

**Part 1            General**

**1.1                DELIVERY, STORAGE AND HANDLING**

- .1            Deliver, store and handle materials in accordance with Section 01 61 10 - Product Requirements with manufacturer's written instructions.

**Part 2            Products**

**2.1                NOT USED**

- .1            Not Used.

**Part 3            Execution**

**3.1                REMOVING PAVEMENT MARKINGS**

- .1            Remove rubber tire deposits and paint markings, in areas as directed by Departmental Representative by sand, water, shot blasting, rotary grinding, heater planing or other method approved in writing by Departmental Representative.
- .2            Exercise care to avoid dislodging of coarse aggregate particles, excessive removal of fines, damage to bituminous binder or damage to joint and crack sealers.
- .3            Do not heat pavement surfaces above 120 degrees C, when using heater planing equipment.

**3.2                PAVEMENT SURFACE CLEANING**

- .1            Remove sealing compound which has protruded excessively, where directed by Departmental Representative.
- .2            Use rotary power brooms, vacuum sweepers supplemented by hand brooming.

**3.3                CLEANING**

- .1            Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
  - .1            Leave Work area clean at end of each day.
- .2            Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
- .3            Waste Management: separate waste materials for recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
  - .1            Remove recycling containers and bins from site and dispose of materials at appropriate facility.

**END OF SECTION**

**Part 1           General**

**1.1           REFERENCES**

- .1   British Columbia Ministry of Transportation and Infrastructure, 2012 Standard Specifications for Highway Construction.
  - .1    Exception are those portions with heading "Payment".
- .2   British Columbia Ministry of Transportation and Infrastructure Recognized Product List (RPL).
- .3   British Columbia Ministry of Transportation and Infrastructure Pavement Structure Guidelines, Technical Circular T-01/15.

**1.2           QUALITY ASSURANCE**

- .1   Upon request from Departmental Representative submit manufacturer's test data and certification that asphalt surface treatment material meets requirements of this Section.

**1.3           DELIVERY, STORAGE AND HANDLING**

- .1   Deliver, store and handle materials in accordance with Section 01 61 10 - Product Requirements.
- .2   Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

**Part 2           Products**

**2.1           EQUIPMENT**

- .1   Equipment shall be as specified in 1.1 of this Section.

**2.2           MATERIALS**

- .1   All materials as specified in 1.1 of this Section.
- .2   Pavement Class shall be Class 1, Medium mix.
- .3   Marshall target shall be 2.5% for air voids.
- .4   Anti-strip additive shall be at a rate of not less than 0.5% weight of asphalt.
- .5   Apply an emulsified tack coat and primer.
  - .1    Products used shall conform to the products listed under the Emulsified Penetrating Primer Section of the MoTI's RPL.

**Part 3           Execution**

**3.1           PREPARATION**

- .1   All preparation as specified in 1.1 of this Section.

**3.2 TRAFFIC CONTROL**

- .1 Direct traffic through project with warning signs and flag persons in accordance with Section 01 56 00 - Temporary Barriers and Enclosures.
- .2 Keep traffic off freshly sprayed asphalt.
- .3 Restrict speed of traffic over newly treated areas, to 10 km/h maximum until rolling is completed and asphalt has taken initial set.
- .4 Rolling must be complete before traffic is permitted over newly treated areas.

**3.3 APPLICATION**

- .1 All application as specified in 1.1 of this Section.

**3.4 CLEANING**

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
  - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
- .3 Sweep excess material from entire surface by means of power brooms.

**3.5 MAINTENANCE**

- .1 Maintain treated surface as directed by Departmental Representative for period of [4] days minimum after rolling.
  - .1 Include distribution of aggregate material over surface to absorb free asphalt material.
  - .2 Include covering of areas deficient in aggregate material.
- .2 Ensure embedded material remains stationary during maintenance.

**END OF SECTION**

**Part 1            General**

**1.1                REFERENCES**

- .1        British Columbia Ministry of Transportation and Infrastructure, 2012 Standard Specifications for Highway Construction.
  - .1        Exception are those portions with heading "Payment".
- .2        British Columbia Ministry of Transportation and Infrastructure Recognized Product List (RPL).
- .3        British Columbia Ministry of Transportation and Infrastructure Pavement Structure Guidelines, Technical Circular T-01/15.

**1.2                ADMINISTRATIVE REQUIREMENTS**

- .1        Traffic Control: direct traffic through project with warning signs, flag persons, in accordance with Section 01 56 00 - Temporary Barriers and Enclosures.
  - .1        Keep traffic off freshly sprayed asphalt.
  - .2        Ensure traffic flow by treating one lane at any given time as directed by Departmental Representative.
  - .3        Adjust traffic speed to 10 km/h maximum until rolling is completed and asphalt has taken initial set.
  - .4        Complete rolling before permitting traffic over newly treated areas.

**1.3                QUALITY ASSURANCE**

- .1        Upon request from Departmental Representative submit manufacturer's test data and certification that asphalt surface treatment material meets requirements of this section.

**1.4                DELIVERY, STORAGE AND HANDLING**

- .1        Deliver, store and handle materials in accordance with Section 01 61 10 - Product Requirements and with manufacturer's written instructions.
- .2        Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

**Part 2            Products**

**2.1                EQUIPMENT**

- .1        Equipment shall be as specified in 1.1 of this Section.

**2.2                MATERIALS**

- .1        All materials as specified in 1.1 of this Section.
- .2        Pavement Class shall be Class 1, Medium mix.
- .3        Marshall target shall be for 2.5% air voids.

- .4 Anti-strip additive shall be at a rate of not less than 0.5% weight of asphalt.
- .5 Apply an emulsified tack coat and primer.
  - .1 Products used shall conform to the products listed under the Emulsified Penetrating Primer Section of the MoTI's RPL.

**Part 3 Execution**

**3.1 EXAMINATION**

- .1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for product installation in accordance with manufacturer's written instructions prior to flexible paving surface treatment installation.
  - .1 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
  - .2 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

**3.2 PREPARATION**

- .1 All preparation as specified in 1.1 of this Section.

**3.3 APPLICATION**

- .1 All application as specified in 1.1 of this Section.

**3.4 CLEANING**

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
  - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
- .3 Sweep excess material from entire surface by means of power brooms.

**END OF SECTION**

**Part 1            General**

**1.1                REFERENCES**

- .1        All work, materials and construction to be in accordance with British Columbia Ministry of Transportation and Infrastructure, 2012 Standard Specifications for Highway Construction.
- .2        U.S. Environmental Protection Agency (EPA) / Office of Water
  - .1        EPA 832/R-92-005, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.

**1.2                DELIVERY, STORAGE AND HANDLING**

- .1        Deliver, store and handle materials in accordance with Section 01 61 10 - Product Requirements and with manufacturer's written instructions.
- .2        Storage and Handling Requirements:
  - .1        Store materials in accordance with manufacturer's recommendations and erosion and sedimentation control plan.
  - .2        Replace defective or damaged materials with new.

**Part 2            Products**

**2.1                MATERIALS**

- .1        Granular sub-base material: in accordance with Section 31 05 16 - Aggregate Materials and these specifications.

**Part 3            Execution**

**3.1                COMPACTION**

- .1        Compaction equipment to be capable of obtaining required material densities.
- .2        Compact to density as indicated.
- .3        Shape and roll alternately to obtain smooth, even and uniformly compacted sub-base.
- .4        Apply water as necessary during compaction to obtain specified density.
- .5        In areas not accessible to rolling equipment, compact to specified density with mechanical tampers.
- .6        Correct surface irregularities by loosening and adding or removing material until surface is within specified tolerance.

**3.2                CLEANING**

- .1        Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
  - .1        Leave Work area clean at end of each day.

- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

**3.3 SITE TOLERANCES**

- .1 Finished sub-base surface to be within 10 mm of elevation as indicated but not uniformly high or low.

**3.4 PROTECTION**

- .1 Maintain finished sub-base in condition conforming to this section until succeeding base is constructed, or until granular sub-base is accepted by Departmental Representative.

**END OF SECTION**

**Part 1            General**

**1.1                REFERENCES**

- .1        All work, materials and construction to be in accordance with British Columbia Ministry of Transportation and Infrastructure, 2012 Standard Specifications for Highway Construction.
- .2        U.S. Environmental Protection Agency (EPA) / Office of Water
  - .1        EPA 832/R-92-005, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.

**1.2                ACTION AND INFORMATIONAL SUBMITTALS**

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

**1.3                DELIVERY, STORAGE AND HANDLING**

- .1        Deliver, store and handle materials in accordance with Section 01 61 10 - Product Requirements and 31 05 16 - Aggregate Materials.

**Part 2            Products**

**2.1                MATERIALS**

- .1        Granular base: material in accordance with Section 31 05 16 - Aggregate Materials and these specifications.

**Part 3            Execution**

**3.1                SITE TOLERANCES**

- .1        Finished base surface to be within plus or minus 10 mm of established grade and cross section but not uniformly high or low.

**3.2                PROTECTION**

- .1        Maintain finished base in condition conforming to this Section until succeeding material is applied or until acceptance by Departmental Representative.

**END OF SECTION**

**Part 1            General**

**1.1                REFERENCES**

- .1        British Columbia Ministry of Transportation and Infrastructure, 2012 Standard Specifications for Highway Construction.
- .2        Exception are those ports with heading "Payment".
- .3        British Columbia Ministry of Transportation and Infrastructure Recognized Product List (RPL).

**1.2                QUALITY ASSURANCE**

- .1        Upon request from Departmental Representative, submit manufacturer's test data and certification that asphalt prime material meets requirements of this Section.

**1.3                DELIVERY, STORAGE AND HANDLING**

- .1        Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.
- .2        Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

**Part 2            Products**

**2.1                MATERIALS**

- .1        All materials as specified in 1.1 of this Section.

**2.2                EQUIPMENT**

- .1        Equipment required for Work of this Section to be in satisfactory working condition and maintained for duration of Work.
- .2        Pressure distributor:
  - .1        Designed, equipped, maintained and operated so that asphalt material can be:
    - .1        Maintained at even temperature.
    - .2        Applied uniformly on variable widths of surface up to 5 m.
    - .3        Applied at readily determined and controlled rates from 0.2 to 5.4 L/m<sup>2</sup> with uniform pressure, and with allowable variation from any specified rate not exceeding 0.1 L/m<sup>2</sup>.
    - .4        Distribute in uniform spray without atomization at temperature required.
  - .2        Equipped with meter, registering travel in metres per minute, visibly located to enable truck driver to maintain constant speed required for application at specified rate.
  - .3        Equipped with pump having flow meter graduated in units of 5 L or less per minute passing through nozzles and readily visible to operator. Pump power unit to be independent of truck power unit.

- .4 Equipped with easily read, accurate and sensitive device which registers temperature of liquid in reservoir.
  - .1 Measure temperature to closest whole number.
- .5 Equipped with accurate volume measuring device or calibrated tank.
- .6 Equipped with nozzles of same make and dimensions, adjustable for fan width and orientation.
- .7 Equipped with nozzle spray bar, with operational height adjustment in increments of 0.6 metres and capable of being raised or lowered.
- .8 Cleaned if previously used with incompatible asphalt material.

**Part 3 Execution**

**3.1 EXAMINATION**

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for asphalt tack coat installation in accordance with manufacturer's written instructions.
  - .1 Visually inspect substrate.
  - .2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
  - .3 Proceed with installation only after unacceptable conditions have been remedied.

**3.2 APPLICATION**

- .1 Application shall be as specified in 1.1 of this Section.

**3.3 CLEANING**

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
  - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

**END OF SECTION**

**Part 1            General**

**1.1                REFERENCES**

- .1    British Columbia Ministry of Transportation and Infrastructure, 2012 Standard Specifications for Highway Construction.
- .2    Exception are those ports with heading "Payment".
- .3    British Columbia Ministry of Transportation and Infrastructure Recognized Product List (RPL).

**1.2                QUALITY ASSURANCE**

- .1    Upon request from Departmental Representative, submit manufacturer's test data and certification that asphalt prime material meets requirements of this Section.

**1.3                DELIVERY, STORAGE AND HANDLING**

- .1    Deliver materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.
- .2    Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

**Part 2            Products**

**2.1                MATERIAL**

- .1    All materials as specified in 1.1 of this Section.

**2.2                EQUIPMENT**

- .1    Pressure distributor:
  - .1    Designed, equipped, maintained and operated so that asphalt material can be:
    - .1    Maintained at even temperature.
    - .2    Applied uniformly on variable widths of surface up to 5 m.
    - .3    Applied at controlled rates from 0.2 to 5.4 L/m<sup>2</sup> with uniform pressure, and allowable variation from any specified rate not exceeding 0.1 L/m<sup>2</sup>.
    - .4    Distributed in uniform spray without atomization at temperature required.
  - .2    Equipped with meter registering travel distance in metres per minute, visibly located to enable truck driver to maintain constant speed required for application at specified rate.
  - .3    Equipped with pump having flow meter graduated in units of 5 L or less per minute passing through nozzles and readily visible to operator.
    - .1    Pump power unit to be independent of truck power unit.
  - .4    Equipped with easily read, accurate and sensitive device which registers temperature of liquid in reservoir.

- .1 Temperature to be measured to nearest whole number.
- .5 Equipped with accurate volume measuring device or calibrated tank.
- .6 Equipped with nozzles of same make and dimensions, adjustable for fan width and orientation.
- .7 Equipped with nozzle spray bar, with operational height adjustment in increments of 0.6 metres and capable of being raised or lowered.
- .8 Cleaned if previously used with incompatible asphalt material.
- .2 Aggregate Spreader:
  - .1 Apply blotter sand to primed surfaces using roll type spreader, or rotating disc sander capable of applying aggregate at variable widths and at variable rates.

### **Part 3 Execution**

#### **3.1 EXAMINATION**

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for asphalt prime coat installation in accordance with manufacturer's written instructions.
  - .1 Visually inspect substrate.
  - .2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
  - .3 Proceed with installation only after unacceptable conditions have been remedied.

#### **3.2 APPLICATION**

- .1 Application shall be as specified in 1.1 of this Section.

#### **3.3 USE OF SAND BLOTTER**

- .1 If asphalt prime fails to penetrate within 24 hours, spread sand blotter material in amounts required to absorb excess material.
- .2 Allow sufficient time for excess prime to be absorbed.
- .3 Apply second application of sand blotter as required.
- .4 Do not roll blotter sand.
- .5 Sweep and remove excess blotter material.

#### **3.4 CLEANING**

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
  - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

- .3 Waste Management: separate waste materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
  - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

**END OF SECTION**

**Part 1 General**

**1.1 REFERENCES**

- .1 American Society for Testing and Materials International (ASTM)
  - .1 ASTM C117-04, Standard Test Method for Materials Finer than 0.075 mm (No. 200) Sieve in Mineral Aggregates by Washing.
  - .2 ASTM C136-05, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
  - .3 ASTM D260-86(2001), Standard Specification for Boiled Linseed Oil.
  - .4 ASTM D698-00ae1, Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400ft-lbf/ft<sup>3</sup>) (600 kN-m/m<sup>3</sup>).
- .2 Canadian General Standards Board (CGSB)
  - .1 CAN/CGSB-3.3-99(March 2004), Kerosene, Amend. No. 1, National Standard of Canada.
  - .2 CAN/CGSB-8.1-88, Sieves, Testing, Woven Wire, Inch Series.
- .3 Canadian Standards Association (CSA International)
  - .1 CSA-A23.1-04/A23.2-04, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.

**1.2 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submittals in accordance with Section 01 33 00 – Shop Drawings, Product Data and Samples.

**1.3 DELIVERY, STORAGE AND HANDLING**

- .1 Waste Management and Disposal:
  - .1 Separate waste materials for reuse or recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

**Part 2 Products**

**2.1 MATERIALS**

- .1 Concrete mixes and materials: in accordance with Section 03 30 00 - Cast-in-Place Concrete.
- .2 Reinforcing steel: in accordance with Section 03 20 00 - Concrete Reinforcing.
- .3 Granular base: material to Section 32 11 23 - Aggregate Base Courses.
- .4 Non-staining mineral type form release agent: chemically active release agents containing compounds that react with free lime to provide water-soluble soap.
- .5 Fill material: to Section 31 05 16 - Aggregate Materials.

**Part 3 Execution**

**3.1 GRADE PREPARATION**

- .1 Do grade preparation work in accordance with Section 31 23 33.01 - Excavating, Trenching and Backfilling.
- .2 Construct embankments using excavated material free from organic matter or other objectionable materials.
  - .1 Dispose of surplus and unsuitable excavated material off site.
- .3 When constructing embankment provide for minimum 0.5 m shoulders, where applicable, outside of neat lines of concrete.
- .4 Place fill in maximum 150 mm layers and compact to at least 95% of maximum dry density to ASTM D698.

**3.2 GRANULAR BASE**

- .1 Place granular base material to lines, widths, depths and compaction as indicated.

**3.3 CONCRETE**

- .1 Obtain Departmental Representative's approval of granular base and reinforcing steel prior to placing concrete.
- .2 Do concrete work in accordance with Section 03 30 00 - Cast-in-Place Concrete.
- .3 Immediately after floating, give sidewalk surface uniform broom finish to produce regular corrugations not exceeding 2 mm deep, by drawing broom in direction normal to centre line.
- .4 Provide edging as indicated with 10 mm radius edging tool.

**3.4 TOLERANCES**

- .1 Finish surfaces to within 3 mm in 3 m as measured with 3 m straightedge placed on surface.

**3.5 EXPANSION AND CONTRACTION JOINTS**

- .1 Install tooled transverse contraction joints after floating, when concrete is stiff, but still plastic, at intervals as indicated.
- .2 Install expansion joints as indicated.
- .3 When sidewalk is adjacent to curb, make joints of curb, gutters and sidewalk coincide.

**3.6 ISOLATION JOINTS**

- .1 Install isolation joints around manholes and catch basins and along length adjacent to concrete curbs, catch basins, buildings, or permanent structure.
- .2 Install joint filler in isolation joints as indicated.
- .3 Seal isolation joints with sealant.

**3.7 CURING**

- .1 Cure concrete by adding moisture continuously in accordance with CSA-A23.1/A23.2 to exposed finished surfaces for at least 1 day after placing, or sealing moisture in by curing compound as directed by Departmental Representative.
- .2 Where burlap is used for moist curing, place two prewetted layers on concrete surface and keep continuously wet during curing period.
- .3 Apply curing compound evenly to form continuous film, in accordance with manufacturer's requirements.

**3.8 BACKFILL**

- .1 Allow concrete to cure for 7 days prior to backfilling.
- .2 Backfill to designated elevations with material as directed by Departmental Representative.

**3.9 CLEANING**

- .1 Proceed in accordance with Section 01 74 11 - Cleaning.
- .2 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

**END OF SECTION**

**Part 1           General**

**1.1               REFERENCES**

- .1       British Columbia Ministry of Transportation and Highways, Manual of Standard Traffic Signs and Pavement Markings (September 2000).
- .2       British Columbia Ministry of Transportation and Infrastructure 2012 Standard Specifications for Highway Construction.

**1.2               CLOSEOUT SUBMITTALS**

- .1       Submit in accordance with Section 01 78 30 - Closeout Submittals.

**Part 2           Products**

**2.1               MATERIALS**

- .1       All materials to conform to specifications listed in 1.1.

**Part 3           Execution**

**3.1               EXAMINATION**

- .1       Pavement surface: dry, free from water, frost, ice, dust, oil, grease and other deleterious materials.
- .2       Proceed with Work only after unacceptable conditions have been rectified.

**3.2               EQUIPMENT REQUIREMENTS**

- .1       Paint applicator: approved pressure type mobile with positive shut-off distributor capable of applying paint in single, double and dashed lines and capable of applying marking components uniformly, at rates specified, and to dimensions as indicated.
- .2       Distributor: capable of applying reflective glass beads as overlay on freshly applied paint.

**3.3               APPLICATION**

- .1       Pavement markings: Lay out pavement markings.
- .2       Unless otherwise approved by Departmental Representative, apply paint only when air temperature is above 10 degrees C, wind speed is less than 60 km/h and no rain is forecast within next 4 hours.
- .3       Do not thin paint unless approved by Departmental Representative.
- .4       Symbols and letters to dimensions indicated.
- .5       Paint lines: of uniform colour and density with sharp edges.
- .6       Thoroughly clean distributor tank before refilling with paint of different colour.

**3.4 TOLERANCE**

- .1 Paint markings: within plus or minus 12 mm of dimensions indicated.
- .2 Remove incorrect markings in accordance with Section 32 01 11.01 - Pavement Cleaning and Marking Removal.

**3.5 PROTECTION OF COMPLETED WORK**

- .1 Protect pavement markings until dry.
- .2 Repair damage to adjacent materials caused by pavement marking application.

**END OF SECTION**

**Part 1            General**

**1.1                REFERENCES**

- .1    ASTM International
  - .1    ASTM A53/A53M-10, Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless.
  - .2    ASTM A90/A90M-09, Standard Test Method for Weight of Coating on Iron and Steel Articles with Zinc or Zinc-Alloy Coatings.
  - .3    A653/A653M-10, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
  - .4    ASTM C618-08a, Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Concrete.
  - .5    ASTM F1664-08, Standard Specification for Poly(Vinyl Chloride) (PVC)-Coated Steel Tension Wire Used with Chain-Link Fence.
  - .6    ASTM A123/A123M-09, Standard Specification for Zinc (Hot Dip Galvanized) coatings on Iron and Steel Products.
- .2    CSA International
  - .1    CSA A23.1/A23.2-09, Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.
  - .2    CAN/CSA-A3000-08, Cementitious Materials Compendium.
- .3    Master Painters Institute (MPI)
  - .1    Architectural Painting Specification Manual - current edition.
- .4    U.S. Environmental Protection Agency (EPA) / Office of Water
  - .1    EPA 832/R-92-005, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.

**Part 2            Products**

**2.1                MATERIALS**

- .1    Concrete mixes and materials: in accordance with CSA A23.1 Section 03 30 00 - Cast-in-Place Concrete.
- .2    Chain-link fence fabric: to CAN/CGSB-138.1.
  - .1    Type 1, Class A, minimum 9 AWG with diamond mesh not exceeding 50 mm.
  - .2    Total height of fabric: 3.35 m.
  - .3    Fabric to be buried 0.60 m, with approximately 2.75 exposed above grade.
  - .4    Knuckled sevice on both ends.
- .3    Barbed wire to be 12.5 gauge with 4-point barbs spaced at 150 mm, galvanized.

- .1 Three strands of barbed wire to be stretched tight between terminal posts. It is to be vertical at the gate and end posts and is to be at 45° angle in the line and at the corners.
- .4 Posts, braces and rails: to CAN/CGSB-138.2, galvanized steel pipe.
  - .1 Line posts to be 60.3 mm OD galvanized pipe complete with post tops
  - .2 Terminal posts (end, corner, and gate) to be 88.9 mm OD galvanized pipe, furnished complete with all necessary braces and fittings.
  - .3 Top rail to be 42.2 mm OD galvanized pipe.
- .5 bottom tension wire: to CAN/CGSB-138.2, single strand, 9 gauge galvanized steel wire.
- .6 Tie wire fasteners: steel wire.
- .7 Tension bar: to ASTM A653/A653M, 5 x 20 mm minimum galvanized steel.
- .8 Gates: to CAN/CGSB-138.4.
- .9 Gate frames: to ASTM A53/A53M, galvanized steel pipe, as indicated.
  - .1 Fabricate gates as indicated with electrically welded joints, and hot-dip galvanized or painted with zinc pigmented paint after welding.
  - .2 Fasten fence fabric to gate with twisted selvage at top.
  - .3 Furnish gates with galvanized malleable iron hinges, drop pin latch and latch catch with provision for padlock which can be attached and operated from either side of installed gate. Hinges to permit opening 180° one way (out).
  - .4 Furnish double gates with chain hook to hold gates open and centre rest with drop bolt for closed position.
- .10 Fittings and hardware: to CAN/CGSB-138.2, galvanized steel.
  - .1 Tension bar bands: 3 x 20 mm minimum galvanized steel.
  - .2 Post caps to provide waterproof fit, to fasten securely over posts and to carry top rail.
  - .3 Overhang tops to provide waterproof fit, to hold top rails.
  - .4 Turnbuckles to be drop forged.
  - .5 Provide weatherproof padlock, "ASSA ABLOY".
- .11 Organic zinc rich coating: to CAN/CGSB-1.181.

## 2.2 FINISHES

- .1 Galvanizing:
  - .1 For chain link fabric: to CAN/CGSB-138.1 Grade 2.
  - .2 For pipe: 550 g/m<sup>2</sup> minimum to ASTM A90.
  - .3 For other fittings: to ASTM A123/A123M.

**Part 3 Execution**

**3.1 PREPARATION**

- .1 Grading:
  - .1 Remove debris and correct ground undulations along fence line to obtain smooth uniform gradient between posts.
  - .1 Provide clearance between bottom of fence and ground surface of 30 mm to 50 mm.

**3.2 ERECTION OF FENCE**

- .1 Erect fence along lines as indicated.
- .2 Excavate post holes to dimensions indicated.
- .3 Space line posts to minimum 3.05 m intervals.
- .4 Install end posts at end of fence and at buildings.
  - .1 Install gate posts on both sides of gate openings.
- .5 Place concrete in post holes then embed posts into concrete to depths indicated.
  - .1 Extend concrete 50 mm above ground level and slope to drain away from posts.
  - .2 Brace to hold posts in plumb position and true to alignment and elevation until concrete has set.
- .6 Install fence fabric after concrete has cured, minimum of 5 days or as per manufacturer's instructions.
- .7 Install overhang tops and caps.
- .8 Install top rail between posts and fasten securely to posts and secure waterproof caps and overhang tops.
- .9 Install bottom tension wire, stretch tightly and fasten securely to end, corner, gate and straining posts with turnbuckles and tension bar bands.
- .10 Lay out fence fabric. Stretch tightly to tension recommended by manufacturer and fasten to end, corner, gate and straining posts with tension bar secured to post with tension bar bands spaced at 300 mm intervals.
- .11 Secure fabric to top rails, line posts and bottom tension wire with tie wires at 450 mm intervals.
  - .1 Give tie wires minimum two twists.

**3.3 INSTALLATION OF GATES**

- .1 Install gates in locations as indicated.
- .2 Level ground between gate posts and set gate bottom approximately 40 mm above ground surface.

- .3 Determine position of centre gate rest for double gate.
  - .1 Cast gate rest in concrete as directed.
  - .2 Dome concrete above ground level to shed water.
- .4 Install gate stops where indicated.

**3.4 TOUCH UP**

- .1 Clean damaged surfaces with wire brush removing loose and cracked coatings. Apply two coats of organic zinc-rich paint to damaged areas.
  - .1 Pre-treat damaged surfaces according to manufacturers' instructions for zinc-rich paint.

**END OF SECTION**