PROJECT MANUAL

ISSUE FOR TENDER

FEBRUARY 11, 2026

DNA B109 Renovation
Trent University

2140 E Bank Dr., Peterborough, Ontario

REFER TO MECHANICAL AND ELECTRICAL SPECIFICATIONS ON THE DRAWINGS

Part 1 General

1.1 INTENT

.1 This Section includes mandatory construction sequencing constraints and a suggested sequence of construction that will satisfy the mandatory constraints required in the execution of the Work.

.2 The suggested sequence of construction described herein is general in nature and outlines the intent of the design with respect to the implementation and general progress of the Work. The descriptions of construction activities as outlined in this Section are not intended to be comprehensive or all-inclusive. Many other construction activities and Work components, although not specifically noted in this Section, are integral parts of the Work and shall be scheduled and completed by the Contractor in accordance with the Contract Documents.

.3 The broad grouping of parts of the Work under phases, stages or similar divisions in the suggested sequence of construction is intended to illustrate the general sequence for execution of the Work as envisioned by the Contract Administrator. Such grouping shall in no way relieve the Contractor of complete and sole responsibility for the construction means, methods, techniques, sequences and procedures of construction, or the safety precautions and programs incidental thereto.

1.2 SUBMITTALS

.1 Sequence of Construction

.1 The Contractor shall provide a proposed sequence of construction no later than five (5) Working Days prior to the preconstruction meeting.

.2 Hoarding Diagrams

.1 Refer to and Coordinate with Section 01 50 00 Temporary Work

.3 Engineered Temporary platforms

.1 Refer to and Coordinate with Section 01 50 00 Temporary Work

1.3 COORDINATION

.1 Coordinate the requirements of this Section with the other requirements of the Contract Documents.

.2 Coordinate construction activities with existing plant operations as specified, but not limited to, in the following sections:

.1 Owner’s Division 01 specifications
.2 Section 01 50 00 Temporary Work

.3 Services provided by Contractor

.1 The Contractor shall provide all required temporary construction, roads, drainage, grading, sedimentation and erosion control measures for the construction area.

.2 The Contractor shall provide all necessary temporary power, pumping facilities, ventilation equipment, pipes, valves, fittings, equipment and material storage, diversions, temporary bulkheads, or any other equipment and systems, as required during construction.

.3 Coordinate with the Owner to ensure the following:

.1 Compliance of all Health and Safety regulations

.2 Compliance with all applicable Building Code regulations including, but not limited to, maintenance, coordination and regulation of fire exits with the Owner's Facility Operator and Building Inspector.

.3 Compliance with continuous operation of the Site.

.4 No Extras will be allotted or entertained to ensure Compliance of the above.

.5 The Contractor shall hold a site meeting with mechanical, electrical and architectural consultant following demolition. Contractor to notify consultant team of any as found interferences and provide dimensioned interference drawing (in pdf.) to document as found existing mechanical ductwork, sprinklers, and conduits. Consultant team will coordinate as found locations with proposed mechanical and electrical fixtures.

.4 Code Compliance

.1 Related Section: Section 01 31 00 Project Management and Coordination

.2 For each sequence of construction, Fire Exit and Fire Separation requirements per the latest edition of the Ontario Building Code must be maintained.

.1 All Exit Doors to be provided with necessary hardware to meet the minimum OBC requirements.

.2 Maintain existing exit doors during construction. Provide temporary exit doors as required to comply with Building Code regulations.

.3 A minimum 6m horizontal clear and 4.2m vertical clearance path of travel for emergency exit vehicles is required.

.3 Fire Protection

.1 Provide adequate supplementary fire protection facilities including, but not limited to, ample hand operated 7kg to 15kg multipurpose dry chemical extinguishers in each facility. Provide temporary hose lines in areas where construction is in progress until the permanent fire protection is placed into service. Do not block hydrant hose connections and other fire fighting equipment by construction equipment and make readily accessible at all times.

.2 Monitor and control probable ignition sources as necessary to prevent the threat of fire.

.3 Minimize hot Work including, but not limited to, operations involving open flames, heat, or sparks such as brazing, cutting, grinding, soldering and torching. Prior to starting Work which requires welding, cutting, open flame or heat, develop and implement Hot Work procedure based on existing and foreseeable conditions that meet of exceeds the local hot work procedures.

.4 Provide Fire watch services during course of work.

.5 Temporary Barriers and Protection

.1 Related Section: 01 50 00 Temporary Work

.6 Monitoring and Emergency Response

.1 The Contractor shall have the necessary resources, materials, personnel and equipment readily available to provide continuous 24hours per calendar day, 7 calendar days per week monitoring and emergency repair of Contractor's work area where, in the opinion of the Owner or the Contract Administrator, the failure of such temporary systems could adversely impact Owner operations and or Pedestrian safety.

.2 Provide and operate temporary systems as required to contain and remove leakage through mechanical or electrical systems and other such isolation devices that are used during construction of the Works.

.3 The Contractor is to provide the necessary means and methods to ensure Owner operations are not disrupted unless approved by Owner 2 weeks in advance.

.7 Electrical and Temporary Power

.1 Contractor to minimize the duration of shutdowns and keep the facility in continuous operation, maintain existing facility electrical systems in operation while new electrical components are installed, or the existing systems are modified or replaced as required for the final electrical system configuration. Where this is not possible, provide temporary power in the form of overhead lines or portable generators at no additional cost to the Owner.

.2 Provide written formal report or request to the Owners two weeks in advance of any electrical shutdown.

.8 Ventilation and Temporary ventilation.

.1 It is the responsibility of the General and Mechanical Contractor to inform the Owner if any source or potential source of indoor air contamination is identified.

.2 Prior to enclosing spaces such as plumbing chases, air shafts and return air plenums, clean all areas thoroughly. The Contractor shall guarantee that the plenum chamber used for recirculating of air will be of tight construction and that all sources of contamination from traps, soil stacks,

downspouts, vents, exhaust discharges and other sources will be enclosed so that no contaminated air will be recirculated.

.3 Prior to commencing construction activities, shut off the HVAC system, block off all air grills, diffusers and other openings outside the immediate construction area. Openings to adjacent occupied spaces shall be covered with filter media to prevent dust and other airborne contaminants from passing to adjoining spaces.

.4 Contractor to install temporary exhaust system to ventilate construction site and keep site under slight negative pressure during all hours of construction, even if after normal business hours.

.5 Contractor to install temporary barriers to protect adjacent spaces from dust, particulates, vapours and noise. Where temporary barriers are installed always maintain fire exits and exitways.

.9 Requirements of other Divisions

.1 During site services relocation and replacement works Contractor shall coordinate with and notify Owner and all utility service providers, including, but not limited to Enbridge, Owner's Facility Operators and Owner's Project Manager for any works related to shut downs, disconnect and/or reconnect of incoming utility services.

.2 Underground Service Locates must be obtained prior to any construction requiring digging or excavation of existing grade.

.3 Drain scoping and clearing is required before and after construction activities.

.10 Transition of new and existing services

.1 Coordinate with Building Owner for protection requirements and ensure protection measures are reviewed and approved by Building Owner prior to installation.

Part 2 Products

2.1 GENERAL

.1 Unless specifically stated otherwise in the Contract Documents, provide all labour, materials and equipment necessary to accomplish the work of this Section.

Part 3 EXECUTION

3.1 MANDATORY CONSTRAINTS

.1 Incorporate the construction constraints and sequence of construction in the Progress Schedules required in Division 01.

.2 The Working limits for this Contract and adjoining contracts are shown on the Contract Drawings. The working limits are time dependant and may change

during the course of the Contract and as other contracts start and finish. No extras will be permitted or entertained to revise site limits.

.3 The Contractor is required to work within the space constraints shown and in accordance with the time constraints instructed by the Owner.

.4 The Contractor shall work with the Owner and the Other Contractors to coordinate the interface between the Contract and other Contracts.

.1 Allow 15 working days for coordination of any activity with Owner and Contract Administrator.

.2 Additional days may be allotted for coordination if reported in written form to ensure all requirements of the Contract are met.

.5 Ensure strict adherence to the Owner' safety standards, Building Code, Provincial Safety Acts, Ministry of Labour and the Occupational Health and Safety Act at a minimum.

.6 No Work will be allowed above rotating equipment that is in operation.

.7 Carefully examine the existing utility service at the Site to determine the difficulty of the Work and the number and type of existing services required to be re-routed or protected from damage during construction of the Work.

.8 Coordinate and Schedule tie-ins to other existing structures and services with Owner.

.1 Provide minimum 10 working day notice of any shutdown or tie-in requirements.

.2 Coordinate and Schedule tie-ins and shutdowns with Owner to ensure proposed date and time are acceptable by Owner. Modify date as required at no extra cost to contract for any tie-in or shutdown requirements.

.9 Event Days, Work Stoppages, Service Shutdowns

.1 Co-operate with Owner and Building Operators building shutdowns as a result of Owner's internal schedule.

.10 Building Operation and Staging

.1 The building will be in operation during the course of work.

.2 Construct work in a manner to minimize disruption to ongoing building activities.

.3 Provide as many stages of construction as required to complete the work in coordination with the Owner and Building Operator.

END OF SECTION

1 GENERAL

1.1 RELATED REQUIREMENTS

.1 The description of this Section is intended to supplement and provide additional requirements in conjunction with the Owner's 'Summary of Work.' Where a contradiction occurs between Owner's Front End and/or Construction Agreement and the items described in this Consultant specification sections, the Owner's Conditions shall supersede the requirements of this section.

.2 Where a discrepancy occurs between the Consultant Specifications and/or drawings, the most stringent requirement shall prevail unless instructed in writing otherwise by the Consultant or Owner.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Special procedure submittals:

.1 Submit schedule of shutdowns or closure of active service or facility, including power and communications services.

1.3 CLOSEOUT SUBMITTALS

.1 Submit in accordance with Section 01 77 00 – Project Close Out.

.2 Operation and maintenance data:

.1 Include, in the operation and maintenance manual, manufacturer's operating and maintenance instructions and recommended cleaning materials and methods.

.2 Submit operating and maintenance instructions for pre-bid or pre-purchased products or equipment.

1.4 WORK COVERED BY CONTRACT DOCUMENTS

.1 The Contractor shall furnish all labour, materials, equipment and supervision to construct the project at 2140 E Bank Dr., in accordance with the drawings and specification including any addenda issued during the time of bidding. This work shall include, but not be limited to the short summary below:

.2 Work under this contract covers the following major items:

.1 Demolition of existing doors and partitions. Trenching concrete slab.

.2 Installation of new glazing, glass partitions, and drywall partitions.

.3 New wall, floor, and ceiling finishes.

.4 New furniture and millwork.

.5 Installation of new lighting.

.6 Sprinkler and ductwork relocation. New plumbing fixtures

1.5 CONTRACT METHOD

.1 Construct work under one stipulated price contract.

.2 Employ Subcontractors assigned by the Owner for:

.1 Lighting Control Programming:

.1 AMG Baytech. Phone 905-720-2144. robin@amgbaytech.ca

.2 Sprinkler Work

.1 Georgian Bay Fire. Phone 705-957-1081. Brennan.Shortall@fire-sp.com

.3 Fire Alarm

.1 Troy Fire and Safety. Phone 905-914-0474. tanya.mckelvey@troylfs.com

.3 Relations and responsibilities between the Contractor and Subcontractors assigned by the Owner are as defined in Conditions of Contract.

1.6 WORK BY OTHERS

.1 Cooperate with other Contractors carrying out their respective work.

.2 Coordinate work with other Contractors. If any part of the work of this Contract depends on work of another Contractor for its proper execution or result, promptly report, in writing, defects which may interfere with proper execution of the work to the Consultant.

.3 Review scopes of work to be executed at the Place of the Work during work of this Contract:

.1 Furniture delivery

.2 Sequencing of utility pole, utility pole cladding, sprinkler work and acoustic clouds

1.7 FUTURE WORK

.1 Coordinate Work with Owner and Consultant to facilitate future work.

1.8 WORK SEQUENCE

.1 Coordinate Progress Schedule and coordinate with Owner's continued use of adjacent facilities during construction.

.2 Maintain fire access/control and exit requirements at all times.

1.9 CONTRACTOR USE OF PREMISES

.1 Coordinate use of premises and Contractor Laydown area where indicated on drawings, Specification 01 05 01 Construction Sequencing and under direction of Owner and Consultant.

.2 Clean on daily basis areas outside of Contractor Work Area to maintain public access and emergency egress requirements during course of Work.

.3 Obtain and pay for use of additional storage or work areas needed for operations under this Contract.

.4 Remove or alter existing work to prevent injury or damage to portions of existing work which remain.

.5 Repair or replace portions of existing work which have been altered during construction operations to match existing or adjoining work, as directed by the Engineer.

.6 At completion of operations condition of existing work: equal to or better than that which existed before new work started.

.7 Only Contractor's vehicles, tools, equipment and materials that are clearly identified with Contractor's signage/decals are permitted to park in construction area. Personal vehicles will not be permitted in construction area.

1.10 OWNER AND PUBLIC OCCUPANCY

.1 The Owner will occupy the premises during construction.

.2 Cooperate with Owner's requirements to schedule operations to minimize conflict and facilitate Owner's occupancy.

1.11 JURISDICTIONAL AUTHORITIES

.1 Allow 1 month after award of contract meeting after pre-construction meeting for receipt of building permit documents from Jurisdictional Authorities.

1.12 CONTRACTOR RESPONSIBILITIES

.1 Designate submittals and delivery date for each product in progress schedule.

.2 Review shop drawings, product data, samples, and other submittals. Submit to Consultant notification of any observed discrepancies or problems anticipated due to non-conformance with Contract Documents.

.3 Receive and unload products at site.

.4 Inspect deliveries jointly with Owner; record shortages, and damaged or defective items.

.5 Handle products at site, including uncrating and storage.

.6 Protect products from damage, and from exposure to elements.

.7 Assemble, install, connect, adjust, and finish products.

.8 Provide installation inspections required by public authorities.

.9 Repair or replace items damaged by Contractor or subcontractor on site (under his control).

1.13 ALTERATIONS, ADDITIONS OR REPAIRS TO EXISTING BUILDING

.1 Take responsibility for the care, custody, and control of property which is assigned to the Contractor for performance of the work.

.2 Take responsibility for the premises assigned to the Contractor for performance of the work.

.3 Make good damage to existing property caused by work of this Contract.

1.14 DOCUMENTS REQUIRED

.1 Maintain at project site, one copy of each document:

.1 Drawings.

.2 Specifications.

.3 Addenda.

.4 Site-specific health and safety plan and other related documents.

.5 WHMIS safety data sheets in accordance with Section 01 35 29 - Health, Safety, and Emergency Response Procedures.

.6 Reviewed construction progress Schedule.

.7 Reviewed shop drawings.

.8 Manufacturer's instructions.

.9 List of outstanding shop drawings.

.10 Change Orders.

.11 Change Directives.

.12 Other modifications to the Contract.

.13 Site inspection and test reports.

.14 Other specified documents.

1.15 CONSULTANTS ELECTRONIC FILES

.1 Electronic Drawing Files: upon written request by the Contractor, Electronic drawing files in AutoCAD, version 2010 format will be made available to the Contractor by the Consultant for the preparation of Shop Drawings specific to this Project subject to the following conditions:

.2 Electronic drawing files will be provided by e-mail or DVD depending on size and quantities of requested electronic drawing files.

.3 Electronic drawing files will be provided in the native format the drawing was completed in. A change to a version or format that is not the native format of the file will not be undertaken by the Consultant.

.4 The Consultant will alter electronic drawing file information not essential to the Contract from materials provided to the Contractor including, but not limited to, the following

.1 Remove Title Blocks and Logos

.2 Remove Professional Seals

.3 Bind External File and Blocks.

.5 Contractor shall request specific electronic drawing files at the beginning of the Work:

.1 Consultant makes no warranty or guarantee that dimensions provided or established from the electronic drawing file represent actual site conditions.

.2 Contractor shall remain responsible for established and confirming field dimensions and project conditions, and providing this information to affected Subcontractors.

.3 In the event that there is a discrepancy between the electronic drawing files provided to the Contractor and the Bid Documents and Addenda, the Bid Documents and Addenda shall govern.

.4 In the event that dimensions are not indicated, they shall not be scaled electronically from the electronic drawing files. Missing dimensions shall be brought to the attention of the Consultant who will determine the dimensions or direct the method for determination of the missing dimensions.

.6 The Contractor recognizes the use of the electronic drawing files is at their own risk. The Contractor will be required to accept terms of use including, but not limited to, the following:

.1 Contractor, Subcontractor, Sub-Subcontractor, supplier, manufacturer or other third part agent agrees to indemnify and hold harmless the Consultant from any damage, liability or costs arising from the use of the electronic drawing files conveyed in the CADD file format provided.

.2 Consultant retains the copyright for electronic drawing files made available to the Contractor.

.3 Use of the supplied electronic drawing files for any subsequent Project is strictly forbidden with the express written consent of the Consultant.

.4 Consultant will not be held liable for any unauthorized use or modification of the electronic drawing files provided.

.5 Consultant expressly disclaims any warranty or assurance that the electronic drawing files will remain accurate beyond the date the files were created.

.6 The Consultant assumes no responsibility and disclaims any liability to any person or entity for any loss or damages including any special, indirect or consequential damage caused by error or omissions in the electronic drawing files and CADD format provided, whether resulting from negligence, accident or any other cause.

.7 Consultant reserves the right to withdraw the offer for electronic drawing files where an excessive number of drawings are requested.

.8 Consultant reserves the right to reject shop drawing prepared from electronic drawing files submitted to them by the Contractor that have not been substantially altered from the electronic drawing files provided and as follows:

.1 Shop drawings shall reflect constructability requirements.

.2 Shop drawing shall be detailed in accordance with requirements listed in the technical specification sections.

.3 Shop drawings shall be submitted along with Contractor’s cover page including the following information; signature, date of review, date of submittal, shop drawing number and Contractor’s logo.

1.16 QUALITY CONTROL

.1 Regulatory Requirements

.1 Materials and workmanship shall be in accordance with requirements and recommendations of applicable rules, regulations, standards and codes as specified hereunder. All products shall bear a certification label of CSA, CGA, TSSA, ULC, or ESA, as applicable.

.1 ESA Electrical Safety Code (Canadian Electrical Code and Electrical Safety Authority Supplements)

.2 Canadian Standards Association (CSA)

.3 Underwriter's Laboratories of Canada (ULC)

.4 Ministry of Health (MOH)

.5 Ontario Building Code (OBC)

.6 Ontario Fire Code (OFC)

.7 Boards, Services, Companies or other Authorities having jurisdiction

.8 Technical Standards and Safety Authority (TSSA)

.2 Project Manager

.1 The Contractor shall assign an experienced and competent project manager who shall be responsible for this project from beginning to completion. This person shall act as the Owner's and Engineer’s contact to the Contractor, and shall not be changed without significant reason and prior notification and agreement of the Owner.

.3 Site Supervisor

.1 The Contractor shall assign an experienced and competent Gold Seal certified full-time Site Supervisor who shall be responsible for this project from beginning to completion. This person shall not be changed without significant reason and prior notification and agreement of the Owner.

.4 Inspection of the Work

.1 The Owner or Consultant shall be entitled to inspect the work at any time. Prior to completion of the Work, the Contractor shall request that the Consultant inspect the Work.

.5 Labour

.1 The work shall be performed by persons experienced and skilled in the work. The Contractor shall provide effective supervision of the work, and shall employ local labour where practicable. The hours of work, wages paid, terms of employment, and working conditions shall conform to labour agreements and all applicable legislation and guidelines issued from time to time by the Ontario Ministry of Labour and governing authorities.

.2 The Contractor may assign or subcontract any part of the Contract. However, all subcontractors and their contribution shall be clearly identified as part of the bid submission. After award of the Contract, the Contractor shall neither assign nor sub-contract any part of the Contract without the prior written consent of the Engineer. Every subcontract entered into by the Contractor shall adopt all of the terms and conditions of the Contract.

.3 The Contractor shall be responsible to the Owner for the acts and omissions of its subcontractors and suppliers, and of persons directly or indirectly employed by them. Nothing contained in the Contract shall create any contractual relationship between any sub-contractor or supplier and the Owner.

.6 Hours of Work

.1 Include in Scope of Work all hours of work, including overtime and holidays, as required to facilitate timelines and constraints identified in Section 01 05 00 Construction Sequencing and 01 32 18 Construction Schedule

.7 Materials Supplied

.1 The Contractor shall supply only new materials and components for the Work. Used, re-manufactured, or rebuilt components shall not be used except as expressly permitted herein.

.2 Products shall be provided with complete documentation. Undocumented products must be tagged and accepted by the Consultant prior to installation. Do not install undocumented products without such acceptance.

.3 All products and materials shall be new, clean, and free of defects, damage and corrosion.

.4 Ship and store products and materials in a manner that will protect them from damage, weather, and entry of debris. Do not install damaged items, but take immediate steps to obtain replacement or repair.

.8 Changes in the Work

.1 Change orders shall be issued and fees adjusted only where the Owner makes a significant change in the project scope as outlined herein. Extras shall not be granted due to the Contractor's unfamiliarity with the site, or due to the Contractor's lack of thorough investigation prior to bid submission. Any additions to the Work under this contract shall conform to all construction standards and conditions laid out herein, whether or not such conditions are expressly stated in the Owner’s acceptance of the addition(s).

.2 The Contractor shall not proceed with Work in addition to the Contract Documents until the formal change process has been completed.

.9 Delays

.1 Should the performance of the work be delayed due to an act or omission of the Contractor or any of his sub-contractors, the Owner will have the right to hold back, set off or recover from the Contractor, and the Contractor shall be liable to the Owner for, any and all damages that the Owner incurs as a consequence of such delay. In particular, the Contractor shall be liable for any utility costs (water, electricity and natural gas), temporary facilities, cancellation or relocation of programmed events paid by the Owner due to the project not being completed on schedule.

1.17 HEALTH AND SAFETY REQUIREMENTS

.1 File Notice of Project with Provincial authorities prior to beginning of Work.

.2 Perform site specific safety hazard assessment related to project.

.3 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.

.4 Consultant may respond in writing, where deficiencies or concerns are noted and may request re-submission with correction of deficiencies or concerns.

.5 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.

.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.

.6 Comply with Ontario Health and Safety Act, R.S.O.

.7 Ensure applicable items, articles, notices and orders are posted in conspicuous location on site in accordance with Acts and Regulations of Province.

.8 Give precedence to safety and health of public and site personnel and protection of environment over cost and schedule considerations for Work.

1.18 REVIEW OF EXISTING CONDITIONS

.1 Contractor to review report of radar scanning of existing slab prior to commencement of Work.

.2 Review existing conditions prior to shop drawing submittal, fabrication and installation of Work.

.3 Mark out locations of all partitions and major trade items for Consultant coordination and review prior to construction. Review by all parties to determine and resolve interferences will occur at this time.

.4 Review and coordinate sub-contractors Work.

2 PRODUCTS

2.1 NOT USED

.1 Not used.

3 EXECUTION

3.1 NOT USED

.1 Not used.

END OF SECTION

Part 1 General

1.1 GENERAL

.1 *Contractor* is to provide photographic documentation in digital format and in accordance with procedures and submission requirements specified in this section.

1.2 DIGITAL PHOTOGRAPHS

.1 Equipment: Provide photographs using minimum 4 megapixel digital camera.

.2 Submit the required photographs to the *Consultant* and to the *Owner.*

.3 Output: Supply date stamped maximum resolution colour photos to the Consultant in JPEG format, on CD-ROM format.

.4 Number of photos required:

.1 Prior to construction: Provide necessary number of photographs, as required to document existing conditions.

.2 Weekly: Provide 8 photographs to document the stage of the Work from points selected by the *Consultant* showing as much as possible of the Work installed.

.3 Completion: When the Work is completed, arrange to take final photographs of the Work from a minimum of 8 points of view.

Part 2 Products - NOT USED

Part 3 Execution - NOT USED

END OF SECTION

1.1 ADMINISTRATIVE

.1 Submit to the *Consultant* all submittals listed for review. Submit with reasonable promptness and in an orderly sequence so as not to cause any delay in the Work. Failure to submit in ample time will not be considered sufficient reason for an extension of the Contract Time, and no claim for extension by reason of such default will be allowed.

.2 Submit only those submittals specifically required by the *Contract Documents,* or those specifically requested by the *Contract Administrator*. Any submittals submitted that are not specifically required by the *Contract Documents*, or requested by the *Contract Administrator*, will be returned to the *Contracto*r at the *Contractor's* expense without being reviewed.

.3 Work affected by a submittal shall not proceed until the review of that submittal is complete.

.4 *Contractor's* review of submittals:

.1 The *Contractor* is to review submittals prior to submission to the *Contract Administrator*. This review represents that the necessary requirements have been determined and verified, or will be, and that each submittal has been checked and coordinated with the requirements of the *Work* and all of the *Contract Documents*.

.2 Submittals shall bear stamp of *Contractor* and signature of a responsible official in *Contractor's* organization indicating in writing that such submittals have been checked and coordinated by *Contractor*. *Contractor's* review shall be performed by qualified personnel who have detailed understanding of those elements being reviewed and of the conditions at the Working Area.

.3 Check and sign each submittal and make notations considered necessary before submitting to *Contract Administrator* for review. Where submittal is substantially and obviously in conflict with requirements of *Contract Documents*, reject submittal without submitting to *Contract Administrator* and request resubmission.

.4 *Contractor* shall assume sole responsibility for any conflicts occurring in the *Work* that result from lack of comparison and coordination of submittals required for the *Work.*

.5 Notify *Contract Administrator* in writing of changes made on submittals from *Contract Documents*. *Contract Administrator's* review of submittals shall not relieve *Contractor* of responsibility for changes made from *Contract Documents* not covered by written notification to *Contract Administrator*.

.6 Submittals that clearly have not been reviewed by the *Contractor*, or are not stamped, signed, dated, and identified as to the specific project, will be returned without being reviewed.

.5 *Consultant's* review of submittals:

.1 Review of submittals by *Contract Administrator* is for the sole purpose of ascertaining conformance with the general design concepts and the general intent of the *Contract Documents*. This review shall not mean that *Contract Administrator* approves the detail design inherent in the submittals, responsibility for which shall remain with the *Contractor*. Such review shall not relieve the *Contractor* of responsibility for errors or omissions in the submittals, or responsibility for meeting requirements of *Contract Documents*.

.2 *Contractor* shall be responsible for dimensions to be confirmed and correlated at the *Working Area* for information that pertains solely to techniques of demolition, and for coordination of the *Work*.

.3 *Contract Administrator's* review and markings on submittals do not authorize changes in the *Work* or the *Contract Time,* and will be accommodated at no additional cost to the Owner. If, in the opinion of the *Contractor*, the *Contract Administrator's* markings on submittals constitute a change in the *Work* or will effect a change in the Contract Time, then the *Contractor* shall so notify the *Contract Administrator* in writing and request an interpretation following the procedures for requests for interpretation. If the *Contract Administrator* finds that the *Contract Administrator's* markings on submittals do constitute a change in the Work or will effect a change in the *Contract Time*, then a *Change Order* will be prepared therefore. The time taken to process such a request for interpretation shall not, in and of itself, constitute a change in the *Work* nor increase the *Contract Time*.

.4 Submittals received but not required by the *Contract Documents* or requested by the *Contract Administrator* will not be reviewed by the *Contract Administrator* and will be marked 'NOT REVIEWED' by the *Contract Administrator* and returned to the *Contractor*.

.7 Verify that field measurements and affected adjacent work are coordinated.

.8 The *Contractor's* responsibility for errors and omissions in the submissions is not relieved by the *Contract Administrator's* review of submittals.

.9 The *Contractor's* responsibility for deviations in the submission from the requirements of the *Contract Documents* is not relieved by the *Contract Administrator's* review of submittals.

.10 Keep one hard copy reviewed copy of each submittal on-site.

.11 Engineered submittals:

.1 Submittals for items required to be engineered shall be prepared under the direct control and supervision of a qualified professional engineer registered in the *Working Area*, and having minimum of $250,000 professional liability insurance, who shall also apply his/her professional

seal and signature to submittals prepared under their direct control and supervision.

.2 Include with engineered submittal, professional engineer's certificate of insurance.

.3 Design includes life safety, sizing of supports, anchors, framing, connections, spans, and as additionally required to meet or exceed requirements of applicable codes, standards, regulations, and authorities having jurisdiction.

1.2 CERTIFICATES AND SCHEDULES

.1 Prior to commencement of the *Work*, the *Contractor* is required to provide to the *Owner* a copy of the *Contractor's* current Certificate of Clearance from the Workplace Safety and Insurance Board.

.2 No later than ten (10) *Working Days* prior to, and as a condition of, the first application for progress payment, the *Contractor* is required to submit the following to the *Contract Administrator*:

.1 A copy of the *Contractor's* Certificate of Clearance from the Workplace Safety and Insurance Board provided to the *Owner* in accordance with paragraph 1.4.1

.2 A schedule of values for the parts of the *Work*.

.3 A construction progress schedule in accordance with paragraph 1.4 of this section (below).

1.3 SCHEDULE OF SUBMITTALS

.1 Before commencement of the Work, submit to the *Contract Administrator* a detailed schedule of submittals required by the *Contract Documents* correlated to the construction progress schedule specified under paragraph 1.6 of this section.

.2 Indicate dates for submitting, review time, resubmission time, float time, and last date for meeting construction schedule.

.3 *Contract Administrator* will review submittal schedule and advise *Contractor* if volume and timing of submittals will permit timely review and response. Contract Administrator may require modifications to submittals schedule in order to allow adequate time for review of submittals. Adjust submittals schedule and construction schedule as required to comply with *Contract Administrator's* needs.

.4 Make provisions in schedule for at least 10 *Working Days* for *Contract Administrator's* review of submittals. When submittals have to be reviewed by one or more of *Contract Administrator's* sub consultants, add 5 more *Working Days* for a total 15 *Working Day* review period.

.5 If the *Contract Administrator* requires resubmission of submittals, allow for an additional *10 Working Days* review for each resubmission.

.6 If, at any time, the *Contractor* submits a large enough number of submittals such that the *Contract Administrator* cannot process these submittals within 10 *Working Days,* the *Contract Administrator*, in consultation with the *Contractor* within 3 *Working Days* of receipt of such submittal, will provide the *Contractor* with an estimate of the time necessary for processing same. The *Contractor* shall accommodate such necessary time at no increase in the *Contract Time* and at no additional cost to the *Owner*.

.7 The *Contractor* shall periodically resubmit the submittal schedule to correspond to changes in the demolition schedule. Such resubmissions shall maintain the minimum 10 *Working Day* period for the *Contract Administrator's* review.

1.4 CONSTRUCTION PROGRESS SCHEDULE

.1 Submit a construction progress schedule in MS Schedule.

.2 Prepare schedule in the form of a horizontal bar chart.

.3 Provide a separate bar for each trade or operation.

.4 Provide a horizontal time scale identifying the first work day of each week.

.5 The format for the listings shall be the chronological order of the start of each item of work.

.6 The identification of the listings shall be by a brief systems description.

.7 Submission:

.1 Submit initial schedules within ten (10) *Working Days* after award of *Contract*, but before commencing the *Work*.

.2 Submit two electronic formats to the *Contract Administrator*, one in MS Schedule the other PDF formats

.3 The *Contract Administrator* will review the submitted schedules and return a reviewed copy to the *Contractor* within ten (10) *Working Days* after receipt.

.4 The *Contractor* shall resubmit a finalized copy of the required schedules within five (5) Working Days after return of reviewed copy.

.5 The *Contractor* shall submit a revised progress schedule with each application for progress payment in PDF format.

.8 Distribute copies of the revised schedule to:

.1 The site office.

.2 Subcontractors.

.3 All concerned parties.

.9 Instruct Subcontractors, suppliers, and manufacturers, to report to the *Contractor* in writing within ten (10) days, any problems anticipated by the timetable shown in the schedule. The *Contractor* shall convey this information to the *Contract Administrator* if necessary.

10. Milestones:

The following milestones must be incorporated into the schedule

.1 Project Award

.2 Site Mobilization

.3 Submittals (individually, with full timeline)

.4 Construction broken down by trade, product, subcategory.

.5 *Substantial Performance of the Work*.

.6 Total Performance of the Work.

All construction to be complete and all contractors off site by August 15, 2026

Part 2 Products - NOT USED

Part 3 Execution - NOT USED

END OF SECTION

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 PRECEDENCE

.1 For Federal Government projects, Division 1 Sections take precedence over technical specification sections in other Divisions of this Project Manual.

1.3 RELATED SECTIONS

.1 Section 01 33 00 - Submittal Procedures.

.2 Section 01 77 00 – Project Close Out.

1.4 REFERENCES

.1 Canadian Construction Documents Committee (CCDC)

.1 CCDC 2-[2020], Stipulated Price Contract.

1.5 INSPECTION

.1 Allow Consultant 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 Consultant 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 Consultant 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.

1.6 INDEPENDENT INSPECTION AGENCIES

.1 Independent Inspection/Testing Agencies will be engaged by Consultant for purpose of inspecting and/or testing portions of Work.

.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 Consultant at no cost to Consultant. Pay costs for retesting and reinspection.

1.7 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.

1.8 PROCEDURES

.1 Notify appropriate agency and Consultant 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.

1.9 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 Consultant 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.

.3 If in opinion of Consultant it is not expedient to correct defective Work or Work not performed in accordance with Contract Documents, Owner may deduct from Contract Price difference in value between Work performed and that called for by Contract Documents, amount of which shall be determined by Consultant.

1.10 REPORTS

.1 Submit 4 copies of inspection and test reports to Consultant.

.2 Provide copies to Subcontractor of work being inspected or tested and/or manufacturer or fabricator of material being inspected or tested.

1.11 TESTS AND MIX DESIGNS

.1 Furnish test results and mix designs as may be requested.

.2 The cost of tests and mix designs beyond those called for in Contract Documents or beyond those required by law of Place of Work shall be appraised by Consultant and may be authorized as recoverable.

1.12 MOCK-UPS

.1 Prepare mock-ups for Work specifically requested in specifications. Include for Work of all Sections required to provide mock-ups.

.2 Construct in all locations acceptable to Consultant as specified in specific Section.

.3 Prepare mock-ups for Consultant's review with reasonable promptness and in an orderly sequence, so as not to cause any delay in Work.

.4 Failure to prepare mock-ups in ample time is not considered sufficient reason for an extension of Contract Time and no claim for extension by reason of such default will be allowed.

.5 If requested, Consultant will assist in preparing a schedule fixing dates for preparation.

.6 Remove mock-up at conclusion of Work or when acceptable to Consultant.

.7 Mock-ups may remain as part of Work.

.8 Specification section identifies whether mock-up may remain as part of Work or if it is to be removed and when.

1.13 MILL TESTS

.1 Submit mill test certificates as required of specification Sections.

1.14 EQUIPMENT AND SYSTEMS

.1 Submit adjustment and balancing reports 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.

END OF SECTION

Part 1 General

1.1 GENERAL INSTRUCTIONS

.1 Read and be governed by conditions of the *Contract* and sections of Division 1.

1.2 INSTALLATION AND REMOVAL

.1 Provide temporary supports, utilities, facilities and controls in order to execute the Work expeditiously.

.3 Arrange, obtain and pay cost for permits required for temporary facilities and controls.

.4 Remove from the Working Area all such work after use.

1.3 COORDINATION

.1 Coordinate all Temporary Work facilities and tie-ins, if required, with Owner in order to execute the Work expeditiously.

1.4 SANITARY FACILITIES

.1 Provide sufficient sanitary facilities for workers in accordance with local health authorities.

.2 Maintain in clean condition and properly screened from public view.

.3 The Owner may designate an existing building Sanitary facility for use during construction.

.1 The Contractor is NOT to rely on this possibility when providing a cost during the Tender period.

.2 Where the Owner's Sanitary Facility is used, the Contractor is responsible for all daily cleanup and disposal during the course of construction.

.3 Maintain Owner's sanitary facility in hygienic, clean condition satisfactory to the Building User.

1.5 WATER SUPPLY

.1 Provide a continuous supply of potable water for use in the Work.

.2 Potable water available at the *Work* should be tested for quantity (pressure) and quality prior to any use. If inadequate for the work, arrange for connection with the appropriate utility company and pay costs for installation, maintenance, and removal.

1.6 TEMPORARY SUPPORTS, TEMPORARY ENGINEERED STRUCTURES, ELEVATED MOBILE WORK PLATFORMS AND SCAFFOLDING

.1 Supply and install and pay for temporary support, shoring, structures, utilities as required to complete the *Work*, including any and all permit fees.

.2 Design, erection, operation, removal and maintenance of Temporary Supports to be solely borne by the Contractor. Engage and pay for registered professional engineer[s] to perform such functions and to provide inspection reports for the duration of Work activities.

.3 All scaffolding installation must be installed in conformance with the Ontario Building Code and O.Reg 213/91 (Construction Projects)

1.7 TEMPORARY HEATING AND VENTILATION

.1 Supply and install and pay for temporary heating, cooling and ventilating required for the Work during the *Work*, including attendance, maintenance and fuel.

.2 Supply and install temporary heat and ventilation as required to:

.1 Facilitate continuous uninterrupted progress of the Work.

.2 Provide adequate ventilation to meet health regulations for safe working environment, particularly with respect to periods of hazardous material removal.

.3 Construction heaters used inside buildings must be vented to the outside or be flameless type. Solid fuel salamanders are not permitted.

.4 Maintain temperatures of minimum 10°C in areas where the Work is in progress, unless indicated otherwise in the specification sections.

.5 Ventilate heated areas and keep building free of exhaust or combustion gases.

.6 No Extras will be allotted for heating and ventilation during any season or inclement weather during construction period.

1.8 TEMPORARY POWER AND LIGHT

.1 Arrange for temporary power required during construction for the proper execution of the Work and the safe and proper operating of power tools.

.2 Abide by the rules of the Canadian Electrical Code.

.3 Maintain in good working order throughout the course of the Work.

1.9 TEMPORARY TELEPHONE AND COMUNICATIONS

.1 The *Contractor* shall pay all service and local use charges for Contractor's telephone, email and long distance charges including installation and removal on completion of the Work.

1.10 HOISTING

.1 Supply and install, operate and maintain any hoists/cranes required for moving of workers, materials and equipment.

.2 Hoists/cranes are to be operated by a qualified operator only. Proof of operator's qualification shall be provided upon request.

.3 All costs associated with hoisting to be solely borne by the Contractor.

1.11 SITE STORAGE AND OVER LOADING

.1 Confine the *Work* and the operations of workers to limits indicated by the *Contract Documents.* Do not unreasonably encumber the premises with products or construction machinery and equipment.

.2 Do not load or permit to be loaded any part of the *Work* with a weight or force that will endanger the Work.

.3 Coordinate with Owner for storage and loading locations.

1.12 EQUIPMENT, TOOL, AND MATERIAL STORAGE

.1 Supply and install and maintain, in 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 at the *Working Area* in a manner to cause the least interference with the Work.

.3 No tools or equipment are to be left unattended outside the construction zone during course of Work.

1.13 CONSTRUCTION SIGN

.1 No other signs, other than for safety, caution, or instruction, will be permitted.

.1 Provide full color tabloid size directional signage with laminate cover indicating access to exits and pedestrian walking routes based on Owner's templates. Provide as many times as necessary during the course of work where directional signage is damaged, missing.

.1 Location of directional signage to be approved by Building Owner prior to installation.

.2 Install additional signage related to Health and Safety as instructed by the Owner at no extra cost to the Contract.

1.14 OWNER SIGN

.1 Supply and install 2 no. Owner's Signage and nominal 100 mm x 100 mm wood posts and framing, to fix the sign to the framing.

.1 Owner Sign to be maximum size of 1200 mm x 2400 mm.

.2 Owner Sign contents must be approved by Owner prior to fabrication and installation.

1.15 HOARDING

.1 Supply and install hoarding and barricades as and where required by authorities having jurisdiction or required to protect the public, workers, and public and private property from injury or damage.

.2 Include for the provision of overhead protection and temporary exits and exit signs as may be required during the course of the *Work.*

.3 Include for the provision of 2 temporary gates and/or doors to provide restricted access to the *Working Area* as required.

.4 Hoarding to be min. 8'-0" high with counterweights and supports for long runs.

.5 Install hi-contrast anti-trip feet supports "bigfoot" sloped supports or similar

.1 Spray paint, loose construction material, or loose sand bags are not approved 'anti-trip' support mechanisms

.6 Install full height shade screen

.7 Advertisements or similar such signage are not permitted on hoarding.

.8 Hoarding must be providing at all openings after window demolition is complete and to ensure no exterior weather conditions enter the interior of the facility.

1.16 DUST TIGHT SCREENS

.1 Supply and install dust tight screens or partitions to localize dust generating activities, and for protection of workers and the public.

.2 Maintain and relocate protection until such work is complete.

1.17 OWNER'S EXISTING FURNISHINGS, FIXTURES AND EQUIPMENT ("FFE")

.1 Work will occur in an occupied facility.

.2 Protect Owner's existing FFE during the course of work.

.3 Assist in relocation of existing FFE in areas of work at no extra cost to the Contract,

.4 Co-operate and coordinate schedule of installation with Building Owner's use of facility and FFE relocation.

1.18 SNOW REMOVAL

.1 Allow no accumulation of ice and snow within the *Working Area*. There shall be no use of salt for de-icing in areas of building work.

.2 Remove snow from access routes to the Work to maintain uninterrupted progress of the Work.

1.19 LANDSCAPE MAINTENCE

.1 Grass growth must be maintained at all times in area of work.

.2 Weeds must be removed on an ongoing basis in area of work.

1.20 TRAFFIC CONTROL AND ROAD MAINTENANCE

.1 Do not block roads or impede traffic. Keep construction traffic to designated roads only. Provide flag person to direct traffic as required.

.2 Clean roads regularly, public or private. Wash down and scrape flush roads at least daily when earth moving operations take place. Maintain public property in accordance with requirements of authorities having jurisdiction.

.3 Flag person must be present during escorting of any contractor vehicles on site.

.4 Emergency vehicular access must be maintained at all times. Refer to Work Restrictions and Drawings for minimum clear dimensions.

1.21 SECURITY

.1 The *Contractor* shall be solely responsible for securing the *Working Area* and the *Work*, and for securing areas used for the storage of products or construction machinery and equipment. The *Owner* shall have no responsibility in this regard.

.2 Supply and install and maintain security lighting.

.3 Supply and install and maintain temporary locks. Premises to be locked after working hours.

.4 Provide double lock or similar device acceptable to Owner to ensure Owner Operations and Security may enter premise at all hours. Coordinate with Operations and Security and facilitate entry/exit of Owner's own forces during course of Work.

.1 Contractor must be present during periods in which Owner Representatives or Security enters site.

1.22 FIRE PROTECTION AND FIREWATCH

.1 Provide and maintain temporary fire protection equipment during performance of Work required by governing codes, regulations and bylaws.

.2 Burning rubbish and construction waste materials is not permitted on site.

.3 Provide fire watch services during course of work for all hours as required to complete Work.

1.23 DEWATERING

.1 Provide temporary drainage and pumping facilities to keep excavations and site free from standing water.

1.24 DESIGN AND SAFETY REQUIREMENTS FOR TEMPORARY FACILITIES

.1 Be responsible for design, erection, operation, maintenance and removal of temporary structural and other temporary facilities. Engage and pay for registered professional engineering personnel skilled in the appropriate disciplines to perform these functions to produce safe and satisfactory results.

.2 Engage and pay for professional engineer(s) registered in *Working Area* to design and supervise construction and maintenance of scaffolding, hoardings, covered ways, protective canopies and project sign(s). Designs provided by *Contract Administrator* or *Owner* for such work cover general appearance only.

.3 Submit drawings of hoarding, scaffolding and mobile elevated work platform construction and extent for Owner and Consultant review.

.1 Drawing to be 11x17 diagrams showing all areas of hoarding.

.2 Drawings to be coordinated with Construction Sequence Schedule by identifying time lines of hoarding areas and install/knock-down schedule.

.3 Resubmit Submittals as required to the satisfaction of the Owner and Contractor Administrator. Delays and or extras will not be entertained as a result of an incomplete and unsatisfactory response.

.4 Noise Protection

.1 Provide noise protection, vibration dampers and/or false walls as required during Construction to minimize construction noise and activity from Plant Operations.

.2 Complaints or concerns arising from lack of Noise Protection are to be rectified immediately at no extra cost to the Contract.

.5 Daily record keeping:

.1 Hoarding must be monitored daily.

.2 Provide log record book identifying morning, afternoon and end review of hoarding and scaffolding construction confirming trip hazards, unsafe sections have been reviewed and rectified. Daily log must identify personnel reviewing hoarding and include sign-off that all Health and Safety measures have been undertaken.

.3 Submit weekly compiled logs the beginning of every week to Owner for review and records.

.6 Adjustments to hoarding

.1 Where required by Authorities with Jurisdiction or Owner Requirements, adjust hoarding to suit and at any time to ensure public safety or facility operations are not disrupted.

Part 2 Products - NOT USED

Part 3 Execution - NOT USED

END OF SECTION

Part 1 General

1.1 SCOPE OF WORK

.1 This Section shall apply for openings required in existing construction.

.2 Include for all cutting and patching for all mechanical services for holes and openings with dimensions up to 200mm (8 in.) in size and related patching.

Part 2 Products

2.1 MATERIALS

.1 All products and materials required for Work under this and related sections shall be of a quality and type consistent and compatible with existing building materials affected by the cutting and patching activities.

.2 All services and materials used for the cutting and patching shall be carried out by professional workers experienced in the cutting and patching work to be done.

Part 3 Execution

3.1 INSTALLATION

.1 Locate all openings in non-structural elements requiring cutting and patching in cooperation with Division 22(Plumbing), Division 23(HVAC) and Division 26(Electrical) requiring the openings.

.2 Cut all openings no larger than is required for the services.

.3 Locate all openings in structure elements requiring cutting and patching and scan the structure prior to cutting or core drilling of existing structure. Make adjustments to location of openings as required to minimize cutting of rebar and completely avoid electrical conduit.

.1 Cut holes through slabs only.

.2 Do not cut holes through beams.

.3 Holes to be cut are 200mm (8 in.) diameter or smaller only.

.4 Maintain at least 100mm (4 in.) clear from all beam faces. Space at least 3-hole diameters on Centre.

.5 For holes that are required closer than 25% of slab span from the supporting beam face, use cover meter above the slab to clear slab top bars.

.6 For holes that are required within 50% of slab span, use cover meter underside of slab to clear slab bottom bars.

.4 Perform coring, drilling, and any other loud Work carrying the potential to impact building operations at a time acceptable to the Owner.

.5 Patch all openings after services have been installed to match the surrounding finishes.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

.1 Text, schedules and procedures for systematic Waste Management Program for construction, and rehabilitation projects, including:

- .1 Diversion of Materials.
- .2 Waste Reduction Workplan (WRW)
- .3 Materials Source Separation Program (MSSP).
- .4 Governmental Responsibility for the Environment Resources

1.2 RELATED SECTIONS

.1 Section 01 33 00 - Submittal Procedures.

1.3 DEFINITIONS

.1 Materials Source Separation Program (MSSP): Consists of series of ongoing activities to separate reusable and recyclable waste material into material categories from other types of waste at point of generation.

.2 Recyclable: Ability of product or material to be recovered at end of its life cycle and re-manufactured into new product for reuse by others.

.3 Recycle: Process by which waste and recyclable materials are transformed or collected for purpose of being transferred into new products.

.4 Recycling: Process of sorting, cleansing, treating and reconstituting solid waste and other discarded materials for purpose of using in altered form. Recycling does not include burning, incinerating, or thermally destroying waste.

.5 Reuse: Repeated use of product in same form but not necessarily for same purpose. Reuse includes:

- .1 Salvaging reusable materials from re-modelling projects, before demolition stage, for resale, reuse on current project or for storage for use on future projects.
- .2 Returning reusable items including pallets or unused products to vendors.

.6 Separate Condition: Refers to waste sorted into individual types.

.7 Source Separation: Acts of keeping different types of waste materials separate beginning from first time they became waste.

.8 Waste Management Coordinator (WMC) : Contractor representative responsible for supervising waste management activities as well as coordinating related, required submittal and reporting requirements.

.9 Waste Reduction Workplan (WRW): Written report which addresses opportunities for reduction, reuse, or recycling of materials. WRW is based on information acquired from WA.

1.4 DOCUMENTS

.1 Maintain at job site, one copy of following documents:

.1 Waste Reduction Workplan.

.2 Material Source Separation Plan.

1.5 SUBMITTALS

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

.2 Prepare and submit following prior to project start-up:

.1 Submit 2 copies of completed Waste Reduction Workplan (WRW): Schedule B.

.2 Submit 2 copies of Materials Source Separation Program (MSSP) description.

.3 Submit before final payment summary of waste materials salvaged for reuse, recycling or disposal by project using deconstruction/disassembly material audit form.

.1 Failure to submit could result in hold back of final payment.

.2 Provide receipts, scale tickets, waybills, and show quantities and types of materials reused, recycled, co-mingled and separated off-site or disposed of.

.3 For each material reused, sold or recycled from project, include amount in tonnes or quantities by number, type and size of items and the destination.

.4 For each material land filled or incinerated from project, include amount in tonnes of material and identity of landfill, incinerator or transfer station.

1.6 QUALITY ASSURANCE - SITE VISIT

.1 Pre-tender site visit:

.1 Walk-through of project site prior to completion of tender submittal is mandatory.

.2 Date, time and location to be arranged by City.

1.7 WASTE REDUCTION WORKPLAN (WRW)

.1 Prepare WRW prior to project start-up.

.2 WRW should include but not limited to:

.1 Destination of materials listed.

.2 Deconstruction/disassembly techniques and sequencing.

.3 Schedule for deconstruction/disassembly.

.4 Location.

.5 Security.

.6 Protection.

.7 Clear labelling of storage areas.

.8 Details on materials handling and removal procedures.

.9 Quantities for materials to be salvaged for reuse or recycled and materials sent to landfill.

.3 Structure WRW to prioritize actions and follow 3R's hierarchy, with Reduction as first priority, followed by Reuse, then Recycle.

.4 Describe management of waste.

.5 Identify opportunities for reduction, reuse, and recycling of materials. Based on information acquired from WA.

.6 Post WRW or summary where workers at site are able to review content.

.7 Set realistic goals for waste reduction, recognize existing barriers and develop strategies to overcome these barriers.

.8 Monitor and report on waste reduction by documenting total volume and cost of actual waste removed from project.

1.8 MATERIALS SOURCE SEPARATION PROGRAM (MSSP)

.1 Prepare MSSP and have ready for use prior to project start-up.

.2 Implement MSSP for waste generated on project in compliance with approved methods and as reviewed by Consultant.

.3 Provide on-site facilities for collection, handling, and storage of anticipated quantities of reusable and recyclable materials.

.4 Provide containers to deposit reusable and recyclable materials.

.5 Locate containers in locations, to facilitate deposit of materials without hindering daily operations.

.6 Locate separated materials in areas which minimize material damage.

.7 Collect, handle, store on-site, and transport off-site, salvaged materials in separate condition.

.1 Transport to approved and authorized recycling facility.

.8 Collect, handle, store on-site, and transport off-site, salvaged materials in combined condition.

.1 Ship materials to site operating under Certificate of Approval.

.2 Materials must be immediately separated into required categories for reuse or recycling.

1.9 STORAGE, HANDLING AND PROTECTION

.1 Store, materials to be reused, recycled and salvaged in locations as directed by Consultant.

.2 Unless specified otherwise, materials for removal do not become Contractor's property.

.3 Protect, stockpile, store and catalogue salvaged items.

.4 Separate non-salvageable materials from salvaged items. Transport and deliver non-salvageable items to licensed disposal facility.

.5 Protect structural components not removed for demolition from movement or damage.

.6 Support affected structures. If safety of building is endangered, cease operations and immediately notify Consultant.

.7 Protect surface drainage, mechanical and electrical from damage and blockage.

.8 Separate and store materials produced during dismantling of structures in designated areas.

.9 Prevent contamination of materials to be salvaged and recycled and handle materials in accordance with requirements for acceptance by designated facilities.

.1 On-site source separation is recommended.

.2 Remove co-mingled materials to off-site processing facility for separation.

.3 Provide waybills for separated materials.

1.10 DISPOSAL OF WASTES

.1 Do not bury rubbish or waste materials.

.2 Do not dispose of waste, volatile materials, mineral spirits, oil or paint thinner into waterways, storm, or sanitary sewers.

.3 Keep records of construction waste including:

.1 Number and size of bins.

.2 Waste type of each bin.

.3 Total tonnage generated.

.4 Tonnage reused or recycled.

.5 Reused or recycled waste destination.

.4 Prepare project summary to verify destination and quantities on a material-by-material basis as identified in pre-demolition material audit.

1.11 USE OF SITE AND FACILITIES

.1 Execute work with least possible interference or disturbance to normal use of premises.

.2 Maintain security measures established by existing facility.

1.12 SCHEDULING

.1 Coordinate Work with other activities at site to ensure timely and orderly progress of Work.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 APPLICATION

.1 Do Work in compliance with WRW.

.2 Handle waste materials not reused, salvaged, or recycled in accordance with appropriate regulations and codes.

3.2 CLEANING

.1 Remove tools and waste materials on completion of Work, and leave work area in clean and orderly condition.

.2 Clean-up work area as work progresses.

.3 Source separate materials to be reused/recycled into specified sort areas.

3.3 DIVERSION OF MATERIALS

.1 From following list, separate materials from general waste stream and stockpile in separate piles or containers, as reviewed by Consultant, and consistent with applicable fire regulations.

.1 Mark containers or stockpile areas.

.2 Provide instruction on disposal practices.

.2 Construction Waste

Material Type	Recommended Diversion %	Actual Diversion %
Cardboard	100	[___]
Plastic Packaging	100	[___]
Rubble	100	[___]
Steel	100	[___]
Wood (uncontaminated)	100	[___]
Other		[___]

3.4 WASTE AUDIT (WA)

.1 Schedule - Waste Audit (WA)

(1) Material Category	(2) Material Quantity Unit	(3) Estimated Waste %	(4) Total Quantity of Waste (unit)	(5) Generation Point	(6) % Recycled	(7) % Reused
Wood and Plastics Material Descrip.						
Off-cuts						
Warped Pallet Forms						
Plastic Packaging						
Cardboard Packaging						
Other						

3.5 WASTE REDUCTION WORKPLAN (WRW)

.1 Schedule

(1) Material Category	(2) Person(s) Respon-sible	(3) Total Quantity of Waste (unit)	(4) Reused Amount (units) Projected	Actual	(5) Recycled Amount (unit) Projected	Actual	(6) Material (s) Destina-tion
Wood and Plastics Material							

(1) Material Category	(2) Person(s) Respon-sible	(3) Total Quantity of Waste (unit)	(4) Reused Amount (units) Projected	Actual	(5) Recycled Amount (unit) Projected	Actual	(6) Material (s) Destina-tion
Descrip.							
Warped Pallet Forms							
Plastic Packag ing							
Card-board Packag ing							
Other							
Other							

3.6 GOVERNMENTAL DEPARTMENTS CHIEF RESPONSIBILITY FOR THE ENVIRONMENT

.1 Schedule - Government Chief Responsibility for the Environment

Province	Address	General Inquires	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	

END OF SECTION

Part 1 General

1.1 FINAL CLEANING

.1 Environmental controls:

.1 Conduct cleaning and disposal operations to comply with local ordinances and anti-pollution laws.

.2 Store volatile wastes in covered metal containers, and remove from Working Area daily.

.3 Prevent accumulation of wastes which create hazardous conditions.

.4 Provide adequate ventilation during use of volatile or noxious substances.

.2 Materials:

.1 Use only cleaning materials recommended by manufacturer of surface to be cleaned and as recommended by cleaning material manufacturer.

.3 Final cleaning:

.1 Immediately prior to *Contract Administrator's* review to determine if *Substantial Performance of the Work* has been achieved, remove surplus products and construction machinery and equipment not required for the performance of the remaining *Work*.

.2 Remove waste products and debris other than that caused by the *Owner*, and leave the *Work* clean and suitable for occupancy by *Owner*.

.3 When the *Contract* is completed, remove surplus products, tools, construction machinery and equipment.

.4 Broom clean and wash exterior walks, steps and surfaces.

.5 Remove dirt and other disfigurations from exterior surfaces.

.6 Sweep and wash clean paved areas at the *Working Area*.

1.2 SUBSTANTIAL PERFORMANCE AND TAKEOVER PROCEDURES

.1 The *Contractor* shall conduct an inspection of the *Work* to identify deficiencies and defects, which shall be repaired as required. When the *Contractor* considers that the Work is substantially performed, the Contractor shall prepare and submit to the *Contract Administrator* a comprehensive list of items to be completed or corrected and apply for a review by the *Contract Administrator* to establish *Substantial Performance*. Failure to include an item on the list does not alter the responsibility of the *Contractor* to complete the *Contract*.

.2 No later than ten (10) *Working Days* after the receipt of the *Contractor's* application, the *Contract Administrator* and the *Contractor* will review the Work to identify any defect or deficiencies. If necessary, the *Contract Administrator* will tabulate a list of deficiencies to be issued to the *Contractor* for correction of same.

.3 When the *Contract Administrator* considers that the deficiencies and defects have been completed and that it appears that the requirements of the *Contract Documents* (as may have been amended during the Work) have been substantially performed, the *Contract Administrator* shall issue a certificate of *Substantial Performance* to the *Contractor*, stating the date of *Substantial Performance*.

.4 Immediately following the issuance of the certificate of *Substantial Performance*, the Contractor, in conjunction with the *Contract Administrator*, will establish a reasonable date for finishing the Work.

.5 The *Warranty Period* shall commence from the date of *Substantial Performance*.

Part 2 Close Out Submittals

2.1 SUBMITTALS

.1 Prepare instructions and data using personnel experienced in maintenance and operation of described products.

.2 Copy will be returned with Consultant'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 *Consultant* three final copies of operating and maintenance manuals.

.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.

2.2 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 Provide tabbed fly leaf for each separate product and system, with typed description of product and major component parts of equipment.

.6 Text: Manufacturer's printed data, or typewritten data.

.7 Drawings: provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.

.8 Provide [1:1] scaled CAD files in dwg format on CD.

2.3 RECORDING ACTUAL SITE CONDITIONS

.1 Construction Set: Record information on set of black line opaque drawings and in copy of Project Manual, provided by *Owner*.

.1 Provide felt tip marking pens, maintaining separate colours for each major system, for recording information.

.2 Record information concurrently with construction progress. Do not conceal Work until required information is recorded.

.3 Prior to substantial completion request, obtain AUTOCAD contract drawing from Contract Administrator/Consultant and update all construction update/changes.

.2 Shop drawings: legibly mark each item to record actual construction.

2.4 WARRANTIES

.1 Separate each warranty 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 executed in duplicate by subcontractors, suppliers, and manufacturers, within ten (10) days after completion of the applicable item of work.

Part 3 Products - NOT USED

Part 4 Execution - NOT USED

END OF SECTION

1 GENERAL

1.1 SUMMARY

.1 Section Includes:

.1 demolition and disposal of select building items

.2 removal and reinstallation of select building items

.3 removal and turning over to the Owner of select building items

.4 repair and restoration work after completion of work of this section

1.2 DEFINITIONS

.1 Hazardous Materials: Products, mixtures, materials, or substances classified as physical hazards or health hazards in accordance with Schedule 2 of the Hazardous Products Act.

1.3 REFERENCE STANDARDS

.1 CSA Group (CSA):

.1 CSA Z783:[12], Deconstruction of Buildings and Their Related Parts

.2 Health Canada (HC):

.1 R.S.C. 1985, c H-3, Hazardous Products Act

1.4 SITE CONDITIONS

.1 Hazardous Materials are not expected to be encountered in the Work.

.2 Stop work immediately and take preventative measures if material resembling spray-or trowel-applied asbestos or other Hazardous Materials are encountered.

.1 Notify the Consultant immediately.

.2 Proceed with Work after receipt of written instructions from the Consultant.

.3 The Contractor is to remove all existing furnishings and wall accessories/decorations as required to facilitate construction activities. Items shown for demolition or removal on drawings may not reflect all necessary items to remove. It is the responsibility of the Contractor to familiarize themselves with the existing conditions on site prior to bidding to ensure all items are accounted for to facilitate construction activities.

2 PRODUCTS

2.1 NOT USED

.1 Not used

3 EXECUTION

3.1 EXAMINATION

.1 Review existing conditions and coordinate with indicated requirements to determine extent of demolition required.

.2 Locate and protect services. Preserve active services traversing room(s) in operating condition.

3.2 PREPARATION

.1 Protection of In-Place Conditions:

.1 Minimize noise, dust, vibration, and inconvenience to occupants.

.2 Protect building systems, utilities, equipment.

.3 Provide temporary, sound insulated, dust protection walls at classroom doors, within the work area and demising walls between Construction Activities and Building Occupants during construction. Turn off mechanical systems and cover all vents in construction zone.

.4 Disconnect, cap, plug or divert, as required, existing public utilities within the property where they interfere with the execution of the work, in conformity with the requirements of the authorities having jurisdiction. Mark the location of these and previously capped or plugged services on the site and indicate location (horizontal and vertical) on the record drawings. Support, shore up and maintain pipes and conduits encountered.

.1 Immediately notify Consultant in case of damage to any service designated to remain in place

.5 Provide temporary shoring system where structural work is affected.

.6 Do Work in accordance with Health and Safety Requirements.

3.3 DEMOLITION AND REMOVAL REQUIREMENTS

.1 Demolish or remove select building items in accordance with CSA Z783.

3.4 DEMOLITION

.1 Demolish items as indicated on the Drawings to permit new construction.

.2 Millwork and trim required to be partially demolished should be dismantled by skilled mill worker with knowledge of proposed components being added under this contract.

.3 Trim edges of partially demolished millwork and building elements to tolerances to suit future use.

.4 Work incidental to mechanical or electrical Work including but not limited roof penetrations, wall penetrations, concrete coring, drilling or trenching is to be included as part of the contract price. Work may not be shown on drawings but is to be included to ensure code compliance and health and safety of all users are maintained.

.1 Use methods to minimize dust, such as wetting dust-producing materials.

.2 Leave Work in safe and stable condition at end of each Working Day.

.3 Dispose of demolished items off site, to appropriate recycling facilities except where specified otherwise. Comply with hauling and disposal regulations of AHJ

3.5 REMOVE AND REINSTALL

.1 Remove items indicated on the Drawings and associated components and reinstall in working condition upon completion of construction activities.

.2 Examine removed items. Confirm Consultant's acceptance for reinstallation if removed items appear in poor condition.

.3 Temporarily store, protect, and prepare removed items for re-use.

.4 Reinstall removed items as indicated on the Drawings.

.5 Items damaged during construction are to be replaced at no extra cost to the Contract.

3.6 REMOVE AND SALVAGE

.1 Remove items to be salvaged as indicated on the Drawings

.2 Work to be clearly identified and confirmed by Consultant prior to commencement.

.3 Store and protect removed items where acceptable to the Owner, and re install under appropriate section of specification.

3.7 REPAIRS AND RESTORATION

.1 Promptly repair damage to adjacent construction caused by work of this section. Patch existing surfaces to make suitable for new materials.

.2 Restore exposed finishes on patched surfaces. Extend restoration to adjoining construction to eliminate evidence of patching and refinishing.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

.1 Section 09 22 16 Non-Structural Metal Framing

1.2 QUALITY ASSURANCE

.1 Lumber identification to be by grade stamp of an agency certified by The Canadian Lumber Standards Association Board.

.2 Plywood identification: by grade mark in accordance with applicable CSA standards.

Part 2 Products

2.1 LUMBER

.1 All materials shall be straight, new, dry and clean, properly sized and shaped to correct dimensions from nominal sizes specified or indicated, and in accordance with CAN/CSA 0141.

.2 Grades: to be in accordance with the NLGA Standard Grading Rules for Canadian Lumber.

.3 Except where specified otherwise, lumber to be Spruce species, grade “No. 2” Structural and Better, S4S, S-Dry.

.4 Furring, blocking, nailing strips, grounds, rough bucks, cants, curbs, fascia backing and sleepers: grade Std. & Btr., Light Framing.

2.2 PLYWOOD

.1 DFP: 3/4” tongue and groove, Sheathing (SHG) grade, to CSA 0121.

.2 Maximum moisture content at time of installation, 10% to 12%

2.3 ACCESSORIES

.1 *Provide* all fasteners and hardware required for a complete and proper installation, including all hardware as may be required for temporary enclosures and hoarding.

.2 Nails, spikes, and staples: to CSA B111, galvanised for exterior work, interior humid areas, and for treated lumber.

.3 Screws: to ANSI B18.6.1.

.4 Bolts: 1/2” diameter, unless indicated otherwise, complete with nuts and washers.

.5 Sill gasket: in accordance with Section 07 26 00 Sheet Vapour Barrier.

2.4 FINISHES

.1 Galvanizing: hot dipped galvanised with zinc coating to CAN/CSA-G164.

Part 3 Execution

3.1 WORKMANSHIP

.1 *Provide* all rough carpentry work as required and indicated. Where not indicated, work shall be done in accordance with the best standard practice.

3.2 INSTALLATION

.1 Accurately fit joints and intersecting members in true planes with adequate fastenings.

.2 Locate joints over bearing or support devices.

.3 Set and fill nail head occurring in exposed carpentry work.

.4 Sand and remove marks or scrapes from all exposed wood surfaces.

.5 *Provide* continuous members from pieces of longest practical length.

.6 Install spanning members crown edge up.

.7 Blocking, grounds, strapping, rough bucks, anchors and other fastenings indicated shall not be regarded as exact or complete. Location and method of securing pieces is at the option of the *Contractor*. *Provide* adequate fastenings. Erect as required or indicated to provide true, plumb, rigid, secure, and adequate supports.

.8 Fastening to solid concrete block shall be with expansion shields and lag screws. Use lead or inorganic fibre plugs.

.9 Countersink bolts where necessary to provide clearance for other work.

.10 *Provide* furring and blocking as required to space out and support all millwork case work, cabinets, wall and ceiling finishes, *washroom accessories* and other work as required.

.11 Align and plumb faces of furring and blocking to a tolerance of 1:600.

.12 *Provide* rough bucks, nailers, and linings to rough openings as required to provide backing for frames and other work.

.13 Provide sill gaskets at concrete slab on grade or foundation wall wherever wood framing and support occurs or is required to properly support millwork, washroom accessories etc.

.14 Provide concealed support for all washroom fixtures and accessories, tack boards, white boards, etc. to fully support all products mounted on gypsum board partitions.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

.1 Section 01 33 00 - Submittal Procedures.

.2 Section 01 74 19 - Construction/Demolition Waste Management And Disposal.

.3 Section 01 45 00 - Quality Control.

.4 Section 06 10 11 – Rough Carpentry

.5 Section 07 92 10 - Joint Sealing.

1.2 REFERENCES

.1 Architectural Woodwork Manufacturers Association of Canada (AWMAC)

.1 AWMAC Architectural Woodwork Standards, 2009.

.2 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-71.20-M88, Adhesive, Contact, Brushable.

.3 Canadian Standards Association (CSA)

.1 CSA B111-74(R1998), Wire Nails, Spikes and Staples.
.2 CSA O112.4-M1977(R1999), Standards for Wood Adhesives.
.3 CSA O112.5-Series-M-1977(R1999), Urea Resin Adhesives for Wood (Room- and High-Temperature Curing).
.4 CSA O112.7-Series M-1977(R1999), Resorcinol and Phenol-Resorcinol Resin Adhesives for Wood (Room- and Intermediate-Temperature Curing).
.5 CSA O115-M1982(R2001), Hardwood and Decorative Plywood.
.6 CSA O121-M89(R1998), Douglas Fir Plywood.
.7 CAN/CSA O141-91R1999, Softwood Lumber.
.8 CSA O151-M1978(R1998), Softwood Plywood.
.9 CSA O153-M1980(R1998), Poplar Plywood.
.10 CSA Z760-94, Life Cycle Assessment.

.4 Environmental Choice Program (EPC)

.1 ECP-44-92, Adhesives.
.2 ECP-45-92, Sealants and Caulking Compounds.
.3 ECP-76-98, Surface Coatings.

.5 International Organization for Standardization (ISO)

.1 ISO 14040-97, Environmental Management-Life Cycle Assessment - Principles and Framework.

.2 ISO 14041-98, Environmental Management-Life Cycle Assessment - Goal and Scope Definition and Inventory Analysis.

.6 National Electrical Manufacturers Association (NEMA)

.1 NEMA LD-3-95.

.7 National Hardwood Lumber Association (NHLA)

.1 Rules for the Measurement and Inspection of Hardwood and Cypress, January 1996.

.8 National Lumber Grades Authority (NLGA)

.1 Standard Grading Rules for Canadian Lumber, 2000.

1.3 DEFINITIONS

.1 Exposed Surfaces

.1 Surfaces visible with doors and drawers closed.

.2 Interiors of all open cabinets (cabinets without doors and/or drawers)

.3 Interiors of all glass door cabinets, or other transparent face material

.2 Semi-exposed Surfaces

.1 Interior surfaces not visible with doors and drawers in closed position.

.3 Concealed Surfaces

.1 Surfaces not visible after installation, or during use of products

1.4 QUALITY ASSURANCE

.1 Provide AWMAC Quality Certification Program certificates indicating that the woodwork complies with requirements of Custom Grade, with noted upgrade exceptions herin. The manufacturer, upon award of work, shall register the works under this section with the AWMAC Quality Certification Program and provide documentation at time of last product shipment.

.2 All products to be supplied with a one year manufacturer’s warranty against defects in manufacturing and workmanship.

1.5 SHOP DRAWINGS

.1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.

.2 Indicate details of construction, profiles, jointing, fastening and other related details.

.1 Scales: profiles full size, details 1/2 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.

1.6 SAMPLES

.1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.

.2 Submit duplicate samples: sample size 100 x 100 mm long unless specified otherwise.

.3 Submit duplicate samples of veneer for verification.

1.7 DELIVERY, STORAGE, AND HANDLING

.1 Protect millwork against dampness and damage during and after delivery.

.2 Store millwork in ventilated areas, protected from extreme changes in temperature or humidity.

1.8 WASTE MANAGEMENT AND DISPOSAL

.1 Separate and recycle waste materials in accordance with Section 01 74 19 - Construction/Demolition Waste Management And Disposal and the Waste Reduction Workplan, to the maximum extent economically possible.

.2 Set aside damaged wood for acceptable alternative uses (e.g. bracing, blocking, cripples, bridging, finger-joining, or ties). Store this separated reusable wood waste convenient to cutting station and area of work.

.3 Separate corrugated cardboard in accordance with Waste Management Plan and place in designated areas for recycling.

.4 Do not burn scrap at the project site.

.5 Fold up metal banding, flatten, and place in designated area for recycling.

1.9 WARRANTY

.1 Provide Manufacturer’s standard five (5) year warranty from date of substantial completion.

1.10 ALTERNATES

.1 Refer to Section 5 – General Conditions of Contract and Section 01 33 00 Submittal Procedures.

.2 Alternate submissions to include:

.1 Submit evidence that alternate materials meet or exceed performance characteristics as set out in this specification.

.2 Submit references clearly indicating that the Manufacturer has successfully completed projects on an annual basis of similar scope and nature for a minimum of five years.

.3 Submit manufacturers' complete set of standard details and evidence that Warranty requirements meet or exceed performance guidelines as set out in the specifications.

.4 Submit a list of 5 projects executed over the past twelve months and any related case studies.

.1 Substitution Acceptance: Acceptance will be in written form, either as an addendum or modification, and documented by a formal Change Order signed by Owner and Contractor.

Part 2 Products

2.1 MATERIALS

.1 Softwood lumber: unless specified otherwise, S4S, moisture content 15% or less in accordance with following standards:

.1 CAN/CSA-O141.

.2 NLGA Standard Grading Rules for Canadian Lumber.

.3 AWMAC premium grade, moisture content as specified.

.2 Machine stress-rated lumber is acceptable for all purposes.

.3 The manufacturing process must adhere to Lifecycle Assessment (LCA) Standards as per CSA Z760 94 Life Cycle Assessment.

.4 Hardwood plywood: to CSA O115, exterior grade, Used at toe base.

.5 MDF (medium density fibreboard) core: to ANSI A208.2, 19 mm thick density 769 kg/m^2.

.1 Medium density fibreboard must:

.1 Meet the performance requirements of ANSI A208.2.

.2 Be manufactured such that formaldehyde emissions do not exceed 0.15 ppm (180 g/m^3) when tested in accordance with ASTM E1333.

.3 Contain at least 15 % recycled materials by weight.

.4 Maximum moisture content: 10% to 12%

.6 Nails and staples: to CSA B111.

.7 Wood screws: stainless steel, type and size to suit application.

.8 Splines: wood.

.9 Sealant: to be clear silicone or recommend clear sealant by Manufacturer. Refer to Section 07 92 10 - Joint Sealing for procedure and workmanship requirements.

2.2 MANUFACTURED UNITS

.1 Casework General

.1 Fabricate caseworks to AWMAC premium quality grade.

.2 Construction: to be flush overlay in accordance with Section 305.1 of the AWMAC Manual.

.3 Exposed and Semi-Exposed parts to be Medium Density Fibreboard 19 mm thick, laminated with veneer finish as specified or indicated on drawings.

.4 Concealed parts: Backer, Medium Density Fibreboard 19 mm thick, laminated with finish as specified or indicated on drawings.

.5 Edgebanding: Hardwood edging by same manufacturer as veneer

.2 Casework Access Panel

.1 Same as Casework General

.3 Utility Pole Cladding

.1 Same as Casework General

.4 WDV-1: Wood Veneer - birch veneer

.5 Door Pull

.1 Richelieu Functional Steel Pull – 332

.2 Finish: Brushed Nickel

.3 Center to Center: 4”

.4 Width: 8mm

.6 Door Lock

.1 Richelieu Cam Lock for Panel Thickness up to 38 mm

.2 Product#: BP140451140

.7 Other Casework Hardware

.1 Provide spring closing cabinet hinges, heavy duty elbow latch, steel pilasters, and nylon bumpers as required.

.8 Waste Container with Drawer Hardware

.1 Rev-A-Shelf Aluminum Bottom Mount Waste Container w/Rev-A-Motion

.2 Model# 5149-18DM-217. Included: (2) Silver 35 qt. waste containers, (1) metal frame, (1) pair of slides, mounting hardware, and Door-Mount brackets

.3 To fit cabinet opening of 14.5” wide

.4 Install as per manufacturer’s instructions.

2.3 FABRICATION

.1 Set nails and countersink screws apply plain wood filler to indentations, sand smooth and leave ready to receive finish.

.2 Shop install cabinet hardware for doors, shelves and drawers. Recess shelf standards unless noted otherwise.

.3 Shelving to cabinetwork to be adjustable unless otherwise noted.

.4 Provide cutouts for plumbing fixtures, inserts, appliances, outlet boxes and other fixtures.

.5 Shop assemble work for delivery to site in size easily handled and to ensure passage through building openings.

.6 Obtain governing dimensions before fabricating items which are to accommodate or abut appliances, equipment and other materials.

.7 Ensure adjacent parts of continuous laminate work match in colour and pattern.

.8 Veneer laminated to core material in accordance with adhesive manufacturer's instructions. Ensure core and laminate profiles coincide to provide continuous support and bond over entire surface. Use continuous lengths up to 3000 mm. No laminate joints or splices are to occur on any casework.

.9 Use straight self-edging laminate strip for flatwork to cover exposed edge of core material. Chamfer exposed edges uniformly at approximately 20 degrees. Do not mitre laminate edges.

.10 Apply laminate backing sheet to reverse side of core of plastic laminate work.

Part 3 Execution

3.1 INSTALLATION

.1 Do architectural woodwork to Quality Standards of the Architectural Woodwork Manufacturers Association of Canada (AWMAC), except where specified otherwise.

.2 Coordinate all cutouts and openings with DIV 22 plumbing fixtures and piping requirements

.3 Install prefinished millwork at locations shown on drawings. Position accurately, level, plumb straight.

.4 Fasten and anchor millwork securely. Provide heavy duty fixture attachments for wall mounted cabinets.

.5 Use draw bolts in countertop joints.

.6 Scribe and cut as required to fit abutting walls and to fit properly into recesses and to accommodate piping, columns, fixtures, outlets or other projecting, intersecting or penetrating objects.

.7 At junction of Solid Surface countertop and adjacent wall finish, apply small bead of clear silicone sealant. Refer to Section 07 92 10 Joint Sealing for type.

.8 Apply water resistant building paper over wood framing members in contact with masonry or cementitious construction.

.9 Fit hardware accurately and securely in accordance with manufacturer's written instructions.

.10 Install all millwork in location indicated.

.11 Site apply laminated plastic to units as indicated. Adhere laminated plastic over entire surface. Make corners with hairline joints. Use full sized laminate sheets. Make joints only where indicated. Slightly bevel arises.

.12 For site application, offset joints in plastic laminate facing from joints in core.

3.2 CLEANING

.1 Clean millwork inside and outside surfaces.

.2 Remove excess glue from surfaces.

3.3 PROTECTION

.1 Protect millwork and cabinet work from damage until final inspection.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

.1 Section 01 33 00 - Submittal Procedures.

.2 Section 01 74 19 - Construction Waste Management and Disposal.

.3 Section 01 45 00 - Quality Control.

.4 Section 06 10 00 - Rough Carpentry.

.5 Section 07 92 00 - Joint Sealants.

1.2 DEFINITION

.1 Solid surface is defined as nonporous, homogeneous material maintaining the same composition throughout the part with a composition of acrylic polymer, aluminum trihydrate filler and pigment.

1.3 SHOP DRAWINGS

.1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.

.2 Show location of each item, dimensioned plans and elevations, large-scale details, attachment devices and other components.

.1 Show full-size details, edge details, thermoforming requirements, attachments, etc.

.2 Show locations and sizes of furring, blocking, including concealed blocking and reinforcement specified in other Sections.

.3 Show locations and sizes of cutouts and holes for plumbing fixtures, faucets, soap dispensers, waste receptacle and other items installed in solid surface.

.3 Product Data:

.1 For each type of product indicated.

1.4 SAMPLES

.1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.

.2 Submit duplicate samples: sample size 6” x 6” unless specified otherwise.

1.5 QUALITY ASSURANCE

.1 Qualifications:

.1 Shop that employs skilled workers who custom fabricate products similar to those required for this project and whose products have a record of successful in-service performance.

.2 Fabricator/installer qualifications:

.1 Work of this section shall be by a certified fabricator/installer, certified in writing by the manufacturer.

1.6 DELIVERY, STORAGE, AND HANDLING

.1 Deliver no components to project site until areas are ready for installation.

.2 Store components indoors prior to installation.

.3 Handle materials to prevent damage to finished surfaces.

.1 Provide protective coverings to prevent physical damage or staining following installation for duration of project.

1.7 WASTE MANAGEMENT AND DISPOSAL

.1 Separate and recycle waste materials in accordance with Section 01 74 19 - Construction Waste Management and Disposal and the Waste Reduction Workplan, to the maximum extent economically possible.

1.8 WARRANTY

.1 Provide manufacturer’s warranty against defects in materials.

.1 Warranty shall provide material and labor to repair or replace defective materials.

.2 Damage caused by physical or chemical abuse or damage from excessive heat will not be warranted.

.2 Provide Manufacturer’s standard ten (10) year warranty from date of substantial completion.

1.9 ALTERNATES

.1 Refer to Section 5 – General Conditions of Contract and Section 01 33 00 Submittal Procedures.

.2 Alternate submissions to include:

.1 Submit evidence that alternate materials meet or exceed performance characteristics as set out in this specification.

.2 Submit references clearly indicating that the Manufacturer has successfully completed projects on an annual basis of similar scope and nature for a minimum of five years.

.3 Submit manufacturers' complete set of standard details and evidence that Warranty requirements meet or exceed performance guidelines as set out in the specifications.

.4 Submit a list of 5 projects executed over the past twelve months and any related case studies.

.3 Substitution Acceptance: Acceptance will be in written form, either as an addendum or modification, and documented by a formal Change Order signed by Owner and Contractor.

Part 2 Products

2.1 MANUFACTURERS

.1 Manufacturers:

.1 Subject to compliance with requirements, provide products by one of the following:

.1 Corian® surfaces from the DuPont company (basis of design).

2.2 MATERIALS

.1 Solid polymer components:

.1 Cast, nonporous, filled polymer, not coated, laminated or of composite construction with through body colors meeting ANSI Z124.3 or ANSI Z124.6, having minimum physical and performance properties specified..

.2 Superficial damage to a depth of 0.010 inch (.25 mm) shall be repairable by sanding and/or polishing.

.2 Thickness:

.1 ½ inch

.3 Colour:

.1 Refer to drawing Finish Schedules

.4 Finish:

.1 Matte

.5 Edge treatment:

.1 As indicated in drawings.

.6 Performance characteristics:

Property	**Typical Result**	**Test**
Tensile Strength	6,000 psi	ASTM D 638
Tensile Modulus	1.5×10^{-6} psi	ASTM D 638
Tensile Elongation	0.4% min.	ASTM D 638
Flexural Strength	10,000 psi	ASTM D 790
Flexural Modulus	1.2×10^{-6} psi	ASTM D 790
Hardness	>85	Rockwell "M"

		Scale ASTM D 785
	56	Barcol Impressor ASTM D 2583
Thermal Expansion	3.02 x 10^{-5} in./in./°C (1.80 x 10^{-5} in./in./°F)	ASTM D 696
Gloss (60° Gardner)	5–75 (matte—highly polished)	ANSI Z124
Light Resistance	(Xenon Arc) No effect	NEMA LD 3-2000 Method 3.3
Wear and Cleanability	Passes	ANSI Z124.3 & Z124.6
Stain Resistance: Sheets	Passes	ANSI Z124.3 & Z124.6
Fungus and Bacteria Resistance	Does not support microbial growth	ASTM G21&G22
Boiling Water Resistance	No visible change	NEMA LD 3-2000 Method 3.5
High Temperature Resistance	No change	NEMA LD 3-2000 Method 3.6
Izod Impact (Notched Specimen)	0.28 ft.-lbs./in. of notch	ASTM D 256 (Method A)
Ball Impact Resistance: Sheets	No fracture—½ lb. ball: ¼" slab—36" drop ½" slab—144" drop	NEMA LD 3-2000 Method 3.8
Weatherability	ΔE^*_{94}<5 in 1,000 hrs.	ASTM G 155
Specific Gravity †	1.7	
Water Absorption	Long-term 0.4% (¾") 0.6% (½") 0.8% (¼")	ASTM D 570
Toxicity	99 (solid colors) 66 (patterned colors)	Pittsburgh Protocol Test ("LC50"Test)
Flammability	All colors (Class I and Class A)	ASTM E 84, NFPA 255 & UL 723
Flame Spread Index	<25	
Smoke Developed Index	<25	

† Approximate weight per square foot: ¼" (6 mm) 2.2 lbs., ½" (12.3 mm) 4.4 lbs.
Shapes meet or exceed the ANSI Z124.3 and ANSI Z124.6 standards for plastic sinks and lavatories.
NEMA results based on the NEMA LD 3-2000

2.3 ACCESSORIES

.1 Joint adhesive:

.1 Manufacturer's standard one- or two-part adhesive kit to create inconspicuous, nonporous joints.

.2 Sealant:

.1 Manufacturer's standard mildew-resistant, FDA-compliant, NSF 51-compliant (food zone — any type), UL-listed silicone sealant in colors matching components.

2.4 FACTORY FABRICATION

.1 Shop assembly

.1 Fabricate components to greatest extent practical to sizes and shapes indicated, in accordance with approved shop drawings and manufacturer's printed instructions and technical bulletins.

.2 Form joints between components using manufacturer's standard joint adhesive without conspicuous joints.

a. Reinforce with strip of solid polymer material, 2" wide.

.3 Provide factory cutouts for plumbing fittings and bath accessories as indicated on the drawings.

.4 Rout and finish component edges with clean, sharp returns.

a. Rout cutouts, radii and contours to template.
b. Smooth edges.
c. Repair or reject defective and inaccurate work.

.2 Thermoforming:

.1 Comply with manufacturer's data.

.2 Heat entire component.

.1 Material shall be uniform, between 275 and 325 degrees Fahrenheit during forming.

.3 Form pieces to shape prior to seaming and joining.

.4 Cut pieces to finished dimensions.

.5 Sand edges and remove nicks and scratches.

2.5 FABRICATION

.1 Set nails and countersink screws apply plain wood filler to indentations, sand smooth and leave ready to receive finish.

.2 Shop install cabinet hardware for doors, shelves and drawers. Recess shelf standards unless noted otherwise.

.3 Shelving to cabinetwork to be adjustable unless otherwise noted.

.4 Provide cutouts for plumbing fixtures, inserts, appliances, outlet boxes and other fixtures.

.5 Shop assemble work for delivery to site in size easily handled and to ensure passage through building openings.

.6 Obtain governing dimensions before fabricating items which are to accommodate or abut appliances, equipment and other materials.

.7 Ensure adjacent parts of continuous laminate work match in colour and pattern.

.8 Veneer laminated plastic to core material in accordance with adhesive manufacturer's instructions. Ensure core and laminate profiles coincide to provide

continuous support and bond over entire surface. Use continuous lengths up to 10 feet. No laminate joints or splices are to occur on any casework.

.9 Use straight self-edging laminate strip for flatwork to cover exposed edge of core material. Chamfer exposed edges uniformly at approximately 20 degrees. Do not mitre laminate edges.

.10 Apply laminate backing sheet to reverse side of core of plastic laminate work.

Part 3 Execution

3.1 EXAMINATION

.1 Examine substrates and conditions, with fabricator present for compliance with requirements for installation tolerances and other conditions affecting performance of work.

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

3.2 INSTALLATION

.1 Install components plumb, level and rigid, scribed to adjacent finishes, in accordance with approved shop drawings and product data.

.1 Provide product in the largest pieces available.

.2 Form field joints using manufacturer’s recommended adhesive, with joints inconspicuous in finished work.

.1 Exposed joints/seams shall not be allowed.

.3 Reinforce field joints with solid surface strips extending a minimum of 1 inch on either side of the seam with the strip being the same thickness as the top.

.4 Cut and finish component edges with clean, sharp returns.

.5 Rout radii and contours to template.

.6 Anchor securely to base cabinets or other supports.

.7 Align adjacent countertops and form seams to comply with manufacturer’s written recommendations using adhesive in color to match countertop.

.8 Carefully dress joints smooth, remove surface scratches and clean entire surface.

.9 Install countertops with no more than 1/8-inch (3 mm) sag, bow or other variation from a straight line.

.2 Coved backsplashes and applied sidesplashes:

.1 Install applied sidesplashes using manufacturer’s standard color-matched silicone sealant.

.2 Adhere applied sidesplashes to countertops using manufacturer's standard color-matched silicone sealant.

3.3 REPAIR, CLEANING AND PROTECTION

.1 Repair or replace damaged work which cannot be repaired to architect's satisfaction.

.2 Keep components clean during installation.

.3 Remove adhesives, sealants and other stains.

END OF SECTION

Part 1 General

1.1 SCOPE OF WORK

.1 Work required by this section includes the furnishing of all labour, materials, equipment and other services to provide complete installation of applied fireproofing as required by the Project drawings and specifications in conformance with Building Code requirements of Authorities Having Jurisdiction.

.2 Work is installed in areas requiring 1hr Fire Rated floor assemblies as identified on drawings and Consultant fire separation diagrams.

1.2 QUALITY ASSURANCE

.1 Application Contractor: Fireproofing application contractor shall be acceptable to the manufacturer of the fireproofing materials based the contractor's experience and qualifications.

.2 Fireproofing Material Characteristics: Fireproofing materials shall have the performance characteristics necessary to maintain the specified fire resistance under the prevailing service conditions of various Project locations identified herein.

.3 Fire Resistance Ratings: Fireproofing materials shall be tested and listed for use in Fire Resistive Construction Designs which will provide fire resistance in accordance with the Fire Resistance Rating Schedule on the General Information Sheet of the Project Drawings.

.4 Fire Resistive Designs: Fire resistive designs shall be those published in the Underwriters Laboratories of Canada "Fire Resistance Directory", published directories of other testing agencies acceptable to Ontario Building Codes, or provided in other written form by the testing organization.

.5 Pre-Application Coordination: General Contractor, Fireproofing Contractor, Independent Testing Laboratory and other construction team members as determined by the Architect shall attend a pre-application coordination meeting to review the Fireproofing Material and Thickness Schedule, substrate acceptability, application procedures, inspection procedures and other coordination issues.

.6 Certified Testing and Inspection Agency: General Contractor to provide as part of Contract Price formal written report and minimum three interim reviews from an Professional Engineering Independent Testing and Inspection Agency licensed to practice in the Province of Ontario to verify application is in conformance with Jurisdictional Authority and Manufacturer's requirements.

1.3 REFERENCES

.1 ASTM E84 – Test for Surface Burning Characteristics of Building Materials.

.2 ASTM EI19 – Fire Tests of Building Construction and Materials.

.3 ASTM E136 – Behavior of Materials in a Vertical Tube Furnace at (750° C) 1400° F.

.4 ASTM E605 – Thickness and Density of Sprayed Fire-Resistive Material Applied to Structural Members.

.5 ASTM E736 – Cohesion/Adhesion of Sprayed Fire-Resistive Materials Applied to Structural Members.

.6 ASTM E759 – Effect of Deflection on Sprayed Fire-Resistive Materials Applied to Structural Members.

.7 ASTM E760 – Effect of Impact on Bonding of Sprayed Fire-Resistive Materials Applied to Structural Members.

.8 ASTM E761 – Compressive Strength of Sprayed Fire-Resistive Materials Applied to Structural Members.

.9 ASTM E859 – Air Erosion of Sprayed Fire-Resistive Materials Applied to Structural Members.

.10 ASTM E937 – Corrosion of Steel by Sprayed Fire-Resistive Materials Applied to Structural Members.

.11 ASTM E1042 – Acoustically Absorptive Materials Applied by Trowel or Spray.

.12 ASTM D2240 - Rubber Property—Durometer Hardness

.13 ASTM D2794 - Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact)

.14 ASTM D4541 - Pull-Off Strength of Coatings Using Portable Adhesion Testers

.15 ASTM D695 - Compressive Properties of Rigid Plastics

.16 ASTM G-21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi

.17 Underwriters Laboratories Canada Inc. “Fire Resistance Directory”, Current Edition.

1.4 SUBMITTALS

.1 Manufacturer’s Data: Submit manufactures published data on the selected materials including Product Brochures, Data Sheets, Physical Characteristic Test Results and Installation Instructions.

.2 Fire Resistive Designs: Submit a schedule of ASTM E119 fire resistive designs from the "Fire Resistance Directory" by ULI, or designs from other qualified testing agencies, selected to meet the Fire Resistance Rating Schedule specified for the Project.

.1 ULC Design No. P701 for a 1hour fire resistance rating is required for cementitious Fireproofing on metal deck substrate

.3 Fireproofing Thickness Schedule: Submit a Thickness Schedule for the fireproofing including the building elements to be protected, hourly rating requirements and fireproofing thickness to be applied.

Part 2 PRODUCTS

2.1 FIREPROOFING:

.1 Cementitious Fireproofing

.1 All products shall be spray-applied portland fireproofing materials or accessory products for use with cementitious fireproofing. Products shall have a base of Portland cement with the necessary aggregates, fillers and additives factory blended by the manufacturer to assure proper composition.

.2 Mineral fiber based products and products containing asbestos are not acceptable.

2.2 ACCEPTABLE MANUFACTURERS

.1 Cementitious Fireproofing shall be Southwest Fireproofing Products Type 7GP as manufactured by Southwest Fireproofing Products Co., Albuquerque, NM

.1 A/D Fire Protection Systems Inc., Toronto, Ontario, Canada

.2 Or Consultant approved equivalent

2.3 ACCEPTABLE PRODUCT: CEMENTITIOUS FIREPROOFING

.1 SFRM-1: Normal Density Cementitious Fireproofing shall be Southwest Fireproofing Products Type 7GP™, as determined by Fire Resistive Design Selection.

.2 Normal Density Cementitious Fireproofing shall be a portland cement based product and shall have physical properties that meet or exceed those listed below when tested in accordance with the referenced test methods.

.1 Surface Burning Characteristics per ASTM E84: Maximum flame spread of 0 and maximum smoke developed of 0.

.2 Fire Resistance Classification per ASTM E119: Fireproofing materials are to have been tested in accordance with ASTM E119 by Underwriters Laboratories Inc. (ULI) or other organizations recognized by the U. S. Model Building Codes for this purpose.

.3 Combustibility Classification per ASTM E136: Fireproofing materials shall be classified as Non-Combustible.

.4 Density per ASTM E605: Minimum average density of 352 kg/m^3 (22 pcf) nominal.

.5 Cohesion/Adhesion Strength per ASTM E736: Minimum of >95.8 kPa (>2000 psf)

.6 Effect of Deflection per ASTM E759: No cracking or delaminating of material.

.7 Impact Resistance per ASTM E760: No cracking or delaminating of material.

.8 Compressive Strength per ASTM E761: Minimum of 1840 kPa (38448 psf)

.9 Air Erosion per ASTM E859: Maximum weight loss of 0.00 g/m^2 (0.000 g/ft^2).

.10 Corrosion Resistance per ASTM E937: No evidence of corrosion or bond failure.

.11 Fungi Resistance per ASTM G-21: No evidence of growth

.3 Accessory Products shall be as required by the selected Fire Resistive Designs or as recommended by the manufacturer of the applied fireproofing material.

.4 Water for mixing cementitious fireproofing shall be clean, suitable for domestic use and free of chemical contaminants that adversely affects the fireproofing setting time or physical properties. Water quantity and flow rate to the mixing site shall be adequate to accommodate the required fireproofing mixing rates.

Part 3 EXECUTION

3.1 MATERIAL DELIVERY AND STORAGE

.1 Materials shall be delivered in original unopened packages bearing name of manufacturer, product identification, and Underwriters Laboratories Inc. label.

.2 Store materials under cover and off the ground or other damp surface and in a dry area.

.3 Discard materials that are damaged from improper storage or exposed to water by any means before actual use.

.4 Store materials in strict accordance with manufacturers documented instructions.

3.2 APPLICATION ENVIRONMENT

.1 Do not apply spray applied fire resistive material when temperature of substrate or surrounding air temperature is below 4.0°C (40°F) or above 43.0°C (110°F) for 24 hours prior to, during and after application.

.2 Do not apply intumescent coating when temperature of substrate or surrounding air temperature is below 5.0° C (41° F) or above 43° C (110° F) for 24 hours prior to, during and after application.

.3 Provide sufficient ventilation, with fresh air intake, to avoid moisture build up or condensation in areas receiving fireproofing until after fireproofing has cured and dried.

3.3 PROTECTIVE MEASURES

.1 Provide temporary enclosures for spraying operations to prevent contamination of air or nearby property.

.2 Protect adjacent surfaces and equipment from damage by overspray, fall-out and dusting-off of fireproofing.

.3 Close off and seal ductwork in areas where fireproofing is being applied. All tarps used must be cleaned of all foreign duct, materials or crusting prior to installation. Any build-up of dust, dirt or materials on tarps during the construction is to be vacuumed daily.

.4 Protect applied fireproofing from damage.

.5 Coordinate installation with other trades to avoid cutting and patching of installed fireproofing.

3.4 PRE-INSTALLATION EXAMINATION

.1 Verify that surfaces to receive fireproofing are free of oil, grease, dirt, loose paint, mill scale or other matter that would impair bond. Do not proceed until defects are corrected. Where necessary the cleaning of steel surfaces to receive fireproofing shall be the responsibility of the general contractor.

.2 Verify that painted steel surfaces to be fireproofed comply with fire resistive design requirements or ULI requirements for painted or primed steel, including any necessary bond tests.

.3 Verify completion of preparatory work by others that is to be covered by fireproofing, including clips, hangers and other attachments.

.4 Verify that ducts, piping, equipment or other items that would interfere with application of fireproofing are not positioned until fireproofing application is completed.

.5 For application to underside of roof deck, verify that roofing application is completed and roof traffic has ceased.

3.5 PREPARATION

.1 Attach metal lath or non-metallic mesh to one side of each steel joist web member in manner acceptable by approved Fire Resistive Designs.

.2 Install accessory products required by Fire Resistive Designs, manufacturer or project specifications prior to application of fireproofing.

3.6 APPLICATION

.1 Apply fireproofing in accordance with manufacturer's recommendation to comply with fire rating requirements and approved fire resistance designs.

.2 Spray-apply cementitious fireproofing using as many coats as necessary to obtain required thickness and uniform density.

.3 Completely cover members scheduled to be fireproofed.

.4 Fill areas between fluted steel deck and beam top flange with fireproofing as required by Fire Resistive Designs.

3.7 PATCHING:

.1 Examine members for complete coverage, correct unacceptable work and patch.

.2 Patch areas damaged or cut by subsequent work.

.3 All patching and repairing of sprayed fireproofing, due to damage by other trades, shall be performed under this section and paid for by the trade(s) responsible for the damage,

3.8 CLEANING:

.1 Remove equipment and thoroughly clean all surfaces of overspray deposits of fireproofing materials.

.2 Remove fire protection materials from surfaces not required to be fireproofed

3.9 FIELD QUALITY CONTROL:

.1 Provide formal report from Certified Independent Testing Agency confirming application is in conformance with applicable Fire Resistive Design and provides sufficiency of rating identified in Contract Documents.

3.10 SCHEDULE

.1 Install Applied Fireproofing in the following locations:

.1 Refer to drawings for location.

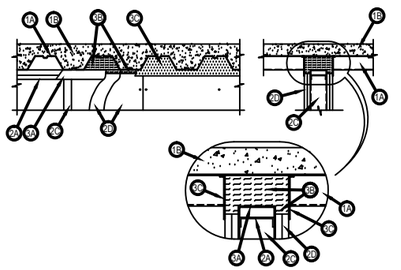
.1 Reference:

.1 Refer to UL assembly included for full detail and acceptable material list for installation requirements.

END OF SECTION

System No. HW-D-0087

Assembly Rating — 1 And 2 Hr (See Items 2 And 3B)
Nominal Joint Width — 2 In.
L Rating At Ambient — Less Than 1 CFM/Lin Ft
L Rating At 400°F — Less Than 1 CFM/Lin Ft
Class II And III Movement Capabilities — 20% Compression Or Extension



1. Floor Assembly — The fire-rated fluted steel deck/concrete floor assembly shall be constructed of the materials and in the manner described in the individual D700 or D900 Floor-Ceiling Design in the UL Fire Resistance Directory and shall include the following construction features:
   A. Steel Floor and Form Units* — Max 3 in. (76 mm) deep galv steel fluted floor units.
   B. Concrete — Min 2-1/2 in. (64 mm) thick reinforced concrete, as measured from the top plane of the floor units.
   C. Spray—Applied Fire Resistive Materials* — Prior to or after the installation of the deflection channel, Forming Material and Fill, Void or Cavity Material (Items 3A, 3B, 3C) the steel floor units may be sprayed with a min 5/16 in. (8 mm) to max 1-3/4 in. (44 mm) thickness of fire resistive material.
   W R GRACE & CO - CONN — Type MK-6-HY
   ISOLATEK INTERNATIONAL — Type 300

1A. Roof Assembly — (Not Shown) — As an alternate to the floor assembly, a fire rated fluted steel deck roof assembly may be used. The roof assembly shall be constructed of the materials and in the manner described in the individual P900 Series Roof-Ceiling Design in the UL Fire Resistance Directory. The hourly rating of the roof assembly shall be equal to or greater than the hourly rating of the wall assembly. The roof assembly shall include the following construction features:
   A. Steel Roof Deck — Max 3 in. (76 mm) deep galv steel fluted roof deck.
   B. Roof Insulation — Min 2-1/4 in. (57 mm) thick poured insulating concrete, as measured from the top plane of the floor units.

1B. Roof Assembly — As an alternate to Items 1 and 1A, a fire rated protected fluted steel deck roof assembly may be used. The roof assembly shall be constructed of the materials and in the manner described in the individual P700 Series Roof-Ceiling Design in the UL Fire Resistance Directory. The hourly rating of the roof assembly shall be equal to or greater than the hourly rating of the wall assembly. The roof assembly shall include the following construction features:
   A. Steel Roof Deck — Max 3 in. (76 mm) deep galv steel fluted roof deck.
   B. Spray—Applied Fire Resistive Materials* — (Not Shown)—Prior to or after the installation of the steel ceiling runners, Forming Material and Fill, Void or Cavity Material (Items 2A, 3A, 3B), the roof assembly shall be sprayed with the type and thickness of fire resistive material indicated in the individual P700 Series design.
   W R GRACE & CO - CONN — Type MK-6-HY
   ISOLATEK INTERNATIONAL — Type 300

2. Wall Assembly — The 1 or 2 hr fire rated gypsum board/steel stud wall assembly shall be constructed of the materials and in the manner described in the individual U400 or V400 Series Wall and Partition Design in the UL Fire Resistance Directory and shall include the following construction features:
   A. Steel Floor and Ceiling Runners — Floor and ceiling runners of wall assembly shall consist of galv steel channels sized to accommodate steel studs (Item 2C). Ceiling runner to be provided with 1 in. (25 mm) flanges. Ceiling runner installed within the U-shaped deflection channel (Item 3A) with a 1-1/2 in. (38 mm) gap maintained between the top of ceiling runner and top of deflection plate.
   A1. Light Gauge Framing*-Slotted Ceiling Runner — (For use in applications where the nominal joint width does not exceed 1-1/2 in. or 38 mm) - As an alternate to the ceiling runner in Item 2A, slotted ceiling runner to consist of galv steel channel with slotted flanges sized to accommodate steel studs (Item 2C). Slotted ceiling runner installed perpendicular to direction of fluted steel deck before or after fireproofing and secured to valleys with steel masonry anchors, steel fasteners or welds spaced max 24 in. (610 mm) OC. The use of welds to secure the ceiling runner may only be used prior to the installation of the optional spray-applied material.When slotted ceiling runner is used, deflection channel (Item 3A) shall not be used. When optional spray-applied material is used on the steel deck, slotted ceiling runner secured through spray-applied material to each valley of the steel deck with min 3/16 in. (5 mm) diam steel fasteners,steel masonry anchors spaced max 24 in. (610 mm) OC.
   BRADY CONSTRUCTION INNOVATIONS INC, DBA SLIPTRACK SYSTEMS — SLP-TRK
   CALIFORNIA EXPANDED METAL PRODUCTS CO — CST
   CLARKDIETRICH BUILDING SYSTEMS — Type SLT, SLT-H
   MARINO/WARE, DIV OF WARE INDUSTRIES INC — Type SLT
   METAL-LITE INC — The System
   SCAFCO STEEL STUD MANUFACTURING CO
   TELLING INDUSTRIES L L C — True-Action Deflection Track
   A2. Light Gauge Framing*-Vertical Deflection Ceiling Runner — (For use in applications where the nominal joint width does not exceed 1 in. or 25 mm) - As an alternate to the ceiling runners in Items 2A and 2A1, vertical deflection ceiling runner to consist of galv steel channel with slotted vertical deflection clips mechanically fastened within runner. Slotted clips provided with step bushings for permanent fastening of steel studs. Flanges sized to accommodate steel studs (Item 2C). Vertical deflection ceiling runner installed perpendicular to direction of fluted steel deck and secured before or after spray-applied materials to valleys with steel masonry anchors,steel fasteners or welds spaced max 24 in. (610 mm) OC. The use of welds to secure the ceiling runner may only be used prior to the installation of the optional spray-applied material. When vertical deflection ceiling runner is used, deflection channel (Item 3A) shall not be used. When optional spray-applied material is used on the steel deck, vertical deflection ceiling runner secured through spray-applied material to each valley of the steel deck with min 3/16 in. (5 mm) diam steel fasteners or steel masonry anchors spaced max 24 in. (610 mm) OC.
   THE STEEL NETWORK INC — VertiTrack VTD250, VTD362, VTD400, VTD600 and VTD800
   A3. Light Gauge Framing* - Notched Ceiling Runner — As an alternate to the ceiling runners in Items 2A through 2A3, notched ceiling runners to consist of C-shaped galv steel channel with notched return flanges sized to accommodate steel studs (Item 2C). Notched ceiling runner installed perpendicular to direction of fluted steel deck and secured before or after spray-applied materials to valleys with steel masonry anchors, steel fasteners or welds spaced max 24 in. (610 mm) OC. The use of welds to secure the ceiling runner may only be used prior to the installation of the optional spray-applied material. When notched ceiling runner is used, deflection channel (Item 3A) shall not be used. When optional spray-applied material is used on the steel deck, notched ceiling runner secured through spray-applied material to each valley of steel deck with min 3/16 in. (5 mm) diam steel fasteners spaced max 24 in. (610 mm) OC.
   OLMAR SUPPLY INC — Type SCR
   B. Steel Attachment Clips — (Optional - Not Shown) - When spray applied fireproofing is used ceiling runner may be secured to deck with Z-shaped clips formed from min. 1 in. (25 mm) long strips of min 20 ga galv steel. Length of clips should not exceed the width (thickness) of the wall. Clips to be sized to extend through the thickness of the spray-applied fire-resistive material on the bottom of the steel deck with 1-1/2 or 2 in. (38 or 51 mm) long upper and lower legs. Legs of clips fastened to valleys of steel deck (prior to application of spray-applied fire-resistive materials) and top of ceiling runner with steel fasteners or welds. Clips spaced max 24 in. (610 mm) OC.
   C. Studs — Steel studs to be min 2-1/2 in. (64 mm) wide. Studs cut 1/2 to 3/4 in. (13 to 19 mm) less in length than assembly height with bottom nesting in and resting on floor runner and with top nesting in ceiling runner without attachment. When slotted ceiling runner (Item 2A1) is used, steel studs secured to slotted ceiling runner with No. 8 by 1/2 in. (13 mm) long wafer head steel screws at midheight of slot on each side of wall. When vertical deflection ceiling runner (Item 2A2) is used, steel studs secured to slotted vertical deflection clips, through the bushings, with steel screws at midheight of each slot. Stud spacing not to exceed 24 in. (610 mm) OC.
   D. Gypsum Board* — Gypsum board installed to a min total thickness of 5/8 in. (16 mm) or 1-1/4 in. (32 mm) on each side of wall for 1 and 2 hr rated assemblies, respectively. Wall to be constructed as specified in the individual Wall and Partition Design in the UL Fire Resistance Directory, except that a nom 2 in. (51 mm) gap shall be maintained between the top of the gypsum board and the bottom of the steel deck and the top row of screws shall be installed into the studs 1 to 1-1/2 in. (25 to 38 mm) below the bottom of the deflection track. The hourly rating of the joint system is dependent on the hourly rating of the wall assembly. The roof assembly shall include the following construction features:

3. Joint System — Max separation between bottom of floor and top of wall at time of installation of joint system is 2 in. (51 mm). The joint system is designed to accommodate a max 20 or 12.5 percent (see Item 1C) compression or extension from its installed width. The joint system consists of a deflection channel, forming material and a fill material as follows:
   A. Deflection Channel — A nom 3-5/8 in. (92 mm) wide by 3 in. (76 mm) deep min No. 22 gauge steel U-shaped channel. Deflection channel installed perpendicular to direction of fluted steel deck and secured to valleys with masonry anchors, steel fasteners or welds spaced max 24 in. (610 mm) OC before or after optional spray-applied fire resistive material is used. The ceiling runner (Item 2A) is installed within the deflection channel to maintain a 1-1/2 in. (38 mm) gap between the top of the ceiling runner and the top of the deflection channel. The ceiling runner is not fastened to the deflection channel.
   B. Forming Material* — Nom 4 pcf (64 kg/m3) density mineral wool batt insulation cut to a length approx equal to the overall thickness of the wall and multiple pieces stacked on top of each other, as needed, and then compressed 25 percent in thickness and inserted into the flutes of the steel deck above the top of the ceiling runner. The mineral wool batt insulation is to project beyond each side of the ceiling runner, flush with wall surfaces. Alternately, nom 4 pcf (64 kg/m3) forming material cut to shape of flute and nom 1 in. (25 mm) longer than thickness of wall; mineral wool compressed from ends and firmly packed into each flute to attain a min compression rate of 14.3 percent in the length (wall thickness) direction to be flush with both wall surfaces. Additional 5/8 in. (16 mm) and 1-1/4 in. (32 mm) wide strips for 1 and 2 hr rated assemblies, respectively, of nom 4 pcf (64 kg/m3) mineral wool batt insulation are to be cut to fill the gap between the top of the gypsum board and bottom of the steel deck. The strips of mineral wool are compressed 50 percent and tightly packed, cut edge first, into the gap between the top of the gypsum board and bottom of the steel deck on both sides of the wall.
   ROCK WOOL MANUFACTURING CO — Delta Board
   ROXUL INC — SAFE
   THERMAFIBER INC — Type SAF
   IIG MINWOOL L L C — MinWool-1200 Safing
   B1. Forming Material*—Plugs (For use with 3-1/2 in. or 89 mm deep studs or larger) — (Optional-Not Shown) - Preformed mineral wool plugs, formed to the shape of the fluted floor units, friction fit to completely fill the flutes above the ceiling runner. The plugs shall project beyond each side of the ceiling runner, flush with wall surfaces. Additional forming material, described in Item 3B, to be used in conjunction with the plugs to fill the gap between the top of gypsum board and the bottom of plug.
   HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CP777 Speed Plugs

B2. Forming Material* - Strips — (Optional) - Nom 5/8 in. (16 mm) and 1-1/4 in. (32 mm) wide by 4 in. (102 mm) thick precut mineral wool strips for 1 and 2 hr rated assemblies, respectively. The strips are compressed 50 percent in thickness and firmly packed into the gap between the top of the gypsum board and bottom of the steel floor units on both sides of the wall.
   HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CP 767 Speed Strips

C. Fill, Void or Cavity Material* — Min 1/16 in. (1.6 mm) dry thickness (min 1/8 in. or 3.2 mm wet thickness) of fill material sprayed or troweled on each side of the wall to completely cover mineral wool forming material and to overlap a min of 1/2 in. (13 mm) onto gypsum board and steel deck on both sides of wall. When spray-applied fire resistive material is applied to the steel deck, the fill material is to overlap the gypsum board a min of 1/2 in. (13 mm) and the spray-applied fire resistive material a min of 2 in. (51 mm) on both sides of wall. When spray-applied fire resistive materials are used, the firestop joint spray shall overlap the wall a min 1/2 in. (13 mm) and overlap the spray-applied fire resistive material a min of 2 in. (51 mm) on both sides of the wall.
HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CFS-SP WB Firestop Joint Spray

*Bearing the UL Classification Mark
Track

Hilti Firestop Systems

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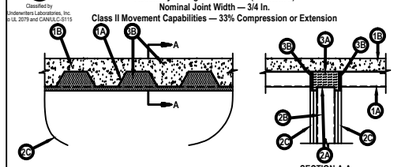
August 26, 2013

System No. HW-D-0045

Assembly Rating — 1 and 2 Hr (See Item 2)
Nominal Joint Width — 3/4 In.
Class II Movement Capabilities — 33% Compression or Extension



1. Floor Assembly — The fire-rated fluted steel floor unit/concrete floor assembly shall be constructed of the materials and in the manner described in the individual Floor-Ceiling Design in the Fire Resistance Directory and shall include the following construction features:
   A. Steel Floor and Form Units* — Max 3 in. (76 mm) deep galv steel fluted floor units.
   B. Concrete — Min 2-1/2 in. (64 mm) thick reinforced concrete, as measured from the top plane of the floor units.

1A. Roof Assembly — (Not Shown) — As an alternate to the floor assembly, a fire rated fluted steel deck roof assembly may be used. The roof assembly shall be constructed of the materials and in the manner described in the individual P900 Series Roof-Ceiling Design in the UL Fire Resistance Directory. The hourly rating of the roof assembly shall be equal to or greater than the hourly rating of the wall assembly. The roof assembly shall include the following construction features:
   A. Steel Roof Deck — Max 3 in. (76 mm) deep galv steel fluted roof deck.
   B. Roof Insulation — Min 2-1/4 in. (57 mm) thick poured insulating concrete, as measured from the top plane of the floor units.

2. Wall Assembly — The 1 or 2 hr fire rated gypsum board /stud wall assembly shall be constructed of the materials and in the manner described in the individual U400 or V400 Series Wall and Partition Design in the UL Fire Resistance Directory and shall include the following construction features:
   A. Steel Floor and Ceiling Runners — Steel Floor and Ceiling Runners — Floor and ceiling runners of wall assembly shall consist of galv steel channels sized to accommodate steel studs (Item 2B). Flange height of ceiling runner shall be min 1/4 in. (6 mm) greater than max extended joint width. . Ceiling runner installed perpendicular to direction of fluted steel deck and secured to valleys with steel fasteners or by welds spaced max 24 in. (610 mm) OC.
   A1. Light Gauge Framing*-Slotted Ceiling Runner — As an alternate to the ceiling runner in Item 2A, slotted ceiling runner to consist of galv steel channel with slotted flanges sized to accommodate steel studs (Item 2B). Slotted ceiling runner installed perpendicular to direction of fluted steel deck and secured to valleys with steel fasteners or welds spaced max 24 in. (610 mm) OC.
   BRADY CONSTRUCTION INNOVATIONS INC, DBA SLIPTRACK SYSTEMS — SLP-TRK
   CALIFORNIA EXPANDED METAL PRODUCTS CO — CST
   CLARKDIETRICH BUILDING SYSTEMS — Type SLT, SLT-H
   MARINO/WARE, DIV OF WARE INDUSTRIES INC — Type SLT
   METAL-LITE INC — The System
   SCAFCO STEEL STUD MANUFACTURING CO
   TELLING INDUSTRIES L L C — True-Action Deflection Track
   A2. Light Gauge Framing*-Vertical Deflection Ceiling Runner — As an alternate to the ceiling runners in Item 2A and 2A1, vertical deflection ceiling runner to consist of galv steel channel with slotted vertical deflection clips mechanically fastened within runner. Slotted clips provided with step bushings for permanent fastening of steel studs. Flanges sized to accommodate steel studs (Item 2B). Vertical deflection ceiling runner installed perpendicular to direction of fluted steel deck and secured to valleys with steel fasteners or welds spaced max 24 in. (610 mm) OC.
   THE STEEL NETWORK INC — VertiTrack VTD250, VTD362, VTD400, VTD600 and VTD800
   A3. Light Gauge Framing*- Notched Ceiling Runner — As an alternate to the ceiling runners in Items 2A through 2A3, notched ceiling runners to consist of C-shaped galv steel channel with notched return flanges sized to accommodate steel studs (Item 2B). Notched ceiling runner installed perpendicular to direction of fluted steel deck and secured to valleys with steel fasteners or welds spaced max 24 in. (610 mm) OC.
   OLMAR SUPPLY INC — Type SCR
   B. Studs — Steel studs to be min 2-1/2 in. (64 mm) wide. Studs cut 1/2 to 3/4 in. (13 to 19 mm) less in length than assembly height with bottom nesting in and resting on floor runner and with top nesting in ceiling runner without attachment. When slotted ceiling runner (Item 2A1) is used, steel studs secured to slotted ceiling runner with No. 8 by 1/2 in. (13 mm) long wafer head steel screws at midheight of slot on each side of wall. When vertical deflection ceiling runner (Item 2A2) is used, steel studs secured to slotted vertical deflection clips, through the bushings, with steel screws at midheight of each slot. Stud spacing not to exceed 24 in. (610 mm) OC.
   C. Gypsum Board* — For 1 hr assembly, one layer of 5/8 in. (16 mm) thick gypsum board is required in the individual Wall and Partition Design. For 2 hr assembly, two layers of 5/8 in. (16 mm) thick gypsum board is required in the individual Wall and Partition Design. For both hourly ratings, a nominal 3/4 in. (19 mm) gap shall be maintained between the top of the gypsum board and the bottom surface of the steel floor units and the top row of screws shall be installed into the studs 3 in. (76 mm) below the valleys of the steel floor units.
   The hourly rating of the joint system is dependent on the hourly fire rating of the wall.

3. Joint System — Max separation between bottom of floor or roof and top of wall is 3/4 in. (19 mm). The joint system is designed to accommodate a max 33 percent compression or extension from its installed width. The joint system consists of a packing material and a fill material between the top of the gypsum board and the bottom of the floor or roof, as follows:
   A. Forming Material* — Nom 4 pcf (64 kg/m3) mineral wool batt insulation, cut to the shape of the fluted deck, approx 20 percent larger than the area of the flutes and compressed into the flutes of the steel deck above the wall assembly. The forming material shall be recessed 1/2 in. from each side of the wall. Additional pieces of forming material, compressed min 50 percent in thickness and installed edge first into joint opening between bottom of steel deck and top of wall, parallel with joint direction. Compressed batt sections recessed 1/2 in. from both wall surfaces. Adjoining lengths of batt to be tightly butted with butted seams spaced min 48 in. apart along the length of the joint.
   FIBREX INSULATIONS INC — FBX Safing Insulation
   A1. Forming Material*—Plugs — (Optional-Not Shown) Performed mineral wool plugs, formed to the shape of the fluted deck, friction fit to completely fill the flutes. The plugs shall be recessed 1/2 in. from both wall surfaces. Additional forming material, described in Item 3A, to be used in conjunction with the plugs to fill the gap between the top of the wall and bottom of steel deck.
   HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CP777 Speed Plugs
   B. Fill, Void or Cavity Material* - Sealant — Min 1/2 in. thickness of fill material installed on each side of the wall in the flutes of the steel deck and between the top of the wall and the bottom of the steel deck, flush with each surface of the wall.
   HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CP606 Flexible Firestop Sealant

Configuration B
   A. Forming Material — Min 4 in. thickness of 4 pcf density mineral wool batt insulation compressed min 50 percent in thickness and installed edge first into joint opening between bottom of steel deck and top of wall, parallel with joint direction. Compressed batt sections recessed 1/2 in. from both wall surfaces. Adjoining lengths of batt to be tightly butted with butted seams spaced min 48 in. apart along the length of the joint.
   FIBREX INSULATIONS INC — FBX Safing Insulation
   B. Fill, Void or Cavity Material* - Sealant — Min 1/2 in. thickness of fill material installed on each side of the wall in the flutes of the steel deck and between the top of the wall and the bottom of the steel deck, flush with each surface of the wall.
   HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CP606 Flexible Firestop Sealant

*Bearing the UL Classification Mark

Hilti Firestop Systems

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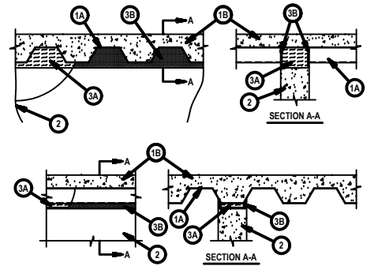
January 11, 2013

System No. HW-D-0081

Assembly Rating - 2 Hr
Nominal Joint Width - 3/4 in.
Class II Movement Capabilities - 33% Compression or Extension



1. Floor Assembly — The fire-rated fluted steel floor unit/concrete floor assembly shall be constructed of the materials and in the manner described in the individual Floor-Ceiling Design in the Fire Resistance Directory and shall include the following construction features:
   A. Steel Floor and Form Units* — Max 3 in. deep galv steel fluted floor units.
   B. Concrete — Min 2-1/2 in. thick reinforced concrete, as measured from the top plane of the floor units.

1A. Roof Assembly — (Not Shown) — As an alternate to the floor assembly, a fire rated fluted steel deck roof assembly may be used. The roof assembly shall be constructed of the materials and in the manner described in the individual P900 Series Roof-Ceiling Design in the UL Fire Resistance Directory. The hourly rating of the roof assembly shall be equal to or greater than the hourly rating of the wall assembly. The roof assembly shall include the following construction features:
   A. Steel Roof Deck — Max 3 in. deep galv steel fluted roof deck.
   B. Roof Insulation — Min 2-1/4 in. thick poured insulating concrete, as measured from the top plane of the floor units.

2. Wall Assembly — Min 5 in. thick steel reinforced lightweight or normal weight (100-150 pcf) concrete. Wall may also be constructed of an UL Classified Concrete Blocks* .
   See Concrete Blocks (CAZT) category in the Fire Resistance Directory for names of manufacturers.

3. Joint System — Max separation between bottom of floor or roof and top of wall is 3/4 in. (19 mm). The joint system is designed to accommodate a max 33 percent compression or extension from its installed width. The joint system consists of a packing material and a fill material between the top of the gypsum board and the bottom of the floor or roof, as follows:
   A. Forming Material* — Nom 4 pcf (64 kg/m3) mineral wool batt insulation, cut to the shape of the fluted deck, approx 20 percent larger than the area of the flutes and compressed into the flutes of the steel deck flutes above the ceiling runner. The mineral wool insulation is to project beyond each side of the ceiling runner, recessed 1/2 in. (13 mm) from both wall surfaces . For 2 hr assembly, an additional 1-1/2 in. (38 mm) thick by 3/4 in. (19 mm) wide sections of mineral wool batt insulation compressed 50 percent and installed cut edge first to fill the 3/4 in. (19 mm) gap between the top of gypsum board and bottom of the steel deck. The forming material shall be recessed 1/2 in. (13 mm) from each side of the wall.
   ROCK WOOL MANUFACTURING CO — Delta Board
   ROXUL INC — SAFE
   THERMAFIBER INC — Type SAF
   A1. Forming Material*—Plugs — (Optional, Not Shown) - Preformed mineral wool plugs, formed to the shape of the fluted floor units, friction fit to completely fill the flutes above the ceiling channel. The plugs shall project beyond each side of the ceiling runner and shall be recessed 1/2 in. (13 mm) from both wall surfaces. Additional forming material, described in Item 3A, to be used in conjunction with the plugs to fill the gap between the top of gypsum board and bottom of steel deck.
   HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CP777 Speed Plugs
   B. Fill, Void or Cavity Material* — Sealant — Min 1/2 in. (13 mm) thickness of fill material installed on each side of the wall in the flutes of the steel deck and between the top of the gypsum board and the bottom of the steel deck, flush with each surface of the wall.
   HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CP606 Flexible Firestop Sealant

*Bearing the UL Classification Mark

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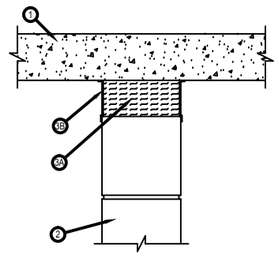
April 15, 2009

System No. HW-D-0097

Assembly Rating — 2 Hr
Nominal Joint Width — 2 In.
Class II Movement Capabilities — 14% Compression or Extension



1. Floor Assembly — Min 4-1/2 in. thick steel-reinforced lightweight or normal weight (100-150 pcf) structural concrete.
2. Wall Assembly — Min 8 in. thick steel-reinforced lightweight or normal weight (100-150 pcf) structural concrete. Wall may also be constructed of any UL Classified Concrete Blocks*.
   See Concrete Blocks (CAZT) category in the Fire Resistance Directory for names of manufacturers.
3. Joint System — Max separation between bottom of floor and top of wall (at time of installation of joint system) is 2 in. The joint system is designed to accommodate a max 14 percent compression or extension from its installed width. The joint system shall consist of the following:
   A. Forming Material — Min 4.0 pcf mineral wool batt insulation installed in joint opening as a permanent form. Batt cut to min width of 8 in. and installed cut edge-first into joint opening, parallel with joint direction, such that batt sections are compressed min 50 percent in thickness and such that the compressed batt sections are flush with both surfaces of wall. Adjoining lengths of batt to be tightly butted with butted seams spaced min 48 in. apart along the lengths of the joint.
   ROCK WOOL MANUFACTURING CO — Delta Board
   B. Fill, Void or Cavity Material* — Min 1/8 in. wet thickness of fill material sprayed or trowelled on each side of wall to completely cover mineral wool forming material and to overlap a min 1/2 in. onto concrete floor and concrete wall.
   HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CP672 Firestop Spray or CFS-SP WB Firestop Joint Spray

*Bearing the UL Classification Mark

Hilti Firestop Systems

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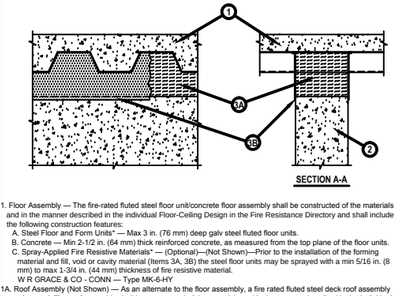
June 04, 2010

System No. HW-D-1037

Assembly Rating - 2 Hr
Nominal Joint Width - 3-1/2 In.
Class II Movement Capabilities - 14% Compression and Extension



1. Floor Assembly — The fire-rated fluted steel floor unit/concrete floor assembly shall be constructed of the materials and in the manner described in the individual Floor-Ceiling Design in the Fire Resistance Directory and shall include the following construction features:
   A. Steel Floor and Form Units* — Max 3 in. (76 mm) deep galv steel fluted floor units.
   B. Concrete — Min 2-1/2 in. (64 mm) thick reinforced concrete, as measured from the top plane of the floor units.
   C. Spray-Applied Fire Resistive Materials* — (Optional)—(Not Shown)—Prior to the installation of the forming material and fill, void or cavity material (Items 3A, 3B) the steel floor units may be sprayed with a min 5/16 in. (8 mm) to max 1-3/4 in. (44 mm) thickness of fire resistive material.
   W R GRACE & CO - CONN — Type MK-6-HY

1A. Roof Assembly (Not Shown) — As an alternate to the floor assembly, a fire rated fluted steel deck roof assembly may be used. The roof assembly shall be constructed of the materials and in the manner described in the individual P900 Series Roof-Ceiling Design in the UL Fire Resistance Directory. The hourly rating of the roof assembly shall be equal to or greater than the hourly rating of the wall assembly. The roof assembly shall include the following construction features:
   A. Steel Roof Deck — Max 3 in. (76 mm) deep galv steel fluted roof deck.
   B. Roof Insulation — Min 2-1/4 in. (57 mm) thick poured insulating concrete, as measured from the top plane of the floor units.

1B. Roof Assembly — As an alternate to Items 1 and 1A, a fire rated protected fluted steel deck roof assembly may be used. The roof assembly shall be constructed of the materials and in the manner described in the individual P700 Series Roof-Ceiling Design in the UL Fire Resistance Directory. The hourly rating of the roof assembly shall be equal to or greater than the hourly rating of the wall assembly. The roof assembly shall include the following construction features:
   A. Steel Roof Deck — Max 3 in. (76 mm) deep galv steel fluted roof deck.
   B. Spray-Applied Fire Resistive Materials* — (Not Shown) - Prior to the installation of the steel ceiling runners, Forming Material and Fill, Void or Cavity Material (Items 2A, 3A, 3B), the roof assembly shall be sprayed with the type and thickness of fire resistive material indicated in the individual P700 Series design.

2. Wall Assembly — Min 8 in. (203 mm) thick steel reinforced lightweight or normal weight (100-150 pcf) (1600 -2400 kg/m3) structural concrete. Wall may also be constructed of any UL Classified Concrete Blocks*.
   See Concrete Blocks (CAZT) category in the Fire Resistance Directory for names of manufacturers.

3. Joint System — Max separation between bottom of floor units and top of concrete wall at time of installation is 3-1/2 in. (89 mm). The joint system is designed to accommodate a max 14 percent compression or extension from its installed width. The joint system shall consists of the following:
   A. Forming Material* — Nom 4 in. (102 mm) thick pieces of nom 4 pcf (64 kg/m3) forming material sized to attain a min compression rate of 50 percent in the thickness direction firmly packed to completely fill the flutes. Additional pieces of batt insulation, min 8 in. (203 mm) wide, shall be compressed 50 percent in thickness and installed edge first into joint opening between bottom of fluted floor or roof units and top of concrete wall.
   THERMAFIBER INC — Type SAF
   A1. Forming Material*—Plugs — (Optional-Not Shown) Performed mineral wool plugs, formed to the shape of the fluted floor units, friction fit to completely fill the flutes above the ceiling runner. The plugs shall be flush with both wall surfaces. Additional forming material, described in Item 3A, to be used in conjunction with the plugs to fill the gap between the top of the wall and the bottom of steel deck.
   HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CP777 Speed Plugs
   A2. Forming Material — As an alternate to Item 3A, min 6 pcf (96 kg/m3) ceramic blanket insulation installed in joint as a permanent form. Nominal 4 in (102 mm) thick pieces of nominal 6 pcf (96 kg/m3) forming material sized to attain a min compression rate of 50 percent in the thickness direction firmly packed to completely fill the flutes. Additional pieces of batt insulation, min 8 in. (203 mm) wide, shall be compressed 50 percent in thickness and installed edge first into joint opening between bottom of fluted floor or roof units and top of concrete wall.
   B. Fill, Void or Cavity Material* - Sealant — A 1/8 in. (3.2 mm) wet thickness of fill material sprayed of trowled on each side of wall to completely cover mineral wool forming material and to overlap a min 1/2 in. (13 mm) onto steel floor units and concrete wall. When spray-applied fire resistive material* is applied to the steel deck, the fill material is to overlap the wall a min ½ in. and the spray-applied fire resistive material a min of 2 in. (51 mm) on both sides of the wall.
   HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CP672 Firestop Spray or CFS-SP WB Firestop Joint Spray

*Bearing the UL Classification Mark

Hilti Firestop Systems

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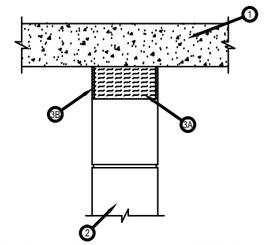
December 14, 2012

System No. HW-D-1009

Assembly Rating — 2 Hr
L Rating at Ambient — Less Than 1 CFM/Lin Ft
L Rating at 400 F — Less than 1 CFM/Lin Ft
Nominal Joint Width — 3-3/4 in.
Class II Movement Capabilities — 7% Compression Or Extension



1. Floor Assembly — Min 4-1/2 in. thick reinforced lightweight or normal weight (100-150 pcf) structural concrete.
2. Wall Assembly — Min 5 in. thick reinforced lightweight or normal weight (100-150 pcf) structural concrete. Wall may also be constructed of any UL Classified Concrete Blocks*.
   See Concrete Blocks (CAZT) category in the Fire Resistance Directory for names of manufacturers.
3. Joint System — Max separation between bottom of floor and top of wall (at time of installation of joint system) is 3-3/4 in. The joint system is designed to accommodate a max 7 percent in compression or extension from its installed width. The joint system shall consist of the following:
   A. Forming Material — Min 4 pcf mineral wool batt insulation installed in joint opening as a permanent form. Pieces of batt cut to min width of 4 in. and installed edge-first into joint opening, parallel with joint direction, such that batt sections are compressed min 42 percent in thickness and that the compressed batt sections are recessed from both surfaces of the wall as required to accommodate the required thickness of fill material. Adjoining lengths of batt to be tightly-butted with butted seams spaced min 24 in. apart along the length of the joint.
   FIBREX INSULATIONS INC — FBX Safing Insulation
   B. Fill, Void or Cavity Material* — Sealant — Min 1/2 in. thickness of fill material applied within the joint, flush with both surfaces of wall.
   HILTI CONSTRUCTION CHEMICALS, DIV OF
   HILTI INC — CP606 Flexible Firestop Sealant

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Hilti Firestop Systems

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April 15, 2009

Notes:

1. *Refer to section 07840 of the specifications. For Quality Control requirements, refer to the Quality Control portion of the specification.*
2. *Details shown are typical details. If field conditions do not match requirements of typical details, approved alternate details shall be utilized. Field conditions and dimensions need to be verified for compliance with the details, including but not limited to the following:*
   - ** Minimum and maximum annular space*
   - ** Type and thickness of fire-rated construction. The minimum assembly rating of the firestop assembly shall meet or exceed the highest rating of the adjacent construction.*
3. *If alternate details matching the field conditions are not available, manufacturer's engineering judgment drawings are acceptable. Drawings shall follow the International Firestop Council (IFC) Guidelines for Evaluating Firestop Systems Engineering Judgments.*
4. *References:*
   - ** 2013 Fire Resistance Directory - Volume III or UL Products Certified for Canada (cUL) Directory*
   - ** All governing local, provincial or national building codes*
   - ** www.UL.com/database*
   - ** www.Intertek.com*
5. *Firestop System installations must meet requirements of tested assemblies that provide the required assembly rating CAN/ULC-S115.*
6. *All rated assemblies shall be prominently labeled with the following information:*
   - ** ATTENTION: Fire Rated Assembly*
   - ** ULC ,cUL or Intertek #*
   - ** Product(s) used*
   - ** Hourly Rating (Assembly Rating)*
   - ** Installation Date*

<Notes to designer (delete this note after reading and replace with title block information)>
1. Any modification to these details could result in an application/system not meeting the ULC/cUL Classification or the intended temperature or fire ratings.
2. Details shown are up to date as of February 2015.
3. For additional information on the details, refer to the most current "Underwriter's Laboratories of Canada Fire Resistance Directory Volume III" or "Underwriter's Laboratories Products Certified for Canada (cUL) Directory.
</Notes>

JOB NUMBER:

DRAWN:

CHECKED:

ISSUE DATE:

REVISIONS:

TYPICAL FIRESTOP JOINT DETAILS

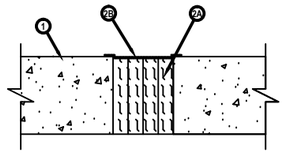
SHEET NAME:

SHEET NUMBER:

A.1.2

System No. FF-D-1013

Assembly Rating - 2 Hr
Nominal Joint Width - 3-1/2 in.
Class II Movement Capabilities - 14% Compression or Extension



1. Floor Assembly — Min 4-1/2 in. (114 mm) thick reinforced lightweight or normal weight (100 - 150 pcf or 1600 - 2400 kg/m3) structural concrete.
2. Joint System — Max width of joint (at time of installation of joint system) is 3-1/2 in. (89 mm). The joint system is designed to accommodate a max 14 percent compression or extension from its installed width. The joint system shall consist of the following:
   A. Packing Material — Min 4 pcf (64 kg/m3) mineral wool batt insulation installed in joint opening as a permanent form. Pieces of batt cut to min width of 4-3/8 in. (111 mm) and installed edge-first into joint opening, parallel with joint direction, such that batt sections are compressed min 42 percent in thickness and that the compressed batt sections are recessed from top surface of the floor as required to accommodate the required thickness of fill material. Adjoining lengths of batt to be tightly-butted with butted seams spaced min 24 in. (610 mm) apart along the length of the joint.
   B. Fill, Void or Cavity Material* — Sealant — Min 1/8 in. (3.2 mm) wet thickness of fill material applied within the joint, flush with top surface of floor and lapping a min 1/2 in. (13 mm) onto the top surface of the floor.
   HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CP672 Firestop Spray or CFS-SP WB Firestop Joint Spray

*Bearing the UL Classification Mark

Hilti Firestop Systems

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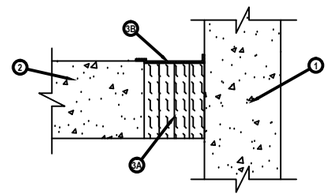
June 04, 2010

System No. FW-D-1013

Assembly Rating - 2 Hr
Nominal Joint Width - 3-1/2 in.
Class II Movement Capabilities - 14% Compression or Extension



1. Wall Assembly — Min 4-1/2 in. (114 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m3) structural concrete. Wall may also be constructed of any UL Classified Concrete Blocks*.
   See Concrete Blocks (CAZT) category in the Fire Resistance Directory for names of manufacturers.
2. Floor Assembly — Min 4-1/2 in. (114 mm) thick reinforced lightweight or normal weight (100 - 150 pcf or 1600-2400 kg/m3) structural concrete.
3. Joint System — Max separation between edge of floor and face of wall (at time of installation of joint system) is 3-1/2 in. (89 mm). The joint system is designed to accommodate a max 14 percent compression or extension from its installed width. The joint system shall consist of the following:
   A. Packing Material — Min 4 pcf (64 kg/m3) mineral wool batt insulation installed in joint opening as a permanent form. Pieces of batt cut to min width of 4-3/8 in. (117 mm) and installed edge-first into joint opening, parallel with joint direction, such that batt sections are compressed min 42 percent in thickness and that the compressed batt sections are recessed from top surface of the floor as required to accommodate the required thickness of fill material. Adjoining lengths of batt to be tightly-butted with butted seams spaced min 24 in. (610 mm) apart along the length of the joint.
   B. Fill, Void or Cavity Material* — Sealant — Min 1/8 in. (3.2 mm) wet thickness of fill material applied within the joint, flush with top surface of floor and lapping a min 1/2 in. (13 mm) onto the top surface of the floor and edge of the wall.
   HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CP672 Firestop Spray or CFS-SP WB Firestop Joint Spray

*Bearing the UL Classification Mark

Hilti Firestop Systems

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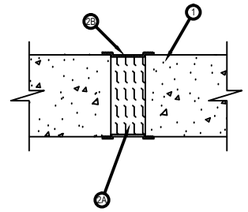
June 04, 2010

System No. WW-D-0017

Assembly Rating — 2 Hr
Nominal Joint Width — 2 In.
L Rating At Ambient — Less Than 1 CFM/Lin Ft
L Rating At 400°F — Less Than 1 CFM/Lin Ft
Class II Movement Capabilities — 12.5% Compression or Extension



1. Wall Assembly — Min 4-1/2 in. (114 mm). thick steel-reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m3) structural concrete. Wall may also be constructed of any UL Classified Concrete Blocks*.
2. Joint System — Max width of joint (at time of installation of joint system) is 2 in. (51 mm). The joint system is designed to accommodate a max 12.5 percent compression or extension from its installed width. The joint system shall consist of the following:
   A. Forming Material* — Min 4 pcf (64 kg/m3) mineral wool batt insulation installed in joint opening as a permanent form. Batt cut to min width of 4-1/4 in. (108 mm) and installed cut edge-first into joint opening, parallel with joint direction, such that batt sections are compressed min 50 percent in thickness and such that the compressed batt sections are recessed from both surfaces of wall to accommodate the required thickness of fill material. Adjoining lengths of batt to be tightly butted with butted seams spaced min 48 in. (1.2 m) apart along the lengths of the joint.
   ROCK WOOL MANUFACTURING CO — Delta Board
   B. Fill, Void or Cavity Material* — 1/16 in. (1.6 mm) dry thickness (min 1/8 in. or 3.2 mm wet thickness) of fill material applied within the joint, flush with both surfaces of wall and lapping 1/2 in. (13 mm) onto surfaces of wall on both sides of wall assembly.
   HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CP672 Firestop Spray or CFS-SP WB Firestop Joint Spray

*Bearing the UL Classification Mark

Hilti Firestop Systems

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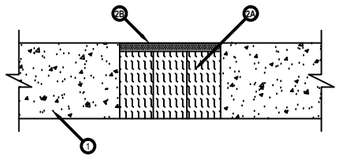
June 07, 2010

System No. FF-D-1039

ANSI/UL2079	CAN/ULC S115
Assembly Rating —2 Hr	F Rating — 2 Hr
Nominal Joint Width - 6 In.	FT Rating — 2 Hr
Class II Movement Capabilities — 10% Compression or Extension	FH Rating — 2 Hr
	FTH Rating — 2 Hr
	Nominal Joint Width - 6 In.
	Class II Movement Capabilities — 10% Compression or Extension



1. Floor Assembly — Min 4-1/2 in. thick reinforced lightweight or normal weight (100-150 pcf) structural concrete.
2. Joint System — Max width of joint (at time of installation of joint system) is 6 in. The joint system is designed to accommodate a max 10 percent compression or extension from its installed width. The joint system shall consist of the following:
   A. Forming Material — Min 4 pcf mineral wool batt insulation installed in joint opening as a permanent form. Pieces of batt cut to min width of 4 in. and installed edgefirst into joint opening, parallel with joint direction, such that batt sections are compressed min 50 percent in thickness and that the compressed batt sections are recessed a min of 1/2 in. from top surface of the floor to accommodate the required thickness of fill material. Adjoining lengths of batt to be tightly-butted with butted seams spaced min 24 in. apart along the length of the joint.
   THERMAFIBER INC — Type SAF
   B. Fill Void or Cavity Material* - Sealant — Min 1/2 in. thickness of fill material applied within the joint, flush with top surface of floor.
   HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CP604 Self-Leveling Firestop Sealant, CFS-S SIL GG or CFS-S SIL SL (floors only) Sealant

*Bearing the UL Classification Mark

Hilti Firestop Systems

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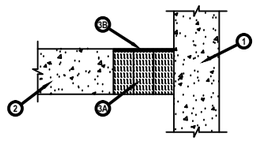
December 26, 2013

System No. FW-D-1037

ANSI/UL2079	CAN/ULC S115
Assembly Rating — 2 Hr	F Rating — 2 Hr
Nominal Joint Width - 6In.	FT Rating — 2 Hr
Class II Movement Capabilities - 10% Compression or Extension	FH Rating — 2 Hr
	FTH Rating — 2 Hr
	Nominal Joint Width - 6 In.
	Class II Movement Capabilities - 10% Compression or Extension



1. Wall Assembly — Min 4-1/2 in. thick reinforced lightweight or normal weight (100-150 pcf) structural concrete. Wall may also be constructed of any UL Classified Concrete Blocks*.
   See Concrete Blocks (CAZT) category in the Fire Resistance Directory for names of manufacturers.
2. Floor Assembly — Min 4-1/2 in. thick reinforced lightweight or normal weight (100-150 pcf) structural concrete.
3. Joint System — Max separation between edge of floor and face of wall (at time of installation of joint system) is 6 in. The joint system is designed to accommodate a max 10 percent compression or extension from its installed width. The joint system shall consist of the following:
   A. Forming Material — Min 4 pcf mineral wool batt insulation installed in joint opening as a permanent form. Pieces of batt cut to min width of 4 in. and installed edgefirst into joint opening, parallel with joint direction, such that batt sections are compressed min 50 percent in thickness and that the compressed batt sections are recessed a min of 1/2 in. from top surface of the floor to accommodate the required thickness of fill material. Adjoining lengths of batt to be tightly-butted with butted seams spaced min 24 in. apart along the length of the joint.
   THERMAFIBER INC — Type SAF
   B. Fill Void or Cavity Material* - Sealant — Min 1/2 in. thickness of fill material applied within the joint, flush with top surface of floor.
   HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CP604 Self-Leveling Firestop Sealant, CFS-S SIL GG or CFS-S SIL SL (floors only) Sealant

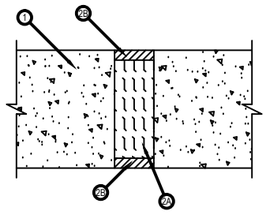
*Bearing the UL Classification Mark

Hilti Firestop Systems

Reproduced by HILTI, Inc. Courtesy of Underwriters Laboratories, Inc.
December 27, 2013

System No. WW-D-1047

Assembly Rating - 4 Hr
Nominal Joint Width - 2 In.
Class II Movement Capabilities - 12.5% Compression or Extension



1. Wall Assembly — Min 6 in. thick reinforced lightweight or normal weight (100-150 pcf) structural concrete. Wall may also be constructed of any UL Classified Concrete Blocks*.
   See Concrete Blocks (CAZT) category in the Fire Resistance Directory for names of manufacturers.
2. Joint System — Max separation between edge of floor and face of wall (at time of installation of joint system) is 2 in. The joint system is designed to accommodate a max 12.5 percent compression or extension from its installed width. The joint system shall consist of the following:
   A. Forming Material — Min 4 pcf mineral wool batt insulation installed in joint opening as a permanent form. Pieces of batt cut to min width of 5 in. and installed edge-first into joint opening, parallel with joint direction, such that batt sections are compressed min 50 percent in thickness and that the compressed batt sections are recessed a min 1/2 in. from both surfaces of the wall as required to accommodate the required thickness of fill material. Adjoining lengths of batt to be tightly-butted with butted seams spaced min 24 in. apart along the length of the joint.
   THERMAFIBER INC — Type SAF
   B. Fill, Void or Cavity Material* - Sealant — Min 1/2 in. thickness of fill material applied within the joint, flush with both surfaces of wall.
   HILTI CONSTRUCTION CHEMICALS, DIV OF
   HILTI INC — CP601S Elastomeric Firestop Sealant

*Bearing the UL Classification Mark

Hilti Firestop Systems

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July 24, 2002

Notes:

1. *Refer to section 07840 of the specifications. For Quality Control requirements, refer to the Quality Control portion of the specification.*
2. *Details shown are typical details. If field conditions do not match requirements of typical details, approved alternate details shall be utilized. Field conditions and dimensions need to be verified for compliance with the details, including but not limited to the following:*
   * *Minimum and maximum annular space*
   * *Type and thickness of fire-rated construction. The minimum assembly rating of the firestop assembly shall meet or exceed the highest rating of the adjacent construction.*
3. *If alternate details matching the field conditions are not available, manufacturer's engineering judgment drawings are acceptable. Drawings shall follow the International Firestop Council (IFC) Guidelines for Evaluating Firestop Systems Engineering Judgments.*
4. *References:*
   * *2013 Fire Resistance Directory - Volume III or UL Products Certified for Canada (cUL) Directory*
   * *All governing local, provincial or national building codes*
   * *www.UL.com/database*
   * *www.Intertek.com*
5. *Firestop System installations must meet requirements of tested assemblies that provide the required assembly rating CAN/ULC-S115.*
6. *All rated assemblies shall be prominently labeled with the following information:*
   * *ATTENTION: Fire Rated Assembly*
   * *ULC ,cUL or Intertek #*
   * *Product(s) used*
   * *Hourly Rating (Assembly Rating)*
   * *Installation Date*

<Notes to designer (delete this note after reading and replace with title block information)>
1. Any modification to these details could result in an application/system not meeting the ULC/cUL Classification or the intended temperature or fire ratings.
2. Details shown are up to date as of February 2015.
3. For additional information on the details, refer to the most current "Underwriter's Laboratories of Canada Fire Resistance Directory Volume III" or "Underwriter's Laboratories Products Certified for Canada (cUL) Directory.

JOB NUMBER:

DRAWN:

CHECKED:

ISSUE DATE:

REVISIONS:

TYPICAL FIRESTOP JOINT DETAILS

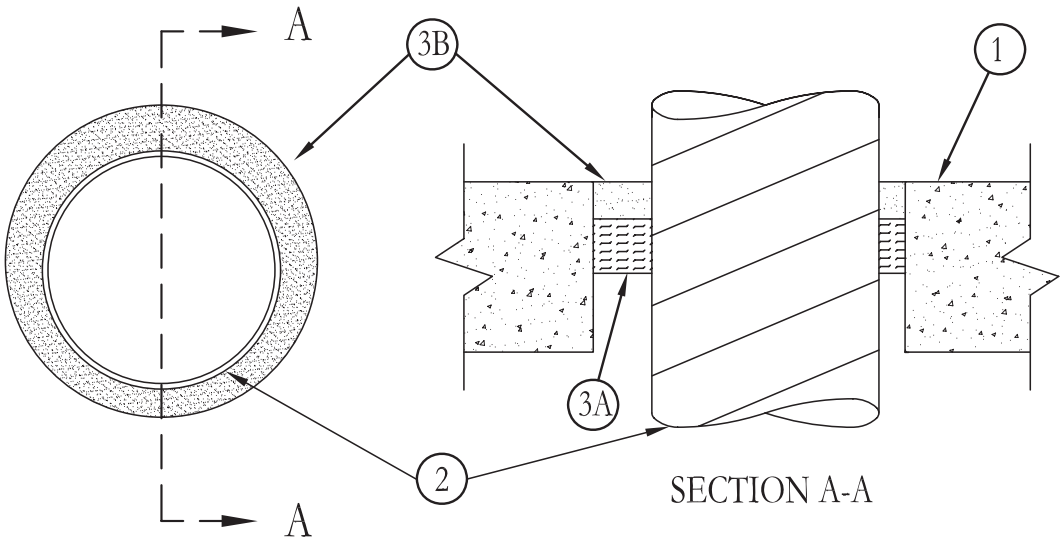
SHEET NAME:

SHEET NUMBER:

A.2.2

System No. C-AJ-7003

October 05, 2006
F Rating – 3 Hr
T Rating – 0 Hr
L Rating At Ambient – 1 CFM/sq ft (See Item 3)
L Rating At 400 F – less than 1 CFM/sq ft (See Item 3)
W Rating – Class I (See Item 3B)



1. **Floor or Wall Assembly** – Min 4-1/2 in. (114 mm) thick lightweight or normal weight (100-150 pcf or 1600-2400 kg/m^3) concrete. Wall may also be constructed of any UL Classified **Concrete Blocks***. Max diam of opening is 18 in. (457 mm).

   See **Concrete Block**s (CAZT) category in the Fire Resistance Directory for names of manufacturers.

1A. **Steel Sleeve** – Nom 6 in. (152 mm) diam (or smaller) Schedule 40 (or heavier) steel pipe sleeve, cast into floor or wall flush with floor or wall surfaces.

2. **Through Penetrant** – One steel duct to be installed either concentrically or eccentrically within the firestop system. An annular space of min 1/2 in. (13 mm) to max 1-1/2 in. (38 mm) is required within the firestop system. Steel duct to be rigidly supported on both sides of floor or wall assembly. The following sizes of steel ducts may be used:

   A. **Steel Duct** – Nom 16 in. (406 mm) diam (or smaller) No. 24 gauge (or heavier) spiral wound galv steel duct.

   B. **Steel Vent Duct** – Nom 10 in. (254 mm) diam (or smaller) No. 28 gauge (or heavier) galv steel vent duct.

3. **Firestop System** – The firestop system shall consist of the following:

   A. **Packing Material** – Nom 1 in. (25 mm) thickness of tightly-packed mineral wool batt insulation firmly packed into opening as a permanent form. Polyethylene backer rod or nom 1 in. (25 mm) thick glass fiber insulation may be used with steel vent ducts (Item 2B) in lieu of mineral batt insulation. Packing material to be recessed from top surface of floor or from both surfaces of wall as required to accommodate the required thickness of caulk fill material.

   B. **Fill, Void or Cavity Materials*** – **Caulk or Sealant** – Min 1 in. (25 mm) thickness of fill material applied within the annulus, flush with top surface of floor or both surfaces of wall assembly. W Rating applies only when FB-3000 WT sealant is used. Water resistance of through penetrant (Item 2) must be considered in addition to water resistance of firestop system.

      3M COMPANY – CP 25WB+ or FB-3000 WT
      (Note: W Rating applies only when FB-3000 WT sealant is used.)

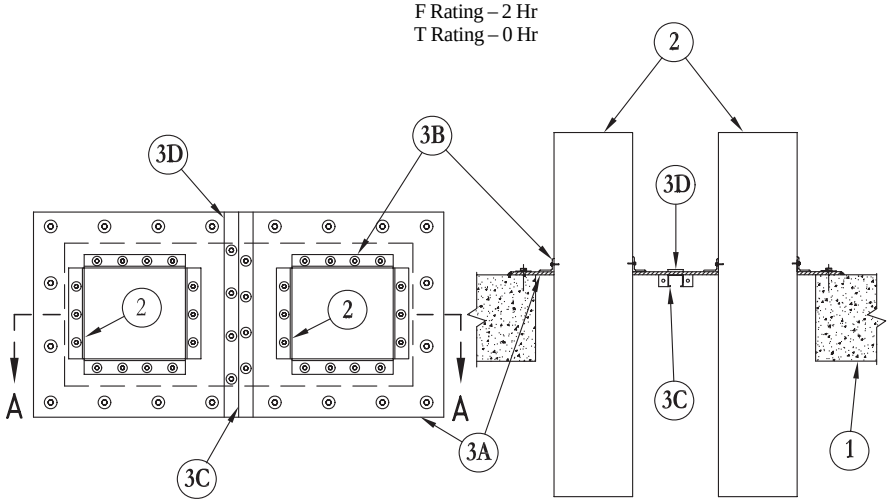
*Bearing the UL Classification Marking

3M Fire Protection Products

This material was extracted by 3M Fire Protection Products from the 2006 edition of the UL Fire Resistance Directory.

System No. C-AJ-7017

May 19, 2005
F Rating – 2 Hr
T Rating – 0 Hr



1. **Floor or Wall Assembly** – Min 2-1/2 in. (64 mm) thick lightweight or normal weight (100-150 pcf or 1600-2400 kg/m^3) concrete. Wall may also be constructed of any UL Classified **Concrete Blocks***. Max area of opening is 720 sq in. (4645 cm^2) with max dimension of 40 in. (1016 mm).

   See **Concrete Blocks** (CAZT) category in the Fire Resistance Directory for names of manufacturers.

2. **Through Penetrant** – Max of two steel ducts, nom 12 in. by 14 in. (305 mm by 356 mm) (or smaller) No. 24 gauge (or heavier) to be installed either concentrically or eccentrically within the firestop system. An annular space of 0 in. (point contact) to max 5 in. (0 mm to max 127 mm) is required within the firestop system. A min 4 in. (102 mm) space shall be maintained between two ducts. Steel ducts to be rigidly supported on both sides of floor or wall assembly.

3. **Firestop System** – The firestop system shall consist of the following:

   A. **Fill, Void of Cavity Materials*** – **Intumescent Sheet** – Rigid aluminum foil-faced sheet with galv steel sheet backer. Sheets cut to tightly follow the contours of the duct with a max 1/4 in. (6 mm) gap between the sheets and the ducts. Sheets cut to lap a min of 2 in. (51 mm) on the floor or wall surface on all sides of the opening. Sheet is required to be installed on the top surface of floor or both sides of wall assembly. Sheet to be installed with the galv steel sheet backer exposed (aluminum foil facing against floor or wall surface) and secured to floor or wall surface with min 3/16 in. (5 mm) diam by 1-1/4 in. (32 mm) long steel anchor screws, or equivalent, in conjunction with min 1-1/4 in. (32 mm) diam steel fender washers. Max spacing of fasteners not to exceed 6 in. (152 mm) with additional fasteners located on each side of butted seams made to permit installation of the sheet around the ducts.

      3M COMPANY – CS-195+

   B. **Retaining Angles** – Min 16 gauge galv steel angles sized to lap duct a min of 2 in. (51 mm) and lap intumescent sheet on top surface of floor or both surfaces of wall a min of 2 in. (51 mm). Angles attached to duct and intumescent sheet with min 1/4 in. (6 mm) long, No. 10 (or larger) sheet metal screws spaced a max of 1 in. (25 mm) from each end of duct and spaced a max of 6 in. (152 mm) OC. Prior to the installation of the retaining angles, a min 1/4 in. (6 mm) diam bead of caulk (Item 3E) shall be applied at the intumescent sheet/duct interface on the top surface of floor and on both surfaces of wall assembly.

   C. **Support Channel** – Support channel shall be installed flush with top surface of floor or both surfaces of wall, centered between ducts. Support channels to be min 1-5/8 in. by 1-5/8 in. (41mm by 41 mm) and formed of min 0.093 in. (2.4 mm) thick (No. 12 gauge) painted or galv steel. Ends of steel channel bolted or welded to steel angles anchored to inside walls of through opening. Intumescent sheet secured to steel support channels with steel sheet metal screws in conjunction with min 1-1/4 in. (32 mm) diam steel fender washers. When support channel is used beneath butted seam of intumescent sheets, fasteners spaced max 3 in. (76 mm) OC on each side of butted seam. When support channel is located away from intumescent sheet seam, fasteners spaced max 6 in. OC. Prior to installation of the intumescent sheet(s), a nom 1/4 in. (6 mm) diam continuous bead of caulk (Item 3E) shall be applied as gasket over the steel support channel and the edge of intumescent sheet at its interface with surface of floor or wall around entire perimeter of through opening.

   D. **Steel Cover Strip** – Min 2 in. (51 mm) wide strip of min 0.019 in. (0.5 mm) thick (26 ga) galv steel centered over entire length of each butted seam made in the intumescent sheet. Prior to installation of the steel strip, the seams in the intumescent sheet shall be covered with a min 1/4 in. (6 mm) diam bead of caulk (Item 3E). Steel cover strip secured to galv steel sheet backer of intumescent sheet with steel sheet metal screws or steel rivets spaced max 3 in. (76 mm) OC on each side of seam or slit.

   E. **Fill, Void or Cavity Material*** – **Graphite Seal, Caulk, Sealant or Putty** (Not Shown) – One layer of 1/2 in. x 1/16 in. (13 mm by 1.6 mm) adhesive backed graphite intumescent seal positioned under intumescent sheet around entire perimeter of through opening or min 1/4 in. (6 mm) diam continuous bead of caulk or putty applied to edge of intumescent sheet at its interface with surface of floor or wall around entire perimeter of through opening. Min 1/4 in. (6 mm) bead of caulk applied to fill all interstices between duct and intumescent sheet. A min 1/4 in. (6 mm) diam bead of caulk shall be applied at the intumescent sheet/duct interface, and to all seams in the intumescent sheet on the top surface of floor and on both surfaces of wall assembly.

      3M COMPANY – E-FIS or Ultra GS seals, CP 25WB+, IC 15WB+ caulk, FB-3000 WT sealant, or MP+ Stix putty.

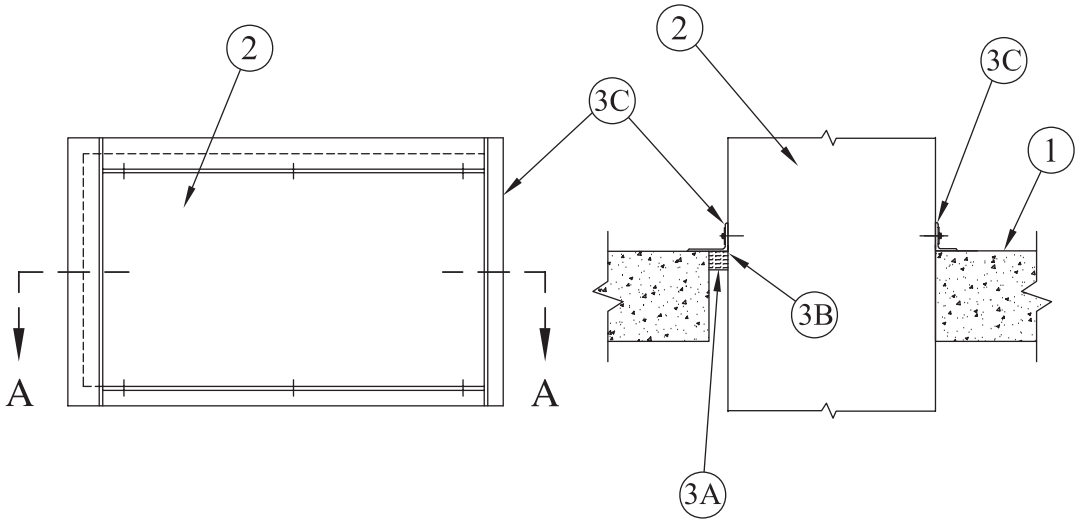
*Bearing the UL Classification Marking

3M Fire Protection Products

This material was extracted by 3M Fire Protection Products from the 2006 edition of the UL Fire Resistance Directory.

System No. C-AJ-7016

May 19, 2005
F Rating – 2 & 3 Hr (See Item 1)
T Rating – 0 Hr



1. **Floor or Wall Assembly** – Min 2-1/2 in. (64 mm) thick or min 4-1/2 in. (114 mm) thick lightweight or normal weight (100-150 pcf or 1600-2400 kg/m^3) concrete. Wall may also be constructed of any UL Classified **Concrete Blocks***. **The F Rating is 2 hr and 3 hr for min 2-1/2 in. (64 mm) or min 4-1/2 in. (114 mm) thick assemblies.** Max area of opening is 576 sq in. (3716 c/m^2) with max dimension of 36 in. (914 mm) for 2 hr assemblies and 544 sq in. (3510 c/m^2) with max dimension of 34 in. (864 mm) for 3 hr assemblies.

   See **Concrete Blocks** (CAZT) category in the Fire Resistance Directory for names of manufacturers.

2. **Through Penetrants** – One steel duct to be installed either concentrically or eccentrically within the firestop system. An annular space of min 0 in. (point contact) to max 4 in. (0 mm to max 102 mm) is required within the firestop system for 2 hr assemblies and min 0 in. (point contact) to max 2 in. is required within the firestop system for 3 hr assemblies. Steel duct to be rigidly supported on both sides of floor or wall assembly. The following sizes of steel ducts may be used:

   A. **Steel Duct** – Nom 32 in. by 14 in. (813 mm by 356 mm) (or smaller) No. 22 gauge (or heavier) galv steel duct.

   B. **Steel Duct** – Nom 30 in. by 12 in. (762 mm by 305 mm) (or smaller) No. 24 gauge (or heavier) galv steel duct.

3. **Firestop System** – The firestop system shall consist of the following:

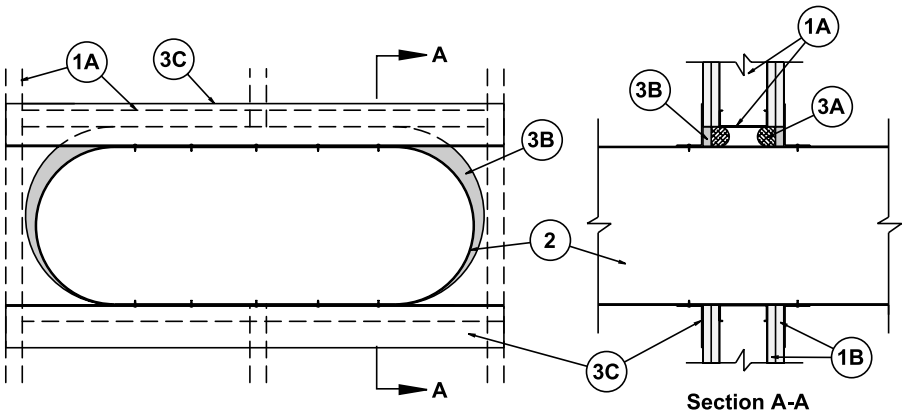
   A. **Packing Material** – Nom 1 in. (25 mm) thickness of tightly packed mineral wool batt insulation firmly packed into opening as a permanent form. Packing material to be recessed from top surface of floor or from both surfaces of wall as required to accommodate the required thickness of caulk fill material.

   B. **Fill, Void or Cavity Material* – Caulk or Sealant** – Min 1 in. (25 mm) thickness of fill material applied within annulus, flush with top surface of floor or both surfaces of wall assembly. At the point contact location between duct and concrete, a min 1/4 in. (6 mm) diam bead of sealant shall be applied to the concrete/duct interface on the top surface of floor and on both surfaces of wall assembly.

      3M COMPANY – CP 25WB+, IC 15WB+ caulk or FB-3000 WT sealant.

   C. **Retaining Angles** – Min 16 gauge galv steel angles sized to lap duct a min of 2 in. (51 mm) in. and lap top surface of floor or both surfaces of wall a min of 1 in. (25 mm). Angles attached to duct with min 1/2 in. (13 mm) long, No. 10 (or larger) sheet metal screws spaced a max of 1 in. (25 mm) from each end of duct and spaced a max of 6 in. (152 mm) OC.

*Bearing the UL Classification Marking



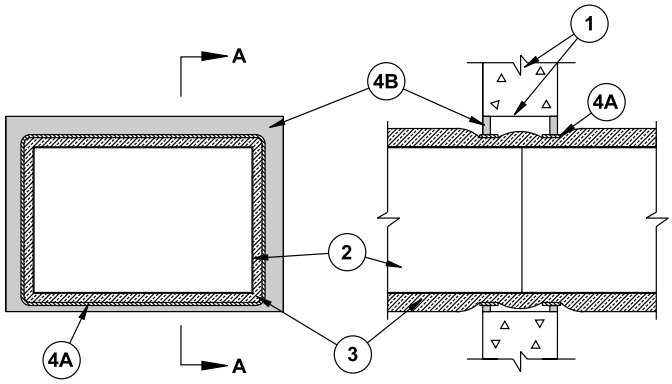
System No. W-L-7033
January 18, 1999
F Ratings — 1 and 2 Hr (See Item 1)
T Rating — 0 Hr

1. **Wall Assembly** — The 1 or 2 hr fire-rated gypsum wallboard/steel stud wall assembly shall be constructed of the materials and in the manner described in the individual U400 Series Wall or Partition Designs in the UL Fire Resistance Directory and shall include the following construction features:
   A. **Studs** — Wall framing shall consist of min 3-5/8 in. wide steel channel studs spaced max 24 in. OC. Additional 3-5/8 in. wide steel studs shall be used to completely frame the opening.
   B. **Gypsum Board*** — 5/8 in. thick, 4 ft wide with square or tapered edges. The gypsum wallboard type, thickness, number of layers, fastener type and sheet orientation shall be as specified in the individual U400 Series Designs in the UL Fire Resistance Directory. Max opening shall be 1-1/2 in. larger than the outside dimension of the steel duct.

   The hourly F Ratings of the firestop system is dependent upon the hourly fire rating of the wall assembly in which it is installed.
2. **Steel Duct** — Nom 36 by 18 in. (or smaller) No. 24 gauge (or heavier) steel flat oval duct to be installed within the framed opening. The annular space within the firestop system shall be min 0 in. (point contact) to max 1-1/2 in. Steel duct to be rigidly supported on both sides of the wall assembly.
3. **Firestop System** — The firestop system shall consist of the following:
   A. **Packing Material** — Polyethylene backer rod, mineral wool batt insulation or fiberglass batt insulation friction fit into annular space. Packing material to be recessed from both surfaces of wall to accommodate the required thickness of fill material (Item 3B).
   B. **Fill, Void or Cavity Material*** — **Sealant** — Min 5/8 in. thickness of fill material applied within annulus, flush with both surfaces of the wall. At the point contact location between the steel duct and the wallboard, a min 1/4 in. diam bead of sealant shall be applied at the wall/duct interface on both surfaces of the wall assembly.
      SPECIFIED TECHNOLOGIES INC — SpecSeal Series 100 Sealant
   C. **Retaining Angles** — Min 16 gauge galv steel angles sized to lap duct a min of 2 in. and lap wall surfaces a min 1 in. Angles attached to top and bottom of steel duct on both sides of wall. Angles attached to duct with min 1/2 in. long, No. 10 (or larger) sheet metal screws spaced a max 1 in. from each end of long side of duct and spaced a max 4 in. OC.

*Bearing the UL Classification Marking

FOD-3294



Section A-A

System No. W-J-7011
December 16, 1998
F Rating — 2 Hr
T Rating — 3/4 Hr

1. **Wall Assembly** — Min 6 in. thick reinforced lightweight or normal weight (100-150 pcf) concrete. Wall may be constructed of any UL Classified **Concrete Blocks*.** Rectangular opening in wall to be max 4-3/4 in. higher and wider than steel duct (Item 2). Max area of opening is 364 sq in. with a max single dimension of 22-3/4 in.
   See **Concrete Blocks** (CAZT) category in the Fire Resistance Directory for names of manufacturers.
2. **Steel Duct** — Nom 18 by 12 in. (or smaller) No. 24 gauge (or heavier) steel duct to be installed within the opening. Min clearance between the duct and the edge of opening in wall is 1-1/2 in. Steel duct to be rigidly supported on both sides of the wall assembly.
3. **Batt and Blankets*** — Max 1-1/2 in. thick light density (min 3/4 pcf) glass fiber blanket insulation jacketed on the outside with a foil-scrim-kraft facing. Longitudinal and transverse joints sealed with foil-scrim-kraft tape. During the installation of the blanket insulation, blanket to be compressed approx 50 percent in thickness such that the annular space within the firestop system shall be min 1/2 in. to max 2 in.
   See **Batts and Blankets** (BKNV) category in the Building Materials Directory for names of manufacturers. Any batt or blanket meeting the above specifications and bearing the UL Classification Marking with a Flame Spread Index of 25 or less and a Smoke Developed Index of 50 or less may be used.
4. **Firestop System** — The firestop system shall consist of the following:
   A. **Fill, Void or Cavity Material*** — **Wrap Strap** — Nom 1/4 in. thick intumescent material faced on both sides with a plastic film, supplied in 1-1/2 in. wide strips. Single layer of wrap strip wrapped around to compress the duct insulation (Item 3) with the ends butted and and held in place by means of two layers of foil tape. Wrap strip installed such that 1-1/4 in. of the wrap strip extends into the wall. One set of wrap strips to be installed on each side of the wall.
      SPECIFIED TECHNOLOGIES INC — SpecSeal RED Wrap Strip
   B. **Fill, Void or Cavity Material*** — **Sealant** — Min 5/8 in. thickness of fill material applied within annulus, flush with both surfaces of the wall. A min 1/4 in. bead of fill material shall be applied at the wrap strip/ insulated through-penetrant interface on both sides of the wall.
      SPECIFIED TECHNOLOGIES INC — SpecSeal 100, 101,102 or 105 Sealant

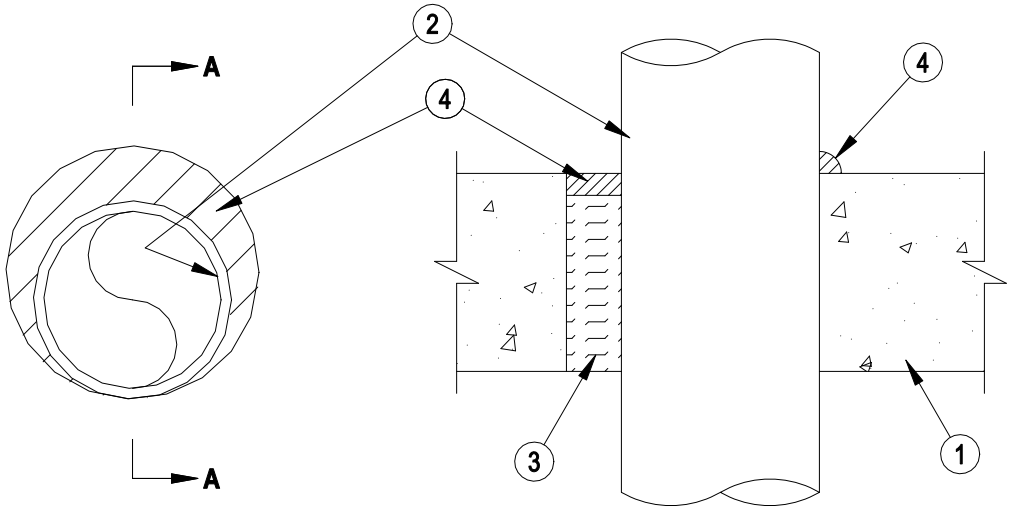
*Bearing the UL Classification Marking

FOD-3289

CAJ 1150

System No. C-AJ-1150

F Rating -- 3 Hr
T Rating -- 0 Hr
L Rating At Ambient -- Less Than 1 CFM/sq ft
L Rating At 400 F -- 4 CFM/sq ft
W Rating -- Class I (See Item 4)



SECTION A-A

1. Floor or Wall Assembly -- Min 4-1/2 in. thick reinforced lightweight or normal weight (100-150 pcf) concrete. Wall may also be constructed of any UL Classified Concrete Blocks *. Max diam of opening is 8 in.
   See Concrete Blocks (CAZT) category in the Fire Resistance Directory for names of manufacturers.
2. Through Penetrants -- One metallic pipe or conduit to be installed within the firestop system. Pipe or conduit to be rigidly supported on both sides of floor or wall assembly. The annular space shall be min 0 in. (point contact) to max 1-3/8 in. The following types and sizes of metallic pipes or conduits may be used:
   A. Steel Pipe -- Nom 6 in. diam (or smaller) Schedule 40 (or heavier) steel pipe.
   B. Iron Pipe -- Nom 6 in. diam (or smaller) cast or ductile iron pipe.
   C. Conduit -- Nom 4 in. diam (or smaller) steel electrical metallic tubing or nom 6 in. diam (or smaller) steel conduit.
3. Packing Material -- Min 4 in. thickness of min 4.0 pcf mineral wool batt insulation firmly packed into opening as a permanent form. Packing material to be recessed from top surface of floor or from both surfaces of wall as required to accommodate the required thickness of fill material.
4. Fill, Void or Cavity Material* -- Sealant -- Min 1/4 in. thickness of fill material applied within the annulus, flush with top surface of floor and with both surfaces of wall. At the point contact location between pipe and concrete, a min 1/2 in. diam bead of fill material shall be applied at the concrete/pipe interface on the top surface of floor and on both surfaces of wall. W Rating applies only when CP601S or CP604 sealant is used. HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC -- CP601S, CP604, CP606 or FS-ONE Sealant

*Bearing the UL Classification Mark

HILTI®
FIRESTOP SYSTEMS

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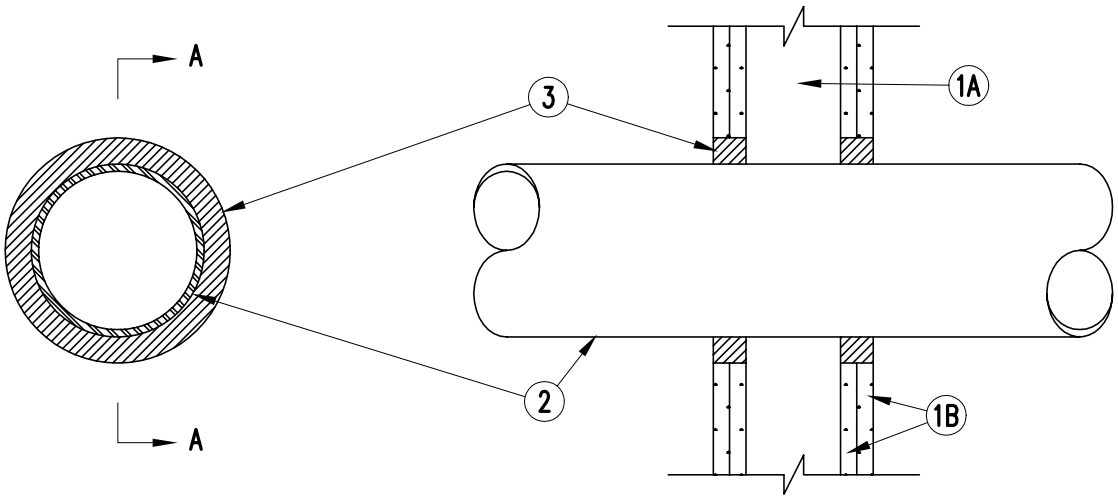
Underwriters Laboratories, Inc.
October 14, 2004

CLASSIFIED C UL US

WL 1054

System No. W-L-1054

F Ratings – 1 and 2 Hr (See Items 1 and 3)
T Rating – 0 Hr
L Rating At Ambient – Less Than 1 CFM/Sq Ft
L Rating At 400 F – 4 CFM/Sq Ft



SECTION A-A

1. Wall Assembly -- The 1 or 2 hr fire-rated gypsum wallboard/stud wall assembly shall be constructed of the materials and in the manner specified in the individual U300 or U400 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall include the following construction features:
   A. Studs -- Wall framing may consist of either wood studs or steel channel studs. Wood studs to consist of nom 2 by 4 in. lumber spaced 16 in. OC. Steel studs to be min 2-1/2 in. wide and spaced max 24 in. OC. When steel studs are used and the diam of opening exceeds the width of stud cavity, the opening shall be framed on all sides using lengths of steel stud installed between the vertical studs and screw-attached to the steel studs at each end. The framed opening in the wall shall be 4 to 6 in. wider and 4 to 6 in. higher than the diam of the penetrating item such that, when the penetrating item is installed in the opening, a 2 to 3 in. clearance is present between the penetrating item and the framing on all four sides.
   B. Gypsum Board* -- 5/8 in. thick, 4 ft wide with square or tapered edges. The gypsum board type, thickness, number of layers, fastener type and sheet orientation shall be as specified in the individual U300 or U400 Series Design in the UL Fire Resistance Directory. Max diam of opening is 32-1/4 in. for steel stud walls. Max diam of opening is 14-1/2 in. for wood stud walls.
   The F Rating of the firestop system is equal to the fire rating of the wall assembly.

HILTI® FIRESTOP SYSTEMS

CLASSIFIED C UL US

System No. W–L–1054

F Ratings – 1 and 2 Hr (See Items 1 and 3)
T Rating – 0 Hr
L Rating At Ambient – Less Than 1 CFM/Sq Ft
L Rating At 400 F – 4 CFM/Sq Ft

2. Through–Penetrants –– One metallic pipe, conduit or tubing to be installed either concentrically or eccentrically within the firestop system. The annular space shall be min 0 in. to max 2–1/4 in. Pipe may be installed with continuous point contact. Pipe, conduit or tubing may be installed at an angle not greater than 45 degrees from perpendicular. Pipe, conduit or tubing to be rigidly supported on both sides of wall assembly. The following types and sizes of metallic pipes, conduits or tubing may be used:
   A. Steel Pipe –– Nom 30 in diam (or smaller) Schedule 10 (or heavier) steel pipe.
   B. Iron Pipe –– Nom 30 in. diam (or smaller) cast or ductile iron pipe.
   C. Conduit –– Nom 4 in diam (or smaller) steel electrical metallic tubing or 6 in. diam steel conduit.
   D. Copper Tubing –– Nom 6 in. diam (or smaller) Type L (or heavier) copper tubing.
   E. Copper Pipe –– Nom 6 in. diam (or smaller) regular (or heavier) copper pipe.
3. Fill, Void or Cavity Material* –– Sealant –– Min 5/8 in. thickness of fill material applied within the annulus, flush with both surfaces of wall. At the point or continuous contact locations between pipe and wall, a min 1/2 in. diam bead of fill material shall be applied at the pipe wall interface on both surfaces of wall .
   HILTI CONSTRUCTION CHEMICALS, DIV OF
   HILTI INC –– FS–One Sealant

*Bearing the UL Classification Mark

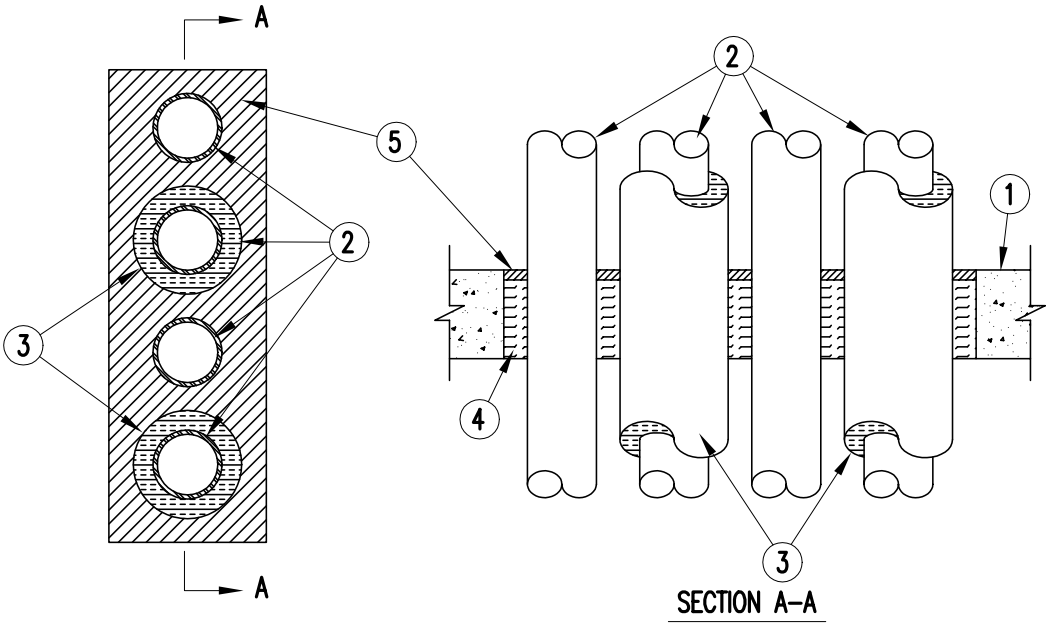
HILTI® FIRESTOP SYSTEMS

CLASSIFIED C UL® US

CAJ 8041

System No. C–AJ–8041

F RATING = 3–HR.
T RATING = 0 and 1 HR.
L Rating At Ambient – 10 CFM/sq ft
L Rating At 400 F – Less Than 6 CFM/sq ft



1. **Floor or Wall Assembly** – Min 4–1/2 in. thick reinforced lightweight or normal weight (100–150 pcf) concrete floor or min 5 in. thick reinforced lightweight or normal weight (100–150 pcf) concrete wall. Wall may also be constructed of any UL Classified **Concrete Blocks***. Max area of opening is 192 sq in. with max dimension of 24 in.
   See **Concrete Blocks** (CAZT) category in the Fire Resistance Directory for names of manufacturers.
2. **Through Penetrants** – A max of 4 pipes, conduits or tubing to be installed within the opening. The space between pipes, conduits or tubing shall be 1–1/2 in. The space between pipes, conduits or tubing and periphery of opening shall be min 1–5/8 in. to max 2–1/2 in. Pipe, conduit or tubing to be rigidly supported on both sides of floor or wall assembly. The following types and sizes of metallic pipes, conduits or tubing may be used:
   A. **Steel Pipe** – Nom 3 in. diam (or smaller) Schedule 10 (or heavier) steel pipe.
   B. **Copper Tubing** – Nom 3 in. diam (or smaller) Type L (or heavier) copper tubing
   C. **Copper Pipe** – Nom 3 in. diam (or smaller) Regular (or heavier) copper pipe.
   D. **Conduit** – Nom 3 in. diam (or smaller) electrical metallic tubing or steel conduit.

HILTI® FIRESTOP SYSTEMS

CLASSIFIED C UL US

CAJ 8041

System No. C–AJ–8041

F RATING = 3–HR.
T RATING = 0 and 1 HR.
L Rating At Ambient – 10 CFM/sq ft
L Rating At 400 F – Less Than 6 CFM/sq ft

3. **Pipe Covering*** – (Optional) – Max 1 in. thick hollow cylindrical heavy density (min 3.5 pcf) glass fiber units jacketed on the outside with an all service jacket. Longitudinal joints sealed with metal fasteners or factory–applied self–sealing lap tape. Transverse joints secured with metal fasteners or with butt strip tape supplied with the product. A nom annular space of 1–1/2 in. is required within the firestop system. **The T Rating is 1 hr when 1 in. thick pipe covering is used. The T Rating is 0 hr. when pipe covering is less than 1 in. or is omitted.**
   See **Pipe and Equipment Covering – Materials** (BRGU) category in the Building Materials Directory for names of manufacturers. Any pipe covering material meeting the above specifications and bearing the UL Classification Marking with a Flame Spread Index of 25 or less and a Smoke Developed Index of 50 or less may be used.
4. **Packing Material** – Min 4 in. thickness of min 4.0 pcf mineral wool batt insulation firmly packed into opening as a permanent form. Packing material to be recessed from top surface of floor or from both surfaces of wall as required to accommodate the required thickness of fill material.
5. **Fill, Void or Cavity Material* – Sealant** – Min 1/2 in. thickness of fill material applied within the annulus, flush with top surface of floor or with both surfaces of wall.
   HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI, INC. – FS–ONE Sealant

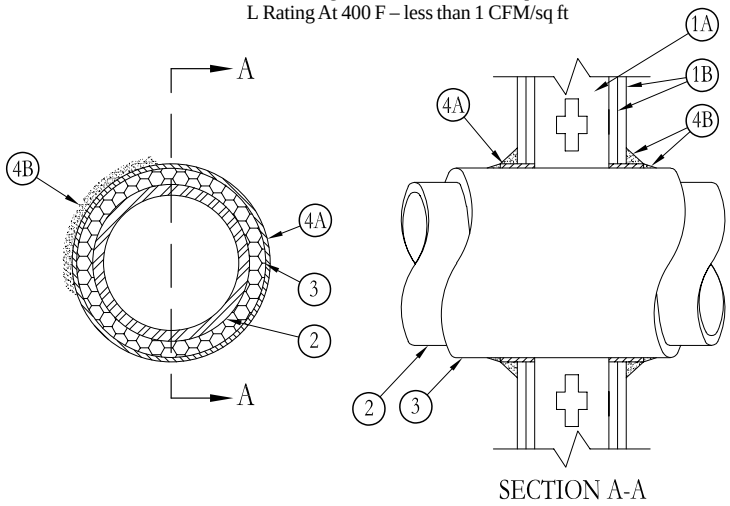
*Bearing the UL Classification Marking

HILTI® FIRESTOP SYSTEMS

CLASSIFIED C UL US

System No. W-L-5001

May 19, 2005
F Ratings – 1 and 2 Hr (See Item 1)
T Ratings – 3/4, 1 and 1-1/2 Hr (See Item 3)
L Rating At Ambient – 2 CFM/sq ft
L Rating At 400 F – less than 1 CFM/sq ft



SECTION A-A

1. **Wall Assembly** – The 1 or 2 hr fire-rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner described in the individual U300, U400 or V400 Series Wall or Partition Design in the UL Fire Resistance Directory and shall include the following construction features:

   A. **Studs** – Wall framing may consist of either wood studs or steel channel studs. Wood studs to consist of nom 2 in. by 4 in. (25 mm by 102 mm) lumber spaced 16 in. (406 mm) OC with nom 2 by 4 in. lumber end plates and cross braces. Steel studs to be min 3-5/8 in. (92 mm) wide by 1-3/8 in. (35 mm) deep channels spaced max 24 in. (610 mm) OC.

   B. **Gypsum Board*** – Nom 5/8 in. (16 mm) thick, 4 ft (122 cm) wide with square or tapered edges. The gypsum board type, thickness, number of layers, fastener type and sheet orientation shall be as specified in the individual U300 or U400 Series Design in the UL Fire Resistance Directory. Max diam of opening is 14-1/2 in (368 mm) for wood stud walls and 18 in. (457 mm) for steel stud walls.

   The hourly F Rating of the firestop system is 1 hr when installed in a 1 hr fire rated wall and 2 hr when installed in a 2 hr fire rated wall.

2. **Through Penetrants** – One metallic pipe or tubing to be centered within the firestop system. Pipe or tubing to be rigidly supported on both sides of wall assembly. The following types and sizes of metallic pipes or tubing may be used:

   A. **Steel Pipe** – Nom 12 in. (305 mm) diam (or smaller) Schedule 10 (or heavier) steel pipe.
   B. **Copper Tubing** – Nom 6 in. (152 mm) diam (or smaller) Type L (or heavier) copper tubing.
   C. **Copper Pipe** – Nom 6 in. (152 mm) diam (or smaller) Regular (or heavier) copper pipe.

3. **Pipe Covering*** – Nom 1 in. or 2 in. (25 mm or 51 mm) thick hollow cylindrical heavy density glass fiber units jacketed on the outside with an all service jacket. Longitudinal joints sealed with metal fasteners or factory-applied self-sealing lap tape. Transverse joints sealed with metal fasteners or with butt strip tape supplied with the product. When nom 1 in. (25 mm) thick pipe covering is used, the annular space between the pipe covering and the circular cutout in the gypsum board layers on each side of the wall shall be min 1/4 in. to max 3/8 in. (6 mm to max 10 mm). When nom 2 in. (51 mm) thick pipe covering is used, the annular space between the pipe covering and the circular cutout in the gypsum board layers on each side of the wall shall be min 1/2 in. to max 3/4 in. (13 mm to max 19 mm).

   See **Pipe and Equipment Covering** – **Materials** (BRGU) category in Building Materials Directory for names of manufacturers. Any pipe covering material meeting the above specifications and bearing the UL Classification Marking with a Flame Spread Index of 25 or less and a Smoke Developed Index of 50 or less may be used.

   The hourly T Rating of the firestop system is 3/4 hr when nom 1 in. (25 mm) thick pipe covering is used. The hourly T Rating of the firestop system is 1 hr and 1-1/2 hr when nom 2 in. (51 mm) thick pipe covering is used with 1 hr and 2 hr fire rated walls, respectively.

4. **Firestop System** – Installed symmetrically on both sides of wall assembly. The details of the firestop system shall be as follows:

   A. **Fill, Void or Cavity Materials*** – **Wrap Strip** – Nom 1/4 in. (6 mm) thick intumescent elastomeric material faced on one side with aluminum foil, supplied in 2 in. (51 mm) wide strips. Nom 2 in. (51 mm) wide strip tightly wrapped around pipe covering (foil side out) with seam butted. Wrap strip layer securely bound with steel wire or aluminum foil tape and slid into annular space approx 1-1/4 in. (32 mm) such that approx 3/4 in. (19 mm) of the wrap strip width protrudes from the wall surface. One layer of wrap strip is required when nom 1 in. (25 mm) thick pipe covering is used. Two layers of wrap strip are required when nom 2 in. (51 mm) thick pipe covering is used.

      3M COMPANY – FS-195+

   B. **Fill, Void or Cavity Materials*** – **Caulk or Sealant** – Min 1/4 in. (6 mm) diam continuous bead applied to the wrap strip/wall interface and to the exposed edge of the wrap strip layer approx 3/4 in. (19 mm) from the wall surface.

      3M COMPANY – CP 25WB+, IC 15WB+, FireDam 150+ caulk or FB-3000 WT sealant

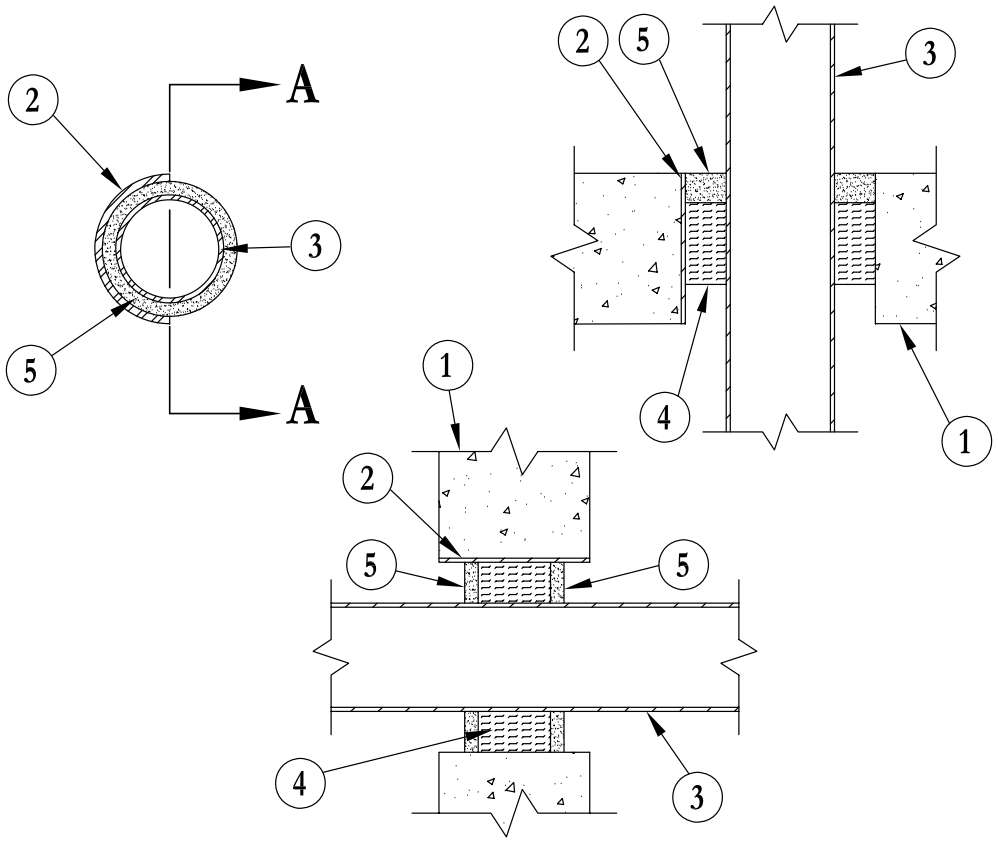
*Bearing the UL Classification Marking

3M Fire Protection Products

This material was extracted by 3M Fire Protection Products from the 2006 edition of the UL Fire Resistance Directory.

System No. C-AJ-1009

December 07, 1999
(Formerly System No. 122)
F Rating – 2 Hr
T Rating – 0 Hr
L Rating At Ambient – Less Than 1 CFM/sq ft (See Item 5)
L Rating At 400 F – Less Than 1 CFM/sq ft (See Item 5)



SECTION A-A
(WALL ASSEMBLY)

1. **Floor or Wall Assembly** – Min 5 in. thick reinforced normal weight (100-150 pcf) concrete. Wall may also be constructed of any UL Classified **Concrete Blocks***. Max diam of opening is 6 in.

   See **Concrete Blocks** (CAZT) category in the Fire Resistance Directory for names of manufacturers.

2. **Metallic Sleeve** (Optional) – Nom 6 in. diam (or smaller) electrical metallic tubing, steel conduit or cast iron pipe cast or grouted into floor or wall assembly, flush with floor or wall surfaces.

3. **Through Penetrants** – One metallic pipe or conduit to be centered within the firestop system. A nom annular space of 3/4 in. is required within the firestop system. Pipe or conduit to be rigidly supported on both sides of floor or wall assembly. The following types and sizes of metallic pipes or conduits may be used:

   A. **Steel Pipe** – Nom 4 in. diam (or smaller) Schedule 5 (or heavier) steel pipe.

   B. **Conduit** – Nom 4 in. (or smaller) diam steel electrical metallic tubing or steel conduit.

4. **Packing Material** – Min 3 in. thickness of min 4 pcf mineral wool batt insulation firmly packed into opening as a permanent form. Packing material to be recessed from top surface of floor as required to accommodate the required thickness of fill material. Packing material to be centered in walls mid depth and recessed to allow for installation of fill material.

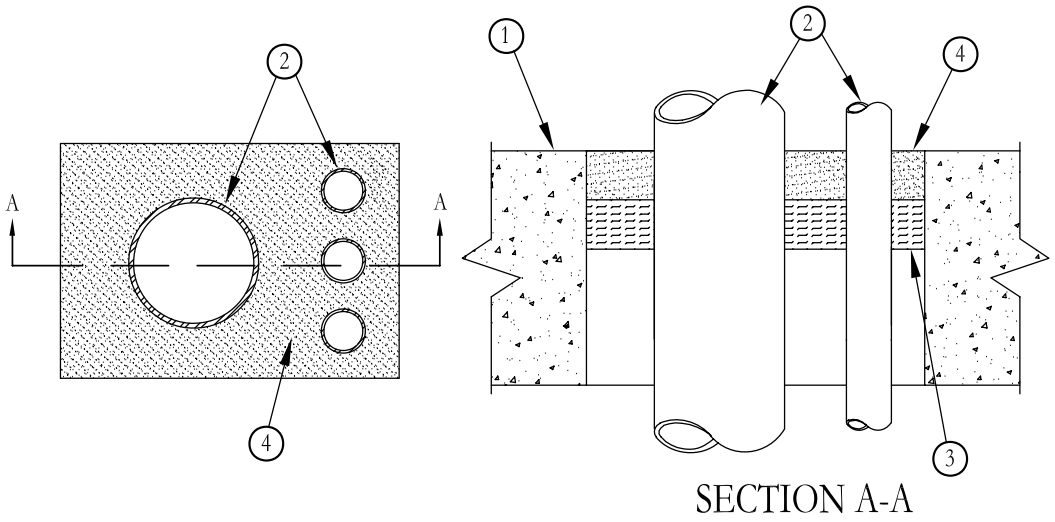
5. **Fill, Void or Cavity Material*** – **Sealant** – Min 1/2 in. thickness of fill material applied within the annulus, flush with top surface of floor. In walls, fill material to be applied on each side of packing material.

   3M COMPANY – FB-2000 or FB-2000+ (floors only).
   (Note: L Ratings apply only when FB-2000+ is used.)

*Bearing the UL Classification Marking

System No. C-AJ-1066

August 23, 2004
(Formerly System No. 395)
F Rating – 3 Hr
T Rating – 0 Hr
L Rating At Ambient – 2 CFM/sq ft
L Rating At 400 F – less than 1 CFM/sq ft
W Rating – Class I (See Item 4)



SECTION A-A

1. **Floor or Wall Assembly** – Min 4-1/2 in. thick lightweight or normal weight (100-150 pcf) concrete. Wall may also be constructed of any UL Classified **Concrete Blocks***. Max area of square, rectangular or circular opening is 45 sq in. with max dimension of 9 in.

   See **Concrete Blocks** (CAZT) category in the Fire Resistance Directory for names of manufacturers.

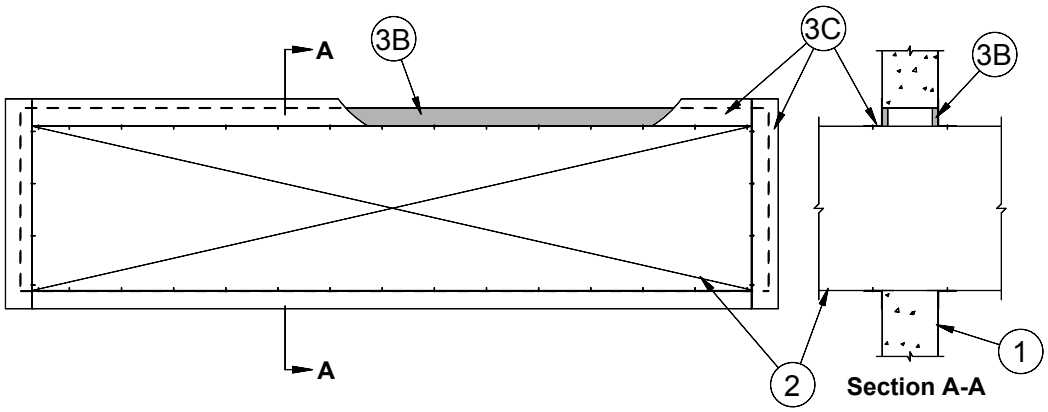
2. **Pipe** – Nom 3 in. diam (or smaller) Type L (or heavier) copper pipe or nom 2-1/2 in. diam (or smaller) Schedule 10 (or heavier) steel pipe. One or more pipes may be installed with a min 1/2 in. to max 1 in. clearance maintained between pipes and with a min 1/4 in. to max 1 in. clearance maintained between pipe and sides of through opening. Pipes to be rigidly supported on both sides of floor or wall assembly.

3. **Packing Material** – Min 1 in. thick mineral wool batt insulation firmly packed into opening with its top surface recessed min 1 in. from top surface of the floor. In wall assemblies, forming material to be firmly packed into opening on both sides of wall and recessed min 1 in. from wall surface.

4. **Fill, Void or Cavity Materials*** – **Caulk or Sealant** – Applied to fill through opening to a min depth of 1 in. In floor assemblies, fill material to be installed flush with top surface of floor. In wall assemblies, fill material to be installed flush with wall surface on both sides of wall.

   3M COMPANY – CP 25WB+ caulk or FB-3000 WT sealant. (Note: W Rating applies only when FB-3000 WT is used.)

*Bearing the UL Classification Marking



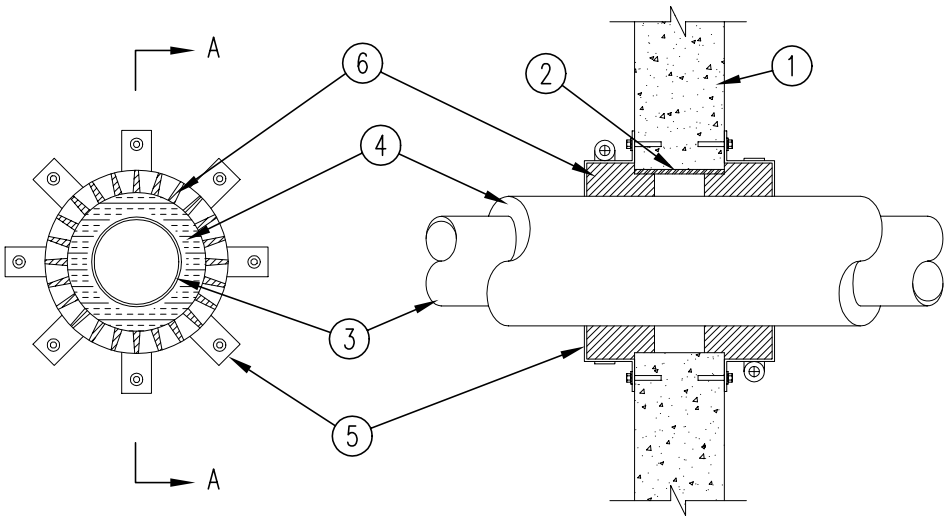
System No. W-J-7007
F Rating — 2 Hr
T Rating — 1/2 Hr

1. **Wall Assembly** — Min 6 in. thick reinforced lightweight or normal weight (100-150 pcf) concrete. Wall may also be constructed of any UL Classified **Concrete Blocks*** Max area of opening is 73.67 sq ft with max dimension of 104 in.
   See **Concrete Blocks** (CAZT) category in the Fire Resistance Directory for names of manufacturers.
2. **Steel Duct** — Nom 100 in. by 100 in. (or smaller) No. 24 gauge (or heavier) galv steel duct to be installed either concentrically or eccentrically within the firestop system. The space between the steel duct and periphery or opening shall be min 0 in. (point contact) to max 2 in. Steel duct to be rigidly supported on both sides of the wall assembly.
3. **Firestop System** — The firestop system shall consist of the following:
   A. **Packing Material** — (Optional, Not Shown) — Polyethylene backer rod, mineral wool batt insulation or fiberglass batt insulation friction fitted into annular space of opening. Packing material to be recessed from both surfaces of wall as required thickness of fill material.
   B. **Fill, Void or Cavity Material*** — **Sealant** — Min 5/8 in. thickness of fill material applied within the annulus, flush with both surfaces of wall. At the point contact location between steel duct and concrete wall, a min 1/4 in. diam bead of fill material shall be applied at the concrete/steel duct interface on both surfaces of wall assembly.
      SPECIFIED TECHNOLOGIES INC — SpecSeal 100, 101, 102, 105, 120 or 129 Sealant
   C. **Steel Retaining Angles** — Min No. 16 gauge galv steel angles sized to lap steel duct a min of 2 in. and lap wall surfaces a min 1 in. Angles attached to steel duct on both sides of wall with min No. 10 by 1/2 in. long steel sheet metal screws spaced a max of 1 in. from each end of steel duct and spaced a max 6 in. OC.

*Bearing the UL Classification Mark

Created or Revised: 11/13/02
Specified Technologies, Inc., Somerville, NJ (800) 992-1180
FOD-3237

System No. W-J-5003
F Rating – 2 Hr
T Rating – 1-3/4 Hr



SECTION A-A

1. Wall Assembly – Min 5 in. thick reinforced lightweight or normal weight (100–150 pcf) concrete. Wall may also be constructed of any UL Classified Concrete Blocks*. Max diam of opening is 18 in.
   See Concrete Blocks (CAZT) category in the Fire Resistance Directory for names of manufacturers.
2. Metallic Sleeve – (Optional) – Nom 18 in. diam (or smaller) Schedule 40 steel pipe cast or grouted into wall assembly.
3. Through-Penetrants – One metallic pipe, conduit or tubing to be centered within the firestop system. Pipe, conduit or tubing to be rigidly supported on both sides of the wall assembly. The following types and sizes of metallic pipes, conduits or tubing may be used:
   A. Steel Pipe – Nom 10 in. diam (or smaller) Schedule 10 (or heavier) steel pipe.
   B. Conduit – Nom 4 in. diam (or smaller) steel electrical metallic tubing or steel conduit.
   C. Copper Tubing – Nom 4 in. diam (or smaller) Type L (or heavier) copper tubing.
   D. Copper Pipe – Nom 4 in. diam (or smaller) Regular (or heavier) copper pipe.

HILTI®
FIRESTOP SYSTEMS

CLASSIFIED C UL US

System No. W-J-5003
F Rating – 2 Hr
T Rating – 1-3/4 Hr

4. Pipe Covering* – Nom 2 in. thick hollow cylindrical heavy density (min 3.5 pcf) glass fiber units jacketed on the outside with an all service jacket. Longitudinal joints sealed with metal fasteners or factory-applied self-sealing lap tape. Transverse joints secured with metal fasteners or with butt tape supplied with the product. An annular space of min 1 to max 1-1/8 in. is required within the firestop system.

   See Pipe and Equipment Covering – Materials (BRGU) category in the Building Materials Directory for the names of manufacturers. Any pipe covering material meeting the above specifications and bearing the UL Classification Marking with a Flame Spread Index of 25 or less and a Smoke Developed Index of 50 or less may be used.

5. Steel Collar – Collar fabricated from precut 0.017 in. thick (28 MSG) galv sheet steel available from the sealant manufacturer. Collar shall be nom 2 in. deep with min 1-1/4 in. wide by 2 in. long anchor tabs for securement to the concrete wall surfaces. Retainer tabs, 1/4 in. wide by 3/4 in. long and located opposite the anchor tabs are folded 90 degrees toward pipe surface to maintain the annular space around the pipe and to retain the fill material. Collar secured to the concrete surface with 1/4 in. diameter by min 1 in. long steel Hilti Kwik fasteners or min 0.145 in. diam by min 1-1/4 in. long powder actuated steel fasteners in every other tab. A nom 1/2 in. wide stainless steel hose clamp is secured to each of the collars at mid-depth.

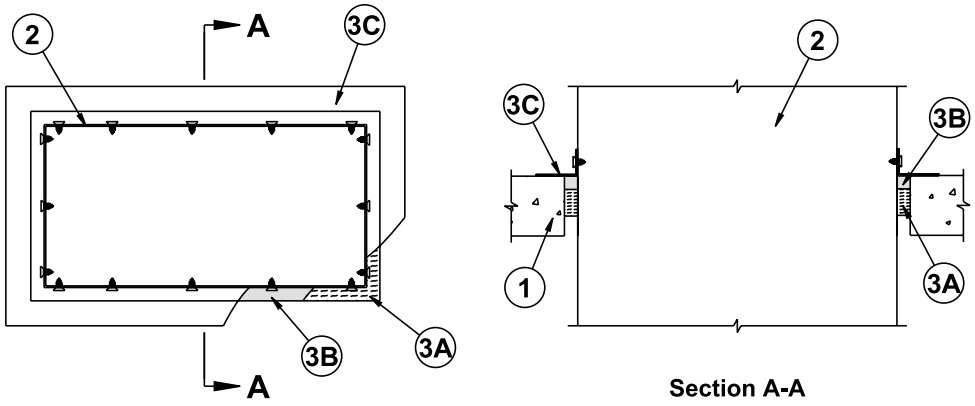
6. Fill, Void or Cavity Material* – Sealant – Min 1-1/4 in. thickness of fill material applied within the annulus on both sides of the wall assembly. Additional fill material applied to completely fill the collars.

   HILTI CONSTRUCTION CHEMICALS, DIV OF
   HILTI, Inc. – FS611A or FS-ONE Sealant

*Bearing the UL Classification Marking

HILTI®
FIRESTOP SYSTEMS

CLASSIFIED C UL US

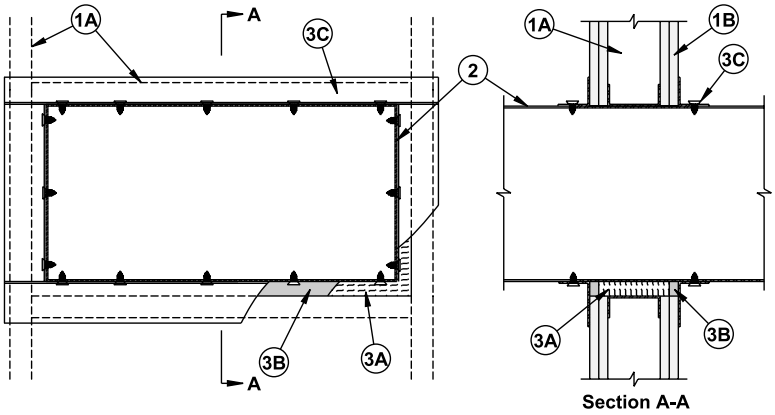


System No. C-AJ-7027
September 18, 1996
F Rating — 2 Hr
T Rating — 0 Hr

1. **Floor or Wall Assembly** — Min 4-1/2 in. thick reinforced lightweight or normal weight (100-150 pcf) concrete. Wall may also be constructed of any UL Classified **Concrete Blocks*.** Max area of opening is 364 sq in. with max dimensions of 26 in.
   See **Concrete Blocks** (CAZT) category in the Fire Resistance Directory for names of manufacturers.
2. **Steel Duct** — Nom 24 by 12 in. (or smaller) No. 24 gauge (or heavier) steel duct. One duct to be installed within the firestop system with a nom 1 in. annular space. Steel duct to be rigidly supported on both sides of floor or wall assembly.
3. **Firestop System** — The firestop system shall consist of the following:
   A. **Packing Material** — Min 2 in. thickness of min 4 pcf mineral wool batt insulation firmly packed into opening as a permanent form. Packing material to be recessed from top surface of floor and from both surfaces of wall as required to accommodate the required thickness of fill material.
   B. **Fill, Void or Cavity Material*** — **Sealant** — Min 1 in. thickness of fill material applied within the annulus, flush with top surface of floor and both surfaces of wall.
      SPECIFIED TECHNOLOGIES INC — SpecSeal 100, 101, 102 or 105 Sealant
   C. **Steel Angle** — Min 2 in. wide by 2 in. high by 0.108 in. thick steel angle cut to fit the contour of the duct with a 1 in. lap on the top surface of floor or both surfaces of wall. Legs of angles secured to duct with min two No. 12 by 3/4 in. sheet metal screws per side, spaced a max 4 in. OC.

*Bearing the UL Classification Marking

FOD-3080



System No. W-L-7060
October 04, 2000
F Ratings — 1 and 2 Hr (See Item 1)
T Rating — 0 Hr

1. **Wall Assembly** — The 1 or 2 hr fire-rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner specified in the individual U300 or U400 Series Wall or Partition Design in the UL Fire Resistance Directory and shall include the following construction features:
   A. **Studs** — Wall framing may consist of either wood studs or steel channel studs. Wood studs to consist of nom 2 by 4 in. lumber spaced 16 in. OC. Steel studs to be min 3-5/8 in. wide and spaced max 24 in. OC. Additional horizontal framing members installed to form a rectangular box around the steel duct (Item 2).
   B. **Gypsum Board*** — Thickness, type, number of layers and fasteners as specified in the individual Wall and Partition Design. When wood studs are used, interior of through opening to be lined with sheets of gypsum board around entire periphery to a total thickness of 5/8 in. or 1-1/4 in. for 1 or 2 hr wall assemblies, respectively. Max area of opening is 364 sq in. with a max dim of 26 in.

   The hourly F Rating of the firestop system is equal to the hourly fire rating of the wall assembly in which it is installed.
2. **Steel Duct** — Nom 12 by 24 in. (or smaller) No. 24 gauge (or heavier) galv steel duct installed eccentrically or concentrically within opening. Annular space between duct and periphery of opening to be min 0 in. (point contact) to max 2 in. Duct to be rigidly supported on both sides of the wall assembly.
3. **Firestop System** — The firestop system shall consist of the following:
   A. **Packing Material** — Min 4 pcf mineral wool batt insulation compressed and tightly packed to min 3-5/8 in. or 4-7/8 in. thickness for 1 or 2 hr fire-rated assemblies, respectively. Packing material recessed from both surfaces of wall as required to accommodate fill material (Item 3B).
   B. **Fill, Void or Cavity Material*** — **Sealant** — Min 5/8 in. thickness of fill material applied within annulus, flush with both surfaces of wall assembly. At point contact location, min 1/4 in. diam bead of fill material applied at steel duct/gypsum board interface on both surfaces of wall.

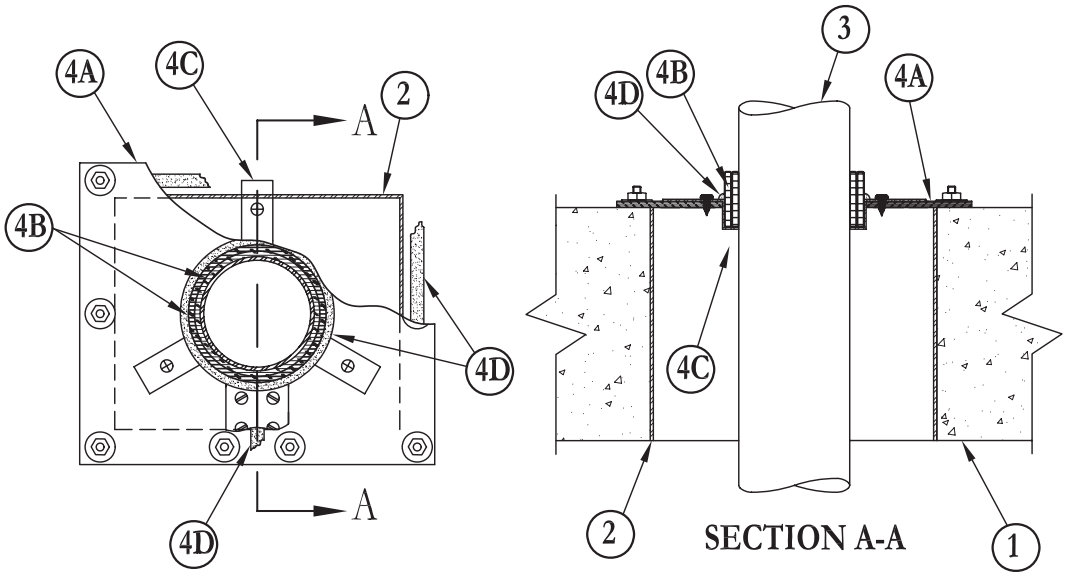
      SPECIFIED TECHNOLOGIES INC — SpecSeal LCI Sealant
   C. **Retaining Angles** — Min 16 GA galv steel angles sized to lap duct a min of 2 in. and lap periphery of opening a min 1 in. Angles attached to all four sides of steel duct on both surfaces of wall with No. 10 (or larger) steel sheet metal screws spaced 1 in. from each end and max 4 in. OC.

*Bearing the UL Classification Marking

FOD-3462

System No. C-AJ-2003

May 18, 2005
F Rating – 3 Hr
T Rating – 1/2 Hr
L Rating at Ambient – 15 CFM/sq ft
L Rating at 400 F – less than 1 CFM/sq ft



1. **Floor or Wall Assembly** – Min 4-1/2 in. (114 mm) thick lightweight or normal weight (100-150 pcf or 1600-2400 kg/m^3) concrete. Wall may also be constructed of any UL Classified **Concrete Blocks***. Max area of rectangular or square opening 64 sq in. (413 sq cm) with max dimension of 8 in. (203 mm). Max diam of circular opening is 8 in. (203 mm).

   See **Concrete Blocks** (CAZT) category in the Fire Resistance Directory for names of manufacturers.

2. **Steel Sleeve** (Optional) – Min 3/16 in. (5 mm) thick steel welded to form a four sided square or rectangular sleeve. For circular openings, steel sleeve to consist of nom 8 in. (203 mm) diam (or smaller) Schedule 40 (or heavier) steel pipe.

3. **Nonmetallic Pipe or Conduit** – Nom 2 in. (51 mm) diam (or smaller) Schedule 40 polyvinyl chloride (PVC) pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems or Rigid Nonmetallic Conduit++ or SDR13.5 chlorinated polyvinyl chloride (CPVC) pipe for use in closed (process or supply) piping systems. One pipe to be installed within the firestop system. A min 1 in. to max 3 in. (25 mm to max 76 mm) annular space is required within the firestop system. Pipe to be rigidly supported on both sides of the floor or wall assembly.

4. **Firestop System** – The firestop system shall consist of the following:

   A. **Fill, Void or Cavity Material*** – **Intumescent Sheet** – Rigid aluminum foil-faced sheet with galv steel sheet backer. Diam of hole cut in sheet to accommodate pipe to be 1 in. (25 mm) larger than diam of pipe such that a uniform 1/2 in. (13 mm) space is present between the pipe and perimeter of the sheet cutout. Sheet cut to lap a min of 2 in. (51 mm) on the concrete on all sides of the through opening. A max of one slit may be made in the sheet to permit installation of the sheet about the pipe. The slit shall be made perpendicular to the side of the sheet nearest the circular cutout and shall intersect with the circular cutout in line with the center of the cutout. Sheet to be installed with the galv steel sheet backer exposed (aluminum foil facing against floor or wall surface). Sheet secured to top surface of floor and to both surfaces of wall using 1/4 in. (6 mm) diam by steel expansion bolts in conjunction with steel nuts and min 1-1/4 in. (32 mm) diam steel washers. Max spacing of fasteners not to exceed 6 in. (152 mm) OC. with additional fasteners required max 1 in. (25 mm) from both sides of slit made to permit installation of sheet about pipe. Prior to installation of the sheet(s), a nom 1/4 in. (6 mm) diam bead of caulk or putty (Item D) shall be applied to the top surface of the floor and on both surfaces of the wall around the perimeter of the through opening. Min 2 in. (51 mm) wide strip of min 0.016 in. (0.41 mm) thick (30 gauge) galv steel sheet to be centered over slit in sheet and secured to galv steel sheet backer on both sides of slit with steel sheet metal screws located max 1/2 in. (13 mm) from edge of cutout and max 1/2 in. (13 mm) from edge of through opening. Prior to installation of the steel cover strip, the slit in the sheet shall be covered with a nom 1/4 in. (6 mm) diam bead of caulk or putty (Item D).

      3M COMPANY – CS-195+

   B. **Fill, Void or Cavity Materials*** – **Wrap Strip** – Nom 1/4 in. (6 mm) thick intumescent elastomeric material faced on one side with aluminum foil, supplied in 2 in. (51 mm) wide strips. Nom 2 in. (51 mm) wide strips tightly wrapped around nonmetallic pipe (foil side exposed). Two layers of wrap strip are required. Each layer of wrap strip to be installed with butted seam with butted seam of second layer offset from butted seam of first layer. Wrap strip layers temporarily held in position using aluminum foil tape, steel wire tie, or equivalent. In wall assemblies, the wrap strip is to be installed in the same manner used for floor assemblies, but it shall be installed symmetrically on both sides of wall assembly.

      3M COMPANY – FS-195+

C. **Steel Collar** – Nom 1-1/4 in. (32 mm) deep collar with 1-1/4 in. (32 mm) wide by 2 in. (51 mm) long anchor tabs and 1/2 in. (13 mm) long tabs to retain wrap strip layers. Coils of precut 0.016 in. (0.41 mm) thick (30 gauge) galv sheet steel available from pipe wrap manufacturer. As an alternate, collar may be field-fabricated from min 0.016 in. (0.41 mm) thick (30 gauge) galv sheet steel in accordance with instruction sheet supplied by wrap strip manufacturer. Steel collar, with anchor tabs bent outward 90 degrees and with retainer tabs bent inward 90 degrees wrapped tightly around wrap strip layers with min 1 in. (25 mm) overlap at seam. Steel collar and wrap strip slid into cutout in intumescent sheet such that the bottom edges of wrap strip layers and steel collar project 1 in. (25 mm) below top plane of floor and such that anchor tabs rest on top surface of intumescent sheet. Secure anchor tabs to galv steel sheet backer of intumescent sheet with steel sheet metal screws. Compress wrap strip layers around pipe above intumescent sheet using a min 1/2 in. (13 mm) wide by 0.028 in. (0.71 mm) thick stainless steel band clamp with worm drive tightening mechanism. Steel collar not required for firestops in wall assemblies. Instead, the wrap strip layers are slid into cutout in intumescent sheet on each side of wall such that the exposed edges of wrap strip layers project 1 in. (25 mm) from exposed face of intumescent sheet. Compress wrap strip layers around pipe using a min 1/2 in. (13 mm) wide by 0.028 in. (0.71 mm) thick stainless steel band clamp with worm drive tightening mechanism at the projecting wrap strip midheight.

D. **Fill, Void or Cavity Materials*** – **Caulk or Sealant** – Generous application of caulk to be applied to the base of the wrap strip at its egress from the intumescent sheet(s) in addition to coating all exposed seams in wrap strip layers. Nom 1/4 in. (6 mm) bead of caulk to be applied to slit in intumescent sheet(s) prior to installation of steel cover strip.

3M COMPANY – CP 25WB+ caulk or FB-3000WT sealant. (CP 25WB+ not suitable for use with CPVC pipes.)

E. **Fill, Void or Cavity Materials*** – **Graphite Seal, Caulk, Sealant or Putty** (Not Shown) – One layer of 1/2 in. x 1/16 in. (13 mm x 1.6 mm) adhesive backed graphite intumescent seal positioned under intumescent sheet around entire perimeter of through opening or min 1/4 in. (6 mm) diam continuous bead of caulk or putty applied to edge of intumescent sheet at its interface with surface of floor or wall around entire perimeter of through opening.

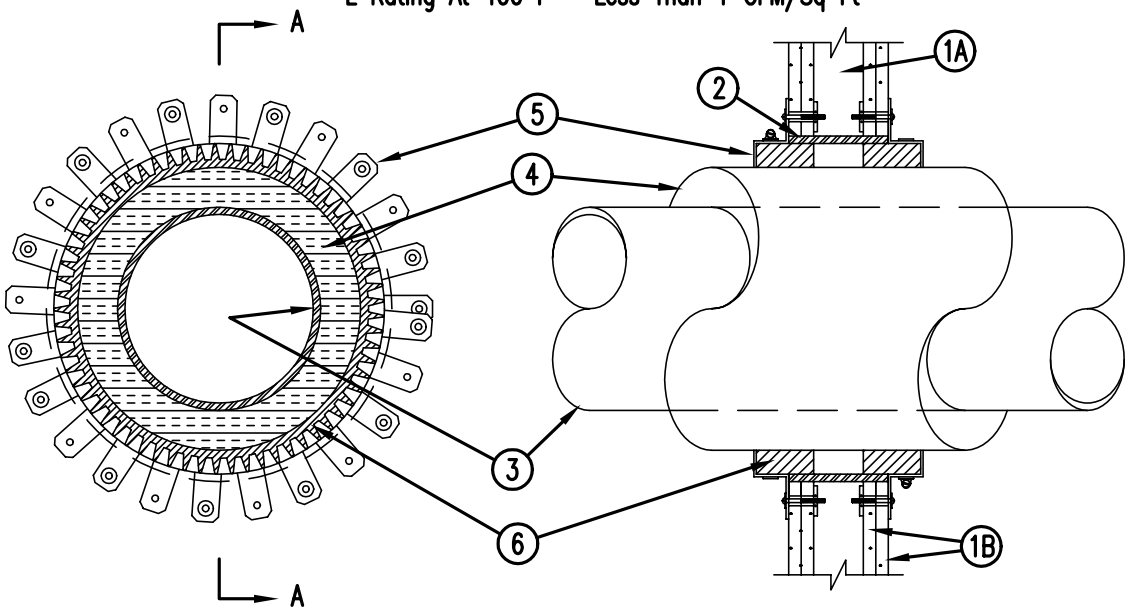
3M COMPANY – E-FIS or Ultra GS seals, CP 25WB+, IC 15WB+ caulk, FB-3000WT sealant or MP+ Stix putty. (Note: CP 25WB+ not suitable for use with CPVC pipes.)

+Bearing the UL Listing Mark
*Bearing the UL Classification Marking

WL 5025

System No. W–L–5025

F Ratings – 1 and 2 Hr (See Items 1 and 6)
T Ratings – 0 and 3/4 Hr (See Item 1)
L Rating At Ambient – 4 CFM/Sq Ft
L Rating At 400 F – Less Than 1 CFM/Sq Ft



SECTION A–A

1. Wall Assembly –– The 1 or 2 hr fire–rated gypsum wallboard/stud wall assembly shall be constructed of the materials and in the manner specified in the individual U300 or U400 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall include the following construction features:
   A. Studs –– Wall framing may consist of either wood studs or steel channel studs. Wood studs to consist of nom 2 by 4 in. lumber spaced 16 in. OC. Steel studs to be min 2–1/2 in. wide and spaced max 24 in. OC.
   B. Gypsum Board* –– 5/8 in. thick, 4 ft wide with square or tapered edges. The gypsum wallboard type, number of layers, fastener type and sheet orientation shall be as specified in the individual Wall and Partition Design. Max diam of opening is 14–1/2 in. for wood stud walls and 18 in. for steel stud walls.

   The hourly F Rating of the firestop system is equal to the hourly fire rating of the wall assembly in which it is installed. The T Ratings are 0 and 3/4 hr when installed in 1 and 2 hr rated walls, respectivley .
2. Metallic Sleeve –– (Optional) –– Nom 18 in. diam (or smaller) Schedule 40 (or thinner) steel pipe cast into wall assembly with joint compound and installed flush with wall surfaces.

HILTI® FIRESTOP SYSTEMS

CLASSIFIED C UL US

System No. W–L–5025

F Ratings – 1 and 2 Hr (See Items 1 and 6)
T Ratings – 0 and 3/4 Hr (See Item 1)
L Rating At Ambient – 4 CFM/Sq Ft
L Rating At 400 F – Less Than 1 CFM/Sq Ft

3. Through–Penetrants –– One metallic pipe or tubing to be centered within the firestop system. Pipe or tubing to be rigidly supported on both sides of wall assembly. The following types and sizes of metallic pipes or tubing may be used:
   A. Steel Pipe –– Nom 10 in. diam (or smaller) Schedule 10 (or heavier) steel pipe.
   B. Copper Tubing –– Nom 4 in. diam (or smaller) Type L (or heavier) copper tubing.
   C. Copper Pipe –– Nom 4 in. diam (or smaller) Regular (or heavier) copper pipe.
4. Pipe Covering* –– Nom 2 in. thick hollow cylindrical heavy density (min 3.5 pcf) glass fiber units jacketed on the outside with an all service jacket. Longitudinal joints sealed with metal fasteners or factory–applied self–sealing lap tape. Transverse joints secured with metal fasteners or with butt tape supplied with the product. A nom annular space of 1–1/8 in. is required within the firestop system.

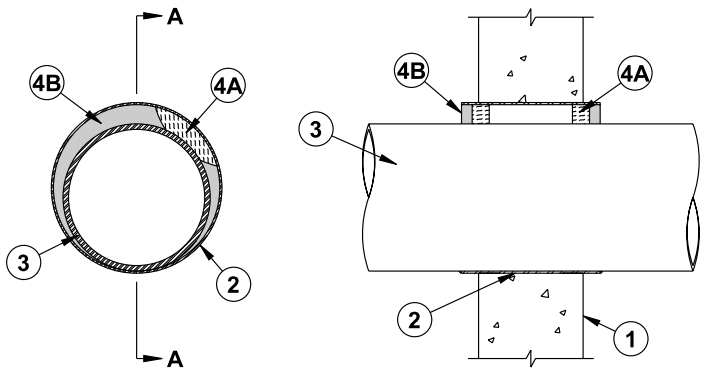
See Pipe and Equipment Covering –– Materials (BRGU) category in the Building Material Directory for the names of manufacturers. Any pipe covering material meeting the above specifications and bearing the UL Classification Marking with a Flame Spread Index of 25 or less and a Smoke Developed Index of 50 or less may be used.

5. Steel Collar –– Collar fabricated from precut 0.017 in. thick (28 MSG) galv sheet steel available from the sealant manufacturer. Collar shall be nom 2 in. deep with min 1–1/4 in. wide by 2 in. long anchor tabs for securement to wall surface. Retainer tabs, 1/4 in. wide by 3/4 in. long and located opposite the anchor tabs are folded 90 degrees toward pipe surface to maintain the annular space around the pipe and to retain the fill material. Collar secured to surface of wall with 1/4 in. toggle bolts. A nom 1/2 in. wide stainless steel hose clamp was secured to each of the collars at mid–depth.
6. Fill, Void or Cavity Material* –– Sealant –– In 1 hr fire rated assemblies, min 5/8 in. thickness of fill material applied within the annulus. In 2 hr fire rated assemblies, min 1–1/4 in. thickness of fill material applied within the annulus. Additional fill material applied to completely fill the collars.

HILTI CONSTRUCTION CHEMICALS, DIV OF
HILTI INC –– FS–One Sealant
*Bearing the UL Classification Mark

HILTI® FIRESTOP SYSTEMS

CLASSIFIED C UL US



Section A-A

System No. W-J-1099
October 11, 2000
F Rating — 2 Hr
T Ratings — 1/4, 3/4 and 1 Hr (See Item 3)

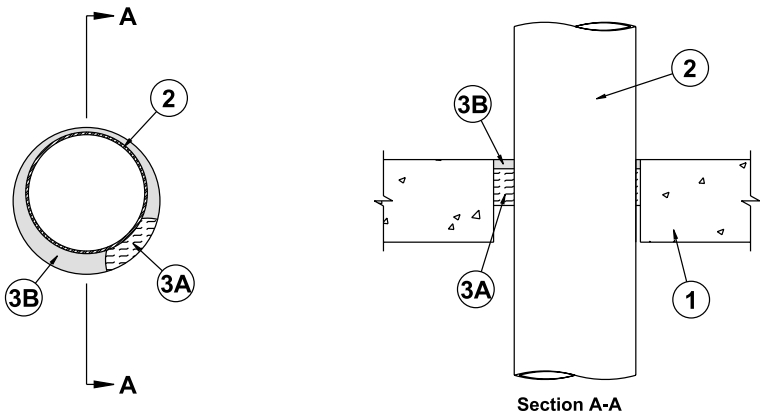
1. **Wall Assembly** — Min 6 in. thick reinforced lightweight or normal weight (100-150 pcf) concrete. Wall may also be constructed of any UL Classified **Concrete Blocks*.** Max diam of opening is 2 in. larger than OD of through penetrant.
   See **Concrete Blocks** (CAZT) category in the Fire Resistance Directory for names of manufacturers.
2. **Steel Sleeve** — Cylindrical sleeve fabricated from 0.0125 in thick (30 gauge) galv sheet steel and having a min 2 in. lap along the longitudinal seam. Length of the sleeve to be equal to or max 2 in. greater than the thickness of the wall. Sleeve installed by coiling the sheet steel to a diam smaller than the through opening, inserting the coil through the opening and releasing the coil to let it uncoil against the circular opening in concrete. The ends of the steel sleeve shall be flush with or extend a max 1 in. beyond each surface of the wall.
   As an alternate, steel sleeve may consist of nom 10 in. diam (or smaller) Schedule 5 (or heavier) steel pipe sleeve cast or grouted into concrete. The ends of the steel sleeve shall be flush with or extend a max 1 in. beyond each surface of the wall.
3. **Through Penetrant** — One metallic pipe, conduit or tube to be installed eccentrically or concentrically within the firestop system. The annular space between the pipe, conduit or tube and the steel sleeve shall be min 0 in. (point contact) to max 2 in. Pipe, conduit or tube to be rigidly supported on both sides of the wall assembly. The following types and sizes of metallic pipes, conduits and tubes may be used:
   A. **Steel Pipe** — Nom 8 in. diam (or smaller) Schedule 5 (or heavier) steel pipe.
   B. **Iron Pipe** — Nom 8 in. diam (or smaller) cast or ductile iron pipe.
   C. **Conduit** — Nom 6 in. diam (or smaller) rigid steel conduit, nom 4 in. diam (or smaller) steel electrical metallic tubing (EMT) or nom 4 in. diam (or smaller) flexible steel conduit.
   D. **Copper Pipe** — Nom 4 in. diam (or smaller) Regular (or heavier) copper pipe.
   E **Copper Tube** — Nom 4 in. diam (or smaller) Type L (or heavier) copper tube.

Type of Penetrant	Max Diam	T Rating
Steel or iron pipe, steel conduit or EMT	2 in.	1 hr
Steel or iron pipe, steel conduit or EMT	8 in.	3/4 hr
Copper pipe or tube	4 in.	1/4 hr

3A. **Through Penetrating Product*** — **Flexible Metal Piping** — As an alternate to Item 3, one nom 2 in. diam (or smaller) steel flexible metal pipe to be installed either concentrically or eccentrically within the firestop system. The annular space between the pipe, conduit or tube and the steel sleeve shall be min 0 in. (point contact) to max 2 in. Pipe to be rigidly supported on both sides of the wall assembly. **When flexible metal piping is used, T Rating is 1 hr.**
   OMEGA FLEX INC
   TITEFLEX CORP
   A BUNDY CO
   WARD MFG INC
4. **Firestop System** — The firestop system consists of the following items:
   A. **Packing Material** — Min 1 in. thickness of min 4 pcf mineral wool batt insulation compressed and tightly packed into each end of steel sleeve. Packing material recessed from each end of steel sleeve. When alternate steel pipe sleeve is used, packaging material may be omitted from the firestop system.
   B. **Fill, Void or Cavity Material*** — **Sealant** — Min 5/8 in. thickness of fill material applied within annulus, flush with each end of steel sleeve. At point contact location, min 1/4 in. diam bead of fill material applied at metallic pipe/steel sleeve interface on both surfaces of wall. Optionally, a min 1/4 in. diam bead of fill material shall be applied around the circumference of the steel sleeve at its egress from each side of the wall.
      SPECIFIED TECHNOLOGIES INC — SpecSeal LCI Sealant

*Bearing the UL Classification Marking

FOD-3431



Section A-A

System No. C-AJ-7023
January 06, 1999
F Rating — 2 Hr
T Rating — 0 Hr

1. **Floor or Wall Assembly** — Min 4-1/2 in. thick reinforced lightweight or normal weight (100-150 pcf) concrete. Wall may also be constructed of any UL Classified **Concrete Blocks*.** Max diam of opening is 8 in.
   See **Concrete Block** (CAZT) category in the Fire Resistance Directory for names of manufacturers.
2. **Steel Duct** — Nom 6 in. diam (or smaller) No. 28 gauge (or heavier) steel duct or nom 4 in. diam (or smaller) No. 30 gauge (or heavier) steel duct. One steel duct to be installed either concentrically or eccentrically within the firestop system. The annular space between the steel duct and the periphery of the opening shall be min 1/4 in. to a max 1-3/4 in. Steel duct to be rigidly supported on both sides of floor or wall assembly.
3. **Firestop System** — The firestop system shall consist of the following:
   A. **Packing Material** — Min 2 in. thickness of min 4 pcf mineral wool batt insulation firmly packed into opening as a permanent form. Packing material to be recessed from top surface of floor or from both surfaces of wall as required to accommodate the required thickness of fill material.
   B. **Fill, Void or Cavity Material*** — **Sealant** — Min 1/2 in. thickness of fill material applied within the annulus, flush with top surface of floor or with both surfaces of wall assembly.
      SPECIFIED TECHNOLOGIES INC — SpecSeal 100, 101, 102 or 105 Sealant

*Bearing the UL Classification Marking

Created or Revised: 09/01/01
Specified Technologies, Inc., Somerville, NJ (800) 992-1180
FOD-3078

Part 1 General

1.1 SECTION INCLUDES

.1 Materials, preparation and application for caulking and sealants.

1.2 RELATED SECTIONS

.1 Section 01 33 00 - Submittal Procedures.

.2 Section 01 45 00 - Quality Control.

1.3 REFERENCES

.1 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-19.24, Multi-Component Sealing Compound.

.2 Health Canada/Workplace Hazardous Materials Information System (WHMIS)

.1 Material Safety Data Sheets (MSDS).

1.4 SUBMITTALS

.1 Submit product data in accordance with Section 01 33 00 - Submittal Procedures.

.2 Manufacturer's product to describe.

.1 Caulking compound.
.2 Primers.
.3 Sealing compound, each type, including compatibility when different sealants are in contact with each other.

.3 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.

.4 Submit samples of each type of material and colour.

.5 Cured samples of exposed sealants for each color where required to match adjacent material.

.6 Submit manufacturer's instructions in accordance with Section 01 33 00 - Submittal Procedures.

.1 Instructions to include installation instructions for each product used.

1.5 DELIVERY, STORAGE, AND HANDLING

.1 Deliver, handle, store and protect materials in accordance with manufacturer’s recommendations.

.2 Deliver and store materials in original wrappings and containers with manufacturer's seals and labels, intact. Protect from freezing, moisture, water and contact with ground or floor.

1.6 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials in accordance with Section 01 74 19 - Construction/Demolition Waste Management and Disposal.

1.7 PROJECT CONDITIONS

.1 Environmental Limitations:

.1 Do not proceed with installation of joint sealants under following conditions:

.1 When ambient and substrate temperature conditions are outside limits permitted by joint sealant manufacturer or are below 5 degrees C.

.2 When joint substrates are wet or frost present.

.2 Joint-Width Conditions:

.1 Do not proceed with installation of joint sealants where joint widths are less than those allowed by joint sealant manufacturer for applications indicated.

.2 Assume all concrete joints need to be widened 10 15mm by grinder.

.3 Joint-Substrate Conditions:

.1 Do not proceed with installation of joint sealants until contaminants capable of interfering with adhesion are removed from joint substrates.

1.8 ENVIRONMENTAL REQUIREMENTS

.1 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials; and regarding labelling and provision of Material Safety Data Sheets (MSDS) acceptable to Labour Canada.

.2 Conform to manufacturer's recommended temperatures, relative humidity, and substrate moisture content for application and curing of sealants including special conditions governing use.

Part 2 Products

2.1 SEALANT MATERIALS

.1 Do not use caulking that emits strong odours, contains toxic chemicals or is not certified as mould resistant in air handling units.

.2 When low toxicity caulks are not possible, confine usage to areas which off-gas to exterior, are contained behind air barriers, or are applied several months before occupancy to maximize off-gas time.

.3 Where sealants are qualified with primers use only these primers.

2.2 SEALANT MATERIAL DESIGNATIONS

.1 For exposed concrete to metal and concrete to concrete surfaces:

- .1 To CAN/CGSB-19.13.
- .2 Acceptable material:
  - .1 TREMCO SILICONE SPECTRUM 1, OFF WHITE

.2 For concealed metal to metal surfaces.

- .1 To CAN/CGSB-19.13.
- .2 Acceptable material:
  - .1 TREMCO SPECTRUM 2, BLACK

.3 Preformed Compressible and Non-Compressible back-up materials.

- .1 Norton Tape Spacer and Sealant Back-up
  - .1 1 side adhesive surface 3mm x 9mm
- .2 Pocket Foamed-in-place insulation and air seal back-up.
  - .1 Dufoam (Dutab Inc.)
- .3 Polyethylene Rope Back-up
  - .1 Extruded closed cell foam backer road
  - .2 Size: oversize 30%

.4 For acoustical sealing of metal stud drywall partitions

- .1 To ASTM C919, interior, non-skinning, non-hardening, simple component synthetic rubber sealant.
- .2 Acceptable material:
  - .1 TREMCO Acoustical/Curtainwall Sealant, dark gray

2.3 JOINT CLEANER

.1 Non-corrosive and non-staining type, compatible with joint forming materials and sealant recommended by sealant manufacturer.

.2 Primer must be used for all concrete substrates – type as recommended by manufacturer.

.3 Primer: as recommended by sealant manufacturer.

.4 Cleaning material: xylol, methylethylketone (MEK), toluol, or as recommended by the sealant manufacturer. For surfaces to receive Type 2 sealant, MED shall be the only acceptable cleaner.

Part 3 Execution

3.1 PROTECTION

.1 Protect installed *Work* of other trades from staining or contamination.

3.2 SURFACE PREPARATION

.1 Examine joint sizes and conditions to establish correct depth to width relationship for installation of backup materials and sealants.

.2 Clean bonding joint surfaces of harmful matter substances including dust, rust, oil grease, and other matter which may impair *Work*.

.3 Do not apply sealants to joint surfaces treated with sealer, curing compound, water repellent, or other coatings unless tests have been performed to ensure compatibility of materials. Remove coatings as required.

.4 Ensure joint surfaces are dry and frost free.

.5 Prepare surfaces in accordance with manufacturer's directions.

3.3 PRIMING

.1 Where necessary to prevent staining, mask adjacent surfaces prior to priming and caulking.

.2 Prime sides of joints in accordance with sealant manufacturer's instructions immediately prior to caulking.

3.4 BACKUP MATERIAL

.1 Apply bond breaker tape where required to manufacturer's instructions.

.2 Install joint filler to achieve correct joint depth and shape, with approximately 30% compression.

3.5 MIXING

.1 Mix materials in strict accordance with sealant manufacturer's instructions.

3.6 APPLICATION

.1 Sealant.

.1 Apply sealant in accordance with manufacturer's written instructions.

.2 Mask edges of joint where irregular surface or sensitive joint border exists to provide neat joint.

.3 Apply sealant in continuous beads.

.4 Apply sealant using gun with proper size nozzle.

.5 Use sufficient pressure to fill voids and joints solid.

.6 Form surface of sealant with full bead, smooth, free from ridges, wrinkles, sags, air pockets, embedded impurities.

.7 Tool exposed surfaces before skinning begins to give slightly concave shape.

.8 Remove excess compound promptly as work progresses and upon completion.

.2 Curing.

.1 Cure sealants in accordance with sealant manufacturer's instructions.

.2 Do not cover up sealants until proper curing has taken place.

.3 Cleanup.

.1 Clean adjacent surfaces immediately and leave Work neat and clean.

.2 Remove excess and droppings, using recommended cleaners as work progresses.

.3 Remove masking tape after initial set of sealant.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

.1 Section 01 33 00 - Submittal Procedures.

.2 Section 07 92 10 - Joint Sealing: Caulking of joints between frames and other building components.

.3 Section 08 71 10 - Door Hardware - General: Supply of finish hardware.

.4 Section 08 80 50 - Glazing

.5 Section 09 91 23 - Painting.

1.2 REFERENCES

.1 Canadian Standards Association (CSA International)

.1 G40.20/G40.21-[98], General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.

.2 Canadian Steel Door Manufacturers' Association, (CSDMA).

.1 CSDMA, Specifications for Commercial Steel Doors and Frames, [1990].

.2 CSDMA, Recommended Selection and Usage Guide for Commercial Steel Doors, [1990].

.3 CSDMA Dimensional Standards for Commercial Steel Doors and Frames.

.3 National Association of Architectural Metal Manufacturers - Hollow Metal Manufacturers Association (NAAMM-HMMA)

.1 NAAMM-HMMA 840 Installation Guide for Commercial Steel Doors and Frames

1.3 TESTING AND PERFORMANCE

.1 Product quality shall meet standards set by the Canadian Steel Door Manufacturers Association.

1.4 SHOP DRAWINGS

.1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.

.2 Indicate each type of door, material, steel core thicknesses, mortises, reinforcements, location of exposed fasteners, openings, arrangement of hardware and finishes.

.3 Indicate each type frame material, core thickness, reinforcements, glazing stops, location of anchors and exposed fastenings and reinforcing finishes.

.4 Include schedule identifying each unit, with door marks and numbers relating to numbering on drawings and door schedule.

.5 Submit test and engineering data, and installation instructions.

1.5 WARRANTY

.1 All steel door and frame products shall be warranted from defects in workmanship for a period of one (1) year from date of shipment.

Part 2 Products

2.1 DOOR MATERIALS

.1 Steel: Doors shall be fabricated from tension leveled steel to ASTM A924-97 (M-97), galvanized to ASTM A653-97 (M-97), Commercial Steel (CS), Type B, coating designation A40 (ZF120), known commercially as paintable Galvanneal.

.2 Adhesives: Heat resistant, single component, polyurethane reactive (water) hot melt, thermoset adhesive UL/ULC/WH approved or equivalent.

.3 Interlocking Edge Seams: Resin reinforced polychloroprene (RRPC), fire resistant, high viscosity, sealant/adhesive or UL approved or equivalent.

.4 Primer: Rust inhibitive touch-up only. Touch-up prime CAN/CGSB-1.181.

.5 Glazing: refer to Section 08 80 50

2.2 DOOR CONSTRUCTION

.1 General: All steel doors shall be as manufactured by Fleming

.1 Doors shall be swinging, 1.75" (44.4mm) thick (1.875"/47.6 for H12-Series), of the types and sizes indicated on the Architect's schedules or drawings.

.2 Door faces of all steel doors shall be fabricated without visible seams, free of scale, pitting, coil brakes, buckles and waves.

.3 Formed edges shall be true and straight with a minimum radius for the thickness of steel used.

.4 Lock and hinge edges shall be beveled 1/8" in 2" unless builders' hardware or door swing dictates otherwise.

.5 Top and bottom of doors shall be provided with inverted, recessed, 16 gage steel end channels, welded to each face sheet at 6" (150mm) on center maximum. Add closure top and bottom of same material and gage to eliminate recess and provide smooth finish.

.2 Interior doors shall be Fleming *D* Series.

.1 Face sheets of interior doors shall be fabricated from *16* gage steel.

.2 Stiffened, insulated and sound deadened with *honeycomb* core laminated under pressure to each face sheet.

.3 Longitudinal edges of interior doors shall be mechanically interlocked, adhesive assisted with edge seams t*ack welded, filled and sanded flush with no visible seam.*

.4 Glazing: refer to Section 08 80 50

.3 Exterior doors shall be Fleming H Series.

.1 Face sheets of interior doors shall be fabricated from *16* gage steel.

.2 Stiffened, insulated and sound deadened with *honeycomb* core laminated under pressure to each face sheet.

.3 Longitudinal edges of doors shall be mechanically interlocked, adhesive assisted with edge seams t*ack welded, filled and sanded flush with no visible seam.*

.4 Batt insulated interior.

.4 Hardware Preparations:

.5 Doors shall be factory blanked, reinforced, drilled and tapped for fully templated mortised hardware only, in accordance with the final approved schedule and templates provided by the hardware supplier.

.6 Templated holes .5" (12.7mm) diameter and larger shall be factory prepared, except mounting and through bolt holes, which shall be by the contractor responsible for installation on site, at the time of application. Templated holes less than .5" (12.7mm) diameter shall be factory prepared only when required for the function of the device (for knobs, levers, cylinders, thumb or turn pieces) or when these holes over-lap function holes.

.7 Drilling and tapping for surface mounted hardware or mortised hardware that is not fully templated shall be by the contractor responsible for installation on site, at the time of application.

.8 Hinge and pivot reinforcements shall be 10 gage steel minimum high frequency type reinforcing.

.9 Lock, strike and flush bolt reinforcements shall be 16 gage steel minimum.

.10 Reinforcements for concealed closers and holders shall be 12 gage steel minimum.

.11 For surface mounted hardware, reinforcements shall be 16 gage steel minimum.

.4 Finishing:

.1 Remove weld slag and splatter from exposed surfaces.

.2 All tool marks, abrasions and surface blemishes shall be filled and sanded to present smooth uniform surfaces.

.3 On exposed surfaces where zinc coating has been removed during fabrication, doors shall receive a factory applied touch-up primer.

.4 Primer shall be fully cured prior to shipment.

2.3 FRAME MATERIALS

.1 Steel: Frame product shall be fabricated from tension leveled steel to ASTM A924 -97 (M-97), galvanized to ASTM A653-97 (M-97), Commercial Steel (CS), Type B, coating designation A40 (ZF120), known commercially as paintable Galvanneal.

.2 Primer: Rust inhibitive touch-up only

.3 Miscellaneous:

.1 Door Silencers: GJ-64 or equal, Single Stud rubber/neoprene type

.2 Thermal Breaks: Rigid polyvinylchloride (PVC) extrusion

.3 Fiberglass: Loose batt type, density: 1.5 pcf (24kg/m^3)(minimum), conforming to ASTM C665

2.4 FRAME CONSTRUCTION

.1 General:

.1 All steel frame product shall be as manufactured by Fleming of the types, sizes and profiles indicated on the Architects' schedules or details.

.2 Jambs and heads, shall be straight and uniform throughout their lengths.

.3 Factory assembled frame product shall be square, free of defects, warps or buckles.

.4 Corner joints shall be accurately mitered and tightly fitted with integral door stops mitered or butted when assembled.

.5 Frame product shall be fabricated with integral door stops having a minimum height of .625" (16mm).

.6 Where required due to site access, as indicated on the Architects' schedules or details, when advised by the contractor responsible for co-ordination or installation, or when shipping limitations so dictate, frame product shall be fabricated in sections for splicing in the field.

.7 Field spliced jambs, heads and sills shall be provided with 16 gage steel splice plates securely welded into one section, extending 4" (100mm) minimum each side of splice joint.

.8 Field splice joints shall be welded, filled and ground to present a smooth uniform surface by the contractor responsible for installation after assembly.

.9 On factory assembled frame product, each door opening shall be provided with two (2) temporary steel jamb spreaders welded to the base of the jambs or mullions to maintain proper alignment during shipping and handling. Spreaders shall be removed by the contractor responsible for installation prior to anchoring of frame to floor.

.2 Hardware Preparations:

.1 Frame product shall be blanked, reinforced, drilled and tapped for fully templated mortised hardware only, in accordance with the final approved schedule and templates provided by the hardware supplier.

.2 Drilling and tapping for surface mounted hardware or mortised hardware that is not fully templated shall be by the contractor responsible for installation on site, at the time of application.

.3 Frames shall be prepared for 4.5" (114.3mm) standard weight hinges (minimum).

.4 Hinge and pivot reinforcements shall be 10 gage steel minimum reinforcing, high frequency type shall be provided (except on R-Series frames).

.5 Reinforcements for surface mounted hardware, concealed closers and holders and flush bolts shall be 12 gage steel minimum.

.6 Mortised cutouts shall be protected with 22 gage steel minimum guard boxes.

.3 Anchorage:

.1 Frame product shall be provided with anchorage appropriate to floor, wall and frame construction.

.2 Each wall anchor shall be located immediately above or below each hinge reinforcement on the hinge jamb and directly opposite on the strike jamb, except as indicated below.

.3 After sufficient tightening of the anchor bolt, the head shall be welded so as to provide a non-removable application. Welded bolt and dimple shall be filled and ground to present a smooth uniform surface by the contractor responsible for installation, prior to finish painting.

.4 Channel extensions shall be provided from the top of the frame assembly to the underside of the structure above. Extensions shall be fabricated from 12 gage steel formed channels, mounting angles and adjusting brackets, with mounting angles welded to the inside of frame head. Formed channels, adjusting brackets and fasteners shall be shipped loose. Channels shall be mechanically connected to mounting angles and adjusting brackets with supplied fasteners, on site, by contractor responsible for installation.

.4 Finishing:

.1 Remove weld slag and spatter from exposed surfaces.

.2 All tool marks, abrasions and surface blemishes shall be filled and sanded to present smooth and uniform surfaces.

.3 On exposed surfaces where zinc has been removed during fabrication, frame product shall receive a factory applied touch-up primer.

.4 Primer shall be fully cured prior to shipment

2.5 PAINT

.1 Field paint steel doors and frames in accordance with Sections 09 91 23 - Painting. Provide final finish shall be free of scratches or other blemishes.

2.6 ACCESSORIES

.1 Door silencers: single stud rubber/neoprene type.

.2 Metallic paste filler: to manufacturer's standard.

.3 Sealants: silicone to CAN/CGSB-19.13 suitable for applications as recommended by manufacturers recommendations and requirements colour to be from manufacturer's full colour range to be submitted to Consultant for selection.

.4 Batt insulation: For exterior door and screen frames and/or to provide acoustical attenuation.

Part 3 Execution

3.1 INSTALLATION

.1 Set frame product plumb, square, aligned, without twist at correct elevation in accordance with NAAMM-HMMA 840.

.2 Frame Product Installation Tolerances:

.1 Plumbness tolerance, measured through a line from the intersecting corner of vertical members and the head to the floor, shall be ± .063".

.2 Squareness tolerance, measured through a line 90° from one jamb at the upper corner of the product, to the opposite jamb, shall be ± .063".

.3 Alignment tolerance, measured on jambs, through a horizontal line parallel to the plane of the wall, shall be ± .063".

.4 Twist tolerance, measured at face corners of jambs, on parallel lines perpendicular to the plane of the wall, shall be ± .063".

.3 Brace frame product rigidly in position while building-in. Remove temporary steel shipping jamb spreaders. Install wood spreaders at mid-point of frame rabbet height to maintain frame widths.

.4 Secure anchorages and connections to adjacent construction.

.5 Adjust operable parts for correct clearances and function.

.6 Steel surfaces shall be kept free of grout, tar or other bonding materials or sealers.

.7 Exposed field welds shall be finished to present a smooth uniform surface and shall be touched-up with a rust inhibitive primer.

.8 Exposed surfaces that have been scratched or otherwise marred during shipment, installation or handling shall be touched-up with a rust inhibitive primer.

.9 Finish paint in accordance with Section 09 91 23 – Painting.

.10 Install door silencers.

3.2 FINISH REPAIRS

.1 Touch up with primer finishes damaged during installation.

.2 Fill exposed frame anchors and surfaces with imperfections with metallic paste filler and sand to a uniform smooth finish.

END OF SECTION

Part 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

.1 This Section includes Manufacturer's Aluminum frame partition and windows for interior use only.

.2 Related Sections:

.1 Section 05 50 00 - Metal Fabrications.

.2 Section 07 92 10 - Joint Sealing and Protection

.3 Section 08 80 50 - Glazing

1.3 SUBMITTALS

.1 Product Data: submit printed producted literature, detail drawings, specifications and samples; include finishes as supplied by Manufacturer

.2 Shop Drawings: submit shop drawings to indicate material, thickness, finishes, methods of anchorage, supports, reinforcement, assembly details, accessories, height and width dimensions, coordination of door hardware as supplied by Manufacturer.

1.4 REQUIREMENTS

.1 Installer qualifications: engnage an experience installer with minimum 5 years of experience who has completed installation of Manufacturer's door and framing of similar design and extent to those of the Contract document and who has a record of successful performance.

.2 Manufacturer's qualifications: provide all glass fronts and doors produced by the Manufacturer.

.3 AAMA 603.8 – Voluntary Performance Requirements and Test Procedures for Pigemented Organic Coatings on Extruded Aluminum.

.4 AA-M12-C22-A44 – Voluntary Guide Specification and Inspection Methods for Electrostatic Deposited Colour Anodic Finish for Architectural Aluminum.

1.5 WARRANTIES

.1 Furnish Manufacturer's warranty for frames against defective material and workmanship which shall appear within a period of seven (7) years from the date of the architect's certificate of substantial performance.

1.6 ALTERNATES

.1 Refer to Section 5 – General Conditions of Contract and Section 01 33 00 Submittal Procedures.

.2 Alternate submissions to include:

.1 Submit evidence that alternate materials meet or exceed performance characteristics as set out in this specification.

.2 Submit references clearly indicating that the Manufacturer has successfully completed projects on an annual basis of similar scope and nature for a minimum of five years.

.3 Submit manufacturers' complete set of standard details and evidence that Warranty requirements meet or exceed performance guidelines as set out in the specifications.

.4 Submit a list of 5 projects executed over the past twelve months and any related case studies.

.5 Pre-Contract (Bidding Period) Substitutions: Submit written requests ten (10) days prior to bid date.

.6 Post-Contract (Construction Period) Substitutions: Submit written request in order to avoid storefront installation and construction delays.

.7 Product Literature and Drawings: Submit product literature and drawings modified to suit specific project requirements and job conditions.

.8 Certificates: Submit certificate(s) certifying substitute manufacturer (1) attesting to adherence to specification requirements for storefront system performance criteria, and (2) has been engaged in the design, manufacturer and fabrication of aluminum storefronts for a period of not less than ten (10) years.

.9 Test Reports: Submit test reports verifying compliance with each test requirement required by the project.

.10 Samples: Provide samples of typical product sections and finish samples in manufacturer's standard sizes.

.11 Substitution Acceptance: Acceptance will be in written form, either as an addendum or modification, and documented by a formal Change Order signed by Owner and Contractor.

.12 No extras to the contract will be approved due to product substitution.

Part 2 PRODUCTS

2.1 MANUFACTURERS

.1 Basis-of-Design Product:

.1 PC350 "Elite" Frames

.1 Contact: PC350, 130 Nolan Court, Markham ON. L3R 2V7

.2 Alternate or Equivalency: to be submitted in accordance with Part 1 Alternates requirements.

.3 1-3/4" Elite base and ceiling frame

.4 Glazing receptor: suited for ½" double glazing or single glazing as indicated on drawings and glazing specification.

.5 Mullions: None.

2.2 MATERIALS

.1 All sections shall be comprised of aluminum extrusions of 6063 alloy with T5 heat treatment.

.2 Framing wall thickness shall be .125” on exposed surfaces and .187” on internal webs.

.3 Steel members to be galvanized.

2.3 FINISH

.1 Factory finish extruded aluminum so that any parts exposed to view upon completion of installation will be uniform in finish and color.

.2 Standard Manufacturer Powder Coat Finish: comply with AAMA 2603.2002; mulitiple-stage electrostatic applied thermoset polyester finish, baked to ensure hardness.

.3 Finish: BLK [standard black]

Part 3 EXECUTION

3.1 CONDITIONS

.1 Deliver all aluminum framing and glazing screen material and related components in the manufacturer’s provided protective packaging. Do not deliver until ready for installation.

.2 Inspect all components for damage upon delivery.

.3 Deliver, store and handle materials in accordance with Manufacturer’s written instructions.

.4 Store all materials indoors, in dry locations. Ensure that materials do not come into direct contact with ground or damp substrates.

3.2 ASSEMBLY

.1 The award contractor shall be responsible for installation of all materials as specified above.

3.3 APPLICATION

.1 Comply with manufacturer’s printed installation instructions and approved shop drawings.

.2 Strictly adhered to manufacturer’s shop drawings specified widths and heights to ensure excellent fit and finish.

3.4 COMPLETION

.1 Clean exposed frames promptly after installation using ammonia free water based cleaner.

.2 Touch up marred areas so that the affected areas are not visible from a distance of 3 feet.

3.5 SCHEDULE

.1 Refer to attached drawings by Manufacturer for reference.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

.1 Section 08 11 14 Metal Doors And Frames.

1.2 SUBMITTALS

.1 The *Contractor* is to submit manufacturer's product data referenced to hardware schedule in accordance with Section 01 33 00 Submittals.

.2 Provide shop drawings for coordination with client

1.3 CLOSEOUT SUBMITTALS

.1 Submit operation and maintenance data for incorporation into the Operation and Maintenance Manuals in accordance with Section 01770 Project Closeout. Include keying charts, data, and direction.

.2 Brief Owner with regards to the proper care, cleaning and general maintenance of the *Products* of this section.

Part 2 Execution

2.1 INSTALLATION

.1 Install hardware in accordance with the Canadian Steel Door and Frame Manufacturers Association, and the manufacturer's recommendations.

.2 Door hardware supplied and installed by owner. Contractor to supply door with hinges.

.3 Carry-out final check of all door hardware prior to completion of the *Work*. Verify all hardware is in perfect operating condition.

.1 Keying for systems are to be carried out by Owner's locksmith. All cylinders to be supplied and installed by Owner's locksmith

.2 Corridor Doors D101

Trent to provide and install a card reader, an electric strike and new Besam auto operator. Trent to supply and install panic bars and pull handles. GC to provide power.

.3 Corridor Door D102

Trent to supply and install 4040XP door closer, finish selected from standard colours. Trent to supply and install panic bars and pull handles (10G05LL). Prep doors for cylindrical sets

.4 Meeting/Study Room Doors D103, D104, and D105

Supply of door levers by owner's door hardware contractor. Trent to install 10G0526DLL (office set door levers). GC to prep doors for cylindrical sets.

END OF SECTION

Part 1 General

1.1 SUMMARY

.1 Laminated acoustic glass.

1.2 RELATED SECTIONS

.1 Section 01 33 00 - Submittal Procedures

.2 Section 08 11 14 – Metal Doors And Fames.

.3 Section 08 11 16 – Aluminum Doors And Fames.

1.3 REFERENCES

.1 American Society for Testing and Materials International, (ASTM)

.1 ASTM D790-[02], Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.

.2 ASTM D1003-[00], Test Method for Haze and Luminous Transmittance of Plastics.

.3 ASTM D1929-[96(R2001)e1], Test Method for Determining Ignition Temperature of Plastics.

.4 ASTM D2240-[02b], Test Method for Rubber Property - Durometer Hardness.

.5 ASTM E84-[01], Test Method for Surface Burning Characteristics of Building Materials.

.6 ASTM F1233-[98], Test Method for Security Glazing Materials and Systems.

.2 Canadian General Standards Board (CGSB).

.1 CAN/CGSB-12.1-[M90], Tempered or Laminated Safety Glass.

.2 CAN/CGSB-12.2-[M91], Flat, Clear Sheet Glass.

.3 CAN/CGSB-12.3-[M91], Flat, Clear Float Glass.

.4 CAN/CGSB-12.4-[M91], Heat Absorbing Glass.

.5 CAN/CGSB-12.5-[M86], Mirrors, Silvered.

.6 CAN/CGSB-12.6-[M91], Transparent (One-Way) Mirrors.

.7 CAN/CGSB-12.8-[97], Insulating Glass Units.

.8 CAN/CGSB-12.9-[M91], Spandrel Glass.

.9 CAN/CGSB-12.10-[M76], Glass, Light and Heat Reflecting.

.10 CAN/CGSB-12.11-[M90], Wired Safety Glass.

.11 CAN/CGSB-12.12-[M90], Plastic Safety Glazing.

.3 Canadian Standards Association (CSA International).

.1 CSA A440.2-[98], Energy Performance Evaluation of Windows and Sliding Glass Doors.

.2 CSA Certification Program for Windows and Doors [2000].

.4 Environmental Choice Program (ECP).

.1 CCD-045-[95], Sealants and Caulking.

.5 Flat Glass Manufacturers Association (FGMA).

.1 FGMA Glazing Manual - [1997].

.6 Laminators Safety Glass Association (LSGA).

.1 LSGA Laminated Glass Design Guide [2000].

1.4 SUBMITTALS

.1 Product Data:

.1 Submit manufacturer's printed product literature, specifications and data sheet in accordance with Section 01 33 00 - Submittal Procedures.

.2 Submit two copies of WHMIS MSDS - Material Safety Data Sheets in accordance with Section 01 33 00 - Submittal Procedures. Indicate VOC's:

.1 For glazing materials during application and curing.

.2 Shop Drawings:

.1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.

.3 Manufacturer's Instructions:

.1 Submit manufacturer's installation instructions.

.4 Closeout Submittals:

.1 Provide maintenance data including cleaning instructions for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.

.1

1.5 QUALITY ASSURANCE

.1 Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties.

.2 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

1.6 SITE CONDITIONS

.1 Environmental Requirements:

.1 Install glazing when ambient temperature is 10 degrees C minimum. Maintain ventilated environment for 24 hours after application.

.2 Maintain minimum ambient temperature before, during and 24hours after installation of glazing compounds.

1.7 WASTE MANAGEMENT AND DISPOSAL

.1 Separate and recycle waste materials in accordance with Section 01 74 19 - Construction/Demolition Waste Management And Disposal.

.2 Divert metal cut-offs from landfill by disposal into on-site Metal recycling bin.

.3 Divert uninstalled materials for reuse at nearest used building materials facility or similar type facility.

.4 Divert unused caulking and sealant materials from landfill through disposal at special wastes depot.

.5 Unused or damaged glazing materials are not recyclable and must not be diverted to municipal recycling programs.

.6 Remove form site and dispose of packaging materials at appropriate recycling facilities.

.7 Dispose of corrugated cardboard, polystyrene, plastic packaging material in appropriate on-site bin for recycling in accordance with site waste management program.

1.8 WARRANTY

.1 Submit manufacturer's standard two (2) year warranty.

1.9 ALTERNATES

.1 Alternate submissions to include:

.1 Submit evidence that alternate materials meet or exceed performance characteristics as set out in this specification.

.2 Submit references clearly indicating that the Manufacturer has successfully completed projects on an annual basis of similar scope and nature for a minimum of five years.

.3 Submit manufacturers' complete set of standard details and evidence that Warranty requirements meet or exceed performance guidelines as set out in the specifications.

.4 Submit a list of 5 projects executed over the past twelve months and any related case studies.

.2 Substitution Acceptance: Acceptance will be in written form, either as an addendum or modification, and documented by a formal Change Order signed by Owner and Contractor.

Part 2 Products

2.1 MATERIALS

.1 GLS-1

.1 Basis of Design/Standard of Quality: PC350 Double Glazing
.2 Laminations to be made of tempered glass
.3 Thickness: 12mm per glazing layer
.4 Double glazed
.5 Acid etched (frosted)
.6 Size: Height as indicated on drawings. Width: Divide opening into glazing panels with width of 900mm.
.7 Acceptable alternate: Pilkington Optiphon 12.8 Acoustic Laminated Glass. Laminations to be made of Pilkington Optifloat Opal Acid Etched Toughened (Tempered) Glass

.2 GLS-2

.1 Basis of Design/Standard of Quality: PC350 Single Glazing
.2 Laminations to be made of tempered glass
.3 Size: Height as indicated on drawings. Width: Divide opening into glazing panels with width of 900mm.
.4 Thickness: 6mm
.5 Single glazed
.6 Clear glass

.3 GLS-3

.1 Basis of Design/Standard of Quality: Pilkington Optifloat Clear Toughened (Tempered) Glass
.2 Size: As indicated on door schedule.
.3 Thickness: 6mm
.4 Single glazed
.5 Clear

.4 GLS-4

.1 Basis of Design/Standard of Quality: Pilkington Optiphon 12.8.
.2 Acoustic Laminated glass with special acoustic PVB interlayer
.3 Laminations to be made of Pilkington Optifloat Opal Acid Etched Toughened (Tempered) Glass
.4 Size: As indicated on door schedule.
.5 Thickness: 12.8 mm
.6 Frosted (Acid Etched) Glazing

2.2 ACCESSORIES

.1 Setting blocks: Neoprene 80-90 Shore A durometer hardness to ASTM D2240, to suit glazing method, glass light weight and area.

.2 Spacer shims: Neoprene 50-60 Shore A durometer hardness to ASTM D2240, 75 mm long x one half height of glazing stop x thickness to suit application. Self adhesive on one face.

.3 Glazing tape:

.1 Closed cell polyvinyl chloride foam, coiled on release paper over adhesive on two sides, maximum water absorption by volume 2%, designed for compression of 25%, to effect an air and vapour seal;13 mm size or sized to suit.

.4 Glazing splines: EPDM, extruded shape to suit glazing channel retaining slot, colour to be selected by consultant after award from full range of manufacturer's colors.

.5 Sealants: as recommended by manufacturer.

.1 Sealant in contact with sealed unit edges to be compatible with unit edge sealants.

.2 Sealants to be compatible with glazing gaskets and glazing tapes.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

.1 Compliance: Comply with manufacturer's written data, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.

3.2 EXAMINATION

.1 Verify that openings for glazing are correctly sized and within tolerance.

.2 Verify that surfaces of glazing channels or recesses are clean, free of obstructions, and ready to receive glazing.

3.3 PREPARATION

.1 Clean contact surfaces with solvent and wipe dry.

.2 Seal porous glazing channels or recesses with substrate compatible primer or sealer.

.3 Prime surfaces scheduled to receive sealant.

3.4 INSTALLATION: INTERIOR - DRY METHOD (TAPE AND TAPE)

.1 Perform work in accordance with FGMA Glazing Manual, IGMAC and Laminators Safety Glass Association - Standards Manual for glazing installation methods.

.2 Cut glazing tape to length and set against permanent stops, projecting 1.6 mm above sight line.

.3 Place setting blocks at [1/4] [1/3] points, with edge block maximum 150 mm from corners.

.4 Rest glazing on setting blocks and push against tape for full contact at perimeter of light or unit.

.5 Place glazing tape on free perimeter of glazing in same manner described.

.6 Install removable stop without displacement of tape. Exert pressure on tape for full continuous contact.

.7 Knife trim protruding tape.

.8 Trim protruding tape edge.

3.5 CLEANING

.1 Perform cleaning after installation to remove construction and accumulated environmental dirt.

.2 Remove traces of primer, caulking.

.3 Remove glazing materials from finish surfaces.

.4 Remove labels after work is complete.

.5 Clean glass using approved non-abrasive cleaner in accordance with manufacture's instructions.

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

3.6 PROTECTION OF FINISHED WORK

.1 After installation, mark light with an "X" by using removable plastic tape or paste. Do not mark heat absorbing or reflective glass units.

3.7 SCHEDULE

.1 Refer to drawings and interior elevations for locations and quantities.

CONSULTANT: unit a architecture inc.

Part 1 General

1.1 RELATED SECTIONS

.1 Section 07 92 10 – Joint Sealing and Protection

.2 Section 09 25 00 - Gypsum Board

1.2 REFERENCES

.1 American Society for Testing and Materials International, (ASTM).

.1 ASTM C645-[14e1], Standard Specification for Nonstructural Steel Framing Members.

.2 ASTM C754-[15], Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products.

1.3 DESIGN CRITERIA FOR CEILINGS AND BULKHEADS

.1 Select Furring Channel and Carrying Channel system and span lengths to support specified loads with maximum deflection of L/360.

.2 Ceiling hanger system including hangers, rods and connectors to structure to safely support weight of framing system, double layer 5/8” gypsum panels and direct applied acoustic panel system.

.3 Secure drywall furring channel system directly to structural framing systems.

Part 2 Products

2.1 MATERIALS FOR CEILING AND BULKHEADS

.1 Hanger wire to be to the requirements of CAN/CSA S136-M89.

.2 Carrying channels to be to the requirements of CAN/CSA S136-M89.

.3 Drywall Furring Channels for screw attachment of gypsum board to be roll formed from 0.035” (0.89mm) thickness cold formed galvanized steel to the requirements of CAN/CSA S136-M89.

.4 Resilient channel roll formed from 0.018” (0.46mm) thick cold formed galvanized steel.

.5 Method of attachment of hangers, rods and or framing to the proposed and existing structure to suit conditions as approved by consultant.

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.6 Tie wire to be No. 16 IWG 0.065" (1.65mm) zinc coated annealed steel wire.

.7 Fasteners to secure metal framing together to be No. 8 x 9/16" Wafer Head Speed Tec Framing Screw.

2.2 MATERIALS FOR NON-LOAD BEARING INTERIOR PARTITION

.1 Non-load bearing channel stud framing: to ASTM C645, stud size as indicated on drawings, roll formed from 0.91 mm thickness hot dipped zinc-coated (galvanized) steel sheet in accordance with ASTM A653, Z180, for screw attachment of gypsum board.

.1 Knock-out service holes at 460 mm centres.

.2 Furring Channels: Commercial steel sheet in accordance with ASTM A653, Z180, hot dipped zinc-coated (galvanized), as follows:

.1 Hat Shaped, Rigid Furring Channels: ASTM C645, 0.75 mm thickness x 22 mm deep

.2 Resilient Furring Channels: 0.46 mm thickness x 13 mm deep members designed to reduce sound transmission having asymmetrical face attached to single flange by a slotted leg (web).

.3 Acoustical sealant: in accordance with Section 07 92 10 - Joint Sealing and Protection.

Part 3 Execution

3.1 GENERAL INSTALLATION

.1 Provide necessary studs, framing and furring systems to provide proper support for double layer gypsum board and direct applied acoustic ceiling system in accordance with good industry practice.

.2 Provide cooperation to other trades to accommodate window and door frames, mechanical and electrical items and any other work required to be incorporated into or coordinated with the partitions and ceiling systems.

3.2 ERECTION OF CEILINGS AND BULKHEADS

.1 Arrange hangers for suspended ceilings to provide support independent of walls, columns, pipes, ducts and install plumb.

.2 Securely attach hangers to structure to ensure the development of the full hanger strength.

.3 Space hangers 16" max. on centre and not more than 6" (150mm) from boundary walls, interruptions of continuity, and changes in direction.

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.4 Run Carrying Channels in opposite direction to structural framing members.

.5 Space Carrying Channels at 24” (610mm) centres maximum.

.6 When staggered splices are necessary, lap members at least 8” (200 mm) and wire each end with minimum of two (2) loops of tie wire.

.7 Install Furring Channels perpendicular to carrying channels 12” (300mm) on centre maximum and not more than 6” (150mm) from perimeter. Secure Furring Channels to carrying channel with two strands of tie wire.

.8 Finished work to be rigid, secure, square, level, plumb and erected to maintain dimensions and contours.

3.3 ERECTION OF NON-LOAD BEARING PARTITIONS

.1 Erect partitions in accordance with framing requirements of ASTM C754

.2 Align partition tracks at floor and ceiling and secure at 610 mm on centre maximum.

.3 Install damp proof course under stud shoe tracks of partitions on slabs on grade.

.4 Position studs in tracks at floor and ceiling at spacing indicated on drawings. Cross brace steel studs as required to provide rigid installation to manufacturer's instructions.

.5 Mechanically fasten studs to bottom and ceiling track

.6 Co-ordinate simultaneous erection of studs with installation of service lines. Align web openings when erecting studs.

.7 Co-ordinate erection of studs with installation of door/window frames and special supports or anchorage for work specified in other Sections.

.8 Frame openings and around built-in equipment, cabinets, access panels, on four sides. Extend framing into reveals. Check clearances with equipment suppliers.

.9 Install steel studs or furring channel between studs for attaching electrical and other boxes.

.10 Maintain clearance under beams and structural slabs to avoid transmission of structural loads to studs.

.11 Install two continuous beads of acoustical sealant under studs and tracks around perimeter of sound control partitions.

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END OF SECTION

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Part 1 General

1.1 RELATED SECTIONS

.1 Section 06 10 11 Rough Carpentry

.2 Section 09 22 16 Non Structural Metal Framing

.3 Section 09 91 00 Painting

Part 2 Products

2.1 MATERIALS

.1 GWB or Drywall: abuse resistant boards to CAN/CSA-A82.27, and as follows:

.1 Type and size: 5/8” x 48” x 96” ends square cut, edges square. To ASTM C1396/C1396M Type X.

.2 Type and size: 1/2” x 48” x 96” ends square cut, edges square. To ASTM C1396/C1396M regular.

.2 Where GWB or Drywall is subject to high humidity or swimming pool locations, type to be:

.1 Cement Board or “Green” Board units, min. ½” x 48” x 96”.

.3 In shower areas, Cement board must be used ½” x 48” x 96”.

.4 Metal furring runners, hangers, tie wires, inserts, and anchors: to CSA-A82.30, galvanised.

.5 Nails, screws, and staples: to CAN/CSA-A82.31.

.6 Screws: 1-1/2”, self-drilling, self-tapping, case hardened wallboard screws with square, socketed, countersunk heads, or as recommended by board manufacturer.

.7 Stud adhesive: to CAN/CSA-A82.31.

.8 Laminating compound: as recommended by board manufacturer, asbestos free.

.9 Casing beads, corner beads: 0.0197” thickness commercial grade sheet steel with Z275 zinc finish to ASTM A653M, perforated flanges, one-piece length per location.

.10 Reinforcing tape: 2” wide, perforated joint tape, as recommended by board manufacturer.

.11 Joint filler: to CAN/CSA-A82.31, asbestos free, as recommended by board manufacturer.

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.12 Polyethylene: to CAN/CGSB-51.34, Type 2.

.13 Waterproofing membrane for shower compartments: Type 2 in accordance with Section 07130 Sheet Waterproofing.

.14 Sealant: Type 4 in accordance with Section 07 90 00 Joint Protection.

.15 Closed Celled Foam Sound Deadening: Closed cell spray foam by Hilti, 3M or LePage

Part 3 Execution

3.1 WORKMANSHIP

.1 Do work in accordance with CAN/CSA-A83.31 supplemented as specified herein.

.2 Support light fixtures by *Providing* ceiling suspension hangers within 6” of each corner and, at maximum, 24” around perimeter of fixture.

.3 Install work level to a tolerance of 1:1200

.4 The perimeter of openings for access panels, light fixtures, diffusers, grilles, and the like, shall be framed with furring channels.

.5 Ceiling furring channels must be spaced a maximum of 16” on centre.

.6 Furr above suspended ceilings for gypsum board fire and sound stops and to form plenum areas as indicated.

.7 Furr openings and around built-in equipment, cabinets, access panels, and the like, on four sides. Extend furring into reveals. Check clearances with equipment suppliers.

.8 Furr duct shafts, beams, columns, pipes, and exposed services where indicated.

3.2 APPLICATION

.1 Do not apply gypsum board until buck, anchors, blocking, mechanical and electrical work have been reviewed and approved.

.2 Apply ½” diameter bead of acoustic sealant continuously around periphery of each face of partitioning to seal gypsum board/structure junction where partitions abut fixed building components. Seal full perimeter of cut-outs around electrical boxes, ducts, and the like, in partitions where perimeter sealed with acoustical sealant.

3.3 JOINT TREATMENT

.1 Filling shall be done manually or by mechanical taping and filling machine. Mix joint filler and taping cement according to manufacturer’s instructions.

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.2 At bevelled joints, apply thin coat of joint filler on each side of joint and embed reinforcing tape. Cover edge of embedded tape with tri-coat of joint filler. After bedding coat is dry, apply a second coat. Apply a third coat of topping cement feathered at least 6" each side of joint and blended into adjoining surface.

.3 At corners, apply filler over metal corner bead flush with nose of bead, and extend 3" onto surface of the bead each side of corner. Apply thin second coat after first is dry.

3.4 INSTALLATION

.1 Erect accessories straight, plumb, level, rigid, and at proper plane, according to manufacturer's instructions. Use full length pieces where practical. Make joints tight, accurately aligned, and rigidly secure. Mitre and fit corners accurately, free from rough edges. Secure 8" on centre using screws driven with a power screw driver and left with countersunk head slightly below board surface.

.2 Install casing beads around perimeter of suspended ceilings.

.3 Install casing beads where gypsum board butts surfaces giving no trim concealing junction and where indicated.

.4 Install shadow mould at gypsum board/ceiling juncture ad indicated. Minimise joints: use corner pieces and splicers.

.5 *Provide* continuous polyethylene dust barrier behind and across joints.

.6 *Provide* expansion joints at building expansion and construction joints. Provide continuous polyethylene dust barrier. *Provide* expansion joints straight and true.

.7 Splice corners and intersections together and secure to each member with three (3) screws.

.8 Fill screw head depressions with joint and taping compounds to bring flush with adjacent surface of gypsum board so as to be invisible after surface finish is completed.

.9 Sand lightly to remove burred edges and other imperfections. Avoid sanding adjacent surface of board.

.10 Completed installation to be smooth, level, plumb, free from waves and other defects, and ready for paint or acoustic panel finish, as indicated or scheduled.

.11 Apply one (1) coat of white primer sealer over surfaces to be textured. When dry, apply textured finish in accordance with manufacturer's instructions.

.12 Access Panels:

.1 Coordinate with mechanical and electrical contractor for exact locations of access panels to be installed.

.2 Refer to drawings for quantities.

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END OF SECTION

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Part 1 General

1.1 SUMMARY

.1 Section Includes:

.1 Mineral Fibre Acoustical ceiling panels

.2 Exposed grid Suspension System

1.2 SCOPE

.1 Interior finish repair as required to facilitate construction activities.

1.3 RELATED SECTIONS

.1 Mechanical and Electrical

1.4 ALTERNATES

.1 Prior Approval: Unless otherwise provided for in the Contract documents, proposed product substitutions may be submitted no later than TEN (10) working days prior to the date established for receipt of bids. Acceptability of a proposed substitution is contingent upon the Architect's review of the proposal for acceptability and approved products will be set forth by the Addenda. If included in a Bid are substitute products that have not been approved by Addenda, the specified products shall be provided without additional compensation.

.2 Submittals that do not provide adequate data for the product evaluation will not be considered. The proposed substitution must meet all requirements of this section, including but not necessarily limited to, the following: Single source materials suppliers (if specified in Section 1.5); Underwriters' Laboratories Classified Acoustical performance; Panel design, size, composition, color, and finish; Suspension system component profiles and sizes; Compliance with the referenced standards.

.3 Fibreglass based Ceiling systems or other “soft core substrate” ceiling systems are not an acceptable alternate.

1.5 REFERENCES

.1 American Society for Testing and Materials (ASTM):

.2 ASTM A 1008 Standard Specification for Steel, Sheet, Cold Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability

.3 ASTM A 641 Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire

.4 ASTM A 653 Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process

.5 ASTM C 423 Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method

.6 ASTM C 635 Standard Specification for Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings

.7 ASTM C 636 Recommended Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels

.8 ASTM D 3273 Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber

.9 ASTM E 84 Standard Test Method for Surface Burning Characteristics of Building Materials

.10 ASTM E 580 Installation of Metal Suspension Systems in Areas Requiring Moderate Seismic Restraint

.11 ASTM E 1111 Standard Test Method for Measuring the Interzone Attenuation of Ceilings Systems

.12 ASTM E 1414 Standard Test Method for Airborne Sound Attenuation between Rooms Sharing a Common Ceiling Plenum

.13 ASTM E 1264 Classification for Acoustical Ceiling Products

.14 International Building Code

.15 ASHRAE Standard 62.1-2004, Ventilation for Acceptable Indoor Air Quality

.16 NFPA 70 National Electrical Code

.17 ASCE 7 American Society of Civil Engineers, Minimum Design Loads for Buildings and Other Structures

.18 International Code Council-Evaluation Services - AC 156 Acceptance Criteria for Seismic Qualification Testing of Non-structural Components

.19 International Code Council-Evaluation Services Report - Seismic Engineer Report

.20 ESR 1308 - Armstrong Suspension Systems

.21 ICC-ES Evaluation Report ESR-1112.

.22 California Department of Public Health CDPH/EHLB Emission Standard Method Version 1.1 2010

.23 L.E.E.D. - Leadership in Energy and Environmental Design is a set of rating systems for the design, construction, operation, and maintenance of green buildings

1.6 SYSTEM DESCRIPTION

.1 Continuous/Wall-to-Wall

1.7 SUBMITTALS

.1 Product Data: Submit manufacturer's technical data for each type of acoustical ceiling unit and suspension system required.

.2 Samples: Minimum samples of specified acoustical panel and suspension system, including main runner and 4 foot cross tees.

.3 Shop Drawings: Layout and details of acoustical ceilings show locations of items that are to be coordinated with, or supported by the ceilings.

.4 Certifications: Manufacturer's certifications that products comply with specified requirements, including laboratory reports showing compliance with specified tests and standards. For acoustical performance, products must be tested to the E400 method.

.5 If the material supplied by the acoustical subcontractor does not have an Underwriter's Laboratory classification of acoustical performance on every carton, subcontractor shall be required to send material from every production run appearing on the job to an independent or NVLAP approved laboratory for testing, at the architect's or owner's discretion. All products not conforming to manufacturer's current published values must be removed, disposed of and replaced with complying product at the expense of the Contractor performing the work.

1.8 SUSTAINABLE MATERIALS

.1 Transparency: Manufacturers will be given preference when they provide documentation to support sustainable requirements for the following: Material ingredient transparency, Removal of Red List Ingredients per LBCV3, Life Cycle impact information, Low-Emitting Materials, and Clean Air performance.

.2 Health Product Declaration. The end use product has a published, complete Health Product Declaration with disclosure at a minimum of 1000ppm of known hazards in compliance with the Health Product Declaration open Standard.

.3 Declare Label. The end use product has a published Declare label by the International Living Future Institute with disclosure of 100 ppm with a designation of Red List Free or Compliant (less than 1% proprietary ingredients).

.4 Low Emitting products with VOC emissions data. Preference will also be given to manufacturers that can provide emissions data showing their products meet CDHP Standard Method v1.1 (Section 01350).

.5 Life cycle analysis. Products that have communicated lifecycle data through Environmental Product Declarations (EPDs) will be preferred.

.6 End of Life Programs/Recycling: Where applicable, manufacturers that provide the option for recycling of their products into new products at end-of-life through take-back programs will be preferred.

.7 Products meeting LEED V4 requirements including:

.1 Storage & Collection of Recyclables

.2 Construction and Demolition Waste Management Planning

.3 Building Life-Cycle Impact Reduction

.4 Building Product Disclosure and Optimization Environmental Product Declarations

.5 Building Product Disclosure and Optimization Sourcing of Raw Materials

.6 Building Product Disclosure and Optimization Material Ingredients

.7 Construction and Demolition Waste Management

1.9 QUALITY ASSURANCE

.1 Single-Source Responsibility: Provide acoustical panel units and grid components by a single manufacturer.

.2 Fire Performance Characteristics: Identify acoustical ceiling components with appropriate markings of applicable testing and inspecting organization.

.1 Surface Burning Characteristics: As follows, tested per ASTM E 84 and complying with ASTM E 1264 Classification.

.3 Acoustical panels, as with other architectural features located at the ceiling, may obstruct or skew the planned fire sprinkler water distribution pattern through possibly delay or accelerate the activation of the sprinkler or fire detection systems by channeling heat from a fire either toward or away from the device. Designers and installers are advised to consult a fire protection engineer, NFPA 13, or their local codes for guidance where automatic fire detection and suppression systems are present.

.4 Coordination of Work: Coordinate acoustical ceiling work with installers of related work including, but not limited to building insulation, gypsum board, light fixtures, mechanical systems, electrical systems, and sprinklers.

1.10 DELIVERY, STORAGE & HANDLING

.1 Deliver acoustical ceiling units to project site in original, unopened packages and store them in a fully enclosed space where they will be protected against damage from moisture, direct sunlight, surface contamination, and other causes.

.2 Provide labels indicating brand name, style, size and thickness.

.3 Before installing acoustical ceiling units, permit them to reach room temperature and a stabilized moisture content.

.4 Handle acoustical ceiling units carefully to avoid chipping edges or damaged units in any way.

1.11 PROJECT/SITE CONDITIONS

.1 Environmental Requirements:

.2 Do not install ceiling panels until building is closed in and HVAC system is operational.

.3 Locate materials onsite at least 24 hours before beginning installation to allow materials to reach temperature and moisture content equilibrium.

.4 Maintain the following conditions in areas where acoustical materials are to be installed 24 hours before, during and after installation:

.1 Relative Humidity: 65 - 75%.

.2 Uniform Temperature: 55 - 70 degrees F (13 - 21 degrees C).

1.12 COORDINATION

.1 Coordinate Work of this section with mechanical and electrical fixtures that will be installed in the ceiling system.

.2 The Ceiling system is an imperial sized suspension grid and panel.

1.13 WARRANTY

.1 Acoustical Panel: Submit a written warranty executed by the manufacturer, agreeing to repair or replace panels that fail within the warranty period. Failures include, but are not limited to the following:

.1 Acoustical Panels: Sagging and warping

.2 Grid System: Rusting and manufacturer's defects

.2 Acoustical panels and suspension systems one source manufacturer is Thirty (30) years from date of substantial completion.

.3 The Warranty shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and will be in addition to and run concurrent with other warranties made by the Contractor under the requirements of the Contract Documents.

1.14 MAINTENANCE

.1 Extra Materials: Deliver extra materials to Owner. Furnish extra materials described below that match products installed. Packaged with protective covering for storage and identified with appropriate labels.

.1 Acoustical Ceiling Units: Furnish quality of full-size units equal to 5.0 percent of amount installed.

.2 Exposed Suspension System Components: Furnish quantity of each exposed suspension component equal to 2.0 percent of amount installed.

Part 2 Products

2.1 MATERIALS

.1 Acoustical Ceiling Panels:

- .1 Basis of Design/Standard of Quality: Armstrong School Zone
- .2 Surface Texture: Fine Fissured
- .3 Composition: Mineral Fibre
- .4 Color: White
- .5 Size: 24 in x 48 in
- .6 Thickness: 15/16in
- .7 Edge Profile: Square Lay-In
- .8 Noise Reduction Coefficient(NRC): ASTM C 423 (E400); 0.70
- .9 Ceiling Attenuation Class (CAC): ASTM C 1414; 42
- .10 Flame Spread: ASTM E 1264; Class A
- .11 Light Reflectance (LR) White Panel: ASTM E 1477; 0.82
- .12 Dimensional Stability: HumiGuard Plus

.2 Suspension system:

- .1 Basis of Design/Standard of Quality: Armstrong Ultima Aluminum Suspension System
- .2 Size: 15/16”

Part 3 Execution

3.1 EXAMINATION

.1 Do not proceed with installation until all wet work such as concrete, plastering and painting has been completed and thoroughly dried out, unless expressly permitted by manufacturer's printed recommendations.

3.2 PREPARATION

.1 Measure each ceiling area and establish layout of acoustical units to balance border widths at opposite edges of each ceiling. Avoid use of less than half width units at borders, and comply with reflected ceiling plans.

.2 Coordinate panel layout with mechanical and electrical fixtures.

.3 Coordination: Furnish layouts for preset inserts, clips, and other ceiling anchors whose installation is specified in other sections.

.1 Furnish concrete inserts and similar devices to other trades for installation well in advance of time needed for coordination of other work.

3.3 INSTALLATION

.1 Install all ceiling suspension and panels in strict accordance with manufacturer's written instructions.

.2 Coordinate work of this section with other division including but not limited to:

.1 Sprinkler head installation

.2 Electrical and Mechanical equipment, registeres, grilles, diffusers, lighting

3.4 ADJUSTING AND CLEANING

.1 Replace damaged and broken panels.

.2 Clean exposed surfaces of acoustical ceilings, including trim, edge moldings, and suspension members. Comply with manufacturer's instructions for cleaning and touch up of minor finish damage. Remove any ceiling products that cannot be successfully cleaned and or repaired. Replace with attic stock or new product to eliminate evidence of damage.

.3 Before disposing of ceilings, contact the Manufacturer's Recycling Center to review with a consultant the condition and location of building where the ceilings will be removed. The consultant will verify the condition of the material and that it meets the Manufacturer's requirements for recycling. The Manufacturer's consultant with provide assistance to facilitate the recycle of the ceiling.

3.5 PROTECTION

.1 Protect installed work from damage due to subsequent construction activity, including temperature and humidity limitations and dust control, so that the work will be without damage and deterioration at the time of acceptance by the Owner.

3.6 SURPLUS MATERIAL

.1 Provide one (1) sealed carton of acoustical panels for each pattern and type required for the project.

END OF SECTION

1 GENERAL

1.01 SUMMARY

.1 Section Includes:

.1 vinyl sheet flooring

.2 resilient bases

1.02 RELATED REQUIREMENTS

.1 Section 02 41 19 – Selective Demolition

1.03 REFERENCE STANDARDS

.1 ASTM International (ASTM):

.1 ASTM F710-[22], Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring

.2 ASTM F1303-[04], Standard Specification for Sheet Vinyl Floor Covering with Backing

.3 ASTM F1482-[21], Standard Practice for Installation and Preparation of Panel Type Underlayments to Receive Resilient Flooring

.4 ASTM F1859-[21a], Standard Specification for Rubber Sheet Floor Covering Without Backing

.5 ASTM F1860-[21a], Standard Specification for Rubber Sheet Floor Covering With Backing

.6 ASTM F1861-[21], Standard Specification for Resilient Wall Base

.7 ASTM F1869-[22], Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride

.8 ASTM F1913-[19], Standard Specification for Vinyl Sheet Floor Covering Without Backing

.9 ASTM F2170-[19a], Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes

.2 CSA Group (CSA):

.1 CSA B651-[18], Accessible design for the built environment

.3 ULC Standards (ULC):

.1 CAN/ULC-S102.2:[2018], Test for Surface Burning Characteristics of Flooring, Floor Coverings, and Miscellaneous Materials and Assemblies

1.04 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Submit the following action submittals before starting work of this Section:

.1 Product Data: Product literature and data sheets, including product characteristics, performance criteria, physical sizes, finishes, and limitations.

.2 Submit 12” x 12” sample only if submitting substitutions to each material listed under Section 2.1 Materials

1.05 QUALITY ASSURANCE SUBMITTAL:

.1 Manufacturer’s printed installation instructions, including product storage requirements.

.2 Supplier shall be an established firm experienced with the specified flooring.

.3 Installer shall be experienced with the installation of specified flooring and be approved by the manufacturer.

1.06 CLOSEOUT SUBMITTALS

.1 Submit in accordance with Section 01 33 00 – Submittal Procedures.

.2 Operation and Maintenance Data: Include the following in the operation and maintenance manual:

.1 Manufacturer’s maintenance instructions.

.2 Recommended cleaning materials and methods.

.3 Warranty Documentation: Submit manufacturer's warranties.

1.07 STOCK MATERIALS

.1 Provide 25 SQ. FT of stock LVT-1 material.

1.08 DELIVERY, STORAGE, AND HANDLING

.1 Protect materials against damage in accordance with the manufacturer’s instructions.

2 PRODUCTS

2.01 REGULATORY REQUIREMENTS

.1 Comply with CAN/ULC-S102.2 for required flame-spread ratings labelled and listed by ULC Standards or another agency acceptable to the authority having jurisdiction.

2.02 RESILIENT SHEET FLOORING MATERIALS

.1 ‘LVT-1’ Sheet Vinyl with Backing:

.1 To ASTM F1303 sheet vinyl floor covering with backing

.2 Size: 2m x 20m x 3.7mm

.3 Acceptable Material: Polyflor Expona Silentflor 19dB PUR

.4 Substitutions:

.1 Type 1, Grade 1, Backing Class: C

.2 Acoustic Performance: 19dB sound reduction

.3 Slip resistance:

.1 Dry static coefficient of friction: To ASTM D2047: SCOF ≥0.5.

.4 Recyclable

.5 FloorScore certified.

.5 Colours and quantities as identified on drawings

2.03 VAPOUR BARRIER BELOW FLOORING

.1 Provide vapour barrier prior to installation of new flooring

.2 Product: Mapei Polyurethane Moisture Barrier Planiseal PMB, for damp concrete floors

2.04 RESILIENT BASE MATERIALS

.1 'RB-1' Resilient Base:

.1 To ASTM F1861 Type TP (thermoplastic rubber), Group 1 (solid/homogenous), Style B (cove), 1/8" thick x 4" high, manufactured in standard lengths minimum 8' long, complete with preformed inside and outside corners and end stops

.2 Installation: Recommended by respective manufacturer for use with specified flooring, stair treads, and base.

.3 Acceptable Materials: Johnsonite Resilient Vinyl, Armstrong or Consultant approved equivalent.

.4 Colours and quantities as identified on drawings

2.05 ACCESSORIES

.1 Subfloor Filler and Leveller: As recommended by resilient sheet flooring manufacturer.

.2 Primer: As recommended by resilient sheet flooring manufacturer for site conditions and application.

.3 Adhesives:

.1 Flooring Adhesives: As recommended by resilient sheet flooring manufacturer for site conditions and application.

.4 Heat Welding Bead: Solid strand product recommended by resilient sheet flooring manufacturer for heat welding seams.

.1 Colour and Pattern: Matching resilient sheet flooring colour and pattern

.5 Metal Transition and Edge Strips: In accordance with CSA B651 for height and slope, extruded aluminum, polished finish, with lip to extend under sheet flooring, shoulder flush with top of adjacent floor finish.

3 EXECUTION

3.01 EXAMINATION

1. Inspect the floor slab for proper tolerance.
2. The floor slab shall be smooth trowelled and level to a tolerance of 1/8” in a 10’ radius. High areas shall be ground down and low areas filled-in with approved leveling compounds.
3. Floor slab shall have been cured for a minimum of sixty (60) days.
4. The slab shall be cleaned of all debris, free from any grease, oil, paint, dust, or any contamination and have a moisture content of 5% or lower.
5. Examine subfloors prior to installation to determine that surfaces are smooth and free from cracks, holes, ridges, and other defects that might prevent adhesive bond or impair durability or appearance of the flooring material.
6. Report to the Consultant all damages, defects, unsatisfactory or unfavourable conditions before proceeding with flooring installation. Correct defective or unfavourable conditions expeditiously. Such corrective Work will not be considered or approved as a change in the Work.
7. Confirm to the Consultant that the adjacent abutting VCT matches thickness of proposed tiles and pattern.

3.02 RESILIENT SHEET FLOORING INSTALLATION

.1 Apply adhesive uniformly using manufacturer’s recommended trowel, followed by a roller or similar tool to knock down trowel ridges and eliminate them from telegraphing through finished flooring. Avoid spreading more adhesive than can be covered by resilient sheet flooring before initial adhesive sets. Applying adhesive only at perimeter is not acceptable.

.2 Lay with seams parallel to building lines to minimize number of seams. Border Widths: Minimum 1/3 of full material width.

.3 Double cut sheet joints and continuously heat weld according to manufacturer's instructions.

.4 Do not install over building expansion joints.

.5 As installation progresses and after installation, roll flooring in accordance with flooring manufacturer’s instructions to ensure full adhesion.

.6 Cut flooring neatly around fixed objects.

.7 Lay flooring to provide a minimum number of seams. Avoid cross seams, filler pieces, and strips. Match edges for color shading and pattern at the seams in compliance with the manufacturer's recommendations.

.8 Terminate flooring at centerline of door in openings where adjacent floor finish or colour is dissimilar.

.9 Install flooring wall to wall before the installation of floor-set cabinets, casework, furniture, equipment, movable partitions, etc. Extend flooring into toe spaces, door recesses, closets, and similar openings as shown on the drawings.

.10 Install metal edge strips at unprotected or exposed edges where flooring terminates.

3.03 RESILIENT BASE INSTALLATION

.1 Lay out resilient base to minimize joints.

.2 Clean substrate and apply one coat of adhesive.

.3 Set resilient base against wall and floor surfaces tightly by using 3 kg hand roller.

.4 Scribe, cut, and fit resilient base to door frames and other obstructions.

.1 Install preformed end stops at flush door frames.

.5 Preformed Corners: Install preformed corners in accordance with manufacturer's installation instructions

3.04 CLEANING

1. Upon completion of the Work, remove all debris, equipment and excess material resulting from the Work of this Section.

2. Clean, seal or wax the floor surface according to the flooring manufacturer’s printed instructions.

3.05 PROTECTION

.1 Prohibit traffic on resilient sheet flooring for a minimum 48 hours after installation.

.2 Protect resilient sheet flooring from damage from time of final set of adhesive until final inspection.

3.06 SCHEDULES

.1 Refer to Room Finish Schedule

END OF SECTION

1 GENERAL

1.1 RELATED REQUIREMENTS

.1 Section 01 33 00 – Submittal Procedures

1.2 REFERENCE STANDARDS

.1 ASTM International (ASTM):

.1 ASTM A641/A641M-[19], Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire

.2 ASTM C423-[17], Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method

.3 ASTM E413-[16], Classification for Rating Sound Insulation

.4 ASTM E1477-[98a], Standard Test Method for Luminous Reflectance Factor of Acoustical Materials by Use of Integrating-Sphere Reflectometers

.2 CSA Group (CSA):

.1 CSA B111-1974, Wire Nails, Spikes and Staples

.3 ULC Standards (ULC):

.1 CAN/ULC-S102-[10], Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies

1.3 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Samples: Minimum 6-inch x 6-inch sample of the colors selected in the ceiling or wall design, include manufacturer sample of suspension components.

.3 Product Data: Submit product data for each acoustic product and each type of mounting hardware.

.4 Shop Drawings:

.1 Submit shop drawings indicating elevation of each interior wall and ceiling with dimensioned acoustic room components. Locate acoustic products with dimensions to nearby walls. Include details of penetrations through acoustic panels/units. Include selected colours and suspension component details.

.5 Certificates: Manufacturer’s certifications that products comply with specified requirements, including laboratory reports showing compliance with specified tests and standards

1.4 CLOSEOUT SUBMITTALS

.1 Operation and Maintenance Data: Submit manufacturer’s recommendations for cleaning acoustic room components. Include recommended cleaning products and procedures, and warnings of products that could cause damage to finishes.

.2 Warranty Documentation: Submit manufacturer's warranty for each type of acoustic room component.

1.5 MAINTENANCE MATERIAL SUBMITTALS

.1 Extra Stock Materials:

.1 None required.

1.6 QUALITY ASSURANCE

.1 Qualifications:

.1 Manufacturer: Provide all acoustic panel products of the same type from a single manufacturer.

1.7 DELIVERY, STORAGE, AND HANDLING

.1 Handle acoustic units wearing clean non-marking gloves. Avoid damaging corners, chipping edges, or scratching visible surfaces.

.2 Store acoustic units in manufacturer's original packaging with labels, and in a dry indoor location, away from direct sunlight. Store units in a way that prevents sagging and other deformation.

1.8 SITE CONDITIONS

.1 Begin installation after building is enclosed and dust generating activities are completed.

.2 Allow wet work to dry before beginning installation.

.3 Maintain a uniform minimum temperature of 5°C and relative humidity of 25-85% for at least 72 hours before, during, and until adhesives have cured.

2 PRODUCTS

2.1 REGULATORY REQUIREMENTS

.1 Acoustic room components to comply with the following fire hazard classifications to CAN/ULC-S102:

.1 Flame Spread Rating: Maximum 150

2.2 SUSTAINABILITY CHARACTERISTICS

.1 Declare Label. The end use product has a published Declare label by the International Living Future Institute with disclosure of 100 ppm with a designation of Red List Free or Compliant (less than 1% proprietary ingredients).

.1 Low Emitting products with VOC emissions data

2.3 AWP-1 ACOUSTIC WALL PANELS

.1 Type: Polyester felt (PET) fiber acoustic sheet

.2 Product: Hush Acoustics, Shaped Wall Tiles.

.3 System NRC (to ASTM C423): 0.65

.4 Panel Size: Custom 66" H x 47.2"(1200mm) W. Coordinate with drawings.

.5 Edge Profile: 5mm Bevel Depth, 45° Bevel Angle

.6 Thickness: 12mm

.7 Flame Spread: Class A

.8 Panel Colour: as per Drawings Finish Schedule

.9 Mounting Type: French Cleat – 2" Z clips to Z-bar. Hardware is not supplied by manufacturer and is to be supplied by the GC.

.10 Accessories:

.1 Screws to CSA B111, appropriate for the substrate and that will not deteriorate due to aging, corrosion, or temperature variations, and as recommended by sound-absorbing ceiling unit manufacturer. Verify screw depth is

.2 Z-bar: Fastened to wall. Basis of Design: Richelieu Z-Shaped Aluminum Molding

.3 Z-bar hanger: 2.5" pre drilled clip, fastened to blind side of wall panel. Basis of Design: Richelieu Z-Bar Hanger

2.4 ACC-1, ACC-2, ACC-3 ACOUSTIC CEILING CLOUDS

.1 Type: Polyester felt (PET) fiber acoustic sheet

.2 Product: Hush Acoustics, Clouds.

.3 System NRC (to ASTM C423): 0.85

.4 Panel Size: Custom sizing. Refer to drawings for sizing and coordinate cutouts as required.

.5 Edge Profile: Square. Minimize appearance of seams between panels. Provide brackets as needed to join panels together.

.6 Thickness: 12mm

.7 Flame Spread: Class A

.8 Panel Colour: as per Drawings Finish Schedule

.9 Mounting Type: U-anchor, wire, and u-anchor.

.10 Acoustic felt valence to be same material. Provide brackets as needed to secure valence to cloud.

.11 Accessories:

.1 Screws to CSA B111, appropriate for the substrate and that will not deteriorate due to aging, corrosion, or temperature variations, and as recommended by sound-absorbing ceiling unit manufacturer.

.2 Provide brackets to join panels to minimize seams as required.

3 EXECUTION

3.1 EXAMINATION

.1 Verify substrates are flat to tolerance of plus or minus 3 mm over 3000 mm.

.2 Verify substrates are clean, dry

3.2 INSTALLATION - GENERAL

.1 Install acoustic room components plumb, level, and aligned.

.2 Arrange acoustic room components as indicated on Drawings.

.3 Neatly cut acoustic room components to accurately fit penetrating mechanical and electrical devices, and sprinkler heads with gaps concealed behind device trim.

.1 Leave 25-mm gap surrounding sprinkler heads.

3.3 INSTALLATION – ACOUSTIC WALL PANELS

.1 Install panels directly to wall substrates.

.2 Scribe acoustic panels to neatly fit adjacent work. Butt joints tight.

3.4 INSTALLATION – ACOUSTIC CEILING CLOUDS

.1 Install ceiling units by attaching wires to building's structural members or intermediate supports.

.2 Splay wires only where required to miss obstructions.

.3 Install wires for ceiling units plumb and free from contact with objects in ceiling plenum that are not part of supporting structure.

.4 Install trapezes or similar devices where width of ducts and other construction within ceiling plenum interfere with ideal wire locations.

3.5 CLEANING

.1 Keep acoustic room components clean.

3.6 PROTECTION

.1 When subsequent dust generating construction activities are unavoidable, protect acoustical room components with non-marring sheeting, type recommended by manufacturer.

.2 Replace damaged or broken panels

3.7 SCHEDULES

.1 Refer to Drawings.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

.1 Section 01 33 00 - Submittal Procedures.

.2 Section 07 90 00 – Joint Protection

.3 Section 08 11 14 – Metal Doors And Frames

.4 Section 09 25 00 – Gypsum Board

1.2 REFERENCES

.1 The Canadian Painting Contractors Association (CPCA) publication “The painting Specifications Manual 2000”, as distributed by the Ontario Painting Contractors Association (OPCA), shall govern all materials and execution practices for the work and materials of this section.

1.3 PRODUCT DATA

.1 Submit product data in accordance with Section 01 33 00 Submittals.

.2 Submit full records of all *Products* used. List each *Product* in relation to finish formula and include the following which are to correspond with the *Contract Documents*.

.1 Finish formula number.
.2 Colour number.
.3 Location of use.
.4 Manufacturer’s product number.
.5 Manufacturer’s name and address.

1.4 SAMPLES

.1 Submit samples in accordance with Section 01 33 00 Submittals.

.2 Submit 11” X 8” sample panels/drawdowns of each type of paint or stain and each colour.

1.5 QUALITY ASSURANCE

.1 Standards of acceptance:

.1 Walls: no defects visible from a distance of 36” at 90° to viewing surface.
.2 Ceilings: No defects visible from floor at 45° to surface when viewed using final lighting source.
.3 Final coat to exhibit uniformity of colour and uniformity of sheen across full surface area.

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1.6 DELIVERY, STORAGE AND HANDLING

.1 Deliver and store materials in original containers, sealed, with labels intact.

.2 Remove damaged, opened, and rejected materials from the *Place of the Work*.

.3 Provide and maintain dry, temperature controlled, and secure storage.

.4 Observe manufacturer's recommendations for storage and handling.

.5 Store *Products* and equipment away from heat generating devices, in a well ventilated area with temperature range of 7°C to 30°C.

.6 Store temperature sensitive *Products* above minimum and below maximum temperatures recommended by manufacturer.

.7 Remove *Products* and equipment from storage only in quantities required for same day use.

.8 Keep areas used for storage, cleaning, and preparation clean and orderly to the approval of the *Consultant*. After completion of operations, return areas to clean condition to approval of the *Consultant*.

Part 2 Products

2.1 MATERIALS

.1 Only Products listed in the CPCA Approved Products Lists are acceptable for use in the Work.

.2 Products for each finish formula to be products of a single manufacturer.

.3 Where possible, select Products exhibiting low odour characteristics. If two (2) Products are otherwise equivalent, select the Product with the lowest odour.

.4 Investigate and report on all existing finishes and compatibility of coating and finishing systems specified. Allow for changes in systems for compatibility with existing finishes.

2.2 COLOURS

.1 Perform all colour tinting operations prior to delivery of Products to the Place of the Work. Tinting will be allowed at the Place of the Work only with the Consultant's written authorisation.

.2 Second coat in a three (3) coat system to be tinted slightly lighter colour than top coat to show visible difference between coats.

.3 Colours as per drawing schedules

□

2.3 INTERIOR PAINT FINISHES

.1 **Formula 1**: for gypsum board/plaster walls, apply CPCA System INT-4-B, premium.

.1 Paint type to be 'DULUX® LIFEMASTER® Interior Latex 100% Acrylic Zero VOC paint' in Eggshell

.2 Use 'Zinsser Odourless Interior Oil Base Stain Blocker' as primer where it is applied on existing plaster, refer to product instruction.

.2 **Formula 4** (Alkyd) : for metal doors and frames, perimeter heating and misc metals (ceiling grid) . CPCA System INT 12A, premium satin finish.

.3 **Formula 6:** for Mechanical and Electrical Items:

.1 CPCA System INT 12A, premium satin finish.

.2 All conduit, ductwork, hangars, stacks.

.3 DO NOT PAINT OVER VALVES, CONTROLLERS, LABELS, TAGS of equipment.

Part 3 Execution

3.1 EXAMINATION

.1 Investigate existing substrates for problems related to proper and complete preparation of surfaces to be painted. Report to the *Consultant* in writing any unfavourable conditions before proceeding with application.

.2 Investigate moisture content of surfaces to be painted using electric moisture meter or other approved method and report findings to *Consultant*. Do not proceed with application until conditions fall within the following ranges:

.1 Concrete and concrete masonry: 12% to 14% for solvent coatings, and as recommended by manufacturer for water based coatings.

.2 Gypsum board and plaster: 12% to 14%.

.3 Wood: maximum 15%.

.3 Correct any defective work or unfavourable conditions expeditiously. Corrective work will not be considered or approved as a change in the *Work*.

3.2 PREPARATION

.1 Prepare surfaces to receive work of this section in accordance with Chapter 3 of the CPCA Manual.

.2 Prepare existing surfaces to be repainted in accordance with Article 6.2 of CAN-CGSB-85.100.

.3 Remove electrical cover plates, light fixtures, surface hardware on doors, door stops, washroom accessories, and all other surface mounted fittings and

fastenings prior to undertaking any painting operations. Store for reinstallation after painting operations have been completed.

.4 Cover or move portable equipment as necessary to carry out painting operations. Replace as painting operations progress.

.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 pre-treatment as soon as possible after cleaning and before deterioration occurs.

.6 Remove existing painting coat and sand with 80grit sandpaper where repaint is required, location refer to architecture drawing.

3.3 PROTECTION

.1 Protect surfaces not to be painted from paint splatters, markings, and other damage resulting from the work of this section. If damaged, clean and restore such surfaces as required or directed. Such reparatory work will not be considered or approved as a change in the *Work*.

.2 Cover or mask floors, windows, and other ornamental hardware adjacent to areas being painted to prevent damage and to protect from paint drops and splatters. Use non-staining coverings.

.3 Protect items that permanently attached.

.4 Protect factory finished *Products* and equipment.

.5 Protect passing persons in and about the *Place of the Work*.

3.4 MIXING

.1 Mix paint ingredients in container before and during use and ensure breaking up of lumps, complete dispersion of settled pigments, and uniform composition.

3.5 APPLICATION

.1 Method of application to be in accordance with manufacturer’s instructions and CPCA Painting Specification Manual.

.2 Brush application:

- .1 Work paint into cracks, crevices, and corners. Paint surfaces not accessible to brushes by spray, daubers, or sheepskins.
- .2 Brush out runs and sags.
- .3 Remove runs, sags, and brush marks for finished work and repaint.

.3 Use dipping, sheepskins, or daubers only when no other method is practical in places of difficult access and only when specifically authorised by the *Consultant*.

□

.4 Apply each coat of paint as a continuous film of uniform thickness. Repaint thin spots or bare areas before next coat of paint is applied.

.5 Allow surfaces to dry and properly cure after cleaning and between subsequent coats for minimum time period as recommended by manufacturer.

.6 Sand and dust between each coat to remove visible defects.

.7 Finish tops of cupboards, cabinets, and projecting ledges, both above and below sight lines, as specified or indicated for surrounding surfaces unless specifically indicated otherwise.

.8 Finish inside of cupboards and cabinets as specified or indicated for outside surfaces unless specifically indicated otherwise.

.9 Finish closets and alcoves as specified or indicated for adjoining rooms unless specifically indicated otherwise.

.10 Finish top, bottom, edges, and cutouts of doors after fitting as specified or indicated for door surfaces unless specifically indicated otherwise.

3.6 MECHANICAL AND ELECTRICAL EQUIPMENT

.1 Paint exposed conduits, piping, hangers, ductwork, and other mechanical and electrical equipment. Colour and texture to match adjacent surfaces, except for exposed gas and fire protection piping.

.2 Touch up scratches and marks on factory painted finishes and equipment with paint or finish as supplied by the manufacturer of that equipment.

.3 Do not paint over nameplates.

.4 Paint inside of ductwork where visible behind grilles, registers, and diffusers with primer and one (1) coat of matte black paint.

.5 Paint disconnect switches for fire alarm system and exit lights in red enamel.

.6 Paint both sides and edges of backboards of telephone and electrical equipment before installation. Leave equipment in original finish except for touch up as required, and paint conduits, mounting accessories, and other unfinished items.

3.7 CLEANING

.1 Clean and reinstall all hardware items that were removed before painting operations.

.2 Remove protective coverings and warning signs as soon as practical after operations cease.

.3 Remove paint splashings on exposed surfaces that were not painted. Remove smears and splatter immediately as operations progress.

□

.4 Protect freshly completed surfaces. Avoid scuffing newly applied paint.

.5 Restore areas used for storage, cleaning, mixing and handling of paint to clean condition.

END OF SECTION

□

Part 1 GENERAL

1.1 RELATED SECTIONS

.1 Section 06 10 11 - Rough Carpentry: Wood blocking and nailers.

.2 Section 09 22 16 - Non-Structural Metal Framing: Concealed supports in metal stud walls.

1.2 SHOP DRAWINGS

.1 Provide shop drawings in accordance with supplementary and/or general conditions. Show dimensional layouts together with fabrication and installation details based on site conditions.

.2 The general contractor, upon request, to forward to this sub-contractor a complete set of architectural drawings, specifications, addenda and colour schedule for use in preparation of shop drawings and execution of installation.

1.3 INSPECTION

.1 Prior to commencement of erection, all surfaces to be checked for irregularities, trueness and rigidity and projections and defects to be reported immediately to the general contractor for correction.

.2 On completion of the installation all materials and workmanship to be inspected for proper operation, rigidity and appearance, and any defective materials to be replaced with new materials prior to final inspection.

1.4 INSPECTION

.1 Samples to be provided to the architect, if requested, for his perusal and approval of all materials to be utilized in this installation.

1.5 STORAGE / DELIVERY

.1 The general contractor to be responsible for providing a dry, warm storage area capable of being locked for the storage of all materials. The general contractor shall unload all materials at the site and place in the aforementioned room.

1.6 SPECIAL PROTECTION

.1 During installation utmost care to be taken by workmen to ensure the protection of the work from damage by other trades until the building is ready for occupation and handed over to the owner.

.2 Protection of all materials during the painting operation shall be carried out by the use of polyethelene covering which shall be the responsibility of the painting contractor.

1.7 SPECIAL CLEANING

.1 Upon completion of all work – clean down, remove all stains, loose dirt and excessive adhesive, and leave all elements in a first-class condition at the point of handing over to the owner.

1.8 MAINTENANCE

.1 A label stating instructions for the care and maintenance of whiteboards to be affixed to the upper right hand corner of all whiteboard elevations for the use of the buildings maintenance staff.

1.9 WARRANTY

.1 Installation of all materials to be warranted for a period of 1 (one) year. This warranty covers both labour and material for replacement of defective materials.

.2 Whiteboards to be warranted for a period of 10 (ten) years against defects due to normal usage, and wear, and upon completion of contract a written warranty to be submitted to the owner by the sub-contractor.

Part 2 PRODUCTS

2.1 INSTALLATION / ERECTION

.1 Erection of materials to be carried out by competent craftsmen supervised by a foreman with at least 10 years experience in this specialized field.

.2 Overhead work such as ceiling grids, plumbing, electrical services, communications systems, painting, etc., to be in an advanced stage of completion in order not to impede this sub-contractor. Millwork units forming integral part of the chalkboard/tackboard installation to be located and affixed to the walls before commencing chalkboard/tackboard installation.

.3 Erection of materials shall be carried out in a substantial manner to ensure a rigid, straight, square, plumb and horizontal lines level.

.4 All aluminum trims to be attached in such a manner that all fastenings shall be concealed. Fastening to be accomplished by the use of #10 x 25.4mm (1") steel wood screws attached to the walls by the use of rawl plugs.

.5 Tackboards to be adhered to wall surface by the use of an adhesive as recommended by the supplier applied in egg-size blobs at approximately 200mm (8") centres. Tackboards to be pressed firmly into this adhesive to ensure proper adhesion.

.6 Whiteboards to be joined together by the use of a 14 gauge x 25.4mm (1") wide steel spline and an extruded polyvinyl slotted insert to ensure a flush butt joint with a hairline appearance.

2.2 WHITEBOARDS

.1 Acceptable Manufacturer: by ASI Visual Display Products, Mississauga, Ontario, consisting of a sandwich type construction composed of face panel, core and balancing rear sheet, in maximum panel sizes of 1219mm x 2438mm (4'0" x8'0")

.1 **Porcelain Enameled Steel Sheet:** ASTM A424/A424M, Type I, Commercial Steel, manufactured in accordance with Porcelain Enamel Institute's PEI-1002 specification consisting of sandwich-type construction of face panel with fired-on vitreous finish, core, and balancing rear sheet.

.2 Face Sheet Writing Surface:

.1 Polyvision e3 CeramicSteel, ultra-smooth writing surface; scratch, stain, bacteria, and fire resistant. Continuous coil-coating process, consisting of steel core of light gauge covered on both sides with thin enamel coatings for thickness of 0.014 inch (0.356 mm).

.2 Color: White Low Gloss.

.3 Core – 11.1mm (7/16") impregnated sound absorbing fibreboard laminated under heat and pressure to face panel and back sheet utilizing adhesives that ensure rupturing of the component materials before failure of joint contact surfaces.

.4 Back up balancing sheet – 28 gauge zinc coated stretcher leveled steel in one unjointed section. Overall thickness of Whiteboard lamination shall be 12.7mm (1/2").

.5 Colour of Whiteboards - to be determined by the Architect from the manufacturer's standard colour range.

2.3 ALUMINUM TRIM

.1 **ASI Visual Display Products,. Architectural Series 200**, aluminum to be 6063T5 alloy with clear etched and anodized 0.051mm (.002') satin finish free from extruding draw marks and surface scratches.

.2 **PERIMETER** – a.s.p. No. 205 trim for all tackboards and also vertical jambs of Whiteboards –

.3 19.1mm (3/4") exposed face and weight of approximately 91g (.20 lbs.) per lineal foot.

.4 **DIVIDER BAR** – a.s.p. No. 207 trim for adjacent Whiteboard/tackboard panels and adjacent tackboard/tackboard panels of elevations greater than 2438mm (8'0") – 12.7mm (1/2") exposed face and weight of approximately 113g. (.25lbs.) per lineal foot.

.5 **MAPRAIL** – a.s.p. No. 206 trim for Whiteboard elevation only complete with integral Forbo insert, end stops and two (2) combination roller maphooks per 1829mm (6) lineal feet – 50.8mm (2") exposed face and weight of approximately 159g. (.35lbs.) per lineal foot.

.6 **MARKERTRAY** – a.s.p. No. 212 triangular box section for Whiteboard elevations only complete with contour fitting end castings – 102mm (4") projection from finished wall *(86mm (3 3/8") projection from face of board)* and weight of approximately 454g (1.0 lbs.) per lineal foot.

.7 **MARKERTRAY OVER MILLWORK** – a.s.p. No. 264 wall mounted markertray for elevations mounted directly on/above millwork - 70mm (2 ¾") projection from finished wall *(50mm (2") projection from face of board)* and weight of approximately 200g. (.45 lbs.) per lineal foot.

.8 **SPLINE** - Whiteboards to be joined together by the use of a 14 gauge x 25.4mm (1") wide steel spline and an extruded polyvinyl slotted insert to ensure a flush butt joint with a hairline appearance.

Part 3 EXECUTION

3.1 SCHEDULE

.1 WB-1 White Board

.1 Provide the following:

.1 Aluminium Trim along perimeter of board with mitred corners

.2 Marker Tray

.3 Size: Overall size as per drawings to be assembled from standard sizes 2 x 3 / 3 x 4 / 4 x4 / 4x6 / 4 x 8 ft. as per Consultant mark-up on submittal.

.4 Fasteners: concealed.

.5 Ledgers: Continuous solid wood ledgers 3 - ¾ x 4 inches securely fastened horizontally into existing walls for leveling and closure.

END OF SECTION

1 GENERAL

1.01 RELATED REQUIREMENTS

Coordinate with Electrical drawings and specifications for power requirements.

NOTE: Equipment is not part of the base contract and will be awarded through cash allowance with furniture.

1.02 REFERENCE STANDARDS

.1 CSA Group (CSA):

.1 CSA C22.2 No. 120:[13], Refrigeration Equipment

.2 Department of Justice Canada:

.1 SOR/[2016]-137, Ozone-depleting Substances and Halocarbon Alternatives Regulations

1.03 ADMINISTRATIVE REQUIREMENTS

.1 Coordinate with electrical and millwork Subcontractors for power requirements, and space clearances, respectively.

.2 Review manufacturer's instructions and warranty requirements.

1.04 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Product Data: Product literature and data sheets including product characteristics, performance criteria, physical sizes, finishes, WHMIS SDSs, example warranty documentation, and limitations.

.1 Description of equipment giving manufacturers name, type, model, year, and capacity.

.2 Details of operation, servicing, and maintenance.

.3 Original Users Manual to be turned over to Owner’s representative.

.3 Sustainable Design Submittals: Information demonstrating sustainability characteristics specified in this Section related to refrigerants

1.05 CLOSEOUT SUBMITTALS

.1 Submit in accordance with Section 01 77 00 – Project Closeout.

.2 Operation and Maintenance Data:

.1 Include in the operation and maintenance manual:

.1 Manufacturer’s operation and maintenance instructions.

.2 Wiring diagrams showing electrical connections.

.3 Parts catalogue showing a complete list of repair and replacement parts, with cuts and identifying numbers.

.4 Dimensioned as-built drawings.

.5 Recommended cleaning materials and methods.

2 PRODUCTS

2.01 REACH-IN REFRIGERATION UNITS

.1 Refrigerators and freezer, reach-in:

.1 Basis of Design: Frigidaire FFET1022UV Top Freezer Refrigerator, 24 inch

.2 Overall exterior dimensions: 23.75” W x 26.25” D x 60” H

.3 Colour: Brushed Steel Appearance

.4 Door Swing: Field reversible, install with hinge on left as shown on drawings

.5 Capacity: 10.1 Cu. Ft.

.6 Refrigerant:

.1 Regulatory requirements:

.1 Material: Contains no CFC, HCFC, or HFC listed in Table 4, Schedule 1 of SOR/2016-137.

3 EXECUTION

3.01 INSTALLATION

.1 Install to locations indicated.

.2 Install fittings and equipment in accordance with manufacturer’s instructions.

.3 Coordinate connection of mechanical and electrical services.

.4 Set and adjust units’ level and plumb.

.5 Plug in or connect to electrical outlets and verify units are operational.

.6 Remove protective packing and wrapping materials from interior and exterior of units before activating.

.7 Activate units to confirm correct operation.

.8 Turn refrigerators “ON” to a moderate temperature setting.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

.1 Materials and components for desks, seating and locker storage systems.

.2 NOTE: Furniture within this specification section is not part of base contract. It is to be procured through cash allowance via change order after contract award.

1.2 RELATED SECTIONS

.1 Section 01 33 00 - Submittal Procedures.

.2 Section 11 40 00 Food Service Equipment

1.3 SUBMITTALS

.1 Submit product data in accordance with Section 01 33 00 - Submittal Procedures.

.2 Submit shop drawings of all furniture including dimensions, available and selected finishes, and quantities of each furniture type.

.3 Closeout submittals:

- .1 Submit cleaning/maintenance instructions for furniture and upholstery.
- .2 Supply part numbers of furniture to allow for replacement of worn or damaged furniture parts.
- .3 Supply instructions detailing procedures for repairing or replacing worn furniture parts.

1.4 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for reuse and recycling in accordance with Section 01 74 19 - Construction/Demolition Waste Management And Disposal.

.2 Remove from site and dispose of packaging materials at appropriate recycling facilities.

.3 Collect and separate for disposal paper, plastic, corrugated cardboard packaging material for recycling in accordance with Waste Management Plan.

.4 Fold up metal banding, flatten and place in designated area for recycling.

1.5 WARRANTY

.1 Include manufacturer’s warranty for all furniture supplied.

Part 2 Products

2.1 CHAIRS

.1 C1: Factor Work Chair by Global Furniture

- .1 Model Name: High Back (5540)
- .2 Mesh Back Finish: Factor Mesh Lime Q4
- .3 Seat Textile: Upholstery Grade 05, Cosmopolitan CP16 Mist
- .4 Back Frame and Arm Finish: Cloud IVC IC
- .5 Arm Type: Fixed Height Arms 45U1
- .6 Base Finish: Ivory Cloud B7
- .7 Caster Type: 2.5” Fog Caster for Carpeted Surfaces
- .8 Mechanism Type: Task Basic Swivel
- .9 Cylinder: 5” Range 855G

.2 C2: Drift Chair 8030 by Global Furniture

- .1 Model Name: Side Chair, Four Leg Wood Base (8030)
- .2 Standard Seams
- .3 Back Textile: Upholstery Grade 05, Cosmopolitan CP14 Horizon
- .4 Seat Textile: Same as Back Textile
- .5 Base and Leg Finish: WC Cream WTM
- .6 Glide Type: White, Non-Marking Nylon for Most Surfaces
- .7 Moisture Barrier for Seat: Yes

.3 C3: Enea Altzo943 by Coalesse, Steelcase

- .1 Model: COALT100, Armless, Non upholstered
- .2 Shell Finish: Plastic. Colour: 0015 Sand.
- .3 Frame Finish: Textured paint. Colour: 4054 Sand Textured
- .4 Leg Finish: V3AK Natural Oak

.4 C4: Watson Love Seat, Allseating

- .1 Inner Fabric: Ennis Fabrics, Challenger. Colour: Meadow 21. Cleaning Code: W
- .2 Outer Fabric: Same as Inner Fabric
- .3 Leg Finish: Light Birch

.5 C5: Watson Club Chair, Allseating

- .1 Inner Fabric: Ennis Fabrics, Challenger. Colour: Meadow 21. Cleaning Code: W
- .2 Outer Fabric: Same as Outer Fabric
- .3 Leg Finish: Light Birch

.6 C6: Beso Barstool (for Quiet Pod), Teknion

- .1 Style: Barstool, Sled Base
- .2 Upholstery: Fabric Grade 1. Fabric: Fundamentals, Verde

.3 Glides: Standard Felt Glides

.4 Base Finish: Fundamentals Paint Finishes, Atrium White

2.2 WORKSTATIONS

.1 WS-1: 30”x60” Routes Desk, Teknion

.1 Table Top Material: Teknion Foundation Laminate. Colour: Coastal Elm. Type: High Pressure Laminate

.2 WS-2: 24”x48” Verb, Steelcase

.1 Model: Student Table, Rectangle, VTR2448

.2 Edge Finish: 6213 ACACIA

.3 Leg Finish: Textured Paint, 7243 Seagull

.4 Top Surface: Laminate Finish, 2HAT Acacia HPL

.5 Dock Options: No Dock

.6 Leg Options: Access Leg with locking Casters

2.3 TABLES

.1 T1: Drift Coffee Table

.1 Model: 16”H Square Table, Wood Base, 22”W x 22”D, Flat Edge (8042SQ2216W)

.2 Top Finish: High Pressure Laminate, Colour: Sheer Beauty SBY

.3 Base Finish: WC Cream WTM

.4 Glide: White, Non-Marking Nylon for Most Surfaces

.2 T2: Zones Canteen Table

.1 Model: Soft Square Canteen Table (ZNTCS)

.2 Height: Task

.3 Depth: 48”

.4 Worksurface Finish: Zones Foundation Laminate, Coastal Elm

.5 Edge Trim Style: Flat with Laminates

.6 Leg Wood Finish: Teknion Foundation Laminate, Natural Beech

.7 Edge Trim and Frame Paint Finish: Submit Product Data to select

.3 T3: 48”x20” Wind Table, Global

.1 Model: Rectangular Coffee Table

.2 Top Finish: High Pressure Laminate, Colour: Sheer Beauty SBY

.3 Leg Finish: Designer White

.4 Glide: White, Non-Marking Nylon for Most Surfaces

2.4 LOCKERS

.1 OFGO Workway Lockers.

.1 Size: 3 Tier. Single 3-Tier locker is 12”W x 15”D x 83”H

.2 Configuration: 3-wide or 2-wide as suited to layout on Drawings

.3 Laminate: Golden Oak

.4 Lock: Black Hasp Lock (base price point)

.5 Door Hinge on Left

.6 Accessories: Anchor lockers to wall. Provide metal strapping, fasteners as required to anchor locker to wall, and to one another as per manufacturer's instructions.

2.5 QUIET POD

.1 Teknion TekBooth

.1 Exterior Left: Fascia Laminate

.2 Exterior Right: Fascia Laminate

.3 Exterior Back: Clear Glass

.4 Front: Full Glass Door

.5 Corner Trims: Foundation Paints

.6 Worksurface: Foundation Laminate

.7 Interior Side Walls: Fascia Laminate

.8 Electrical Hardwire Power Kit, Standard Capacity, 1 USB-A & C, 3 Wire, Circuit 1. Refer to electrical drawings and specifications.

2.6 COAT HOOKS

.1 CH-1: Richelieu Utility Coat Rack With 5 Hooks On 23.7- In Black Wooden Plate

Part 3 Execution

3.1 ELECTRICAL COORDINATION

.1 Coordinate with furniture manufacturer to ensure furniture is accompanied by CSA approval stickers. Coordinate with electrical subcontractor to obtain ESA approval for the full system of clip-on modular power attached to the furniture.

END OF SECTION

CANADIAN CUTTING & CORING LIMITED

DAMAGE PREVENTION SERVICES REPORT

RE: Scan slab on grade.

Client: Trent University

Date: 09/10/25

Job Address: Trent University, 1600 West Bank Rd., Peterborough, Ontario

CANADIAN CUTTING AND CORING (TORONTO) LIMITED
77 WARD ROAD, BRAMPTON ON L6S 6A8
TEL: 905-624-1414
WWW.CANCUT.CA

Canadian Cutting and Coring (Toronto) Limited
77 Ward Rd., Brampton, ON L6S 6A8
Phone: 905-624-1414
www.cancut.ca

CORE SCAN

Concrete Scanning & Private Utility Locating

Page _____ of _____
W/O# 73992
Truck# 80
PO# _____

Company Name: Trent University Company Contact: Chris Pollard
Job Location: Trent University, 1600 West Bank Rd., Peterborough, Ontario

Reason for Survey: Locate embedded anomalies in slab on grade.
Description of Work Area: DNA building across hallway near room B107.1 Photographs Taken: ☑
Marking Method: Paint ☐ Marker / Crayon ☐ Stakes / Flags ☐ Colour: Red Other: ☑ Tape
Limitations of Survey: Obstruction/ Limited Space ☑ Undetectable Utilities ☑ Congestion ☐ EM Distortion ☐ Signal Penetration ☐ Access to Utilities ☑ Other: ☐
Recommendations: X-Ray ☐ Hand Dig ☐ Remove/De-Energise Utilities ☐ **NO WORK** ☐ **POST SCAN MEETING** ☐ Other: ☐

NOTE:
- **CONCRETE SCANNING: To avoid damage stay clear by a minimum of _____ measured horizontally on either side of field markings.**
- **PRIVATE LOCATES: To avoid damage Hand Dig by a minimum of 1m (3.28 ft) measured horizontally on either side of field markings.**
- **PUBLIC UTILITIES: Must be marked / cleared by others prior to this survey.**

LEGEND

Limits of Work Area	
Bore Hole / Drill Location	

SURVEY INTERPRETATION

Electrical	– E –
Water Line	– W –
Sewer	– S –
Gas	– G –
Telecom	– T –
CATV	– TV–
Conduit	– C–
Rebar	– R –
Unknown Utility	– ? –
GPR Anomaly	– GPR –
Hand Dig/ No Cut Zone	

SITE FEATURES

Light Standard	
Transformer	
Pedestal	
Valve	
Hydrant	
Manhole	
Catch Basin	
Column	C
Clean Out	
Fence Line	– FL –
Curb Line	– CL –
Wall Line	

Survey Results & Sketch (not to scale)

North

No visible reinforcing detected in the slab.

No, EM detected in the work area.

4” no work zones applied to all vertical obstructions however, this has been somewhat mitigated by scanning past the end of the hallway.

No visible or accessible conduit penetrations in or around the work area to clamp to.

Low-voltage, utilities, empty or abandoned, conduits, DC lines and intermittent power sources may not be located as they are not passively under AC load.

Embedded anomalies inferred to represent utilities are marked in red tape. This anomaly appears to be heading towards an electrical panel in an adjacent hallway. Additional tape was put on the wall in the event that the tape on the carpet disappears.

A cleanout was observed underneath the carpet and marked in red tape as well.

See photos.

For Post Scan Meeting and/ or Clarification of this Report contact the Technician at: _____

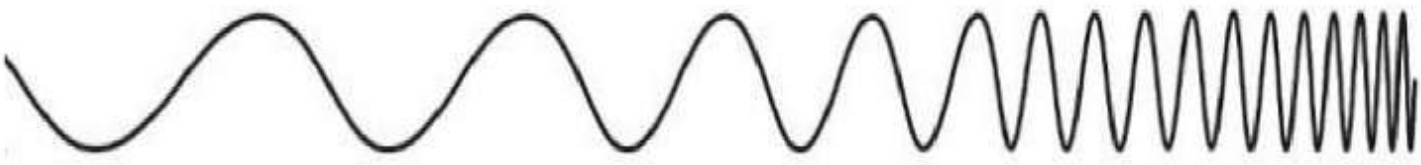
CORE DRILL REPORT **Date** 09/10/25 **Technician** Jason Sagodi **Assistant**

NO. OF HOLES	DIA	WALL	FLOOR	DEPTH	MATERIAL		
						Login: 5:30 AM	Login:
						OnJob: 8:00 AM	OnJob:
						OffJob: 9:00 AM	OffJob:
						LogOut:	LogOut:
						Radar Time Allotment:	hrs
						Core Drill Time Allotment:	hrs

Any subsequent damage to any utilities based on this survey please call 905-624-1414 immediately.

Accepted By (print): _____ **Signature:** _____

SITE PHOTOGRAPHS



TERMS AND CONDITIONS - DAMAGE PREVENTION SERVICES

By Canadian Cutting and Coring (Toronto) Limited (CCC) providing these services, the Customer hereby accepts, agrees to and acknowledges the following statements, terms and limitations on the Services to be provided:

- CCC uses electromagnetic (EM), magnetic, and radiographic (X-Ray) equipment for the purpose of Non-Destructive Testing, Damage Prevention, and Hazard Location to assist in the requests of Customer or Customer's representative(s).
- CCC does not make any express or implied warranty as to the result of these Damage Prevention Services/technologies (Ground Penetrating Radar, EM Utility Locating and X-Ray).
- Survey analysis provided by CCC to the Customer is based on site review/collected data that is inferred, imperfect and incomplete due to the limitations of the technologies used and lack of required documentation (utility drawings and records). As such, CCC will provide advice, but no express or implied warranty, on the probable location of inferred objects/ utilities that may be detected by the technology used by CCC.
- The final determination for the location of any destructive testing or penetration is at the sole discretion of the Customer, not CCC.

GROUND PENETRATING RADAR

Ground Penetrating Radar (GPR) is a form of Non-Destructive Testing used by CCC. GPR can produce false positives and false negatives. Additionally, results can vary when utilizing GPR depending on several factors, including, but not limited to, inadequate working space (e.g. no GPR data can be collected within 6″ of any vertical obstruction for concrete inspection), depth of signal penetration, ambient temperatures, subsurface distribution/geometry, classification/ conductivity and moisture content of subsurface/survey material (concrete ,soils etc.), spatial placement of objects/obstructions within the survey area, such as reinforcing steel, steel mesh, metallic filings, conduits, metal fencing, catch basins, and railway lines among others. Based on the above limitations, Customer is advised, and hereby agrees, to corroborate GPR data with other sources (all records/drawings/utility locates, engineering plans, schematics, building history etc.) before making a determination for the location of any destructive testing or penetrations/ excavation through the material.

X-RAY

The Customer acknowledges that: (a) The Company uses a radioactive isotope for the purpose of Non-Destructive Testing, Damage Prevention and Surveying to assist in the request of the Customer or its representative. This service does not promise or imply that it represents any other than a guide as to the location of buried or embedded objects within the surveyed area of the slab or wall. (b) There may be physical conditions, such as juxtaposition of images in or near the area of interest which may limit or impair the resolution of objects in the area(s) radiographed. The depth of effective penetration for "gamma" radiography in concrete is 22 inches, however, we recommend that the use of radiography be limited to 18 inches in concrete thickness and the Company assumes no liability for damages to objects or services not detected in sections thicker than 18 inches. All markings on tracings or field reports are an interpretation of the images presented on the radiograph and take into account the physical conditions observed at site and any variation in exposure technique required to produce a particular radiograph. In all cases the Customer agrees to observe the 2 inch "NO CUT ZONE" clearly marked around the perimeter of the radiograph and further agrees to position any hole or opening a minimum of 1 inch from any reinforcing component and a minimum of 2 inches from any disclosed services or "post tension cable". Should the Customer or his agent receive engineering approval to cut reinforcing components to allow the progress of the work, the Company shall in no way be liable. (c) It is understood and agreed by the Customer, that the implied positions of all marked objects are for the convenience of the Customer only and does not relieve the Customer or any other person or entity from liability for property damage or personal injury, including death, to any person as a result of the information provided by this survey.

All markings CCC makes as a result of GPR scanning or x-ray imaging represent the inferred center point of the object and do not in any way designate the size of the object. CCC advises Customer against working within the provided tolerance as a result of the service.

EM UTILITY LOCATING

CCC also uses fixed frequency Utility Locating devices which can be severely affected by competing EM fields from sources including, but not limited to, nearby-metal objects, utility/service congestion and electronic equipment. Results from this equipment/technology may be distorted and/or unattainable. Magnetic/Electromagnetic fields which propagate from linear conductors from either passive or active induction, including, but not limited to reinforcing steel bars and nearby services or any linear conductors (fencing, railroad lines etc.), can cause field distortion and lead to false markings and inconclusive results. Direct access to detectable utilities is required with this equipment to generate (or induce) current to flow on specific services and is part of complying with CCC service best practises. As part of the requirements for CCC to complete any Damage Prevention Service it is the responsibility of the customer/ client/ owner to provide all relevant utility information including documentation, records, drawings and direct access to all detectable utilities which may interfere with any subsequent work within the limits of the service provided by CCC.

Customer must locate and mark all services/utilities that are publicly owned and within the work area through an appropriate/approved contractor before CCC commences any Damage Prevention Services.

The inferred/approximate location of all objects detected by any Damage Prevention Service by CCC is for the convenience of the Customer only. Customer defend, indemnify and hold harmless CCC for any property damage or personal injury, including death, to any person arising out of, or relating to, the result of the information provided by CCC.

EXPIRY

The results of all Damage Prevention Services provided by CCC will not be valid and shall expire based on the following:

- 30 days has passed from the day the service was provided.
- Any site markings have been removed or worn away.
- Stakeout/field report has been lost or removed from the job site.
- Stakeout/field report is not available to any personnel completing any destructive/mechanical work within the limits of the original survey area that Damage Prevention Services were provided.
- Scope/limits of work has altered or changed since the completion of any Damage Prevention Service.

HAZARD REPORTING

Please complete hazard reporting card prior to start of each task or change in conditions

WE ARE CANADIAN 1-800-665-0705 TORONTO CUTTING AND CORING

Trent University (Company) | 09/10/25 (Date)

Trent University, 1600 West Bank Rd., (Project) | (Task Location) | 8:00 AM (Time)

Review the following items below and check off only the items which apply to the task. List these tasks and hazards in the first two columns below, and then in the 3rd column identify the plans to eliminate or control them.

Environmental Hazards
- ☐ Spill Potential
- ☐ Weather Conditions
- ☐ MSDS Reviewed
- ☐ Ventilation Required
- ☐ Heat Stress/Cold
- ☐ Other Workers In Area
- ☐ Lighting Too Low
- ☐ Housekeeping

Activity Hazards
- ☐ Energized Equipment In Area
- ☐ Electrical Cords/Tools - Condition
- ☐ Equipment/Tools Inspected
- ☐ Lockout Procedure In Place
- ☐ Airborne Particles
- ☐ All Saws Outfitted/Guards

Ergonomic Hazards
- ☐ Working In Tight Areas
- ☐ Parts Of Body In Line Of Fire
- ☐ Working Above Your Head
- ☐ Pinch Points Identified
- ☐ Repetitive Motion

Work at Height Hazards
- ☐ Barricades, Flagging, Signs
- ☐ Hole Covering In Place
- ☐ Protect From Falling Items
- ☐ Powered Platforms
- ☐ Others Working Overhead/Below
- ☐ Fall Arrest
- ☐ Ladders
- ☐ Scaffold
- ☐ Fall Arrest Rescue Plan

Personal Limitation/Hazards
- ☐ Clear Instructions Provided
- ☐ Trained To Use Tool And Perform Task
- ☐ Distractions In The Work Area
- ☐ Working Alone (Communication)
- ☐ Lift Too Heavy/Awkward Position
- ☐ Physical Limitations

Ensure PPE Requirements
- ☐ Proper Eye Protection
- ☐ Proper Hearing Protection
- ☐ Proper Gloves
- ☐ Heating Protection
- ☐ Respirator
- ☐ (other)_____

Other: _____

It is important that all hazards have plans in place to control them, and that these plans are put in place prior to start of task

Identify the tasks and hazards, then identify the plans to control or eliminate the hazards.

TASK	*HAZARD*	*CONTROL*
Scanning	Slips & trips	Situational awareness
	Physical injury	PPE, proper ergonomics

REPORT ALL UNSAFE CONDITIONS TO YOUR JOB COORDINATOR AND RETURN THESE HAZARD REPORTING CARDS WITH YOUR FIELD REPORTS TO DISPATCH

workers sign: Margot

Job Coord Signature: _____

Review By: _____