2.3 MASONRY BOXES .1 Electro-galvanized steel masonry single and multi gang boxes for devices flush mounted in exposed block walls.
- 2.4 FITTINGS - GENERAL .1 Bushing and connectors with nylon insulated throats.
- .2 Knock-out fillers to prevent entry of debris.
- .3 Double locknuts and insulated bushings on sheet metal boxes.

PART 3 - EXECUTION

- 3.1 INSTALLATION .1 Support boxes independently of connecting conduits.
- .2 Fill boxes with paper, sponges or foam or similar approved material to prevent entry of debris during construction. Remove upon completion of work.
- .3 For flush installations mount outlets flush with finished wall using plaster rings to permit wall finish to come within 6 mm of opening.
- .4 Provide correct size of openings in boxes for conduit, mineral insulated and armoured cable connections. Do not install reducing washers.
- .5 Vacuum clean interior of outlet boxes before installation of wiring devices.
- .6 Identify systems for outlet boxes as required.

PART 1 - GENERAL

- 1.1 REFERENCES .1 CSA International
- .1 CSA C22.2 No.42-10, General Use Receptacles, Attachment Plugs and Similar Devices.
  - .2 CAN/CSA-C22.2 No.42.1-00(R2009), Cover Plates for Flush-Mounted Wiring Devices (Bi-national standard, with UL 514D).
  - .3 CSA C22.2 No.55-M1986(R2008), Special Use Switches.
  - .4 CSA C22.2 No.111-10, General-Use Snap Switches (Bi-national standard, with UL 20).
- 1.2 ACTION AND INFORMATIONAL SUBMITTALS .1 Product Data:
- .1 Submit manufacturer's instructions, printed product literature and data sheets for wiring devices and include product characteristics, performance criteria, physical size, finish and limitations.
- .2 Shop Drawings:
- .1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Ontario, Canada.
- 1.3 CLOSEOUT SUBMITTALS .1 Submit in accordance with Section 01 78 00.
- .2 Operation and Maintenance Data: submit operation and maintenance data for wiring devices for incorporation into manual.
- 1.4 DELIVERY, STORAGE AND HANDLING .1 Deliver, store and handle materials in accordance with Section 01 61 00 and with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
- .1 Store materials indoors in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  - .2 Store and protect wiring devices from nicks, scratches, and blemishes.

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1.4 DELIVERY, .3 Storage and Handling Requirements:(Cont'd)  
STORAGE AND .3 Replace defective or damaged materials  
HANDLING with new.  
(Cont'd)

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PART 2 - PRODUCTS

2.1 SWITCHES .1 15 A, 120 V, single pole,switches to: CSA C22.2  
No.55 and CSA C22.2 No.111.

.2 15 A, 120 V, single pole,three-way, switches  
to: CSA C22.2 No.55 and CSA C22.2 No.111.

.3 Manually-operated general purpose AC switches  
with following features:  
.1 Terminal holes approved for No. 10 AWG  
wire.  
.2 Silver alloy contacts.  
.3 Urea or melamine moulding for parts  
subject to carbon tracking.  
.4 Suitable for back and side wiring.  
.5 Decorator type.

.4 Rocker operated fully rated for tungsten  
filament and fluorescent lamps, and up to 80% of  
rated capacity of motor loads and or heating  
loads.

.5 Switches of one manufacturer throughout  
project.

2.2 RECEPTACLES .1 Duplex receptacles, CSA type 5-15 R, 125 V, 15  
A, U ground, to: CSA C22.2 No.42 with following  
features:  
.1 Ivory urea moulded housing.  
.2 Suitable for No. 10 AWG for back and side  
wiring.  
.3 Break-off links for use as split  
receptacles.  
.4 Eight back wired entrances, four side  
wiring screws.  
.5 Triple wipe contacts and rivetted  
grounding contacts.

.2 Single receptacles NEMA 6-20RCN, 125 V, 20 A, U  
ground with following features:  
.1 Ivory urea moulded housing.  
.2 Suitable for No. 10 AWG for back and side  
wiring.  
.3 Four back wired entrances, 2 side wiring  
screws.

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<u>2.2 RECEPTACLES</u> (Cont'd)	.3	Other receptacles with ampacity and voltage as indicated.
	.4	Receptacles of one manufacturer throughout project.
<u>2.3 COVER PLATES</u>	.1	Cover plates for wiring devices to: CSA C22.2 No.42.1.
	.2	Sheet steel utility box cover for wiring devices installed in surface-mounted utility boxes.
	.3	Stainless steel, vertically brushed, 1 mm thick cover plates, thickness 2.5 mm for wiring devices mounted in flush-mounted outlet box.
<u>2.4 SOURCE QUALITY CONTROL</u>	.1	Cover plates from one manufacturer throughout project.
<u>PART 3 - EXECUTION</u>		
<u>3.1 EXAMINATION</u>	.1	Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for wiring devices installation in accordance with manufacturer's written instructions. .1 Visually inspect substrate in presence of Departmental Representative. .2 Inform Departmental Representative of unacceptable conditions immediately upon discovery. .3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.
<u>3.2 INSTALLATION</u>	.1	Switches: .1 Install single throw switches with handle in "UP" position when switch closed. .2 Install switches in gang type outlet box when more than one switch is required in one location. .3 Mount toggle switches at height in accordance with Section 26 05 00 or as indicated.

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- 3.2 INSTALLATION      .2      Receptacles:  
(Cont'd)
- .1      Install receptacles in gang type outlet box when more than one receptacle is required in one location.
  - .2      Mount receptacles at height in accordance with Section 26 05 00 or as indicated.
  - .3      Where split receptacle has one portion switched, mount vertically and switch upper portion.
  - .4      Install GFI type receptacles as indicated.
- .3      Cover plates:  
.1      Install suitable common cover plates where wiring devices are grouped.  
.2      Do not use cover plates meant for flush outlet boxes on surface-mounted boxes.
- 3.3 PROTECTION      .1      Protect installed products and components from damage during construction.
- .2      Protect stainless steel cover plate finish with paper or plastic film until painting and other work is finished.
  - .3      Repair damage to adjacent materials caused by wiring device installation.

PART 1 - GENERAL

- 1.1 REFERENCES .1 CSA International  
.1 CAN/CSA-C22.2 No.144-M91(R2011), Ground Fault Circuit Interrupters.
- .2 National Electrical Manufacturers Association (NEMA)  
.1 NEMA PG 2.2-1999(R2009), Application Guide for Ground Fault Protection Devices for Equipment.
- 1.2 CLOSEOUT SUBMITTALS .1 Submit in accordance with Section 01 78 00.
- 1.3 DELIVERY, STORAGE AND HANDLING .1 Deliver, store and handle materials in accordance with Section 01 61 00 and with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:  
.1 Store materials indoors in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.  
.2 Store and protect ground fault circuit interrupters from nicks, scratches, and blemishes.  
.3 Replace defective or damaged materials with new.

PART 2 - PRODUCTS

- 2.1 MATERIALS .1 Equipment and components for ground fault circuit interrupters (GFCI): to CAN/CSA-C22.2 No.144 or NEMA PG 2.2.
- .2 Components comprising ground fault protective system to be of same manufacturer.
-

- 2.2 GROUND FAULT PROTECTOR UNIT .1 Self-contained with 15 A, 120 V circuit interrupter and duplex receptacle complete with:
- .1 Solid state ground sensing device.
  - .2 Facility for testing and reset.
  - .3 CSA Enclosure 1, flush mounted with stainless steel face plate.

PART 3 - EXECUTION

- 3.1 EXAMINATION .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for ground fault circuit interrupters installation in accordance with manufacturer's written instructions.
- .1 Visually inspect substrate in presence of Departmental Representative.
  - .2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
  - .3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.
- 3.2 INSTALLATION .1 Do not ground neutral on load side of ground fault relay.
- .2 Connect supply and load wiring to equipment in accordance with manufacturer's recommendations.
- 3.3 FIELD QUALITY CONTROL .1 Perform tests in accordance with Section 26 05 00.
- .2 Demonstrate simulated ground fault tests.

PART 1 - GENERAL

- 1.1 REFERENCES
- .1 American National Standards Institute (ANSI)
    - .1 ANSI C82.1-2004, American National Standard for Lamp Ballasts - Line Frequency Fluorescent Lamp Ballasts.
    - .2 ANSI C82.4-2002, American National Standard for Ballasts for High-Intensity Discharge and Low-Pressure Sodium (LPS) Lamps (Multiple-Supply Type).
  - .2 American National Standards Institute/Institute of Electrical and Electronics Engineers (ANSI/IEEE)
    - .1 ANSI/IEEE C62.41-1991, Recommended Practice for Surge Voltages in Low-Voltage AC Power Circuits.
  - .3 ASTM International Inc.
    - .1 ASTM F1137-00(2006), Standard Specification for Phosphate/Oil and Phosphate/Organic Corrosion Protective Coatings for Fasteners.
  - .4 Canadian Standards Association (CSA International)
  - .5 ICES-005-07, Radio Frequency Lighting Devices.
  - .6 Underwriters' Laboratories of Canada (ULC)
- 1.2 ACTION AND INFORMATIONAL SUBMITTALS
- .1 Product Data:
    - .1 Provide manufacturer's printed product literature, specifications and datasheet and include product characteristics, performance criteria, physical size, finish and limitations.
    - .2 Provide complete photometric data prepared by independent testing laboratory for luminaires where specified, for review by Departmental Representative.
    - .3 Photometric data to include: VCP Table where applicable, spacing criterion.
  - .2 Samples:
    - .1 Provide samples as indicated. Install sample fixtures, design in mock-up ceiling. Do not include cost of mock-up in project price. Locate mock-up on site.
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1.2 ACTION AND INFORMATIONAL SUBMITTALS (Cont'd)

.3 Quality assurance submittals: provide following in accordance with Section 01 45 00.  
.1 Manufacturer's instructions: provide manufacturer's written installation instructions and special handling criteria, installation sequence, cleaning procedures.

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1.3 QUALITY ASSURANCE

.1 Provide mock-ups in accordance with Section 01 45 00 and as directed by Departmental Representative.

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1.4 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 61 00.

.2 Deliver materials to site in original factory packaging, labelled with manufacturer's name, address.

.3 Divert unused metal materials from landfill to metal recycling facility.

.4 Disposal and recycling of fluorescent lamps as per local regulations.

.5 Disposal of old PCB filled ballasts.

## PART 2 - PRODUCTS

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2.1 LAMPS

.1 Fluorescent lamps: T8, 32 Watt, medium bi-pin, rapid-start, 4100 K, 30,000 hour lamp life, 2950 initial lumens, CRI 85; or as indicated.

.2 L.E.D. Troffer fixtures: 0.9 pf, CCT 5000K, 50,000 hour lamp life, 6800 initial lumens, 85 CRI; CSA certified to UL598 and UL750.

.3 Compact fluorescent lamps: 15 to 60 Watt, dimmable, 12,000 hour lamp life, 12,000 initial lumens, 4100 K, CRI 80; or as indicated.

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2.2 BALLASTS

.1 Fluorescent ballast: CBM and CSA certified, energy efficient type, IC electronic.  
.1 Rating: 120 V, 60 Hz voltage as indicated, for use with 1 or 2-32W, rapid start lamps.  
.2 Totally encased and designed for 40 degrees Celsius ambient temperature.

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- 2.2 BALLASTS .1 (Cont'd)  
(Cont'd)
- .3 Power factor: minimum 95% with 95% of rated lamp lumens.
  - .4 Current crest factor: 1.7 maximum.
  - .5 Harmonics: 10% maximum THD.
  - .6 Total circuit power: 62 Watts.
  - .7 Ballast factor: greater than 0.90.
  - .8 Sound rated: Class A.
  - .9 Mounting: integral with luminaire.
- 2.3 FINISHES .1 Light fixture finish and construction to meet ULC listings and CSA certifications related to intended installation.
- 2.4 LUMINAIRES .1 As indicated in luminaire schedule.
- PART 3 - EXECUTION
- 3.1 INSTALLATION .1 Locate and install luminaires as indicated.
- .2 Provide adequate support to suit ceiling system.
- 3.2 WIRING .1 Connect luminaires to lighting circuits:
- .1 Install flexible or rigid conduit for luminaires as indicated.
- 3.3 LUMINAIRE SUPPORTS .1 For suspended ceiling installations support luminaires independently of ceiling; support luminaires from ceiling grid in accordance with local inspection requirements.
- 3.4 LUMINAIRE ALIGNMENT .1 Align luminaires mounted in continuous rows to form straight uninterrupted line.
- .2 Align luminaires mounted individually parallel or perpendicular to building grid lines.
-

- 3.5 CLEANING .1 Clean in accordance with Section 01 74 11.  
.1 Remove surplus materials, excess  
materials, rubbish, tools and equipment.

PART 1 - GENERAL

- 1.1 REFERENCES
- .1 Canadian Standards Association (CSA International)
    - .1 CSA C22.2 No.141-10, Unit Equipment for Emergency Lighting.
    - .2 CAN/CSA-C860-07, Performance of Internally Lighted Exit Signs.
  - .2 National Fire Protection Association (NFPA)
    - .1 NFPA 101-2009, Life Safety Code.
  - .3 Underwriters Laboratories of Canada (ULC)
    - .1 ULC/ORD-924-02, Standard for Emergency Lighting and Power Equipment.
    - .2 CAN/ULC-S572-10, First Edition Standard for Photoluminescent and Self-Luminous Exit Signs and Path Marking Systems.
- 1.2 SUBMITTALS
- .1 Product Data: Submit manufacturer's printed product literature, specifications and datasheet and include product characteristics, performance criteria, physical size, finish and limitations.
  - .2 Submit WHMIS MSDS - Material Safety Data Sheets.
  - .3 Quality Assurance Submittals: submit following in accordance with Section 01 45 00.
    - .1 Instructions: submit manufacturer's installation instructions and special handling criteria, installation sequence, and cleaning procedures.
  - .4 Submit manufacturer's written material warranty for lumination of photo-luminescent exit signs. For the Work of this Section 26 53 00 Exit Lights the 12 months warranty period prescribed in subsection GC 3.13 of General Conditions is extended to 25 years.
- 1.3 WASTE MANAGEMENT AND DISPOSAL
- .1 Separate waste materials for reuse and recycling in accordance with Section 01 74 20.
-

PART 2 - PRODUCTS

2.1 SELF-POWERED  
UNITS

- .1 Exit lights: to CSA C22.2 No.141 and CSA C860.
- .2 Housing: extruded aluminum housing, brush aluminum finish.
- .3 Face and back plates: extruded aluminum.
- .4 Lamps: LED-12W, 120 V, 50,000 hours.
- .5 Operation: designed for 50,000 hours of continuous operation without relamping.
- .6 Letters: 70 mm high x 35 mm wide, with 13 mm thick stroke, red on white glass aluminum face, reading EXIT and SORTIE.
- .7 Face plate to remain captive for relamping.
- .8 Supply voltage: 120 V, ac.
- .9 Output voltage: 12 to 24 V dc.
- .10 Operating time: 60 minimum.
- .11 Recharge time: 12 hours
- .12 Battery: sealed, maintenance free.
- .13 Charger: solid state, voltage/current regulated, inverse temperature compensated, short circuit protected, with regulated output of plus or minus 0.01 V for plus or minus 10% V input variation.
- .14 Solid state transfer circuit.
- .15 Signal lights: solid state, for 'AC Power ON' and 'High Charge' condition.
- .16 Mounting: suitable for universal mounting directly on junction box and c/w knockouts for conduit.
  - .1 Removable or hinged front panel for easy access to batteries.

PART 3 - EXECUTION

- 3.1 MANUFACTURER'S INSTRUCTIONS .1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheets.
- 3.2 INSTALLATION .1 Install exit lights to manufacturer's recommendations, listing requirements, NFPA standard and local regulatory requirements.
- .2 Connect fixtures to exit light circuits.
- .3 Connect emergency lamp sockets to emergency circuits.
- .4 Ensure that exit light circuit breaker is locked in on position.
- 3.3 CLEANING .1 Proceed in accordance with Section 01 74 11.
- .2 Clean photoluminescent sign face with a non-abrasive cloth dampened with water. Do not use any chemical solvents.
- .3 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

PART 1 - GENERAL

- 1.1 REFERENCES .1 Canadian Standards Association, (CSA International)  
.1 CSA-T529-95(R2000), Telecommunications Cabling Systems in Commercial Buildings (Adopted ANSI/EIA TIA 568a with modifications).  
.2 CSA-C22.2 No. 214-02, Communications Cables (Bi-national Standard, with UL 444).  
.3 CAN/CSA-C22.2 No. 182.4-M90(R2001), Plugs, Receptacles, and Connectors for Communication Systems.
- .2 Telecommunications Industry Association (TIA)  
.1 TIA/EIA-568-2001, Commercial Building Telecommunications Cabling Standards Set.
- 1.2 SYSTEM DESCRIPTION .1 Structured system of telecommunications cables (copper and optical fibre) installed within buildings for distributing voice and data (including video) signals.
- .2 Installed in physical star configuration with separate horizontal and backbone sub-systems. Horizontal cables link work areas to telecommunications closet located on same floor. Telecommunications closets linked to central equipment room by backbone cables.
- 1.3 WASTE MANAGEMENT AND DISPOSAL .1 Separate and recycle waste materials in accordance with Section 01 74 20.

PART 2 - PRODUCTS

- 2.1 STATION WIRE (ZSW) .1 4-pair, 24 AWG, 100 ohm cable with insulated copper conductor in separate outer jacket: to C22.2 No. 214. FT-6 fire-rated jacket.
- .2 Voice-grade electrical transmission requirements: to CSA T529 and TIA-EIA-568.
- .3 Data-grade electrical transmission requirements to: CSA T529 and TIA-EIA-568.

2.2 SHIELDED TWISTED PAIR (STP) CABLE .1 2 pair 150 ohm cable: to CSA-T529.

PART 3 - EXECUTION

3.1 INSTALLATION OF HORIZONTAL DISTRIBUTION CABLES .1 Install ZSW horizontal cables, as indicated in conduits and ceiling space from termination in telecommunications closet to outlets.  
.2 Install ZSW cables, as indicated in telecommunications closet.  
.3 Terminate 3 ZSW cables per work station terminated in accordance with CAN/CSA-C22.2 No. 182.4 and CSA-T529.  
.1 2 service outlet(s) terminated in accordance with CAN/CSA-C22.2 No. 182.4 and CSA-T529.  
.2 Wall termination unit interconnecting ZSW to CFC wiring transition.

3.2 FIELD QUALITY CONTROL .1 Perform tests in accordance with Section 26 05 00.  
.2 Test UTP cable installations for:  
.1 Continuity: including open/short, polarity, and pair transpositions.  
.2 DC loop resistance.  
.3 Length using TDR.  
.4 Noise.

PART 1 - GENERAL

- 1.1 REFERENCES .1 Canadian Standards Association (CSA International)  
.1 CSA-C22.2 No. 214-08, Communications Cables (Bi-National standard with UL 444).  
.2 CSA-C22.2 No. 232-M1988(R2004), Optical Fiber Cables.
- .2 Telecommunications Industry Association (TIA)/Electronic Industries Alliance (EIA)  
.1 TIA/EIA-568-B.1-(2001), Commercial Building Telecommunications Cabling Standard, Part 1: General Requirements.  
.2 TIA/EIA-568-B.2-(2001), Commercial Building Telecommunications Cabling Standard, Part 2: Balanced Twisted-Pair Cabling Components.  
.3 TIA/EIA-568-B.3-(2000), Optical Fiber Cabling Components Standard.  
.4 TIA/EIA-606-A-(2002), Administration Standard for the Commercial Telecommunications Infrastructure.  
.5 TIA TSB-140-2004, Telecommunications Systems Bulletin - Additional Guidelines for Field-Testing Length, Loss and Polarity of Optical Fiber Cabling Systems.  
.6 TIA-598-C-(2005), Optical Fiber Cable Color Coding.
- 1.2 DEFINITIONS .1 Refer to TIA/EIA-598-C, Annex A for definitions of terms: optical-fiber interconnect, distribution, and breakout cables.
- 1.3 SYSTEM DESCRIPTION .1 Structured telecommunications wiring system consist of unshielded-twisted-pair and optical fiber cables, terminations, connectors, cross-connection hardware and related equipment installed inside building for occupant's telecommunications systems, including voice (telephone), data, and image.
- .2 Installed in physical star configuration with separate horizontal and backbone sub-systems.  
.1 Horizontal cables link work areas to telecommunications rooms located on same floor.  
.2 Telecommunications rooms linked to main terminal/equipment room (MT/ER) by backbone cables.
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<u>1.3 SYSTEM DESCRIPTION (Cont'd)</u>	.2	(Cont'd) .3 MT/ER also linked to Entrance Room by backbone cables.
<u>1.4 SUBMITTALS</u>	.1	As-built Records and Drawings: .1 Provide Microsoft Access database reflecting cable installation and cross-connections. .2 Provide electronic drawings in AutoCAD 2011 format depicting all construction. .3 Provide two (2) bound complete hard-copy sets of as-built records to the Departmental Representative. .1 Provide and place one hard copy of as-built records for each telecommunications room in plan holder in each telecommunications room.
<u>1.5 DELIVERY, STORAGE AND HANDLING</u>	.1	Waste Management and Disposal: separate waste materials for reuse and recycling in accordance with Section 01 74 20.
<u>PART 2 - PRODUCTS</u>		
<u>2.1 FOUR-PAIR 100 OHM BALANCED TWISTED PAIR CABLE</u>	.1	Four-pair, 100 ohm balanced unshielded-twisted-pair (UTP) cable, flame test classification FT6 or MPP or CMP to: CSA-C22.2 No. 214, Category 6 (Cat 6) to: TIA/EIA-568-B.2.
<u>2.2 UTP CROSS-CONNECT WIRE</u>	.1	Category 6, 4 pairs to: TIA/EIA-568-B.2.
<u>2.3 UTP WORK AREA CORDS</u>	.1	3 meters long, each end equipped with "RJ-45" plug Category 6 to: TIA/EIA-568-B.2.

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PART 3 - EXECUTION

- 3.1 INSTALLATION OF TERMINATION AND CROSS-CONNECT HARDWARE
- .1 Install termination and cross-connect hardware in cabinet as indicated and according to manufacturers' instructions. Identify and label as indicated to: TIA/EIA-606-A.
  - .2 Install consolidation points, as indicated according to manufacturer's instructions. Identify and label as indicated to: TIA/EIA-606-A. Modules employing IDC type terminations for 'RJ-45' jacks and patch chords equipped with 'RJ-45' compatible plugs.
- 3.2 INSTALLATION OF HORIZONTAL DISTRIBUTION CABLES
- .1 Install horizontal cables as indicated in conduits and "J" hooks from telecommunication rooms to individual work-area jacks. Identify and label as indicated to: TIA/EIA-606-A.
  - .2 Support horizontal cables at intervals not exceeding 2 meters.
    - .1 Where raceways are used to distribute cables to each zone, provide supplementary "J" hooks to support cables at intervals not exceeding 2 meters.
  - .3 Install horizontal cables from consolidation point to individual work-area jacks.
    - .1 Provide supplementary "J" hooks to support cables at intervals not exceeding 2 meters.
    - .2 Identify and label as indicated to: TIA/EIA-606-A.
  - .4 Terminate horizontal cables in telecommunications room and at individual work-area jacks.
    - .1 Identify and label as indicated to: TIA/EIA-606-A.
  - .5 Coil spare cables and store in ceiling space in zone.
  - .6 Harness slack cable in cabinets, racks, and wall-mounted termination and cross-connection hardware.
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3.3 INSTALLATION OF  
EQUIPMENT CABLES .1

Install equipment cables from equipment terminal strips as indicated.  
.1 Identify and label as indicated to: TIA/EIA-606-A.

3.4 FIELD QUALITY  
CONTROL .1

Test horizontal UTP cables as specified below and correct deficiencies provide record of results as hard copy.  
.1 Perform tests for Permanent Link on installed cables, including spares:  
.1 Category 5e using certified level IIe tester to: TIA/EIA-568-B.1.  
.2 Category 6 using certified level III tester to: TIA/EIA-568-B.2.  
.2 Perform tests for Channel on 20% of cross-connected data horizontal cabling installed from each telecommunications room, including shortest and longest drops from each telecommunications room: should more than 5% of tested cables fail, test remaining cross-connected data cables.  
.1 Category 5e using certified level IIe tester to: TIA/EIA-568-B.1.  
.2 Category 6 using certified level III tester to: TIA/EIA-568-B.2.  
.2 Provide record of results as hard copy to: TIA/TSB-140.