SECTION 04 20 00

UNIT MASONRY

PART 1 GENERAL

1.1 SUMMARY

A. Comply with Division 1 – General Requirements

B. Products installed but not necessarily supplied under the work of this Section
   1. Vertical Reinforcing Steel: Section 03 21 00, Reinforcing Steel.
   2. Channels, Angles and Plate Supports: Section 05 50 01, Metal Fabrications (Architectural).
   3. Loose Lintels: Section 05 50 02, Metal Fabrications (Structural).

1.2 REFERENCES

A. Comply with the latest edition of the following statutes, standards and all amendments thereto.
   1. National Building Code 2010 with 2011 Manitoba Amendments (NBC).
   2. ASTM A123 Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
   3. ASTM A240 Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications.
   4. ASTM C126 Standard Specification for Ceramic Glazed Structural Clay Facing Tile, Facing Brick, and Solid Masonry Units.
   5. ASTM C207 Standard Specification for Hydrated Lime for Masonry Purposes
   6. ASTM C212 Standard Specification for Structural Clay Facing Tile
   7. CSA A82 Fired Masonry Brick Made from Clay or Shale
   8. CAN/CSA A165.1 Concrete Block Masonry Units
   9. CAN/CSA A165.3 Prefaced Concrete Masonry Units
   10. CSA A179 Mortar and Grout for Unit Masonry
   11. CAN/CSA A370 Connectors for Masonry
   12. CAN/CSA A371 Masonry Construction for Buildings
   13. CSA A3000 Cementitious Materials Compendium
   14. CSA S304 Design of Masonry Structures

1.3 SUBMITTALS

A. Samples: Two samples of each type of concrete masonry units.

B. Material Supplier Certificate: Obtain in writing that reinforcement and anchors were hot-dip galvanized after fabrication.

C. Material Supplier Certificate: For each delivery to Site, obtain in writing that concrete masonry units have completed curing process and are ready for construction.

D. Manufacturer's Instructions: Two copies for installation of air barrier and insulation

E. Premixed Mortar: Submit certificate that mortar meets specifications.

F. Prior to fabrication of mock-up panel , submit data sheets illustrating materials for joint reinforcement, anchors, mechanical fasteners, expansion/control joint filler, prefabricated control joint and other accessories embedded in masonry and profiles of special masonry shapes.

G. Submit Certification that the connectors meet the requirements of CSA A370.

H. Submit pull-out load test results of drilled in fasteners for adjustable anchor ties fastened to concrete.

1.4 QUALITY ASSURANCE

A. Qualification: Membership in good standing of the Manitoba Masonry Contractor's Association, Industrial, Commercial, Institutional Category. Minimum five years proven satisfactory experience installing masonry on projects of comparable scope and using qualified tradesman.

B. Qualification: Minimum five years proven acceptable experience installing masonry on projects of comparable size and scope and using tradesman trained in the application of air barriers. Prior to commencement of masonry construction submit list of project names, owners, contacts, dates completed and construction costs.

C. Mockups:
   1. Construct sample panel for each type of masonry used at Site.
   2. Dimensions: Minimum 1200 mm high by 1200 mm long, showing range, colour, finishing of joints, reinforcement, anchors, ties, veneer, back-up masonry, dampproof flashing, air barrier, air seal, fillers and insulation.
   3. Mock-up to be fully representative of final installation. Clean mock-up panel and allow to dry thoroughly prior to review.
   4. Leave intact after approval until acceptance of permanent masonry work and then remove.
   5. Approved panels will serve as basis of colour, texture, bond, quality of finished joints, and for acceptance of permanent construction.
   6. Demonstrate proper use of running bond or stacked bond.

D. Efflorescence: Protect masonry construction to prevent efflorescence. Provide measures to prevent moisture from entering incomplete walls.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver masonry materials to job Site in dry condition.

B. Protect materials from damage and soiling.

C. Store materials under waterproof covers held off the ground by timber pallets, planks or other suitable means.

1.6 SITE CONDITIONS

A. Hot and cold weather work: Comply with CAN/CSA A371.

1.7 SEQUENCING AND SCHEDULING

A. Do not commence installation of infill masonry walls until building frame is constructed and permanent bracing and roof and floor diaphragms are in place and concrete of structure has acquired minimum of 75 percent of specified 28 day compressive strength.

B. Do not install insulation and exterior masonry wythe of structures containing liquids until leakage testing of the structure is successfully completed.

PART 2 PRODUCTS

2.1 MATERIALS

A. Concrete Masonry Units: Concrete masonry units (CMU): CAN/CSA A165.1, autoclaved or bubble cured, less than 0.03 percent linear shrinkage, free from defects on exposed surfaces, with edges straight, true to line, exposed faces of same colour and texture: by Permacon Group; Simcoe Block Limited; Richvale York Block Inc.
   1. Concrete Masonry Units: Hollow Type H/15/A/M.
   2. Concrete Masonry Units:
      a. Solid Type S/15/A/M, with 75 percent solid net cross sectional area.
      b. Solid Type S/15/A/M, with 100 percent solid net cross sectional area.
   3. Colour: Natural.

B. Special Shapes:
   1. Special shapes: Bullnose and double bullnose concrete masonry, lintel block and other shapes required.
   2. Supply brick and concrete masonry units including special shapes and sizes required in range of materials specified.

C. Mortar and Grout Materials:
   1. Mortar: CSA A179, Portland cement-lime type.
   2. Masonry Grout: CSA A179.
   3. Aggregates for masonry mortars: CSA A179.
   4. Mortar Colouring: By Elementis Specialties. Colour to later selection
   5. Latex Additive: By Master Builders Technologies Ltd.
   6. Water: Potable, free from deleterious material.
   7. Cement: CSA A3000, Type GU.
   8. Lime: ASTM C207, Type 5 Hydrated lime.

D. Adjustable Anchor Ties: Refer to Section 04 43 00, Stone Masonry Units.

E. Reinforcement and Ties:
   1. Acceptable Manufacturers: Blok-lok Ltd., Hohmann & Barnard Inc., Dur-O-Wall Ltd.
   2. Conform to CAN/CSA A370.

3. Galvanize reinforcement and ties (except where stainless steel is specified): ASTM A123, hot-dip zinc coating after fabrication.
4. Horizontal reinforcement: Extra heavy duty type, 4.8 mm diameter steel wire continuous truss design. Width of reinforcement 50 mm less than nominal width of wall. Factory fabricated corner and 'T' junction pieces as required.

F. Air Barrier and Dampproof Flashing :
1. Refer to Section 04 43 00, Stone Masonry Units.

G. Air Seal:
1. Refer to Section 04 43 00, Stone Masonry Units.

H. Cavity Wall Insulation:
1. Refer to Section 04 43 00, Stone Masonry Units.

I. Accessories:
1. Refer to Section 04 43 00, Stone Masonry Units.

2.2 MORTAR MIXING

A. Mix mortar ingredients of Portland Cement, Hydrated Lime or Lime Putty and aggregate thoroughly by proportion method in such quantities as are immediately required. Do not measure by shovel. Prebagged mortar mixes are acceptable.

B. Do not use mortar unless mixed within 2 hours prior to laying, or is retempered within 2 hours of mixing to replace water lost by evaporation.

C. Use mortar colouring mixed in proportions recommended by Manufacturer.

D. Lay all masonry in Type S mortar, natural colour.

E. Use Type N mortar for coloured mortar.

2.3 GROUT MIXING

A. Mix and use masonry grout type according to CSA A179.

B. Semi-fluid consistency with slump maximum 150 mm: For filling voids in roof parapets and loadbearing courses.

C. Fluid consistency with slump minimum 200 mm: For grouting vertical reinforcement.

D. Type 1 Grout: Fine grout for spaces less than 50 mm in width.

E. Type 2 Grout: Coarse grout for spaces greater than 50 mm in width.

2.4 SOURCE QUALITY CONTROL

A. Concrete block testing: Prior to commencement of masonry construction, have tests carried out by independent testing agency to CAN/CSA A165.
   1. Dimensions.
   2. Compressive strength.
   3. Oven dry mass density and maximum water absorption for linear shrinkage characteristics.

PART 3 EXECUTION

3.1 GENERAL

A. Perform masonry work to CAN/CSA A371 except as specified. Do not use scorched sand, salt or anti-freeze admixtures.

3.2 PLACING OF MASONRY

A. Ensure even distribution of colour and texture in finished face of exposed masonry.

B. Cut masonry units using power saw.

C. At interior concrete masonry walls make external corners bullnosed concrete masonry unit, including door and window jambs and sills. Do not provide bullnosed units in areas where ceramic tile finish is scheduled.
   1. Use plain end units at other openings, unless otherwise shown.
   2. Use plain end units for external corners to receive ceramic tile, or other applied finish.
   3. Use plain end units at external building corners.

D. Line out facing units uniformly true and straight to line. Do not carry up any portion of any wall more than 1200 mm above any other portion.

E. Rack down walls between levels.

F. Terminate masonry partitions within 10 mm of underside of structure or structural support members and fill the gap with control joint filler. Provide mineral wool for fire rated separation. Under structural steel leave 10 mm joint for sealing.

G. Install inserts, anchors and other items supplied under the work of other Sections.

H. Ensure walls to receive ceramic tile on thinset setting bed are plumb within 1:1000.

I. Brace masonry walls as required until permanent lateral support is installed.

J. Where partitions are indicated to be glazed on both sides, lay glazed concrete masonry of two wythes of single glazed units as detailed. Concrete masonry units glazed both sides are not acceptable.

3.3 MASONRY COURSING

A. Concrete masonry unit coursing: One block and one joint, 200 mm in height.

B. Unless otherwise indicated lay concrete masonry units in running bond

C. Lay ledge block masonry units in running bond.

D. To determine layout of bond, set out first course of masonry without mortar. After bond layout is reviewed lay the first course in mortar and proceed with work.

E. In existing masonry where new openings are required, tooth-in masonry into existing masonry. Expose uncut, flat end surfaces at opening.

3.4 INSTALLATION - ANCHORS, REINFORCEMENT AND TIES

A. Spacing: Anchor masonry facing wythe to backing at maximum spacing of:
   1. 800 mm o.c. horizontal.
   2. 600 mm o.c. vertical.
   3. 200 mm vertical from top of facing wythe.
   4. 200 mm horizontal from vertical edge of opening.
   5. 200 mm horizontal from outside edge of outer walls.

B. Align anchors horizontally and vertically, do not stagger.

C. Coordinate veneer anchorage with Section 04 43 00, Stone Masonry Units.

D. Anchor masonry to abutting concrete or masonry walls with adjustable tie-back anchor Type 3.

E. Anchor masonry walls to structural steel members with V-Tie anchors set in 1.61 mm thick AB-Clip welded to steel framing at 400 mm o.c. vertically.

F. Locate horizontal reinforcement in alternate courses from location of tie-back anchors.

G. Cut continuous horizontal masonry reinforcing at control joints. Place horizontal reinforcement continuous around corners and intersections. Lap longitudinal wires by placing side-by-side in mortar joint. Provide minimum lap length of 500 mm. Stagger laps from course to course by minimum 1000 mm.

H. Use solid load bearing masonry under bearing of lintels and structural members 200 mm beyond each end of bearing full height.

I. Reinforce walls where thickness is reduced by a chase by placing reinforcing in every horizontal course, extending not less than 600 mm on both sides of the chase.

3.5 GROUTING VERTICAL REINFORCEMENT

A. Where indicated, place reinforcing bar in centre of core of concrete masonry unit and provide lateral support to hold it firmly in position. Tie reinforcing bar to dowel extending from concrete base prior to placing concrete masonry unit. Reinforcing steel placed not within 50 mm diameter from centre of core will be rejected. Place additional reinforcing steel of equal strength in adjacent void of rejected concrete masonry unit core, at no additional cost.

B. Fill reinforced cores with masonry grout to maximum eight (8) courses in height each lift and at end of days work to 50 mm below top of the last block course, to allow for a key on next lift.

C. Rod or vibrate grout to ensure core is completely filled.

D. Splice vertical reinforcement with laps. Tie upper bar to lower bar using steel wire. Provide lap length of 500 mm minimum. Maintain reinforcing steel tolerance of 50 mm diameter from centre of core for splicing vertical reinforcement.

3.6 JOINT FINISHING

A. Tool joints concave with non-staining pointing tool. Tool joints to compressed, even and smooth surface.

B. Tool vertical joints in ledge block flush. Tool horizontal joints in ledge block concave.

C. Compress joints in profiled concrete masonry units to even surface flush with contour of block faces.

D. Strike joints flush in concrete masonry which is not exposed in finished work.

3.7 CHASES, GROOVES AND BOX-OUTS

A. Determine location and size of openings to be left in masonry for heating, ventilating, plumbing and electrical pipes, ducts, box-outs or other items. Where such openings occur cut masonry with a saw to provide square and clean edges.

B. Leave reglets where required for installation of flashings.

3.8 INSTALLATION - LOOSE STEEL LINTELS

A. Install lintels, angle and plate supports. Centre over opening width. Make minimum bearing width 200 mm. Provide bond breaker on full bearing surface under loose lintels.

3.9 INSTALLATION - PARGING

A. Provide mortar Type S with latex additive, 13 mm thick minimum parge coat where indicated.

3.10 INSTALLATION - CONTROL JOINTS

A. Construct control joints in masonry walls as detailed in following locations:
   1. Where indicated and at 6000 mm o.c. maximum unless shown otherwise.
   2. Where walls abut vertical structural members
   3. Where walls change direction or intersect

3.11 INSTALLATION - EXPANSION JOINTS

A. Construct expansion joints in masonry walls as detailed.

3.12 INSTALLATION - FIRE AND SMOKE SEPARATION

A. Supply and install masonry walls as required to provide fire and smoke separations to minimum fire resistance ratings shown on Drawings. Use materials, construction methods and seals at junction to adjacent surfaces to meet listings for tested assemblies and to acceptance of authorities having jurisdiction.

3.13 FIELD QUALITY CONTROL

A. Mortar testing: During masonry construction have tests carried out by independent testing agency to CSA A179 for compressive strength of job-mixed mortars.
   1. Minimum sampling frequency for each 250 m^2 or portion thereof of back-up CMU block wall and for each 125 m^2 or portion thereof of exterior architectural CMU or brick:
      a. One set at the beginning of masonry construction.
      b. One set if there has been any significant suspension of masonry work.
      c. One set every time there is a change in personnel either mixing or installing.
      d. One set every three months, or more frequently if necessary, to account for seasonal weather changes.
      e. Additional sets at the discretion of the Contract Administrator if there is any concerns as to the quality of mixing the mortar.
   2. If mortar fails to meet 7-day compressive strength requirement, but meets 28-day compressive strength requirement, it is acceptable.
   3. If mortar fails to meet 7-day compressive strength requirement, but its strength at 7 days exceeds two-thirds of the value required for 7-day strength, continue work at own risk while awaiting results of 28-day test or take down work affected.

3.14 CLEANING

A. As work proceeds carefully remove mortar splashes from masonry and adjoining surfaces. After completing each section of wall clean down surfaces and make good pointing where required.

B. Thoroughly clean grout spillage.

C. Clean masonry surfaces with detergent, water and stiff fibre brush in accordance with printed instructions of detergent Manufacturer. Use only products recommended by masonry Manufacturers.

D. Clean sample area of masonry first in a designated location.

3.15 RECONSTRUCTION, ALTERATIONS AND REPAIR

A. Do reconstruction, alterations and repair of existing buildings which form part of work of this Section.

B. Remove broken, cracked and deteriorated masonry and mortar, and replace with new masonry and mortar.

C. Prepare parapets to receive wood coping and metal flashing.

D. Exact number of existing masonry courses to be removed will be determined on Site prior to commencement of work.

E. Cut out and repoint all other existing mortar joints that show signs of deterioration and joint separation. Extent to be determined on Site.

END OF SECTION

SECTION 04 43 00

STONE MASONRY UNITS

PART 1 GENERAL

1.1 SUMMARY

A. Comply with Division 1 – General Requirements.

B. Products installed but not necessarily supplied under the work of this Section:
   1. Channels, Angles and Plate Supports: Section 05 50 01, Metal Fabrications (Architectural).
   2. Loose Lintels: Section 05 50 02, Metal Fabrications (Structural).

1.2 REFERENCES

A. Comply with the latest edition of the following statutes, standards and all amendments thereto.
   1. National Building Code of Canada (NBC).
   2. ASTM A167 Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip
   3. ASTM C126 Standard Specification for Ceramic Glazed Structural Clay Facing Tile, Facing Brick, and Solid Stone Masonry Units.
   4. ASTM C144 Standard Specification for Aggregate for Stone Masonry Mortar
   5. ASTM C207 Standard Specification for Hydrated Lime for Stone Masonry Purposes
   6. CAN/CSA A82.1 Burned Clay Brick (Solid Stone Masonry Units Made From Clay or Shale)
   7. CAN3 A82.2 Methods of Sampling and Testing Brick
   8. CAN/CSA A165.1 Concrete Block Stone Masonry Units
   9. CAN/CSA A165.2 Concrete Brick Stone Masonry Units
   10. CAN/CSA A165.3 Prefaced Concrete Stone Masonry Units
   11. CSA A179 Mortar and Grout for Unit Stone masonry
   12. CAN/CSA A370 Connectors for Stone masonry
   13. CAN/CSA A371 Stone Masonry Construction for Buildings
   14. CAN/CSA G164 Hot Dip Galvanizing of Irregularly Shaped Articles
   15. CAN/ULC S701 Standard for Thermal Insulation, Polystyrene, Boards and Pipe Covering
   16. CAN/ULC S702 Standard for Thermal Insulation Mineral Fibre for Buildings
   17. CGSB 71-GP-24 Adhesive, Flexible, for Bonding Cellular Polystyrene Insulation
   18. CSA A23.4 Precast Concrete – Materials and Construction
   19. CSA A3000 Cementitious Materials Compendium
   20. CSA S304.1 Design of Stone Masonry Structures

1.3 SUBMITTALS

A. Samples: Two samples of each type of Stone masonry units.

B. Test Reports for Brick and Stone Masonry Unit: Submit three copies of test data by independent testing agencies for testing specified under Source Quality Control. Provide a letter of certification from Stone masonry unit Manufacturer stating that the units comply with above standards.

C. Material Supplier Certificate: Obtain in writing that reinforcement and anchors were hot-dip galvanized after fabrication.

D. Material Supplier Certificate: For each delivery to Site, obtain in writing that Stone masonry units have completed curing process and are ready for construction.

E. Manufacturer's Instructions: Two copies for installation of air barrier and insulation

F. Premixed Mortar: Submit certificate that mortar meets specifications.

G. Prior to fabrication of mock-up panel, submit data sheets illustrating materials for joint reinforcement, anchors, mechanical fasteners, expansion/control joint filler, prefabricated control joint and other accessories embedded in Stone masonry and profiles of special Stone masonry shapes.

H. Submit Certification that the connectors meet the requirements of CSA A370.

I. Submit pull-out load test results of drilled in fasteners for adjustable anchor ties fastened to concrete.

1.4 QUALITY ASSURANCE

A. Qualification: Membership in good standing of the Manitoba Stone masonry Contractor's Association, Industrial, Commercial, Institutional Category. Minimum five years proven satisfactory experience installing Stone masonry on projects of comparable scope and using qualified tradesman.

B. Mockups:
   1. Construct sample panel for each type of Stone masonry used at Site.
   2. Dimensions: Minimum 1200 mm high by 1200 mm long, showing range, colour, finishing of joints, reinforcement, anchors, ties, back-up Stone masonry, dampproof flashing, air barrier, air seal, fillers and insulation.
   3. Mock-up to be fully representative of final installation. Clean mock-up panel and allow to dry thoroughly prior to review.
   4. Leave intact after approval until acceptance of permanent Stone masonry work and then remove.
   5. Approved panels will serve as basis of colour, texture, bond, quality of finished joints, and for acceptance of permanent construction.
   6. Demonstrate proper use of running bond or stacked bond.

C. Efflorescence: Protect Stone masonry construction to prevent efflorescence. Provide measures to prevent moisture from entering incomplete walls.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver Stone masonry materials to job site in dry condition.

B. Protect materials from damage and soiling.

C. Store materials under waterproof covers held off the ground by timber pallets, planks or other suitable means.

1.6 SITE CONDITIONS

A. Hot and cold weather work: Comply with CAN/CSA A371

1.7 SEQUENCING AND SCHEDULING

A. Do not commence installation of infill Stone masonry walls until building frame is constructed and permanent bracing and roof and floor diaphragms are in place and concrete of structure has acquired minimum of 75 percent of specified 28 day compressive strength.

B. Do not install insulation and exterior Stone masonry wythe of structures containing liquids until leakage testing of the structure is successfully completed.

PART 2 PRODUCTS

2.1 MATERIALS

A. Acceptable Products: Subject to compliance with requirements of this Section, products that may be incorporated into the Work include, but are not limited to, the products specified. Products by other manufacturers similar in function, design, performance, and construction may be used subjected to Contract Administrator's prior acceptance.

B. Stone, General: Hard, durable, well seasoned and of uniform strength, colour and texture, free of harmful quantities of radiation, or other mineral or organic defects.
   1. Limestone: ASTM C568, smooth face, ashlar course, random lengths and heights, 90 to I 00 mm bed thickness, 200 mm course heights, Tyndall Limestone buff colour by Gillis Quarries Limited.

C. Mortar and Grout Materials:
   1. Mortar: CSA A179, Portland cement-lime type.
   2. Stone masonry Grout: CSA A179.
   3. Aggregates for Stone masonry mortars: ASTM C144.
   4. Mortar Colouring: By Elementis Specialties. Colour to later selection
   5. Latex Additive: By Master Builders Technologies Ltd.
   6. Water: Potable, free from deleterious material.
   7. Cement: CSA A3000, Type GU.
   8. Lime: ASTM C207, Type 5 Hydrated lime.

D. Adjustable Anchor Ties: Fero Corporation
   1. Conform to CSA A370.
   2. Stainless steel: ASTM A167 Type 316.
   3. Adjustable anchor types:
      a. Type 1 (masonry back-up): 1.61 mm thick stainless steel Block Shear connector by Fero Corporation, size to suit Stone masonry and insulation thickness.
      b. Type 2 (concrete back-up): 1.61 mm thick stainless steel Slotted Rap-Tie by Fero Corporation, size to suit insulation thickness.
      c. Type 3 (abutting walls or steel column face): 1.61 mm thick sheet metal, stainless steel, AB-Clip by Fero Corporation.
      d. Veneer Tie: 4.76 mm diameter stainless steel V-Tie by Fero Corporation, length to suit cavity width and veneer.
   4. Adjustable Anchor Tie Fasteners:
      a. Concrete Back-up: Stainless steel drilled in fastener with minimum tensile pull-out design load of 1.4 kN per anchor tie.

E. Reinforcement and Ties:
   1. Acceptable Manufacturers: Blok-lok Ltd., Hohmann & Barnard Inc., Dur-O-Wall Ltd.
   2. Conform to CAN/CSA A370.
   3. Galvanize reinforcement and ties (except where stainless steel is specified): CAN/CSA G164, hot-dip zinc coating after fabrication.
      a. Horizontal reinforcement: Extra heavy duty type, 4.8 mm diameter steel wire continuous truss design. Width of reinforcement 50 mm less than nominal width of wall. Factory fabricated corner and 'T' junction pieces as required.

F. Air Barrier:
      1. Primer: As recommended by Manufacturer of barrier or flashing.
   2. Air Barrier: Perm-A-Barrier by W.R. Grace. Construction Products, Blue Skin SA by Bakor Inc., Colphene 1000 by Soprema Waterproofing Inc. or Air Shield by WR Meadows. Thickness: 1.0 mm thick minimum.

G. Dampproof Flashing: Stainless Steel Dampproofing: Type 304 and as indicated and detailed.

H. Air Seal:
   1. Air Seal at Expansion Joint: Thermofusible membrane of elastomeric bitumen reinforced with polyester mesh, 1.5 mm thick Blue Skin EJ by Bakor Inc., Soprajoint by Soprema Waterproofing Inc. or Air Shield by WR Meadows.
   2. Primer: As recommended by Manufacturer of membrane.

I. Cavity Wall Insulation:
   1. Mineral Wool Insulation: Cavity Rock by Roxul Inc.
   2. Insulation Adhesive: CGSB 71-GP-24, Bakor 230-21 and primer by Bakor Inc.
   3. Insulation Retainer: Polyethylene Insulation retainer by Fero Corporation.

J. Accessories:
   1. Vent Weep-holes: Flexible ultraviolet resistant polypropylene cell vent weep-hole ventilator as manufactured by Dur- O-Wall.
   2. Expansion/Control Joint Filler: Closed cell expanded polyethylene, Kono Bord by Goodco Ltd.

3. Prefabricated Control Joint: As manufactured by Dur- O-Wall.
4. Bond Breaker: 0.15 mm polyethylene.
5. Mortar Dropping Control Device: Mor-control by Dur-O-Wall or Mortar Maze supplied by Form & Build Supply Inc.

2.2 MORTAR MIXING

A. Mix mortar ingredients of Portland Cement, Hydrated Lime or Lime Putty and aggregate thoroughly by proportion method in such quantities as are immediately required. Do not measure by shovel. Prebagged mortar mixes are acceptable.

B. Do not use mortar unless mixed within 2 hours prior to laying, or is retempered within 2 hours of mixing to replace water lost by evaporation.

C. Use mortar colouring mixed in proportions recommended by Manufacturer.

D. Lay all Stone masonry in Type S mortar, natural colour

E. Use Type N mortar for coloured mortar.

2.3 GROUT MIXING

A. Mix and use Stone masonry grout type according to CSA A179.

B. Semi-fluid consistency with slump maximum 150 mm: For filling voids in roof parapets and loadbearing courses.

C. Fluid consistency with slump minimum 200 mm: For grouting vertical reinforcement.

D. Type 1 Grout: Fine grout for spaces less than 50 mm in width.

E. Type 2 Grout: Coarse grout for spaces greater than 50 mm in width.

PART 3 EXECUTION

3.1 INSTALLATION- GENERAL

A. Clean stone by washing with water before laying.

B. Lay heavy stones and projecting stones after mortar in courses below has hardened sufficiently to support weight.

C. Prop and anchor projecting stones until wall above is set.

D. Set large stones on water soaked softwood wedges to support stone in proper alignment until mortar has set. Remove wedges when dry, do not break off, grout holes with matching mortar.

E. Remove mortar droppings and splashings from face of stone before mortar is set. Sponge stone free of mortar along joints as work progresses.

F. Tool joints after initial set has occurred to concave finish.

G. Arrange random coursed ashlar stone pattern so that no vertical joint is higher than highest course height being used, no horizontal joint is more than five stones long and no two stones of same height are placed end to end. End stones I 00 mm long.

3.2 INSTALLATION - DAMPPROOF FLASHING

A. Fully adhere dampproof flashing to horizontal and vertical surfaces. Provide dampproof flashings horizontally as detailed, at concrete ledges, over steel lintels, shelf angles, steel members supporting Stone masonry and at other locations indicated.

B. Lap joints 100 mm minimum and seal with flashing adhesive.

C. Terminate flashing at expansion joints and seal with sealant.

D. Place flashing to present neat, even appearance. Remove excess material projecting more than 5 mm beyond edge of support.

3.3 PLACING OF STONE MASONRY

A. Ensure even distribution of colour and texture in finished face of exposed Stone masonry.

B. Cut Stone masonry units using power saw.

C. Line out facing units uniformly true and straight to line. Do not carry up any portion of any wall more than 1200 mm above any other portion.

D. Rack down walls between levels.

E. Install inserts, anchors and other items supplied under the work of other Sections.

3.4 STONE MASONRY COURSING

A. Lay ledge block Stone masonry units to match coursing at existing buildings.

B. In existing Stone masonry where new openings are required, tooth-in Stone masonry into existing Stone masonry. Expose uncut, flat end surfaces at opening.

3.5 INSTALLATION - ANCHORS, REINFORCEMENT AND TIES

A. Spacing: Anchor Stone masonry facing wythe to backing at maximum spacing of:
   1. 800 mm o.c. horizontal.
   2. 600 mm o.c. vertical.
   3. 200 mm vertical from top of facing wythe.
   4. 200 mm horizontal from vertical edge of opening.

5. 200 mm horizontal from outside edge of outer walls.

B. Align anchors horizontally and vertically, do not stagger.

C. Anchor Stone masonry veneer to Stone masonry backing with adjustable tie-back anchor Type 1.

D. Anchor Stone masonry veneer to concrete backing with adjustable tie back anchor Type 2.

E. Anchor Stone masonry to abutting concrete or Stone masonry walls with adjustable tie-back anchor Type 3.

F. Anchor Stone masonry veneer where cavity is less than 40 mm to concrete or Stone masonry backing with adjustable tie-back anchor Type 3.

G. Anchor Stone masonry walls to structural steel members with V-Tie anchors set in 1.61 mm thick AB-Clip welded to steel framing at 400 mm o.c. vertically.

H. Reinforce and tie single wythe and backing wythe of cavity wall construction veneer with horizontal reinforcement at 400 mm o.c.

I. Locate horizontal reinforcement in alternate courses from location of tie-back anchors.

J. Cut continuous horizontal Stone masonry reinforcing at control joints. Place horizontal reinforcement continuous around corners and intersections. Lap longitudinal wires by placing side-by-side in mortar joint. Provide minimum lap length of 500 mm. Stagger laps from course to course by minimum 1000 mm.

3.6 CAVITY DRAINAGE AND VENTING

A. Provide mortar cove at bottom of cavity, to form seat for dampproof flashing.

B. Install vent-weepholes in vertical mortar joints in top and bottom course at 600 mm o.c. horizontally, on top of flashing at openings and where indicated.

C. Ensure vent-weepholes do not project beyond face of Stone masonry.

D. Keep vent-weepholes free of mortar.

E. Install mortar control dropping devices as per Manufacturer’s recommendations.

F. Keep cavity clean and free of mortar droppings. Inspect each cavity regularly.

3.7 APPLICATION - AIR BARRIER

A. Apply primer and membrane air barrier full surface of concrete Stone masonry walls in accordance with Manufacturer's printed instructions and on the warm-in-winter side of insulation.

B. Ensure that surfaces to receive air barrier membrane and insulation are dry, firm, suitable for bond, and free from loose material, projections or other matter.

C. Ensure a uniform, continuous air barrier. Lap joints in membrane minimum of 50 mm and heat seal.

D. Coordinate the work with adjacent air barrier system.

E. Cut and tightly seal membrane around penetrations and protrusions.

F. Extend air barrier membrane at the peripheries of the installation 150 mm min. and as required to join and seal to air barriers provided in adjacent construction.

G. Extend air barrier membrane not less than 300 mm onto adjacent substrates which are indicated to have no applied air barrier.

3.8 INSTALLATION - AIR SEAL

A. Prime surface and install air seal 300 mm minimum wide, continuously with 50 mm lapped joints. Provide 100 mm wide bond breaker centred over joint.
   1. Fold membrane into expansion joints 25 mm on exterior face of backing wythe, in perimeter walls from bottom edge of insulation below grade to top of roof parapet.
   2. Apply flat over horizontal and vertical construction and control joints on exterior face of backing wythe in perimeter walls. Secure air seal, centred over joint.

B. Overlap air seal minimum100 mm over dampproof flashing.

C. Apply air seal reinforcement at junction with adjacent air barrier system and at changes in plane.

3.9 INSTALLATION - CAVITY WALL INSULATION

A. Locate and install anchors so that insulation is held in place by insulation retainer at each corner of insulation board and at maximum spacing of 800 mm along edges of board.

B. Secure insulation with insulation retainer at each reinforcement tie.

C. Fit each board against adjacent board without gaps. Stagger joints. Fit insulation board neatly around pipes, ducts, obstructions, openings and corners without gaps. Provide a continuous thermal barrier.

D. Install insulation with full contact of board with air barrier or concrete.

E. Provide appropriate protection to maintain integrity of installed insulation until facing materials are in place.

F. Provide firestop to block off concealed spaces within a wall assembly:
   1. at every floor level,

2. at every ceiling level where the ceiling forms part of an assembly required to have a fire-resistance rating, and
3. so that the maximum horizontal dimension is not more than 20 m and the maximum vertical dimension is not more than 3 m.

3.10 INSTALLATION - STEEL FRAMES

A. Maintain frames plumb, square, level and at correct elevation and brace securely in position until adjacent Stone masonry work is completed. For frames over 1200 mm in width, provide vertical support at centre of head.

B. Remove temporary spreaders only after completion of Stone masonry.

C. In non-insulated Stone masonry walls fill jambs of frames with mortar.

3.11 INSTALLATION - LOOSE STEEL LINTELS

A. Install lintels, angle and plate supports. Centre over opening width. Make minimum bearing width 200 mm. Provide bond breaker on full bearing surface under loose lintels.

3.12 INSTALLATION - CONTROL JOINTS

A. Construct control joints in Stone masonry walls as detailed in following locations:
1. Where indicated and at 6000 mm o.c. maximum unless shown otherwise.
2. Where walls abut vertical structural members
3. Where walls change direction or intersect

3.13 INSTALLATION - EXPANSION JOINTS

A. Construct expansion joints in Stone masonry walls as detailed.

3.14 INSTALLATION – BRICK/BLOCK VENTS

A. Install brick/block vents where indicated on Drawings.

3.15 INSTALLATION - FIRE AND SMOKE SEPARATION

A. Supply and install Stone masonry walls as required to provide fire and smoke separations to minimum fire resistance ratings shown on Drawings. Use materials, construction methods and seals at junction to adjacent surfaces to meet listings for tested assemblies and to acceptance of authorities having jurisdiction.

3.16 FIELD QUALITY CONTROL

A. Mortar testing: During Stone masonry construction have tests carried out by independent testing agency to CSA A179 for compressive strength of job-mixed mortars.
1. Minimum sampling frequency for each 500 m^2 or portion thereof of back-up CMU block wall and for each 250 m^2 or portion thereof of exterior architectural CMU or brick:
a. One set at the beginning of Stone masonry construction.

b. One set if there has been any significant suspension of Stone masonry work.
c. One set every time there is a change in personnel either mixing or installing.
d. One set every three months, or more frequently if necessary, to account for seasonal weather changes.
e. Additional sets at the discretion of the Contract Administrator, if there is any concerns as to the quality of mixing the mortar.

2. If mortar fails to meet 7-day compressive strength requirement, but meets 28-day compressive strength requirement, it is acceptable.
3. If mortar fails to meet 7-day compressive strength requirement, but its strength at 7 days exceeds two-thirds of the value required for 7-day strength, continue work at own risk while awaiting results of 28-day test or take down work affected.

3.17 INSTALLATION

A. Clean stone by washing with water before laying.

B. Lay heavy stones and projecting stones after mortar in courses below has hardened sufficiently to support weight.

C. Prop and anchor projecting stones until wall above is set.

D. Set large stones on water soaked softwood wedges to support stone in proper alignment until mortar has set. Remove wedges when dry, do not break off, grout holes with matching mortar.

E. Remove mortar droppings and splashings from face of stone before mortar is set. Sponge stone free of mortar along joints as work progresses.

F. Tool joints after initial set has occurred to concave finish.

G. Arrange random coursed ashlar stone pattern so that no vertical joint is higher than highest course height being used, no horizontal joint is more than five stones long and no two stones of same height are placed end to end. End stones I 00 mm long.

3.18 CLEANING

A. As work proceeds carefully remove mortar splashes from stone masonry and adjoining surfaces. After completing each section of wall clean down surfaces and make good pointing where required.

B. Thoroughly clean grout spillage.

C. Clean stone masonry surfaces with detergent, water and stiff fibre brush in accordance with printed instructions of detergent Manufacturer. Use only products recommended by masonry Manufacturers.

D. Clean sample area of masonry first in a designated location.

3.19 RECONSTRUCTION, ALTERATIONS AND REPAIR

A. Do reconstruction, alterations and repair of existing buildings which form part of work of this Section.

B. Remove broken, cracked and deteriorated stone masonry and mortar, and replace with new unit and mortar. Prepare new parapets to receive new wood coping and metal flashing.

C. Exact number of existing stone masonry courses to be removed will be determined on Site prior to commencement of work.

D. Cut out and repoint all other existing mortar joints that show signs of deterioration and joint separation. Extent to be determined on Site.

END OF SECTION